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executive summary

Since developing the 2014 Library Master Space Plan (LMSP) the McLaughlin Library has been able to implement many changes. The strong planning principles and priorities outlined in this initial review of the library’s programs, space allocations, priorities, and future needs has allowed all alterations to be strategic and forward looking. Over the past 5 years the largest renovations in the library’s history have been executed within the existing building shell including;

- Level 0 – compact shelving, new student space with carrels, standing height and soft seating, and expanded archival storage.
- Level 1 – Starbucks café, flooring renewal, and new multipurpose rooms
- Level 2 – new Archival and Special Collections space which includes an exhibit space and a reading room, new Scholars Studio (digital scholarship), new Media Studio (student and faculty support), new group meeting rooms, and new Digital Humanities Lab
- General – exterior envelope work to replace all windows, mechanical upgrades, washroom renewals, study carrel replacement, and additional academic seating across 5 floors.
- Multiple projects have contributed to the 2014 goal of reducing the print collection in McLaughlin Library from 1.2M volumes with work ongoing to achieve the ultimate target of 800,000 volumes.

With the intense development the need to confirm, validate, and/or update the assumptions made in the first LMSP became important. The purpose of this study is to determine what space needs and alterations will be essential over the next 5 to 10 years to keep pace with projected growth and maintain the McLaughlin Library as a major asset and resource in the University of Guelph experience.

Figure 1: Space allocation
IDENTIFIED DEFICIENCIES AND MAJOR NEEDS

1. The McLaughlin Library was built in 1968 for 10,000 students and 625,000 volumes. By leveraging the efficiency of space and finding savings in the size of the collection footprint the library currently services over 23,000 students and a targeted 800,000 volumes. It is still well undersized for the current population it serves as the only library on campus.

2. The first floor of the library should provide an inspiring, welcoming, and inclusive environment. The layout should consolidate the library’s key services in a way that is easy to comprehend and navigate with heightened attention to accessibility. Much of this floor is currently occupied by offices that should be relocated.

3. The current entry is undersized and a pinch point that is very difficult to navigate at class change as well as being a challenge for accessible travel. Seasonal control of temperature levels for front desk staff just inside the entry is not possible with the current configuration while salt and snow clean up is very difficult. Safety conditions should be improved as the exit flows directly to a ramp that is busy with vehicular and pedestrian traffic.

4. Partners and Programming Spaces – there is no room for expansion without jeopardizing other critical space demands. This includes the Student Accessibility Services Exam Center, THINC Lab, and the BRDC. This limits the library’s ability to foster cross disciplinary research and collaboration. With programming space being hard to book especially at peak usage, programming can be compromised.

5. 60% of Study Space on campus is within the McLaughlin Library. The library only meets 43.7% of Council of Ontario Universities (COU) Norms for Study Space. U of G campus wide is at 49.6% of COU Norms. When analysed by general seat counts available, 20% of FTE is a reasonable target for a semi-residential school. 20% of 24,000 = 4,800 seats which is not achievable in the current building shell. Approximately 3,800 seats are achievable by the year 2020 in the current building.

6. Staff Spaces need to be distributed through the building to maximize workflows, 1st floor ‘public service’ connections, to create efficient space use, and ensure appropriate co-location of teams.

7. Provide a dedicated Graduate Space with more amenities and better availability that serves more students than current graduate spaces (carrels and limited quantity of assignable rooms)
IMPLEMENTATION STRATEGY

The McLaughlin Library is the sole library on the University of Guelph main campus. A full shutdown is not feasible and most major construction typically is scheduled to occur over the summer period when the majority of students are off campus. The typical funding sources also dictate that only a phased approach to renovations is feasible. In the next 5 to 10 years there may be many fluid factors that will need to be taken in to account when determining the sequence of the priorities below. The priorities have been given a number and suggested order but when it comes to execution sequencing may be vastly different than what has been outlined below. When a priority is dependent on another in whole or in part a note is added to this effect and design development will have to allow for this. Likewise priorities as listed below may be broken into smaller projects and phases as required for implementation. Please note that collection organization and weeding is currently underway and will be an ongoing focus in order to enable many of the described priorities below.

INTERIM

Priority 1: Transform Main Entry Level

In the intermediate term, improving the campus pedestrian approach is very important as the entry was not built or situated to handle the volume of visits it currently does. It is imperative to remove the tight turn on the current accessible entry and create a main entry that can function well in extreme weather when there is high use. Removing the entrance from being contiguous to the ramp that vehicles circulate on adds a necessary measure of safety.

- Construct a new main fully accessible entrance on the north façade to Winegard Walk with generous vestibule.
- Employ heat curtains, appropriate layout, and door configurations as required to create a modern, energy efficient entry that allows interior spaces to have appropriate climate control.
- Establish flooring and drainage at entry to mitigate water and salt entering building in peak seasonal weather.
- Move the existing welcome desk (that has been built to easily accomplish this) to have a direct sightline from the entry.
- Create appropriate accessible landscaping as setting to the new entry from Winegard Walk.
- Existing main entry could be used as after hours entry once this priority is executed.

Transform entry into McLaughlin Library from pinched, difficult to navigate, and undersized to one that is accessible, welcoming and iconic.
Priority 2: Transform Main Floor and Staff Spaces

This priority is independent of creating a new entry but would work well in tandem with it.

- Decant first floor staff that aren’t deemed critical to front line user services. Relocate staff from existing ‘bunker’ (poured concrete area by existing entry) and behind oak walls as detailed in the proposed design. The larger staff alterations are linked with taking over the 2nd floor computer pool area and moving some employees to room 019.

- Remove the appropriate portion of the oak wall opening up daylight and vistas through the building.

- Construct a Learning Commons, new staff areas, consultation rooms, and meeting rooms within the first floor to bring widely used services and their related staff to public areas. Acoustic control, visual connections, and access to daylight will be important when developing the design.

- Rework surrounding seating and gain a small amount of student space.

- Create efficient, quality staff spaces through team co-location and alignment with COU Space allocations. Maximize daylight into staff spaces.

Priority 3: Provide Graduate Only Space (Level 6)

Removal of single user assigned rooms by semester and creation of a space designed for grad students will provide much needed study space. Removal of current individual graduate offices will allow access to more daylight and exterior views from the current building shell. This project will have two phases to allow the library to assess what the most desired attributes are and to cater to the actual usage.

- Address the needs of graduate students by creating an access controlled dedicated space on Level 6.

- Provide lockers, variety of seating, and bookable group study rooms within the new space.

- Remove second and third floor closed offices to expose exterior windows and expand user seating.

Enhance User Experience by creating an easy to navigate, inclusive, and welcoming first floor.

Showcase vibrancy of programs the library offers.

Offer upgraded amenities to graduates in a dedicated students’ space while reclaiming inefficient underutilized space currently offered in individually booked offices.

Executive Summary
Priority 4: Transform Levels 3 - 5
Subsequent work will address the remaining floors for interior renovation and capitalize on decreasing the collection to 800,000 volumes.

- Continue with removal of second and third floor closed offices to expose exterior windows and expand user seating. *Linked to Priority 3 - Providing Graduate Only Space
- Reclaim Student Accessibility Services (SAS) Exam Space and use for library programming or expanded seating. *Linked to Priority 5 - The Addition unless another space is found outside of the library
- Once the collection is relocated, take double height spaces on Level 5 for new student seating areas. Take the remaining space on Level 4 for student seating when space becomes available.

LONG TERM
Priority 5: Construct a Four-Storey Addition.

- The building addition will provide high quality student space and is required to meet the targeted seating levels of 20% FTE.
- Washroom deficiencies on levels 2 and 3 along with gender neutral washrooms would be resolved in the addition.
- The entry and main floor experience will be fully resolved with the addition.
- Programming and partnerships now unable to grow due to limited space and fully booked rooms will have additional rooms and space to use to foster additional offerings and collaboration.
- An updated façade to a beautiful brutalist building will allow more daylight and great spaces to inject the existing shell with life.
- 2nd level will have space dedicated to an institutional priority (SAS Exam Center or other) that aligns with the library’s program and is easy to find.
- Increase area dedicated to Food Service at the library’s entry. Hospitality services may expand seating and service points as it is currently often lined up and seating is used to capacity. Addition allows for reorientation of counter and back of house with expanded seating configured for a better flow.
2014-2018 to Current (262,133 GSF)
Existing Building

Collection: 1.2M (Currently Reducing)
Total Seats: From 1,887 (2006) to 3,571
New Archival and Special Collections Space
Development of the Scholars Studio for Digital Scholarship
New Cafe
Compact Shelving Introduced on Lower Level

FTE: 22,529 (2018)

~ 5 Years Interim (262,133 GSF)
Existing Building

Collections: 800,000, Upper Floors to Increase Seats
Total Seats: 3,800 goal
Dedicated Grad Space
Main Floor Revitalized
Provide Needed Washrooms
New Front Entry
Maximize Study Space

FTE: 23,000 Projected

~ 10 Years Long Term (304,211 GSF)
Addition

Collections: Assume it holds at 800,000
Total Seats: 4,800 goal
Adequate Programme and Partner Space
Enlarged Cafe
Provide Needed Washrooms
New Front Door and Landscaped Courtyard
Institutional Priority (7,700 SF)

FTE: 24,000 Projected

Figure 2: Summary of Changes
### Current: 3,571 Seats

#### Level 1:
- Create New Entrance + Extended Hours Zone / Feature Space
- Relocate Circ & Ask Us With New Desk
- Create New Main Entrance, Convert Exi. To Extended Hours
- Renovate Circ, Bunker W/ Las Offices / Workroom
- Provide Operable Partition, Storage, Wcs Display Area To Enable Extended Hours & Feature Space

#### Level 2:
- Staff Re-Configure (C&C)
  - Remove Open Study On East Side
  - Renovate & Relocate C&C Clusters On To Level 2

#### Level 2: Decant Exam Centre
- Relocate & Expand Exam Centre Off Site
- Fit Out Space For Flexible Program (Multipurpose / Mtg)

#### Level 0: RM 019 Refresh
- Reconfigure Staff Areas

#### Level 3, 4 & 5: Seating Expansion
- Reduction of Book Stacks (3,820 SF+ 2,850 SF)
- Renovate Remaining Levels (Open Seating, Group Rms, W/C)

#### Level 6:
- Create Graduate Space
  - Demolish 18 Closed Offices + Construct 3
  - Close Off Open Stairs To 5th Flr Add Card Access
  - Enclose Balcony W/ Glass Over 5th Floor North
  - Install Lockers Outside Doors & Complete FFE
  - Convert 30 Grad Offices To Group Rm

### Interim Plan

#### Level 1:
- Create New Entrance + Extended Hours Zone / Feature Space
- Relocate Circ & Ask Us With New Desk
- Create New Main Entrance, Convert Exi. To Extended Hours
- Renovate Circ, Bunker W/ Las Offices / Workroom
- Provide Operable Partition, Storage, Wcs Display Area To Enable Extended Hours & Feature Space

#### Level 2:
- Staff Re-Configure (C&C)
  - Remove Open Study On East Side
  - Renovate & Relocate C&C Clusters On To Level 2

#### Level 2: Decant Exam Centre
- Relocate & Expand Exam Centre Off Site
- Fit Out Space For Flexible Program (Multipurpose / Mtg)

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- Reduction of Book Stacks (3,820 SF+ 2,850 SF)
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  - Demolish 18 Closed Offices + Construct 3
  - Close Off Open Stairs To 5th Flr Add Card Access
  - Enclose Balcony W/ Glass Over 5th Floor North
  - Install Lockers Outside Doors & Complete FFE
  - Convert 30 Grad Offices To Group Rm

**Figure 3: Phasing diagram**
INTERIM PLAN

- LEVEL 1: TRANSFORM MAIN FLOOR & STAFF SPACES
  - TAKE DOWN OAK WALL & PROVIDE PRINT STATIONS
  - CONSTRUCT LEARNING COMMONS & STAFF AREAS
  - CREATE NEW MEETING AREAS & SUPPORT SPACE
  - RENOVATE 1ST FLR W/ OPEN SEATING + COMPUTERS
  - FIT OUT SPACE FOR FLEXIBLE PROGRAM (MULTIPURPOSE / MTG)

+169 SEAT GAIN

LONG TERM PLAN

- SITE WORK & ENHANCE LANDSCAPE
- CONSTRUCT 42,078 SF ADDITION
  - PREPARE FOR ADDITION (DEMO SELECT EX. WALLS)
    - LEVEL 0: M&E
    - LEVEL 1: PUBLIC SEATING & CAFE EXPANSION
    - LEVEL 2: INSTITUTIONAL PRIORITY & P.S.
    - LEVEL 3: PUBLIC SEATING & PROGRAM RMS.
    - LEVEL 4: PUBLIC SEATING & MECHANICAL
    - LEVEL 5: MECHANICAL

FIT OUT FOR INSTITUTIONAL PRIORITY

PUBLIC SEATING EXPANSION (17,670 SF)

+861 SEAT GAIN

+261
+112
+297
+192

+485 SEAT GAIN

TARGET: 3,800 SEATS

TARGET: 4,800 SEATS
Figure 4: Site Plan
1.0 introduction

The McLaughlin Library has been an important landmark on the University of Guelph campus since its construction in 1968. The building is designed in the brutalist form by Macklin Hancock and Joseph Luis Sert, a notable architect of the time. It is an important and prominent building to the cultural fabric of the campus, as well in function to the students, faculty, and staff. Since the original plan the University’s enrollment has increased from the anticipated 10,000 students to approximately 23,000 students on the main campus. Daily the library can see up to 13,000 students at peak periods resulting in 1.5 to 2 million visits a year. The collection space designed for 625,000 volumes evolved into a reality of 1.2 million volumes. It is currently being worked down to 800,000 with a new distribution within the building and the Annex off site storage facility. Consistent with the context of the first review the library is a critical space to provide cross-disciplinary research and intellectual exchange as well as supporting active learning opportunities with its variety of services. It becomes evident quickly that despite efforts on maximizing seating and reducing collection footprint the current building remains undersized for the FTE student population. It can’t meet the demands as they currently stand as the only library on campus.

Since the first study of the library space and program which resulted in the Library Master Space Plan (LMSP) of 2014, several impactful projects have been realized. The purpose of this refresh is to evaluate the success and impact of these alterations. From this analysis we can generate updated interim and long term goals on the 5 to 10 year timeline. This study is in alignment with the most recent Campus Master Plan 2012 where the McLaughlin Library was identified as a building worth investing in for the campus core.

Changes accomplished since the first LMSP could be planned with confidence as a strong roadmap had been charted to follow. All projects took place within the existing building shell and include:

- Level 0 – compact shelving
- Level 0 – new student space with carrels, standing height and soft seating, and expanded archival storage.
- Level 1 – Starbucks café, flooring renewal, and new multipurpose rooms at the northwest corner.
- Level 2 – new Archival and Special Collections space which includes an exhibit space and a reading room along with a new Scholars Studio (digital scholarship).
– Level 2 - new Media Studio (student and faculty support)
– Level 2 - group meeting rooms and multipurpose space for Library Partners (THINC Lab) / Digital Humanities Lab
– General – exterior envelope work to replace all windows, mechanical HVAC upgrades, washroom renewals, study carrel replacement, and additional academic seating across 5 floors. Multiple projects have contributed to achieving the 2014 goal of reducing the print collection in McLaughlin Library from 1.2M volumes with the end target of 800,000 volumes still in the works.

1. CONTEXT
The McLaughlin Library is situated at the busy intersection of two major pedestrian spines on the University of Guelph’s main campus. Given the central location, the programs, and spaces it is (and will continue to be) the campus academic hub for study space, collaboration, research, and scholarship.

This study sets out some refined priorities for the next 5 to 10 years. In some cases more detail has been delivered as the priority is more definable or has had more engagement surrounding it. In others the priority has been slightly transformed by influencing factors. The first LMSP primarily focused on student study space, seating counts, and appropriate collection management. At the time student study space was a reoccurring complaint from students and an undeniable deficiency. It was consistently identified as a problem in surveys and specifically mentioned as a negative in the MacLean’s University ratings, making the detrimental effect on the student experience at the University of Guelph very evident. With the gains made in both of these areas directed by the 2014 LMSP more attention can be given to the other priorities. This document is meant to capture the future 5 to 10 years with as much forward looking analysis as possible with parameters to guide future changes.

Study Space and Seating
Since the first LMSP student space has grown in other buildings on campus through new builds and renovations. The library now houses 60% of all study space across campus which is down from the previous 93% of 2014. In 2014 we were at 46.5% of campus study space according to COU norms and now we are at 49.6%. COU now tracks study spaces specific to the library and sets a level to achieve (new since 2014) and the McLaughlin Library sits at 43.7% of the COU Norm.
When this aspect was examined again it was determined that 20% of Full-Time Equivalent (FTE) for the University of Guelph as a semi-residential school was still valid. This determination was supported by reviews of the current level at almost 16% of our FTE. It is recognized as a vast improvement but still isn’t quite enough to meet demand.

Breaking study space down further into seating counts and examining progress allows us to strategically allocate additional space from the reduction of collection volumes. There have been great gains in reducing the footprint or percentage of space that the collection occupies resulting in strong progress on this aspect. The past, present, and future snapshot of seating counts are as follows.

- **2014** (original LMSP completed) – 20% of FTE targeting for seating counts at approximately 4,320 seats.
- **2019** – 5 years of adding seating with big gains from the compact shelving and additional academic seating achieves seating count of 3,571 which is almost 16% of 22,529 (FTE for 2017/18)
- **By 2020** without a building addition a projected maximum of 3,800 seats would be achievable.
- **Beyond 2020** – with a modest projected growth to 24,000 FTE a 20% target of 4,800 seats would be easily achievable.

**Main Planning Priorities and Factors**

The following priorities and factors have been identified as key items for analysis and to factor findings into the design recommendations;

- Noise zoning
- Integrate washroom capacity study
- Main floor program & experience
- Review current status of collection & possibility of reclaiming space
- Graduate space review
- New entry
- Staff teams, user services, or programming. Related to main floor program and experience
- Address lack of visibility and difficulty to find and cohesiveness of the library’s key areas and offerings
### Area Summary By Phase

<table>
<thead>
<tr>
<th>Area Summary By Phase</th>
<th>Current</th>
<th>Interim</th>
<th>Addition</th>
<th>Change</th>
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<tr>
<td>Total Volumes</td>
<td>891,990</td>
<td>752,108</td>
<td>752,108</td>
<td>-139,882</td>
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<tr>
<td>Total Staff</td>
<td>112</td>
<td>112</td>
<td>112</td>
<td>0</td>
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<tr>
<td>total Seats</td>
<td>3,571</td>
<td>4,073</td>
<td>5,198</td>
<td>1,627</td>
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<table>
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<tr>
<th>No.</th>
<th>Seats</th>
<th>Net SF</th>
<th>Net SF</th>
<th>Net SF</th>
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<td>3,571</td>
<td>178,626</td>
<td>584,917</td>
<td>692,124</td>
<td>-139,882</td>
</tr>
</tbody>
</table>

1. **PUBLIC SEATING**
   - 60,561
   - 67,605
   - 86,990

2. **LIBRARY COLLECTION SPACE**
   - 33,504
   - 23,630
   - 23,630

3. **ARCHIVAL COLLECTION & OFFICES**
   - 14,585
   - 14,585
   - 14,585

4. **PROGRAM ROOMS**
   - 12,518
   - 10,253
   - 18,950

5. **STAFF MEETING ROOM**
   - 2,680
   - 3,705
   - 3,705

6. **LIBRARY SERVICES**
   - 1,850
   - 2,000
   - 2,000

7. **STAFF SPACE**
   - 13,583
   - 13,711
   - 13,711

8. **GRAD OFFICES**
   - 899
   - 5,155
   - 5,155

9. **LIBRARY PARTNERS**
   - 6,125
   - 3,875
   - 5,925

10. **M/E/Washrooms / Storage**
    - 18,110
    - 20,375
    - 25,240

    Circulation / Unassigned

| Total GFA + Basement | 262,133 | 262,133 | 304,211 |

* Support Spaces in Core areas includes: elevators, stairs, M&E, custodial and washrooms

** Staff spaces based on net area breakdown

### Table 1: Programme summary

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<thead>
<tr>
<th>7 STAFF SPACE</th>
<th>Sub-total</th>
<th>Total Staff</th>
<th>Sub-total (SF)</th>
<th>Net Area (SF)</th>
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<tbody>
<tr>
<td>Total</td>
<td>112</td>
<td>13,711</td>
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<tr>
<td>L&amp;C: Learning &amp; Curriculum Services</td>
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<td>2,766</td>
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<tr>
<td>Group 1: Leadership</td>
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<td>387</td>
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<tr>
<td>Group 2: Information Literacy</td>
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<td>Group 3: Learning Services</td>
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<td>Group 4: Writing Services</td>
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<td>Group 5: SLG</td>
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<td>Workroom (Part Time / Peer Support)</td>
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<td>A&amp;S: Archival &amp; Special Collections</td>
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<td>837</td>
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<td></td>
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<td>R&amp;S: Researching &amp; Scholarship</td>
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<td>C&amp;C: Collection &amp; Content</td>
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<td>Group 1: Acting Head + C&amp;C Librarians</td>
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<td>Group 2: E-Learning &amp; Reserves</td>
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<td>Group 3: E-Resources &amp; Metadata</td>
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<td>Group 2: Acquisitions</td>
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<tr>
<td>Group 3: TUG Annex / Collections Maintenance</td>
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<tr>
<td>D&amp;A: Discovery &amp; Access</td>
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<td>3,416</td>
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<tr>
<td>AS: Access Services</td>
<td>11</td>
<td>2,200</td>
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<td></td>
</tr>
<tr>
<td>UX: User Experience</td>
<td>2</td>
<td>258</td>
<td></td>
<td></td>
</tr>
<tr>
<td>LAS: Library Accessibility Services</td>
<td>2</td>
<td>958</td>
<td></td>
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<tr>
<td>20-25 Student Staff</td>
<td></td>
<td></td>
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<td></td>
</tr>
<tr>
<td>ADMIN: Administration</td>
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<tr>
<td>Group 1: Senior Leadership</td>
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<td>850</td>
<td></td>
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<td>Group 2: Manager Finance</td>
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<td>Group 3a: Communications</td>
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<td>Group 3b: Web &amp; IT Systems</td>
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<td>FAC: Facilities</td>
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</tr>
</tbody>
</table>

### Table 2: Staff summary
2. GUIDING PRINCIPLES

The following are success criteria which build and expand upon the original goals of the LMSP:

- **Effective utilization of space** – ensure that space is used to meet the mission of the library, i.e. limit storage, dead spaces, wasted space, etc.

- **Efficient use of space** – ensure that space is utilized by as many patrons for as long as possible. Unused spaces sitting dark do not benefit users.

- **Maximize the use of natural light** – for the benefit of all users, ensure the maximum penetration of natural light into all areas (where appropriate).

- **Maintain flexibility** – minimize expensive, rigid installations that cannot be easily changed.

- **Leverage Fiscal Resources** – investments in changes must be considered with forethought to immediate costs in the scheme of the LSMP.

- **Implement CPTED** (Crime Prevention Through Environmental Design) – see [http://cptedontario.ca/mission/what-is-cpted/](http://cptedontario.ca/mission/what-is-cpted/). An example would be the use of glazing on office doors or in the use of sidelights.

- **Create a cohesive well designed environment** – utilize library colours and standard material palette as per established principles created by Physical Resources. Bright areas of colour and oak honey stained on wood being primary elements. Maintain historical brutalist influences and respect original elements where possible.

- **Establish staff space that support wellness** – prioritize with floor and team based adjacencies to create a thoughtful layout and a design that supports wellness in existing building.
Figure 6: Benchmarking comparison
1. BENCHMARKING

The benchmarking research for this LMSP focused on a comparison of library space allocation between six Canadian universities including Guelph. While there is a considerable variation between scale, the trends within each of these institutions have been focused around addressing the need for student seating. University of Guelph is most aligned with the University of Calgary and Robarts at University of Toronto in terms of overall statistics with 55%-60% of seating, 20-25% of public collections and 10-20% of staff area. While all libraries tended to maintain collections and public space in equal measures on upper floors, they varied in how they supported various functions.

The previous benchmarking research captured many of the significant trends that have occurred with academic libraries since McLaughlin Library’s inception, these key observations still hold true:

- Public space accounts for the majority of allocated space in the profiled institutions, and remains a priority.
- Reserveable rooms must accommodate various group sizes and activities, with enhanced technology to support increasing instruction taking place in the library.
- As future technology and standards are not predictable, decision variables must consider flexibility with respect to space configuration and technology infrastructure.
- Academic support integrating learning commons offering services such as: a writing center, accessibility services, information technology support and peer-tutor support.
- A separate graduate reading room space is a significant resource and signals a commitment to high academic achievement.
- Alignment of library planning with institutional goals. The importance of feedback and involvement of the user community in planning library changes through interviews, surveys and participatory activities was emphasized by all peers.
2. METHODOLOGY
The LMSP refresh strongly builds on the previous study completed in 2014 to assess the current programme following the work that has been done in the past 5 years. An important first step was to establish a new baseline that took into account the LMSP, recently completed renovations, and to understand meaningful categories of space from which to build future work.

Additionally, the library’s Collections & Content Team provided forward-looking collection management scenarios and status reports of off-site storage facilities (the Annex) maintained with TUG consortium partners.

An emphasis on consulting with the campus community stakeholders regarding wants, needs, and deficiencies they see was also integral to the process.

3. AREAS OF FOCUS
The following have been identified as the focus of the LMSP refresh from the Steering Committee. The various forms of stakeholder engagement have been designed to validate and refine the following considerations:

General:
– Review of staff space and adjacencies
– Support for graduate students
– Collection space and user seating ratios
– First floor experience and determination of program that belongs here.
– Adjacency and workflow

This LSMP does not specifically consider structural and civil engineering work or deferred maintenance issues. The mechanical brief in ‘appendix c’ addresses known maintenance items at a high level such as replacement of water lines throughout the building and the replacement of two primary air handlers.
4. ENGAGEMENT PROCESS

The master space planning process included activities to engage stakeholder groups and campus community representatives, ensuring proposed changes reflected the needs and aspirations of those who use, work in, and encounter the library.

Steering Committee:
- Kelly Bertrand, Director, Administrative Services
- Barbara McDonald, Acting University Librarian
- MJ D’Elia, Acting Associate University Librarian, Academic
- Amanda Etches, Associate University Librarian, Research
- Kirk Sprague, Manager, Library Facility Services
- Jill Vigers, Manager, Architectural of Design, Engineering and Construction, Physical Resources

Focus Group Discussions: Staff

Beginning in November 2018 focus group discussions were conducted to engage staff and grad students focusing on the Level 1 experience and the Level 6 graduate space respectively.

Two separate sessions were planned to address the needs of staff. The objective of the first staff session in November was to gather insights from staff to help update the first floor layout to reflect current realities, user preferences, and future services. Six breakout sessions were used to review and discuss:
- The new entrance to the North
- The provision of a 24-hour space
- Print center / computer lab
- The Academic Town Square
- What is missing? What is not needed?
- Staff functions on Level 1

Building on the first staff session and recognizing first floor displacements the second session focused on the relationships within departmental groups and teams. A detailed questionnaire contributed to some of the major moves in the proposed design.
Figure 7: Staff and student engagement sessions
Other Library Partners who were consulted by the steering committee were:

- Hospitality Retail Services, Executive Director, Ed Townsley
- Graduate Services, AVP Graduate and Post Doctoral Studies, Ben Bradshaw,
- Graduate & Post Doctoral Studies, Director, Pauline Sinclair
- Student Affairs, VP Carrie Chassels
- Student Wellness, Director, Alison Burnett
- Student Accessibility Services (Exam Centre), Manager, Barry Praamsma Townshend

Focus Group Discussions: Graduate Students

The objective of the graduate session in November was to gather insights from graduate students as to what their needs are. The planned sixth floor graduate commons, including furniture, audio-visual, and other infrastructure needs could be refined and updated. The following key issues were explored:

- Current provisions review and what ideal future allocation could be.
- Requirements for controlled access
- Size and distribution of quiet and group study/group study
- Requirements for book lockers
- Furniture needs: carrels/soft seating/tables (adjustable), etc.
- Audio/visual needs (if any)
- Typical usage and how it varies by field of study.

Town Hall Events: Undergrad Students

The objective of the undergrad session was to determine which assumptions of the original LSMP resonated as priorities among the undergrad students. In general, the feedback from the students regarding the completed renovations were very positive. On level 1 many students interviewed agreed that increased seating was a positive and were enthusiastic about an after hours space. The concept of an Academic Town Square was met with a lukewarm reaction especially if it meant taking away from the total seats available on the main floor.
2014-2018

Existing Building

- Collection: 1.2M (Currently Reducing)
- Total Seats: From 1,887 (2006) to 3,571
- A New Archival and Special Collections Space
- Development of the Scholars Studio for Digital Scholarship
- New Cafe
- Compact Shelving Introduced on Lower Level

FTE: 22,529 (2018)

~ 5 Years

Interim (262,133 GSF)

- Collections: 800,000, Upper Floors to Increase Seats
- Total Seats: 3,800 goal
- Dedicated Grad Space
- Main Floor Revitalized
- Provide Needed Washrooms
- New Front Entry
- Maximize Study Space

FTE: 23,000 Projected

~ 10 Years

Long Term (304,211 GSF)

Building Addition

- Collections: Assume it holds at 800,000
- Total Seats: 4,800 goal
- Adequate Programme and Partner Space
- Enlarged Cafe
- Provide Needed Washrooms
- New Front Door and Landscaped Courtyard
- Institutional Priority (7,700 SF)

FTE: 24,000 Projected

Figure 8: Changes summary
4. KEY FINDINGS

Through benchmarking, engagement, and subsequent analysis the following needs have been prioritized and detailed.

- Creating an inclusive, accessible, and inspiring Level 1 experience
- Allowing easy access to frequently used services on Level 1
- Starbucks is only food service offering in the building and is frequently over capacity with long lines during school terms
- Staff space efficiency, collocation, and workflow
- Resolving entry, safety, and accessibility issues
- Increasing student study space and seating counts
- Providing dedicated graduate space in a more efficient manner
- Address space deficiency to grow collaborative and programming space.
- Supplement existing washroom undersized capacities for woman on 2nd and 3rd floors. Provide more opportunities for gender neutral washrooms as they currently only exist on main floor.
Figure 9: Site plan

- New 3 Storey Addition
- Renovate Existing Building
1. PROPOSED DESIGN

Flexibility has been accounted for throughout the proposed design. Multipurpose spaces and areas that provide the potential to be used by many users for longer periods of time have been made the priority. Noise levels are either quiet or conversational and remain the same as existing other than the full east portion of the 2nd floor becoming a conversational zone. A noise buffer will be required at the single elevator to facilitate this. Book stacks will be strategically placed to buffer noise and provide some sound attenuation as applicable.

Collections & Collection Distribution

The goal of 800,000 volumes is still projected to be valid. Library teams will continue to weed, reorganize, and capitalize on the compact shelving of the lower level. 5th floor double height spaces and room on floor 4 will be targeted areas to turn back to student study space and increase seating counts.

Student Study Space and Seating Counts

Study space will be increased by utilizing space freed up by Collections on the 4th and 5th floors as well as space reclaimed by removing the inefficient individually assigned graduate offices. There will be some modest growth from the 1st floor reorganization as well. The University’s target is to accommodate 20% of the FTE student population, which is estimated to be 24,000 by 2024 with a modest growth projection. At 20% the library must accommodate 4,800 seats meaning a building addition will be needed in the long term. In the interim we are able to achieve 16% of FTE of 3,800 seats by maximizing the efficiency space utilization within the existing footprint. Historically 16% has proven to be challenging but workable for students in the short term. Seating will be provided in different configurations and forms in both quiet and conversational settings. Wherever possible it will capitalize on the rich architectural spaces and day lit areas of the building. In the long term plan the North addition will provide open study spaces with daylight, views, and great connections to the rest of the building to ensure study space is not scarce in the Library. It should be noted that on the 5th floor an increased occupancy triggers mechanical ventilation system upgrades which have been accounted for with the building addition.

New Entry

The entry will be moved off of Winegard Walk to the North end of the building to ensure space for a safe and properly sized means of access to the library. The new configuration will remove the safety hazard of
Figure 10: Types of spaces
existing directly on to a ramp that is congested and used by utility vehicles, physical resource trucks, and crowds of people at class changes. An enhanced vestibule will allow control of water, snow, salt, and temperature at the area of the entry. Accessibility will be far improved by using a common entry and making it easy to navigate without any tight 90 degree turns. The setting will have upgraded landscaping and a courtyard to remove the harsh entry and create potential meeting and gathering exterior space as well as affording the opportunity to eventually tie in to the new accessible entry to the Massey Building. The entry and canopy will be designed in a way to highlight the entry to the library and provide an updated identity.

**Zoning Study Spaces**

Upon review the recommendation is to have only two types of zones; quiet and conversational. This is for simplicity sake so that users can easily understand and self-enforce.

**Improved Access to User Services**

All frequently used services will be clustered near the Ask Us desk which is the primary point of contact. The Ask Us desk will be front and center, easily identified and give students an immediate point of connection. From there the other services should be easily seen and navigated with attention paid to accessibility and wayfinding cues. Pops of colour, opening the expanse of the oak wall, more views to outside, and increased daylight alongside the addition of windowed working rooms will showcase the vibrancy of the library’s programs. Staff and support spaces that are not directly connected to frequently used services will be relocated to other areas in the building. Meeting rooms and consultation spaces will be designed to be flexible and support the current volume of interactions.

**Food Service, Starbucks Expansion**

The only food offering, located on the main floor of the library, often has long lines and no available seats. As part of the addition to the library more space will be allocated and the back of house and counter are reoriented to make better connections. The quality of the space will be maintained: bright, open, and vibrant near the entry of the library.

**Staff and Administration Workspaces**

With relocations to create the envisioned 1st floor there will be staff moves from and to level 1. The teams have been looked at taking into account modest projected growth and ideal adjacencies. The proposed design shows teams in new areas that support their size according to COU Norms and allowing for circulation and required amenities. Efficiency is achieved by designing the spaces for the teams and daylit workspaces will be made a priority within the existing building constraints. Room, 019 will have
<table>
<thead>
<tr>
<th>Area Summary By Phase</th>
<th>Current</th>
<th>Intern</th>
<th>Addition</th>
<th>Change</th>
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<tbody>
<tr>
<td>Total Volumes</td>
<td>891,990</td>
<td>752,108</td>
<td>752,108</td>
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<tr>
<td>Total Staff</td>
<td>112</td>
<td>112</td>
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<td>0</td>
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<tr>
<td>Total Seats</td>
<td>3,571</td>
<td>4,073</td>
<td>5,198</td>
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<table>
<thead>
<tr>
<th>No.</th>
<th>Net SF</th>
<th>Net SF</th>
<th>Net SF</th>
<th></th>
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<td>3,571</td>
<td>178,626</td>
<td>584,917</td>
<td>692,124</td>
<td>-139,882</td>
</tr>
</tbody>
</table>

| 1 PUBLIC SEATING                      | 60,561   | 67,605  | 86,990  |
| 2 LIBRARY COLLECTION SPACE           | 33,504   | 23,630  | 23,630  |
| 3 ARCHIVAL COLLECTION & OFFICES      | 14,585   | 14,585  | 14,585  |
| 4 PROGRAM ROOMS                      | 12,518   | 10,253  | 18,950  |
| 5 STAFF MEETING ROOM                 | 2,680    | 3,705   | 3,705   |
| 6 LIBRARY SERVICES **                | 1,850    | 2,000   | 2,000   |
| 7 STAFF SPACE                        | 13,583   | 13,711  | 13,711  |
| 8 GRAD OFFICES                       | 899      | 5,155   | 5,155   |
| 9 LIBRARY PARTNERS                   | 6,125    | 3,875   | 5,925   |
| 10 M/E/Washrooms / Storage           | 18,110   | 20,375  | 25,240  |

| Total GFA + Basement                 | 262,133  | 262,133 | 304,211 |

* Support Spaces in Core areas includes: elevators, stairs, M&E, custodial and washrooms
** Staff spaces based on on net area breakdown

Table 3: Space programme summary

<table>
<thead>
<tr>
<th>7 STAFF SPACE</th>
<th>Sub-Total</th>
<th>Sub-Total</th>
<th>Net Area</th>
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<tbody>
<tr>
<td>Total</td>
<td>112</td>
<td>13,711</td>
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<tr>
<td>L&amp;CS: Learning &amp; Curriculum Services</td>
<td>19</td>
<td>2,766</td>
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<tr>
<td>Group 1: Leadership</td>
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<td>387</td>
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<tr>
<td>Group 2: Information Literacy</td>
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<td>645</td>
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</tr>
<tr>
<td>Group 3: Learning Services</td>
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<td>453</td>
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<tr>
<td>Group 4: Writing Services</td>
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<td>453</td>
<td></td>
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<tr>
<td>Group 5: SLG</td>
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<td>345</td>
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<td>Workroom (Part Time / Peer Support)</td>
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<td>A&amp;SC: Archival &amp; Special Collections</td>
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<td>837</td>
<td></td>
</tr>
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<td>R&amp;S: Researching &amp; Scholarship</td>
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<td>1,483</td>
<td></td>
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<tr>
<td>C&amp;C: Collection &amp; Content</td>
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<td>2,907</td>
<td></td>
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<tr>
<td>Group 1: Acting Head + C&amp;C Librarians</td>
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<td>517</td>
<td></td>
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<tr>
<td>Group 2: E-Learning &amp; Reserves</td>
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<td>463</td>
<td></td>
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<tr>
<td>Group 3: E-Resources &amp; Metadata</td>
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<td>549</td>
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<tr>
<td>Group 2: Acquisitions</td>
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<td>689</td>
<td></td>
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<tr>
<td>Group 3: TUG Annex / Collections Maintance</td>
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<td>689</td>
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<tr>
<td>D&amp;A: Discovery &amp; Access</td>
<td>15</td>
<td>3,416</td>
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<tr>
<td>AS: Access Services</td>
<td>11</td>
<td>2,200</td>
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<tr>
<td>UX: User Experience</td>
<td>2</td>
<td>258</td>
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<tr>
<td>LAS: Library Accessibility Services</td>
<td>2</td>
<td>958</td>
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<tr>
<td>20-25 Student Staff</td>
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<tr>
<td>ADMIN: Administration</td>
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<td></td>
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<tr>
<td>Group 1: Senior Leadership</td>
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<td>850</td>
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<td>Group 2: Manager Finance</td>
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<td>Group 3a: Communications</td>
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<td>269</td>
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<tr>
<td>Group 3b: Web &amp; IT Systems</td>
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<td>579</td>
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<tr>
<td>FAC: Facilities</td>
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<td>302</td>
<td></td>
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</table>

Table 4: Staff summary
additional staff located there because it can absorb increased capacity. Level 2 computer pool area/open study will be used for C & C relocation with the displaced computer pool being spread out on other floors as needed. This work on level 1 will trigger the need to replace 2 existing air handlers in the mechanical penthouse that serve multiple floors.

**After Hours Study Space**

The former concept of a 24-hour study space has been tempered by reality of usage and in the interest of fostering well-being. The new plan proposes a zone that would include seating, the café, and be secure from the balance of the library beyond normal hours. Washroom and exits to be allocated within this area are dependant on whether being integrated into the interim plan or the addition.

**Washroom Capacities**

2nd and 3rd women’s washroom capacity shortfalls are addressed in the long term plan by adding additional washroom facilities. In the interim there is a plan to add gender neutral facilities by the single elevators on 2nd, 3rd, and 4th floors.

**Graduate Commons**

Creating a dedicated electronic-accessed space on the 6th floor for the graduate students allows for a much more efficient use of space. Lockers at the entry will allow for secure storage of items and ease of access. Various forms of seating will be incorporated into the interior spaces the majority of which will be single person study spaces. There will be bookable group study rooms as part of this space. A phased approach was suggested for constructing this to allow an accurate assessment of types of use and needed capacity. This space would allow for the individual offices to be demolished and open the space up for open study allowing more day lit in with more views to the outside.

**Partner, Programming, and Collaboration Space**

Group study spaces have been increased since 2012 and are at an acceptable level but other spaces in this category are at maximum capacity. Programming space is often hard to book and is well used so the interim plan does not allow any decrease in allocated space. Likewise there is no additional space for library partners such as the Exam Center, CFI projects, and the BRDC. In particular the Exam Center is looking to double it’s current size. Within the existing building the library can’t accommodate this request. The BRDC space in the interim plan eventually is needed for staff space as well. In the long term plan the addition allows for expansion of programming and collaboration spaces. The full 2nd floor has been allotted for an institutional priority such as the Exam Center with beautiful views and an easy connection to campus.
Addition GFA: 1600 SF
Level 1 - Proposed

Interim: + 167 Seats
Long Term: + 166 Seats
Total: 987 Seats

Legend

- 1. Public Seating 22,940 SF
- 2. Library Collection 0 SF
- 3. Archives 0 SF
- 4. Program Rooms 1,920 SF
- 5. Staff Meeting Rooms 830 SF
- 6. Library Services 2,000 SF
- 7. Staff Space 7,135 SF
- 8. Grad Offices 0 SF
- 9. Library Partners 3,810 SF
- 10. M&E / WC / Storage 2,325 SF

Addition GFA: 11,000 SF
Legend

<table>
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<tr>
<th>Code</th>
<th>Description</th>
<th>Net Area</th>
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<tbody>
<tr>
<td>1</td>
<td>Public Seating</td>
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<tr>
<td>2</td>
<td>Library Collection</td>
<td>1,615 SF</td>
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<tr>
<td>3</td>
<td>Archives</td>
<td>3,050 SF</td>
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<tr>
<td>4</td>
<td>Program Rooms</td>
<td>16,355 SF</td>
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<td>5</td>
<td>Staff Meeting Rooms</td>
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<tr>
<td>6</td>
<td>Library Services</td>
<td>0 SF</td>
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<tr>
<td>7</td>
<td>Staff Space</td>
<td>6,515 SF</td>
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<td>8</td>
<td>Grad Offices</td>
<td>0 SF</td>
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<tr>
<td>9</td>
<td>Library Partners</td>
<td>1,840 SF</td>
</tr>
<tr>
<td>10</td>
<td>M&amp;E / WCs / Storage</td>
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Addition GFA: 11,300 SF

Legend (staff)

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<tr>
<td>AS</td>
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<td>0 SF</td>
</tr>
<tr>
<td>UX</td>
<td>User Experience (0 staff)</td>
<td>0 SF</td>
</tr>
<tr>
<td>LAS</td>
<td>Library Accessibility Services (0 staff)</td>
<td>0 SF</td>
</tr>
<tr>
<td>C&amp;C</td>
<td>Collections &amp; Content (27 staff)</td>
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<tr>
<td>ADMIN</td>
<td>Administration Services (0 staff)</td>
<td>0 SF</td>
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<tr>
<td>L&amp;S</td>
<td>Archival &amp; Special Collections (1 staff)</td>
<td>0 SF</td>
</tr>
<tr>
<td>L&amp;C</td>
<td>Learning &amp; Curriculum Support (0 staff)</td>
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</tr>
<tr>
<td>RS</td>
<td>Research &amp; Scholarship (14 staff)</td>
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<tr>
<td>WEB</td>
<td>Web &amp; IT Systems (0 staff)</td>
<td>0 SF</td>
</tr>
<tr>
<td>COMM</td>
<td>Communications (0 staff)</td>
<td>0 SF</td>
</tr>
<tr>
<td>FAC</td>
<td>Facilities (0 staff)</td>
<td>0 SF</td>
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</table>

McLaughlin Library Master Plan Refresh

Level 2 - Proposed

Interim: - 66 Seats Net
Long Term: + 112 Seats
Total: 1,001 Seat
<table>
<thead>
<tr>
<th>Legend</th>
<th>Description</th>
<th>Area</th>
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</thead>
<tbody>
<tr>
<td>1. Public Seating</td>
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<td>2. Library Collection</td>
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<td>8,370 SF</td>
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<tr>
<td>3. Archives</td>
<td></td>
<td>0 SF</td>
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<tr>
<td>4. Program Rooms</td>
<td></td>
<td>0 SF</td>
</tr>
<tr>
<td>5. Staff Meeting Rooms</td>
<td></td>
<td>0 SF</td>
</tr>
<tr>
<td>6. Library Services</td>
<td></td>
<td>0 SF</td>
</tr>
<tr>
<td>7. Staff Space</td>
<td></td>
<td>0 SF</td>
</tr>
<tr>
<td>8. Grad Offices</td>
<td></td>
<td>0 SF</td>
</tr>
<tr>
<td>9. Library Partners</td>
<td></td>
<td>0 SF</td>
</tr>
<tr>
<td>10. M&amp;E / WCs / Storage</td>
<td></td>
<td>1715 SF</td>
</tr>
</tbody>
</table>

**Level 4 - Existing**

Total: 377 Seats

![Floor Plan](image-url)
Level 4 - Proposed

Interim: +170 Seats
Long Term: +192 Seats
Total: 739 Seats

Addition GFA: 7,000 SF + 3,000 SF
Legend

1. Public Seating 3,054 SF
2. Library Collection 7,254 SF
3. Archives 0 SF
4. Program Rooms 0 SF
5. Staff Meeting Rooms 0 SF
6. Library Services 0 SF
7. Staff Space 0 SF
8. Grad Offices 0 SF
9. Library Partners 0 SF
10. M&E / WCs / Storage 5,105 SF

Level 5 - Existing
Total: 265 Seats
McLaughlin Library Master Plan Refresh

Legend

1. Public Seating 7,440 SF
2. Library Collection 3,180 SF
3. Archives 0 SF
4. Program Rooms 0 SF
5. Staff Meeting Rooms 0 SF
6. Library Services 0 SF
7. Staff Space 0 SF
8. Grad Offices 0 SF
9. Library Partners 0 SF
10. M&E / WCs / Storage 5,105 SF

Addition GFA: 3,000 SF

Level 5 - Proposed

Interim: +114 Seats
Total: 379 Seats

Metres

0 5 10 20

Feet

0 5 10 20 40 80

Page 31
Legend

1. Public Seating: 4,828 SF
2. Library Collection: 0 SF
3. Archives: 0 SF
4. Program Rooms: 0 SF
5. Staff Meeting Rooms: 0 SF
6. Library Services: 280 SF
7. Staff Space: 0 SF
8. Grad Offices: 0 SF
9. Library Partners: 0 SF
10. M&E / WCs / Storage: 2,390 SF

Level 6 - Existing
Total: 172 Seats
Level 6 - Proposed
Interim: Net + 15 Seats
Total: 187 Seats

Legend
1. Public Seating 1,982 SF
2. Library Collection 0 SF
3. Archives 0 SF
4. Program Rooms 0 SF
5. Staff Meeting Rooms 0 SF
6. Library Services 280 SF
7. Staff Space 0 SF
8. Grad Offices 5,155 SF
9. Library Partners 0 SF
10. M&E / WCs / Storage 2,445 SF

McLaughlin Library Master Plan Refresh
page 33
2014-2018 to Current (262,133 GSF)
Existing Building

- Collection: 1.2M (Currently Reducing)
- Total Seats: From 1,887 (2006) to 3,571
- Development of the Scholars Studio for Digital Scholarship
- New Cafe
- Compact Shelving Introduced on Lower Level

FTE: 22,529 (2018)

~ 5 Years Interim (262,133 GSF)
Existing Building

- Collections: 800,000, Upper Floors to Increase Seats
- Total Seats: 3,800 goal
- Dedicated Grad Space
- Main Floor Revitalized
- Provide Needed Washrooms
- New Front Entry
- Maximize Study Space

FTE: 23,000 Projected

~ 10 Years Long Term (304,211 GSF)
Addition

- Collections: Assume it holds at 800,000
- Total Seats: 4,800 goal
- Adequate Programme and Partner Space
- Enlarged Cafe
- Provide Needed Washrooms
- New Front Door and Landscaped Courtyard
- Institutional Priority (7,700 SF)

FTE: 24,000 Projected

Figure 10: Summary of Changes
4.0 implementation

1. TRANSFORMATION OVER TIME

- Today: The library is constrained by difficult circulation patterns and navigation, limited group study and collaboration spaces, lack of power capacity, lack of acoustical controls, and unresponsive climate regulation. Efforts have been undertaken to create seating gains and an improved environment but a plateau has been reached in the existing space organization. Further investment is needed.

- Interim: Before an addition is built an interim planning period will bridge long-term plans by renovating the existing building and adding seating and service capacity incrementally. A new north-facing entrance on the existing library will announce the significant renewal taking place on the interior.

- Long Term: The long-term plan achieves the target planning goals for study and collection spaces by constructing a building addition to the McLaughlin Library. This final stage visually marks the complete exterior transformation and space provision to meet program needs and FTE population.

General Notes:

- All spaces that are touched by the following changes assumes that refinishing of all floor finishes, ceilings and upgraded mechanical and lighting to suit the new design.

- Medium to high finishes are assumed in the design to match the design intent of all precedent imagery

- Deferred maintenance items identified in the mechanical report includes known systems that require replacement from past work experience in the building such as water piping and air handler replacement.
Figure 11: Interior concept - service hub

Figure 12: Interior concept - level 1 transformation
2. INTERIM PLAN

Create New Entrance + After Hours / Feature Space

- Provide new entry at North side of the building (shown as dashed lines) to alleviate pressures of current entrance with landscaped area and barrier free connection to Winegard Walk.
- Relocate circulation / Ask us with new circulation desk
- Bunker becomes available to relocated LAS offices and workroom
- Current LAS offices become available for future decant space.
- The after hours / feature space in the south east seating area through the provision of an operable partition. Provide additional storage and washrooms to support the use after hours.

Level 3, 4, +5 Floor Seating Expansion

- Level 3: Reduce book stacks by and increase seats by 2,264 SF (13%) and increase seats by 87. Provide new washrooms.
- Level 4: Reduce book stacks by and increase seats by 4,245 SF (86%) and increase seats by 170. Provide new washrooms.
- Level 5: Reduce book stacks by 2,855 SF (55%) and increase seats by 114.
- In order for the 5th floor to increase its occupant load by reducing stacks the mechanical ventilation system is required to be increased. The HVAC system associated with the building addition will provide the additional service required for increased occupancy.

Level 6 Create Graduate Space on 6th Floor

- Level 6: Demolish 18 existing closed offices and construct 3 new. Close off open stairs to Level 5 and add card access for security. At entrance provide lockers (1/2 size) and touch down areas. Enclose balcony w/ glass over Level 5 to acoustically separate. Provide 6 acoustically separated break out rooms (65 SF) with power and audio-visual. Provide carrel seating in central bay and workstations on south side with some sit-stand seating. This project can be phased. First phase is to be on the southern portion allowing the existing open carrels to remain and to provide some dedicated study areas with a controlled access. Second phase to expand dedicated grad space to the central zone.
Figure 13: Landscape concept

Figure 14: Exterior concept
Reclaim Open Study / Computer Pool Area on Level 2 & Relocate C&C

- Renovate existing 77 station computer pool area for use by C&C Team and renovate existing L&SC offices for C&C management.

Level 0: Room 019 Refresh

- Co-locate Web Team and Communications Teams within this existing space.

Level 1 Transformation + Staff Refresh

- Take down oak wall - remaining AS, LC&C staff to be temporarily located off site during renovation. This transformation may ultimately be linked to the new build as they may provide services in the programme spaces on level 2 & 3 while level 1 is renovated.
- Construct Learning Commons & staff areas.
- Create new staff meetings areas and support space.
- Renovate level 1 with open seating & computers.
- Construct additional meeting / programme rooms on level 1.
- Replace 2 existing primary mechanical HVAC units / air handlers.
- Demolish 17 group rooms on level 2 & 3 to prepare for addition.

Reclaim Exam Centre on Level 2 for future programme space and multipurpose use

- Move exam centre from level 2 either to new addition or off site. Renovate existing area for multipurpose programming rooms with similar technology support and finishes to what was renovated in 2018.

3. LONG TERM PLAN

Four Storey Addition with Basement & Mechanical Penthouse

- Site Work: Landscaping around the new north entrance.
- Additional space for food service and re-orientation of counter. Provide additional seating on level 2-4.
- Construct 4 storey addition with two storey mechanical penthouse.
- Level 1: Fit out for expanded public seating areas, welcome, and feature stair.
- Level 2: Fit out for institutional priority.
- Level 3: Fit out for library program space / student seating.
- Level 4: Fit out for expanded public seating areas.
CURRENT: 3,571 SEATS

INTERIM PLAN

LEVEL 1:
CREATE NEW ENTRANCE + EXTENDED HOURS ZONE / FEATURE SPACE
RELOCATE CIRC & ASK US WITH NEW DESK
CREATE NEW MAIN ENTRANCE, CONVERT EXI. TO EXTENDED HOURS
RENOVATE CIRC. BUNKER W/ LAS OFFICES / WORKROOM
PROVIDE OPERABLE PARTITION, STORAGE, WCS DISPLAY AREA TO ENABLE EXTENDED HOURS & FEATURE SPACE

LEVEL 3, 4 & 5: SEATING EXPANSION
REDUCTION OF BOOK STACKS (3,820 SF + 2,850 SF)
RENOVATE REMAINING LEVELS (OPEN SEATING, GROUP RMS, W/C)

LEVEL 6:
CREATE GRADUATE SPACE
DEMOULSH 18 CLOSED OFFICES + CONSTRUCT 3
CLOSE OFF OPEN STAIRS TO 5TH FLR ADD CARD ACCESS
ENCLOSE BALCONY W/ GLASS OVER 5TH FLOOR NORTH
INSTALL LOCKERS OUTSIDE DOORS & COMPLETE FF&E
CONVERT 30 GRAD OFFICES TO GROUP RM

INTERIM PLAN

LEVEL 2:
STAFF RE-CONFIGURE (C&C)
REMOVE OPEN STUDY ON EAST SIDE
RENOVATE & RELOCATE C&C CLUSTERS ON TO LEVEL 2

LEVEL 2: DECANT EXAM CENTRE
RELOCATE & EXPAND EXAM CENTRE OFF SITE
FIT OUT SPACE FOR FLEXIBLE PROGRAM (MULTIPURPOSE / MTG)

LEVEL 0: RM 019 REFRESH
RECONFIGURE STAFF AREAS

LEVEL 0: RM 019 REFRESH
RECONFIGURE STAFF AREAS

CURRENT: 3,571 SEATS

INTERIM PLAN

LEVEL 1:
CREATE NEW ENTRANCE + EXTENDED HOURS ZONE / FEATURE SPACE
RELOCATE CIRC & ASK US WITH NEW DESK
CREATE NEW MAIN ENTRANCE, CONVERT EXI. TO EXTENDED HOURS
RENOVATE CIRC. BUNKER W/ LAS OFFICES / WORKROOM
PROVIDE OPERABLE PARTITION, STORAGE, WCS DISPLAY AREA TO ENABLE EXTENDED HOURS & FEATURE SPACE

LEVEL 3, 4 & 5: SEATING EXPANSION
REDUCTION OF BOOK STACKS (3,820 SF + 2,850 SF)
RENOVATE REMAINING LEVELS (OPEN SEATING, GROUP RMS, W/C)

LEVEL 6:
CREATE GRADUATE SPACE
DEMOULSH 18 CLOSED OFFICES + CONSTRUCT 3
CLOSE OFF OPEN STAIRS TO 5TH FLR ADD CARD ACCESS
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INSTALL LOCKERS OUTSIDE DOORS & COMPLETE FF&E
CONVERT 30 GRAD OFFICES TO GROUP RM

INTERIM PLAN

LEVEL 2:
STAFF RE-CONFIGURE (C&C)
REMOVE OPEN STUDY ON EAST SIDE
RENOVATE & RELOCATE C&C CLUSTERS ON TO LEVEL 2

LEVEL 2: DECANT EXAM CENTRE
RELOCATE & EXPAND EXAM CENTRE OFF SITE
FIT OUT SPACE FOR FLEXIBLE PROGRAM (MULTIPURPOSE / MTG)

LEVEL 0: RM 019 REFRESH
RECONFIGURE STAFF AREAS

Figure 15: Phasing diagram
INTERIM PLAN

LEVEL 1:
TRANSFORM MAIN FLOOR & STAFF SPACES

- TAKE DOWN OAK WALL & PROVIDE PRINT STATIONS
- CONSTRUCT LEARNING COMMONS & STAFF AREAS
- CREATE NEW MEETING AREAS & SUPPORT SPACE
- RENOVATE 1ST FLR W/ OPEN SEATING + COMPUTERS
- FIT OUT SPACE FOR FLEXIBLE PROGRAM (MULTIPURPOSE / MTG)

+169 SEAT GAIN

LONG TERM PLAN

SITE WORK & ENHANCE LANDSCAPE

CONSTRUCT 42,078 SF ADDITION

PREPARE FOR ADDITION (DEMO SELECT EX, WALLS)

- LEVEL 0: M&E
- LEVEL 1: PUBLIC SEATING & CAFE EXPANSION + 261
- LEVEL 2: INSTITUTIONAL PRIORITY & P.S. + 112
- LEVEL 3: PUBLIC SEATING & PROGRAM RMS. + 297
- LEVEL 4: PUBLIC SEATING & MECHANICAL + 192
- LEVEL 5: MECHANICAL

FIT OUT FOR INSTITUTIONAL PRIORITY

PUBLIC SEATING EXPANSION (17,670 SF) + 861 SEAT GAIN

+485 SEAT GAIN

+861 SEAT GAIN

TARGET: 3,800 SEATS

TARGET: 4,800 SEATS
### INTERIM PLAN

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<th>Project Cost</th>
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**SUBTOTAL**

| General Requirements + Fees | 12% | $881,664 |
| Design Allowance            | 15% | $1,234,330 |
| Construction Allowance      | 10% | $944,319 |
| **TOTAL INTERIM PLAN**      |     | **$10,409,513** |

### LONG TERM PLAN

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**GRAND TOTAL: INTERIM + LONG TERM PLANS**

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4. COSTING SUMMARY

The estimated construction cost of the various priorities described in this report are summarized in the table to the left. The full report is included in Appendix F describing the costing methodology, project assumptions, and exclusions. The construction estimate includes costs identified in the LMSP report and has utilized three stages of escalation; short term (2022), interim (2025), and long term (2030).

Costs as shown are construction costs not project costs with soft costs included below the subtotal. Totals shown show only a portion of soft costs as itemized.
# Appendix A: detailed programme

## Area Summary By Phase

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</table>

* Support Spaces in Core areas includes: elevators, stairs, M&E, custodial and washrooms

## Total Public
- 56% 82,700
- 42% 91,694
- 68% 122,184

## Total Collection
- 56% 45,985
- 25% 37,335
- 22% 39,935

## Total Staff
- 13% 18,513
- 13% 18,781
- 10% 18,781

## Total Program
- 147,198
- 147,810
- 180,900
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<tr>
<th>Area Summary By Phase</th>
<th>Current</th>
<th>Intern</th>
<th>Addition</th>
<th>Statistic Changes with Addition</th>
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<td></td>
<td>Volumes</td>
<td>No. Staff</td>
<td>No. Seats</td>
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<td>1 Public Seating (average of 30sf / seat)</td>
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<td>5 Library Services</td>
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<td>6 Staff Space</td>
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AS: Access Services
UX: User Experience
LAS: Library Accessibility Services
C&C: Collection & Content
ADMIN: Administration (Group 1&2)
L&C&S: Learning & Curriculum Services
R&S: Researching & Scholarship
WEB & ITS: Web & IT Systems
COMM: Communications
FAC: Facilities
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APPENDIX B
STAFF SPACE ANALYSIS
Appendix B: staff space analysis

Staff Space - General
As a result of the displacement of staff from the first floor, there will be a need to identify an acceptable quantity of space elsewhere in the building.

- Co-locate staff within their strategic teams.
- Maximize natural light in staff work areas.
- Maximize use of room 019 in lower level.
- R&S will remain rooted in their current location within scholars studio and can expand into the BRDC space.
- A&SC current footprint will not change, however, there maybe some fluctuations within the team compliment.
- Look at Level 2 computer pool areas for better adjacent for staff and easier phasing opportunities.
- Leave room 384 as programming space.
- Review the concept of collective living versus individual ownership of space.

The following description of staff by team has been synthesized from area and plans analysis, the user group questionnaires, the Organization Charts. Space requirements have been determined using the COU codes by office type / role.
Staff: Learning & Curriculum Support (L&CS)

Learning & Curriculum Support is an academic support unit that provides individual and group services and programming for learners across disciplines and levels. They provide in class workshops, individual consultations, supported learning group sessions, group programming, media training, resource development and distribution.

- Team of 19 full time staff
- Group 1: Leadership Team – 1 Acting Head, 2 Digital Media Library, and 1 Learning & Curricular Support Associate (387 SF)
- Group 2: Information Literacy - 1 Manager and 4 Librarians (645 SF)
- Group 3: Learning Services - 1 Manager and 3 Learning Specialists (453 SF)
- Group 4: Writing Services - 1 Manager and 3 Writing Specialists (453 SF)
- Group 5 SLG Programs - 1 Manager, 1 Supervisor and 1 Assistant (345 SF)

Current Location: Level 1 behind the oak wall & north east offices on level 2

Recommendation: Currently Level 1 Learning & Curriculum Support will stay on main floor and offices from Level 2 will move to Level 1 and reconfigured within the new staff space. This allows C&C teams the necessary space to stay collocated

Summary of Space Requirements: 2,766 SF of Total Net Area for offices (2,283 SF) & peer workrooms (483 SF), supported also by the Learning Commons.

Staff: Archival & Special Collections (A&SC)

Acquisition, arrangement and description, cataloguing, preservation, provision of public access to archival materials, special collections, and rare books

- Team of 9 full time staff: 1 Archive Librarians, 1 Team Head, 4 Archives Associates, 2 Special Collections Clerk, 1 Support
- Current Location: Level 0: All A&SC staff except Special Collections Librarian on Level 2
- Recommendation: Given that the spaces have been recently renovated, there are no major anticipated changes as a result of the LMSP. Staff will stay in their current locations

Summary of Space Requirements: 837 SF of Total Net Area for 3 Librarian offices of 129 SF each and 6 offices of 75 SF each
Staff: Research & Scholarship (R&S)

- Research and scholarship includes outreach (including in-class sessions), one-on-one consultations, and workshops/meetings related to scholarly publishing, data, and digital scholarship. Consultations and workshops are widely offered.
- Team of 14 full time staff: 1 Head, 6 Librarians, 2 Developers, 2 DRC Associates and 3 Analysts
- Current Location: Currently located on the north side of Level 2 adjacent to the Scholars Studio
- Recommendation: The current size and location of this department works well. To enable the co-location of C&C, two R&S offices are re-located to the current BRDC space. A review of adjacent functions may improve user experience
- Summary of Space Requirements: 1,483 SF of Total Net Area for 1 Head of 161 SF, 6 Managers of 129 SF each, 1 office of 108 SF, and 6 offices of 75 SF each

Staff: Collections & Content (C&C)

Managing the full lifecycle of electronic and physical resources acquired by the library to support the teaching, learning, and research of the University of Guelph community. This includes selection, acquisition, implementation, access and maintenance (including putting items on reserve and troubleshooting electronic resources), review/evaluation, renewal/cancellation, management/maintenance of collections both online and physical, preservation, and withdrawal of resources. This includes obtaining curricular materials through copyright permissions or those lent by faculty. Budgeting and management of the acquisitions budget is also included.
- Team of 27 full time staff: 1 Acting Head, 3 Managers (E-Learning and Reserve, Electronic Resources and Metadata, Acquisitions), and 3 C&C Librarians (7)
  - E-Learning and Reserve: 1 Coordinator and 3 Library Assistants (4)
  - Electronic Resources and Metadata: 1 Librarian, 4 Library Associates, 1 Special Projects, and 1 Library Associates (7)
  - Acquisitions: 1 Coordinator and 5 Library Assistants (6)
  - TUG Annex: 1 Coordinator and 2 Library Assistants (3)
- Current Location: Level 1 behind the oak wall
- Recommendation: Move all C&C teams from Level 1 to free up floor area for seating. Acquisitions, Collection Maintenance & E-Learning move to Level 2 in current open computer area/pool
- Summary of Space Requirements: 2,907 SF of Total Net Area for Collections Librarians require 517 SF, Acquisitions require 689 SF, TUG Annex / Collections Maintenance require 689 SF, E-Learning & Reserve require 463 SF, and E-Resources & Metadata require 549 SF
Staff: Discovery & Access (D&A)
Discovery & Access encompasses three sub-teams that were engaged as part of the questionnaire process.

Access Services (AS)
Front-line service with daily direct contact with the public during opening hours. Staffs the Ask Us desk, the main public service desk in the library. They answer questions, manage circulation, interlibrary loan, document delivery, patron accounts, assigning graduate student lockers and study spaces, booking multimedia, group study room bookings, manage public printing.

- Team of 11 full time staff: 1 Manager, 1 Senior Access Services Assooaites, 2 Senior Access Services Assistants, 4 Access Services Assistants, 2 Stack Maintenance, 1 Interlibrary Assistant, and 20 students
- Current Location: Level 1 in Bunker
- Recommendation: Access Services will stay on Level 1 but relocate out of the bunker to a more centralized location. The new Ask Us desk may address some of the functional issues identified by staff.
- Summary of Space Requirements: 2,200 SF of Total Net Area offices of 908 SF includes 1 Manager of 129 SF, 3 offices of 108 SF each, 7 workstations of 65 SF each and 1292 of flexible space for future adjustments.

Library Accessibility Services (LAS)
- LAS provides expertise and assistance in accessible document creation and repair. Supports Student Accessibility Services (SAS) - registered students with reading, writing and studying by providing distraction reduced study space, assistive technology access and training, and course texts in alternate formats.
- Team of 2 full time staff: 1 Manager and 1 LAS Technician
- Current Location: Level 1 behind the oak wall
- Recommendation: Maintain location on Level 1 but relocate to the bunker to balance the need to be visible and easy to find but also sensitive to privacy and acoustics. This existing area provides adequate space for the co-location of staff, equipment, and the LAS student lab.
- Summary of Space Requirements: 958 SF of Total Net Area for 1 Manager of 129 SF, 1 office of 129 SF, and 700 SF for 20 student LAS resource centre
**User Experience Librarians (UX)**

Recruits students regularly and regularly observances public areas for UX studies. Works regularly with Manager, Web Development. UX noted a need to access a space for 10 people for user testing, focus groups, and user interviews.

- Team of 2 full time staff: 2 UX Librarians
- Current Location: Level 1 behind the oak wall
- Recommendation: Maintain location on Level 1 but relocated within re-configured staff space
- Summary of Space Requirements: **258 SF** of Total Net Area for 2 offices of 129 SF each

**Staff: Administrative Services (ADMIN)**

Library Administration includes the Senior Leadership Team of the library: UL, 2 AULs, Director Administrative Services, Manager HR, Manager Finance, and 3 Administrative staff. In addition, our Senior Research Officer reports directly to an AUL and is in a team of 1.

All of these groups of administration services have a common element in that they are not linked to any one strategic team but support all teams and Library Services.

- Team of 6 full time staff (Group 1 & 2):
  - **Group 1:** Senior Leadership team – 1 University Librarian, 2 AULs, 1 Director Administrative Services, and 3 Administrative Support staff
  - **Group 2:** Manager Finance, Manager HR, and part time Payroll Clerk
  - **Group 3***: Communications (4), Web/ITS (3), Assessment (Senior Research Officer mentioned above), and User (2) Experience Librarian(s)
- Current Location: Group 1 on Level 3 South Block (RM 350), Group 2 on Level 3 (RM 350-357), and Group 3 on Level 0 (RM019)
- Summary of Space Requirements: **1,152 SF** of Total Net Area = Group 1 require **850 SF**, Group 2 require **302 SF** and Group 3 shown in other breakdowns.

**Communications (COMM)**

The Communications Team is responsible for all marketing and communications activities within the library. They manage official library social media channels, assist in event creation and coordination, write articles and reports, create communication plans and future strategic communications planning, design collateral creation, content creation for social media, and assist in any other activities that require communications support or expertise.

- Team of 2 full time staff: 1 Manager, 1 Communications Officer, and 1 Co-op Student
– Current Location: Level 0 in Rm 109
– Recommendation: Maintain in current location – review opportunities for shared amenities with other teams
– Summary of Space Requirements: 269 SF of Total Net Area for 1 Manager office of 129 SF, 1 office of 75 SF, 1 workstation at 65 SF. A storage area of 65 SF is not included in the net area.

Web & ITS
Web team and ITS support all units within the library. It is not a ‘public facing’ team so there is no need to be located on the first floor. Largely, ITS has storage needs for equipment (storing computers, other physical infrastructure for staging and receiving and deployment) as well as a need for a lot of physical network connections.
– Team of 7 full time staff:
  – Web (D&A): 1 Manager (Shared), 2 Analysts, and 1 Library Associate
  – ITS: 2 Technicians, and 1 Analyst
– Current Location: Manager currently located in staff area behind oak wall on Level 1 and techs and Analyst are on Level 0 in room 019
– Recommendation: Consider moving Manager to the Level 0
– Summary of Space Requirements: 579 SF of Total Net Area for 1 Manager 129 SF and 6 offices of 75 SF each

Staff: Facilities (FAC)
Facilities Services is responsible for shipping/receiving, repairs & maintenance, procurement of furniture, safety and security, office supplies, renovations, staff moves, and monitoring of custodial and health & safety issues
– Team of 8 full time staff: 1 Manager, 1 Facilities Supervisor, 1 Library Assistants, and 5 Building Support Staff
– Current Location: Level 0 near loading dock
– Recommendation: Move Facility Manager from Level 1 to Level 0 room 019
– Summary of Space Requirements: 302 SF of Total Net Area for 1 Manager office of 129 SF, 1 office of 108 SF, 1 workstation at 65 SF, and storage area of 65 SF
APPENDIX C
WASHROOM STUDY
# Appendix C: Washroom Study

### For Interim Phase of LSMP

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University of Guelph McLaughlin Library Master Plan Update

Mechanical Systems Schematic Design Brief – R1

May 23, 2019

Prepared by:
Mary Georgious, P.Eng, LEED AP BD+C
Nick Pankratz, EIT, ASHRAE Associate
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1 General

1.1 Objective

The objective of this Master Plan Update is to provide strategic guidance for design of future HVAC, Plumbing, and Fire Protection systems at the University of Guelph McLaughlin Library. Particular attention is paid to the integration of a proposed 4 storey + basement addition into the current Master Plan. This report was developed in the context of a concurrent architectural programme being proposed.

This document should be read in conjunction as an amendment to previous master plan reports and briefs including the Mechanical Master Plan Brief by mcCallumSather, September 2016.

The library is currently served by 4 AHUs for the main spaces. These are located in 2 separate penthouse/mechanical rooms. An additional AHU 5 for the Rare books Area is located in the basement.

The existing conditions as described by MCW were accurate at the time. Subsequent projects have been implemented including Basement level and Level 2 renovations. Since the MCW report, AHU’s 1 & 3 were replaced under UG project # 504018. AHU’s 2 & 4 remain the same.

The University of Guelph would like to utilize the existing infrastructure of the building.

1.2 Commentary on Phasing

The order of execution of the work described in this report may have cost impacts including re-work. In general, refer to the architectural brief containing this report for information on phasing and order of execution.

There are two specific instances identified where phasing would have significant impact.

1. The proposed conversion of existing level 5 stacks to a seating area impacts ventilation air requirements. These impacts are addressed by the new addition’s proposed AC-6. Refer to HVAC section of this report, and MSK-08 at the end of this report. If level 5 renovation work were to occur prior to the AC-6 addition, an alternative measure would be required to address increased ventilation air requirements.
2. The client would prefer the AHU replacement work be done as part of one of the floor renovations. To accommodate this, it is recommended the AHU replacement work (units 2 & 4) be bundled with the 1st floor renovation. The reason for this would be to overlap the disruption to library operations caused by these two scopes of work. The 1st floor was deemed to be the most sensitive to disruption; by coinciding this renovation with the AHU replacements, a major future disruption to this floor would be eliminated.

1.3 Disclaimer

Note that mcCallumSather does not assume any liability for the use of this report, or for the use of any information enclosed in the report, or for damages resulting from the use of this report, by other parties.

All equipment and service sizes should be reconfirmed in design development based on detailed calculations.

1.4 Further Consultation

In order to deliver a high-performing building it is recommended that the following consultants be engaged in some capacity: acoustic consultant. It is also recommended that a commissioning agent be involved during the design.

1.5 Applicable Codes and Standards

The mechanical systems shall be designed and installed by following principles of good engineering practice and meeting or exceeding requirements of all applicable codes, including but not limited to the following list of codes, ordinances and guidelines:

- Ontario Building Code
- Ontario Fire Code

- ASHRAE 90.1-2016, Energy Efficient Design of New Buildings
- ASHRAE 62.1-2016, Ventilation for Acceptable Indoor Air Quality
- ASHRAE 55-2017, Thermal Environmental Conditions for Human Occupancy

- NFPA 10-2007 Portable Fire Extinguishers
- NFPA 13-2013 Standard for the Installation of Sprinkler Systems
- NFPA 14-2013 Standard for the Installation of Standpipe and Hose Systems

- CSA B52 Refrigeration Code
• CAN/CSA – B149.1 Ontario Gas Safety Requirements

• Ontario Electrical Safety Code
  • CAN/CSA-B651-M90 Barrier Free Design

• University of Guelph Design Standard HVAC Systems DSM-01
• University of Guelph Design Standard Plumbing Systems DSM-02
• University of Guelph Design Standard BAS DSM-03
• University of Guelph Master Plan

1.6 Energy Sources
The prime energy sources considered for the building are:

a) District Low-Grade Heating Water from the central plant Stack Heat Recovery system
   (HWS/HWR: 47°C (116°F) / 34°C (94°F) (Refer to study being performed by MCW)

b) District Steam (150 psig rated, 125 psig operating)

c) District Chilled Water (150 psig rated, 110 psig operating, CWS 5.5-7.2°C, DT 8.2°C)

d) Electricity for powering motors, pumps, fans, compressors, etc.
2  Fire Protection Systems

2.1  Existing Building
Existing 4"Ø fire service to building is to remain.

The existing building is protected by standpipe system. Existing fire hose cabinets are to remain or be relocated based on new floor layout as required.

Fire extinguishers shall be provided as required and according to Ontario Fire Code.

2.2  Proposed Addition
Provide new fire water service including backflow preventer to building to accommodate proposed addition. Preliminary estimated 6"Ø main service required. Sizing to be confirmed based on detailed calculations in accordance with NFPA 13.

Provide new Siamese connection adjacent to existing to accommodate proposed addition. Estimated pipe size 6"Ø.

The addition shall be provided with new standpipe system including fire hose cabinets (FHC) and a new wet sprinkler system.

Provide new 4"Ø sprinkler riser, new 4"Ø standpipe riser, supervised zone valves on each floor and at each FHC. Sizing to be confirmed based on detailed calculations in accordance with NFPA 13.

A sprinkler baffle with dedicated supervised zone valve shall be provided in open library space at the demarcation line between existing building providing sprinkler protection on both sides of the line in lieu of a fire rated assembly.

Allow for a new fire pump in new basement mechanical room to serve new sprinkler and standpipe zones. Pump sizing shall be evaluated based on recent hydrant flow test data.

Fire extinguishers shall be provided as required and according to Ontario Fire Code.
3  Plumbing and Drainage Systems

3.1  Domestic Cold Water

Existing building is served by 4” Ø district service including meter and backflow preventer.

It is understood based on the level 0 and 2 renovations that flush valve type fixtures are to be utilized in all washrooms. It is also understood based on asset report that the system is beyond expected service life. The existing building service served flush-tank type fixtures.

For these reasons it is recommended to replace the main domestic cold water distribution piping in the building including mains, risers, and branches. Sizing to be based on detailed calculations in accordance with Ontario Building Code and fixture count to be provided by architect.

Provide new risers and a new connection to main service to serve the proposed addition. Sizing to be based on detailed calculations in accordance with Ontario Building Code and fixture count to be provided by architect.

3.2  Domestic Hot Water

Provide new washrooms in existing building and in addition with connections to existing domestic hot water and recirculation systems including new risers and mains.

Replace existing branches on each floor.

Sizing to be based on detailed calculations in accordance with Ontario Building Code and fixture count to be provided by architect.

3.3  Sanitary Drainage

Existing building is served by 8” Ø service from street. It is expected the existing service will be sufficient. Provide drainage piping from new plumbing fixtures as required and connect to nearest sufficiently sized stack or main. This assumption to be validated based on detailed calculations in accordance with Ontario Building Code and fixture count to be provided by architect.

Replace all existing drainage piping from fixtures and connect to existing stacks.
3.4 Plumbing Fixtures

Plumbing fixtures shall be selected to meet durable standards, barrier-free design requirements, and effectiveness requirements. At minimum, 30% reduction in water use over standard fixtures shall be accomplished through use of:

- Low-volume automatic flush valve toilet
- Tamper-proof aerators on lavatory faucets
- Touchless faucets

3.5 Storm Water Drainage

Existing building 12"ø service from street to remain.

Provide addition with new 10"ø at 1.0% slope storm sewer connection to serve new roof areas. See below design criteria and preliminary calculation.

**Design Criteria**

Storm drains shall be designed to OBC requirements as shown in this table:

<table>
<thead>
<tr>
<th>Table 1 Rainfall Design Data</th>
</tr>
</thead>
<tbody>
<tr>
<td>3.5.1 Rainfall Design Data¹</td>
</tr>
<tr>
<td>15 minute rainfall, mm</td>
</tr>
<tr>
<td>One Day Rainfall, 1/50, mm</td>
</tr>
<tr>
<td>Annual Rainfall, mm</td>
</tr>
<tr>
<td>Annual Total Precipitation, mm</td>
</tr>
</tbody>
</table>

The roof drains to be non-flow-control type. Typical roof drain hub size to be 4"ø.

In total building is estimated to require drainage capacity for a hydraulic load of 170,000L². This is greater than the capacity of a 12"ø storm pipe as currently exists.

For this reason it is recommended that a new storm sewer connection be provided for the addition. Proposed addition hydraulic load estimated at 32,000 L³. New 10"ø at 1.0% slope storm sewer connected estimated to be required to serve new roof areas.

¹ From OBC 2012 SB-1 for Guelph
² Assuming 54,000 ft² gross roof area in architectural programme plus 20% allowance added for vertical faces.
³ Estimated 10,000 ft² new roof area shown in architectural programme plus 20% allowance added for vertical faces.
4 HVAC Systems

4.1 Overview of HVAC System

The HVAC systems shall be designed to provide heating, cooling, and ventilation for a design occupancy to be based on user-defined occupancy density as documented in the architectural programme.

The preliminary sizing used in this report are based on OBC SB-10 minimum envelope design.

Acoustics shall be a prime consideration.

The addition and select areas of the existing library shall be served by a new air handling unit (AHU-6). The new unit shall be located in a new penthouse, refer to sketches attached and architectural report.

The cafeteria addition shall be served by a new air handling unit (AHU-7). The unit shall be located on the rooftop.

The existing building is served by existing AHU-1, 2, 3, & 4. AHU-1 and 3 have been replaced in recent projects and shall remain.

Existing AHU-2 & -4 shall be replaced in a similar manner to units 1 & 3. Based on experience with replacement of AHU-1 & 3, increasing size of heating coils would not be feasible due to space constraints. For this reason it is recommended these units utilize the existing high temperature heating water system.

Refer to attached sketches for proposed hvac zoning overlaid on architectural concept plans.

4.2 Design Conditions

The design temperatures used to size equipment and establish initial temperature set-points shall be as follows. These setpoints meet minimum code and were selected to provide thermal comfort to occupants, and to preserve architectural wood.

Table 2 Outdoor Heating/Cooling Design Conditions

<table>
<thead>
<tr>
<th>Outdoor Design Conditions</th>
<th>Winter</th>
<th>Summer</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dry Bulb</td>
<td>-21°C</td>
<td>29°C</td>
</tr>
<tr>
<td>Wet Bulb</td>
<td>-</td>
<td>23°C</td>
</tr>
</tbody>
</table>
### Table 3 Indoor Heating/Cooling Design Conditions

<table>
<thead>
<tr>
<th>Indoor Design Conditions</th>
<th>Winter</th>
<th>Summer</th>
<th>RH</th>
</tr>
</thead>
<tbody>
<tr>
<td>Stacks and Closed Rooms</td>
<td>25°C</td>
<td>25°C</td>
<td>50%</td>
</tr>
<tr>
<td>Tolerances to be ± 2 °C, +/- 10%</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Humidification and Dehumidification control shall be designed to OBC SB-1 design conditions.

### 4.3 Design Loads

Air handling unit 6 and 7 as well as replacement units #'s 2 and 4 shall be sized based on detailed calculations for the design heating and cooling loads based on the building envelope, building occupancy as well as the lighting and receptacle power densities. The mechanical HVAC systems shall be sized in accordance with the designed thermal resistance of building envelope components such as walls, windows, roof and the building room classifications.

Sizing for AHU-6 for the proposed addition and AHU-7 for the cafeteria addition has been estimated to reflect architecture and occupant loads per proposed addition presented to client at staff engagement meeting on March 25, 2019.

Ceiling heights were assumed to be 9 ft typically, based on existing building and conversation with architect. The 1st floor is an exception where ceiling height expected to be 11 ft.
The AHU-6 and 7 preliminary estimated hvac loads are summarized in table below\(^4\):

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Level 0 (basement)</td>
<td>0</td>
<td>n/a</td>
<td>n/a</td>
<td>n/a</td>
<td>n/a</td>
</tr>
<tr>
<td>Level 1</td>
<td>6,550</td>
<td>1,800</td>
<td>8,150</td>
<td>23</td>
<td>225</td>
</tr>
<tr>
<td>Level 2</td>
<td>9,980</td>
<td>2,800</td>
<td>9,950</td>
<td>32</td>
<td>364</td>
</tr>
<tr>
<td>Level 3</td>
<td>10,030</td>
<td>2,850</td>
<td>10,100</td>
<td>33</td>
<td>370</td>
</tr>
<tr>
<td>Level 4</td>
<td>2,570</td>
<td>670</td>
<td>3,100</td>
<td>10</td>
<td>116</td>
</tr>
<tr>
<td>Level 5(^5)</td>
<td>3,300</td>
<td>710</td>
<td>3,700</td>
<td>11</td>
<td>107</td>
</tr>
<tr>
<td>Level 6</td>
<td>0</td>
<td>n/a</td>
<td>n/a</td>
<td>n/a</td>
<td>n/a</td>
</tr>
<tr>
<td><strong>Total New AHU-6</strong></td>
<td><strong>32,440</strong></td>
<td><strong>8,830</strong></td>
<td><strong>35,000</strong></td>
<td><strong>110</strong></td>
<td><strong>1,200</strong></td>
</tr>
<tr>
<td><strong>Total New Cafeteria AHU-7</strong></td>
<td><strong>2,800</strong></td>
<td><strong>1010</strong></td>
<td><strong>5,150</strong></td>
<td><strong>11</strong></td>
<td><strong>126</strong></td>
</tr>
</tbody>
</table>

*Estimated using ventilation effectiveness of 0.8.

\(^4\) These values do not account for diversity factors that may be applied to reduce the plant capacity below the total loads. The Space Heating Load includes skin losses and ventilation heating requirements.

\(^5\) Existing open seating area shall be re-zoned from existing AHU-1 to new AHU-6 to accommodate increased occupant and ventilation load.
4.4 Controls

4.4.1 Existing Building

Currently the library has a pneumatic control system that the University would like to replace with an electronic system. A building management system (BAS) will be used for monitoring and controlling various HVAC, hydronic, plumbing, electrical equipment and systems as needed. All VAV and hydronic system should be integrated into the existing Siemens BAS along with any new AHU and associated components.

This upgrade is understood to have been completed on levels 0 and 2.

Upgrade of existing systems shall be required on remaining levels 1, 3, 4, 5, & 6.

4.4.2 Proposed Addition

The following describes the control concept:

Control shall be provided on a zone level, ie a thermostat control shall affect a group of similar spaces or an area of the building. Controls to be locked for access by facility team only.

- Integrate controls into existing Siemens Building Automation System (BAS).
- Space temperature and ventilation shall be controlled by direct digital controls integrated to BACNET-based BAS.
- BAS to control (water side and air side) plant scheduling, plant reset, zone scheduling, points monitoring, basic points trending, alarm forwarding, and energy trending. All plant equipment to be provided with BACNet interfaces.
- Control accuracy to be to standard commercial levels.
- Air Handling Units to supply air at 59°F (15 ºC), approx 30% ventilation air.
- VAV reheat to provide supply air temperature and humidity control.
- Wall-mounted sensors shall be provided for each zone to control local supply air temperature, humidity, and CO2.
- Heating water system to operate with outdoor temperature reset.

4.5 Acoustics

Acoustics shall be a prime consideration and shall be addressed by locating noise-generating equipment outside of occupied spaces, low velocity ductwork, aerodynamic duct fittings, acoustic linings, transfer z-boots, equipment isolators, flex connections to equipment and diffusers, and low NC diffusers. Silencers shall be considered as a last resort.

Closed study rooms to meet NC 35

Stacks and open spaces to meet NC 40
4.6 HVAC System Design Options

4.6.1 Existing Building

This upgrade is understood to have been completed on levels 0 and 2.
Upgrade of existing systems shall be required on remaining levels 1, 3, 4, 5, & 6.

4.6.1.1 Air Handling Units

Replace existing air handling units 2 & 4 in existing penthouses. The units are sized roughly at 65,000 CFM with 15%-25% fresh air.

The goal of the University of Guelph is to phase out the existing mechanical system and introduce an energy efficient system to the McLaughlin Library building. The heating, cooling and ventilation will be provided by new air handling units. Detailed calculation for each unit will be required by the design consultants.

The AHU should include the following components:

- Supply fan with a VFD
- Return fan with a VFD
- Fresh air/return air mixing plenum complete with motorized dampers
- Filter section with MERV 8 pre-filters and MERV 14 final filters
- Heating Coil (Hot Water from Heat Exchangers)
- Steam Humidification
- Chilled Water Cooling coil (coil velocity of 400 FPM)
- Energy recovery wheel or piping (space dependent)
- Refer to example specifications included in this report for further information.

Preferred Manufacturers:

- HAAKON
- Engineered Air
- MAFNA

The heating will be provided via hot water heating coil. Utilize existing service provided by Flooded Heat Exchanger assembly skid.

Rough estimate for steam consumption for AHU- 2, and 4 is 1,872 lbs/hr each.

Air shall be supplied at 59°F (15 ºC) and heated to local zone requirements by hydronic terminal reheat coils in Variable Air Volume (VAV) boxes.

The digital control of the HVAC systems will include all standard energy conserving operating strategies in the software packages including unoccupied area set back. High efficiency motors will be used to provide power to mechanical systems.
4.6.1.2 Air Distribution

Existing duct systems utilize induction-based terminal units. Existing duct systems shall be replaced on each level. Existing ‘core’ duct risers and plenums to remain.

Return air to be collected from spaces by appropriate application of eggcrate grilles. Provide open return plenum with transfer ducts as required.

Supply and ventilation air shall be ducted with galvanized steel low velocity ducts, constructed in accordance with ASHRAE recommendations and SMACNA standards. The ductwork shall be sized based on an energy efficient 0.08 in. w.c. of friction loss per 100 feet.

Consideration shall be given to pressurizing the space to limit infiltration from the exterior.

VAV terminal units complete with reheat coils shall be located based on zoning requirements and user preferences. Each VAV box shall be controlled by a thermostat and will communicate with the main air handling unit.

4.6.1.3 Perimeter Heating (Deferred Maintenance Item, Cost Consultant to break-out)

Perimeter heat will be maintained throughout the space. New perimeter heat devices, piping and associated valves are required.

All perimeter heating radiators will be replaced and associated piping to the risers. New pressure independent control valves should be added. The sequence of operation should activate perimeter heat as first stage followed by the re-heat coils in the VAV boxes.

Pressure independent valves will be utilized on the main AHU and are encouraged on the terminal level.

4.6.2 Addition

Please refer to the architectural report for description of this proposed addition.

Two system options are proposed below for consideration.

Both systems shall utilize VAV with reheat system including a new penthouse air handling unit.

The key difference is the heating source.

- Option 1 shall utilize low temperature heating water sourced from future district stack heat-recovery project.
- Option 2 shall utilize the district steam service via a new steam converter skid complete with heating water pumps.
4.6.2.1 **Design Option 1 – Low Temperature Heating Based System**

It is understood the future district loop for a district plant stack heat-recovery water service is currently planned to pass through tunnels located under the McLaughlin Library. The district plant stack heat-recovery water service would provide low temperature heating water understood to operate in this temperature range: HWS/HWR: 47°C (116°F) / 34°C (94°F). Refer to study being performed by MCW.

The proximity to this district service would make the Library a good candidate to utilize the service. Utilizing the service would enable greater efficiencies to be obtained at the district plant.

The impacts of this on the VAV with reheat system include:

- heating coils will require additional surface area (ie will need to be larger and/or heavier) including for air handling units and for reheat coils.
- steam converter or pumps for the heating water would not be required. It is assumed that the system could operate in a manner similar to the chilled water system, where a central PRV can regulate pressure to the building. Pressure would be provided by the district plant, this is assumed because this building is located close to the central plant and would be one of the first loads on the loop.

4.6.2.2 **Design Option 2 – Steam to Heating Water System**

In place of a PRV station as required for option 1, this system would require a steam converter with pump set. Refer to attached cut sheet for example skid. Similar skids were installed in the existing building during renovation of basement and 2nd floor.

4.6.2.3 **Library Addition Air Handling Unit (35,000 CFM)**

New AHU-6 is estimated at 35,000 CFM with 25% fresh air. It shall include the following components:

- Supply fan with a VFD
- Return fan with a VFD
- Fresh air/return air mixing plenum complete with motorized dampers
- Filter section with MERV 8 pre-filters and MERV 14 final filters
- Heating Coil (See Design Options Above)
- Steam Humidification
- Chilled Water Cooling coil (coil velocity of 400 FPM)
- Energy recovery wheel or piping (space dependent)
- Refer to example specifications included in this report for further information.

Preferred Manufacturers:

- HAAKON
- Engineered Air
• MAFNA

The heating will be provided via hot water heating coil. Utilize new service provided by Flooded Heat Exchanger assembly skid or low temperature heating water, refer to design options above.

Air shall be supplied at 59°F (15 ºC) and heated to local zone requirements by hydronic terminal reheat coils in Variable Air Volume (VAV) boxes.

4.6.2.4 Cafeteria Addition Air Handling Unit (5,150 CFM)

A new air handling unit (AHU-7) is estimated at 5,150 CFM and 20% outside air. It shall be provided to serve this space. The unit shall be mounted on the roof and provided with a service vestibule.

New AHU-7 should include the following components:

• Supply fan with a VFD
• Return fan with a VFD
• Fresh air/return air mixing plenum complete with motorized dampers
• Filter section with MERV 8 pre-filters and MERV 14 final filters
• Heating Coil (See Design Options Above)
• Steam Humidification
• Chilled Water Cooling coil (coil velocity of 400 FPM)
• Energy recovery wheel or piping (space dependent)
• Refer to example specifications included in this report for further information.

Preferred Manufacturers:

• HAAKON
• Engineered Air
• MAFNA

The heating will be provided via hot water heating coil. Utilize new service provided by new Flooded Heat Exchanger assembly skid or low temperature heating water, refer to design options above.

4.6.2.5 Air Distribution

An estimated 50 SF (7’ x 7’) shaft shall be required to bring supply and return ductwork (est’d 36” x 72” each) to each level of the addition from AHU-6. Refer to attached sketch.

An additional shaft (estimated 16 sf / 4’ x 4’) shall be required to bring supply and return ductwork (est’d 24’’ x 48’’ each) to 4th and 5th level zones to be served by AHU-6.

Air is to be supplied to spaces by appropriate application of linear, double-deflection grille, and square cone-type diffusers.
Return air to be collected from spaces by appropriate application of eggcrate grilles. Provide open return plenum with transfer ducts as required.

Supply and ventilation air shall be ducted with galvanized steel low velocity ducts, constructed in accordance with ASHRAE recommendations and SMACNA standards. The ductwork shall be sized based on an energy efficient 0.08 in. w.c. of friction loss per 100 feet.

Consideration shall be given to pressurizing the space to limit infiltration from the exterior.

VAV terminal units complete with reheat coils shall be located based on zoning requirements and user preferences. Each VAV box shall be controlled by a thermostat and will communicate with the main air handling unit.

**4.7 Exhaust Systems**

Existing washroom exhaust infrastructure shall be upgraded. Replace existing washroom fans and update intakes and ductwork to provide for exhaust rates according to latest ASHRAE 62.1 standards at a minimum.

New ducts and new shaft shall be required where new washrooms proposed. These shafts estimated to be between 1-4 square feet in area. Coordinate the shaft requirements with plumbing and drainage requirements. It is recommended that washrooms be aligned from floor to floor to minimize quantity of shafts required. Exact size of each shaft shall be based on the number of water closets proposed in new washroom spaces.

Exhaust system to be provided in mechanical/electrical room to limit temperature in summer.

**4.8 Miscellaneous Systems**

Entry vestibules and stairwells shall be provided with electric force-flow heaters.
5 Specifications

5.1 Mechanical Materials and Equipment

5.1.1 Intent
Operational and tested mechanical systems with facilities and services shall be provided to meet requirements described herein and in accordance with applicable codes and ordinances. Furnish certificates confirming work conforms to requirements of Authorities having jurisdiction.

5.1.2 Outline Specifications
Materials and equipment shall not be less than quality specified and of current models with published ratings and readily available replacement parts. Equipment shall have ULC, CSA or ASME nameplates as required by Authorities having jurisdiction. Equipment shall have manufacturer’s name, model number, capacity and serial number attached.

Air Handling Units (Refer to University of Guelph Standards DSM-01, item 2.2.7)
- Central AHU will be custom fabricated built-up air handlers with 100mm thick double wall
- Construction includes:
  - heavy gauge checkboard flooring
  - Stain coated Galvanized Steel G90
  - Marine Lights
  - Full size gasket access doors
  - High efficiency filter section with extended life filters at 95% efficiency
  - Energy Recovery Section
  - Factory pressure-tested cabinet
  - Steam Humidifier

Sanitary Drainage & Vent Piping
- Cast iron pipe and drainage fittings for 75mm and larger
- Type DWV copper tube

Water Distribution
- Type L copper tube and pressure fittings for sizes 65mm and smaller
• Type L copper tube only fittings for sizes 75mm and larger. All soldered connections.

Pipe Insulation

• Rigid fibreglass pipe insulation with all service jacket and preformed PVC jackets where insulation is exposed
• Insulation thickness to ASHRAE std. 90.1

Duct Insulation

• Rigid fibreglass duct insulation with vapour barrier jacket on rectangular ducts
• Flexible fibreglass duct insulation with vapour barrier jacket on round ducts only
• Canvas covering where insulation is exposed
• Insulation thickness to ASHRAE std. 90.1

Fire Extinguishers (Amerex Only)

• 4.5 kg (10 Lb) multi-purpose ABC (4A:60BC) dry chemical extinguisher.
• Extinguisher in cabinets providing required coverage and additional extinguishers in each mechanical and electrical service room.

Automatic Sprinkler

• upright heads, ULC listed plain bronze, standard pattern, ordinary rating
• flush pendant or concealed heads for feature areas, ULC listed, chrome plated, ordinary rating
• flow switches, ULC listed retarded vane type, SPDT

Plumbing Fixtures

• Water closets: white vitreous china, wall mounted, low flow touchless, open front seats less cover in general, with cover in barrier free applications
• Urinals: white vitreous china, wall hung, water saver sensor activated flush valve
• Lavatories: white vitreous china, open grid drains in general, sensor activated faucets, offset waste for barrier free applications
• Sinks: single and two compartment, stainless steel bowls with ledge, swing spout faucet with 75 mm lever blade handles
• Drinking Water/Bottle Fill stations: wall mount with high-efficiency cooler, non-filtered.
• Mop sink: floor mounted molded stone sinks, 600 mm x 900 mm, 200 mm wall-mount faucet with vacuum breaker. Complete with hands-free emergency eyewash station (with thermostatic mixing valve) and cold water hosebib with HCVB for soap dispenser.
• All plumbing fixtures to be hands-free, hard wired
Ductwork
  - Ductwork: G90 galvanized steel, lock forming quality,

Diffusers and Grilles
  - Supply: Square Cone Diffuser, EH Price SCD, Steel
  - Return: Eggcrate, EH Price 80, Steel

Terminal Units
  - Trench perimeter heaters
  - VAV boxes with reheat complete with 1" insulation

Controls
  - Direct digital controls system
  - Combination of electric and electronic control devices

Metering
  - Reserved

Testing and Balancing
The equipment and material shall be tested where specified or required by Authority having jurisdiction. Test shall be in accordance with applicable portions of ASME, ASHRAE, SMACNA, NFPA, CSA, and other recognized test codes. Balancing of air and water systems to be completed by a nationally certified balancing firm
2' X 7' SHAFT ALLOWS FOR
2 x 6"dia. LOW TEMP. HWS/R RISERS
2 x 6"dia. CWS/R RISERS
1 x 2"dia. STEAM RISER
1 x 1.5"dia. STEAM COND.
1 x 6"dia. SAN STACK
1 x 8"dia. STM STACK
1 x 4"dia. DCW RISER
1 x 6"dia. FP RISER

MAIN SERVICE CONNECTIONS TO TUNNEL SERVICES, PIPE TO NEW M&E ROOM. ALLOW FOR:
-4"dia. DCW
-6"dia. CWS/R
-6"dia. FP
-6" dia. LOW TEMP. HEATING WATER SUPPLY & RETURN

PROVIDE NEW MAIN CONNECTED TO EXISTING LP STEAM AND STEAM CONDENSATE

FIRE PUMP AS REQUIRED
ALLOW FOR HEATING WATER BUFFER TANKS AND EXPANSION TANKS
PRESSURE REDUCING STATION LOW TEMPERATURE HEATING WATER SERVICES
PRESSURE REDUCING STATION CHILLED WATER SERVICES

PROVIDE CONNECTION AND NEW MAIN TO EXISTING DHW PLANT

MSK-01
University of Guelph McLaughlin Library Master Plan Update
Mechanical System Design Brief
HVAC Design Option 1
Low Temperature Heating Water
Basement Mech. Rm.
April 8, 2019
mcS Project # 18092
Basement Mech Rm. Layout
Steam-to-Heating Water 1200 SF

2' X 7' SHAFT
ALLOWS FOR
2 x 4"dia. HWS/R RISERS
2 x 6"dia. CWS/R RISERS
1 x 2"dia. STEAM RISER
1 x 1.5"dia. STEAM COND.
1 x 6"dia. SAN STACK
1 x 8"dia. STM STACK
1 x 4" DCW RISER
1 x 6" FP RISER

MAIN SERVICE CONNECTIONS TO EXISTING TUNNEL SERVICES, PIPE TO NEW M&E ROOM. ALLOW FOR:
-4"dia. DCW
-6"dia. CWS/R
-6"dia. FP
PROVIDE NEW MAIN CONNECTED TO EXISTING LP STEAM AND STEAM CONDENSATE

FIRE PUMP AS REQUIRED
STEAM DUPLEX CONVERTER SKID C/W HWS/R DUPLEX PUMP
CONDENSATE DRAIN TO EXISTING SUMP
ALLOW FOR HEATING WATER BUFFER TANKS AND EXPANSION TANKS
PRESSURE REDUCING STATION CHILLED WATER SERVICES
PROVIDE CONNECTION AND NEW MAIN TO EXISTING DHW PLANT

MSK-02
University of Guelph McLaughlin Library Master Plan Update
Mechanical System Design Brief
HVAC Design Option 2
Steam-to-Heating Water
Basement Mech. Rm.
April 8, 2019
mcS Project # 18092
2' X 7' SHAFT
ALLOWS FOR
2 x 4" dia. HWS/R RISERS
2 x 6" dia. CWS/R RISERS
1 x 2" dia. STEAM RISER
1 x 1.5" dia. STEAM COND.
1 x 6" dia. SAN STACK
1 x 8" dia. STM STACK
1 x 4" DCW RISER
1 x 6" FP RISER

7' X 7' SHAFT
ALLOWS FOR
36" x 72" SA RISER
36" x 72" RA RISER

MSK-03
University of Guelph McLaughlin Library Master Plan Update
Mechanical System Design Brief
Proposed Addition Mechanical Spaces Level 1
April 8, 2019
mcS Project # 18092
Legend (staff)       net area
4. Program Rooms      13,355 SF
7. Staff Space         5,165 SF
6. Library Services               0 SF
9. Library Partners         1,840 SF
8. Grad Offices     0 SF
3. Archives               3,050 SF
5. Staff Meeting Rooms           900 SF
10. M&E / WCs / Storage        2,285 SF

D&A   Discovery & Access (0 staff)
UX User Experience (0 staff)
LAS  Learning and Accessibility (0 staff)
C&C  Collections & Content (21 staff)

Institutional Priority
TOTAL: 7,700 SF

2' X 7' SHAFT
ALLOWS FOR
2 x 4"dia. HWS/R RISERS
2 x 6"dia. CWS/R RISERS
1 x 2"dia. STEAM RISER
1 x 1.5"dia. STEAM COND.
1 x 6"dia. SAN STACK
1 x 8"dia. STM STACK
1 x 4" DCW RISER
1 x 6" FP RISER

7' X 7' SHAFT
ALLOWS FOR
36" x 72" SA RISER
36" x 72" RA RISER

MSK-04
University of Guelph McLaughlin Library Master Plan Update
Mechanical System Design Brief
Proposed Addition Mechanical Spaces Level 2
April 8, 2019
mcS Project # 18092
2' X 7' SHAFT
ALLOWS FOR
2 x 4"dia. HWS/R RISERS
2 x 6"dia. CWS/R RISERS
1 x 2"dia. STEAM RISER
1 x 1.5"dia. STEAM COND.
1 x 6"dia. SAN STACK
1 x 8"dia. STM STACK
1 x 4" DCW RISER
1 x 6" FP RISER

7' X 7' SHAFT
ALLOWS FOR
36" x 72" SA RISER
36" x 72" RA RISER

CONNECT NEW
DUCTS TO 4' X 4'
SHAFT ABOVE
ALLOWS FOR
24" x 48" SA RISER
24" x 48" RA RISER
TO SERVE 4TH AND
5TH FLOOR SPACES

MSK-05
University of Guelph McLaughlin Library Master Plan Update
Mechanical System Design Brief
Proposed Addition Mechanical Spaces Level 3
April 8, 2019
mcS Project # 18092
Penthouse Alternate Layout
One storey, 12' clear
4500 SF

2' x 7' SHAFT
ALLOWS FOR
2 x 6"dia. LOW TEMP. HWS/R RISERS
2 x 6"dia. CWS/R RISERS
1 x 2"dia. STEAM RISER
1 x 1.5"dia. STEAM COND.
1 x 6"dia. SAN STACK
1 x 8"dia. STM STACK
1 x 4"dia. DCW RISER
1 x 6"dia. FP RISER

8' x 18' INTAKE LOUVRE

36" x 72" SA RISER
36" x 72" RA RISER
7' x 7' SHAFT

4' x 4' SHAFT
ALLOWS FOR
24" x 48" SA RISER
24" x 48" RA RISER
TO SERVE 4TH AND 5TH FLOOR SPACES

8' x 18' EXHAUST LOUVRE

60 ft

75 ft

MSK-06
University of Guelph McLaughlin Library Master Plan Update
Mechanical System Design Brief
Penthouse Plan One storey, 12' clear
April 8, 2019
mcS Project # 18092
Penthouse Layout
Two storey, 24' clear
3000 SF

2' X 6' SHAFT
ALLOWS FOR
2 x 4"dia. HWS/R RISERS
2 x 6"dia. CWS/R RISERS
1 x 2"dia. STEAM RISER
1 x 1.5"dia. STEAM COND.
1 x 6"dia. SAN STACK
1 x 8"dia. STM STACK

36"X72" SA RISER
36"X72" RA RISER
7' X 7' SHAFT

8'X18' EXHAUST LOUVRE
8'X18' INTAKE LOUVRE
(LEVEL ABOVE)

4' X 4' SHAFT
ALLOWS FOR
24" x 48" SA RISER
24" x 48" RA RISER
TO SERVE 4TH AND 5TH FLOOR SPACES

TC BUILT-UP
EPF
HEAT WHEEL
ACCESS OPP SIDE
ACCESS OPP SIDE
ACCESS OPP SIDE
DRAIN FILL STEAM FLUE SH120 HUMIDIFIER

MSK-06a
University of Guelph McLaughlin Library Master Plan Update
Mechanical System Design Brief
Alternate Penthouse two storey, 24' clear
April 8, 2019
mcS Project # 18092
4' X 4' SHAFT ALLOWS FOR 24" x 48" SA RISER
24" x 48" RA RISER TO SERVE 4TH AND 5TH FLOOR SPACES
OPERATING CONDITIONS

THESE DRAWINGS REMAINS THE PROPERTY OF PRESTON PHIPPS INC. IT SHALL NOT BE MODIFIED, REPRINTED NOR TRANSFERRED WITHOUT THE WRITTEN CONSENT OF PRESTON PHIPPS INC.

INLET OUTLET INLET OUTLET

CAPACITY

FLUID

VAPOR FLOW

LIQUID FLOW

OPERATING TEMPERATURE

OPERATING PRESSURE

CONNECTIONS

# SIZE QTY DESCRIPTION TYPE RATING
N1 3" 2 STEAM INLET RF FLG 300#
N2 1-1/2" 2 CONDENSATE OUTLET NPT -
N3 3" 1 WATER INLET NPT -
N4 3" 2 WATER OUTLET RF FLG 300#
N5 2 water Baumann control valve 25000CF3 LV SR PC 24V 3/4" - 150#
N6 2 spring check valve SV4 1-1/2"
N7 10x Winters pressure gauge PFP659 liquid filled 4'' dial bottom 1/2'' NPT (0-100 psi)
N8 3x Armstrong air separator VAS-3-UM 3" NPT
N9 2x SA Armstrong suction guide SG-32 125#
N10 2x Armstrong flo-trex valve FTV-3FA 3" - 125#
N11 2x Armstrong trap 15B6 1-1/2" NPT
N12 1x Armstrong vent 21-AR 3/4" NPT
N13 4x Apollo brass ball valve 94ALF-104-01A 3/4'' NPT
N14 1x Winters thermometer 9IT 9'' TIM100A (30-240 F) 3/4'' NPT w/brass thermowell 3/4'' NPT

SHIPPED LOOSE PER SKID:
- 2x ARMSTRONG OVERFLOW TRAP CD33SL 3/4" NPT
- 1x INTEMPCO RTD R18A-L-P-1-S3-4-S-12S-TN-006-00-4" 1/2" NPT + WA2 + TW03A12L4 U=2.5" 3/4" NPT
- 1x MCDONNELL MILLER FLOW SWITCH FS4 1" NPT

General Notes:
- SYSTEM ASSEMBLED IN AN APPROVED CSA B51 SHOP
- ONLY ASME/ASTM APPROVED/REGISTERED FITTINGS ARE USED
- POSITION OF CONNECTIONS IS APPROPRIATE
- BLACK PAINTED HEAVY-DUTY CARBON STEEL STRUCTURE AND PIPING
- OVERFLOW OUTLET RECOMMENDED TO BE PIPED TO DRAIN OR CONDENSATE HEADER

Precedent shop drawing for reference only. Not indicative of capacity.
APPENDIX E
ELECTRICAL REPORT
ELECTRICAL REPORT

FOR

MCLAUGHLIN LIBRARY
MASTER PLAN

480 GORDON STREET, GUELPH, ONTARIO

OUR PROJECT NUMBER:

10219.004.E.001

DATE:

2019-08-06

ISSUED / REVISION:

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LIMITS OF LIABILITY ASSOCIATED WITH THIS DOCUMENT

1. HAZARDOUS MATERIALS

1.1. It is understood that hazardous materials may be present (e.g. asbestos, mould, PCB’s, etc.) within the existing building. The identification of and abatement recommendations with respect to hazardous materials is outside the scope of services considered in this document.

2. THIRD PARTY USE

2.1. Any use that a third party makes of this document, or reliance on or decisions to be based on it, are the responsibility of such third party. Smith + Andersen accepts no responsibility for damages, if any, suffered by any third party as a result of decisions made or actions based upon this document.

3. GENERAL LIMITS

3.1. The review of existing installations was general in nature and limited to casual, visual observation without removal of ceilings, chases, destructive testing or dismantling. The review was not exhaustive and was performed to acquire a general understanding of the condition of existing systems. Very limited existing drawings were made available for the review of existing system.

3.2. This document has been prepared solely for the use of the University of Guelph and its design team associated with the McLaughlin Library master plan. The material contained in this document reflects Smith + Andersen's best judgement in light of the information available at the time of preparation. There is no warranty expressed or implied. Professional judgement was exercised in gathering and assessing information. The recommendations presented are the product of professional care and competence and cannot be construed as an absolute guarantee.

3.3. Where equipment sizing is provided it should be considered order-of-magnitude only as the project details that may affect systems have not been established or finalized.
1. DESIGN STANDARDS

1.1. The Electrical systems will be designed in accordance with the current edition of the following Codes and Standards:

- Ontario Building Code (OBC)
- Ontario Electrical Safety Code (OESC)
- National Fire Protection Authority (NFPA)
- Ontario Fire Code
- Local Ordinances and Authorities
- Institute of Electrical and Electronic Engineers (IEEE) standards
- LEED
- Illumination Engineering Society (IES) Standards
- ASHRAE 90.1 “Energy Efficient Design of New Buildings”
- The National Energy Code For Buildings (NECB)
- University of Guelph Design Standards

1.2. This report was written to the active standards at the time writing. All information is subject to most recent standards at the time work is to be completed.

1.3. Section 2 of this report discusses the typical electrical systems that are to be provided throughout the library.

1.4. Section 3 of this report discusses the electrical installations to be installed in all areas of the library.

1.5. Section 4-7 of this report discusses the order to complete the electrical installations and breaking down the library renovation into smaller more manageable portions.

1.6. Refer to conceptual architectural floorplans for exact scope of new areas and required demolition locations. Refer to sections 4-7 for any locations where temporary installations are required for operation of the library to continue during the construction phase of the projects.

2. GENERAL

2.1. Existing Key Plans

2.1.1. Below are layouts showing the typical locations of electrical rooms, typical floor closets, and centralized devices in the existing portion of the library. Refer to architectural conceptual floor plans for each floor layout.

2.1.2. Not every floor contains security and IT infrastructure in closets, location of IT and security infrastructure to be confirmed on site prior to any work. IT and security devices to run to the nearest closet containing security or IT infrastructure.

The quadrants are shown to denote the floor area that is fed by each closet location, these quadrant divisions are typical for each floor. Quadrants are shown for reference only, exact division of the quadrants differs for each floor, and is based on the floor layout. Exact division of quadrants be confirmed prior to any work. Existing quadrant divisions to be re-used where possible based on the new room layouts, revise quadrants to accomodate new room layouts.
2.2. Essential Electrical Distribution

2.2.1. Existing electrical panels for essential power distribution to remain as is. Existing circuits from essential panels to be re-used for new essential electrical loads in existing spaces.

2.2.2. All new lighting panels to have a minimum of 42 circuits, and all new power and distribution panels to have a minimum of 48 circuits. All electrical panels to have copper bus and have a minimum 25% spare circuits. Refer to sections 3-7 for locations of new panels.

2.2.3. All new 600V electrical distribution equipment to have short circuit rating of 22kA, and new 120/208V electrical distribution equipment to have a short circuit rating of 10kA. All short circuit ratings are subject to findings of a short circuit study performed during the design process of the project. Refer to sections 3-7 for locations of new panels.

2.2.4. All new essential equipment to be painted orange as per University requirement.

2.3. Non-Essential Electrical Distribution

2.3.1. Existing receptacle and lighting panels to be replaced with new when work is being completed in the quadrant that the panel feeds. New electrical panels to match circuit quantity, panel ampacity, short circuit rating, and voltage of the existing panel. Relocate all existing circuits to be re-used from existing electrical panel to the new panel. Coordinate with University prior to initiating any work.

2.3.2. All new electrical distribution equipment for non-essential distribution to meet same requirements as essential distribution equipment as described in section 2.2. Refer to sections 3-7 for locations of new electrical distribution equipment.

2.3.3. The existing air handling units 2 & 4 shall be replaced. New electrical services shall be provided for these units and fed from the same distribution source the present ones are fed from.

2.4. Branch Wiring

2.4.1. Provide all electrical connections for new and relocated mechanical equipment. Provide 600V and 120V power to mechanical equipment as requested by the mechanical designer, provide new breakers and wiring as required. In existing space, 600V power
to be fed from nearest 600V distribution panel. Existing 600V electrical panels are located in basement electrical room and 5th floor electrical room. Refer to section 2.1 for room locations containing 600V equipment. Provide essential power feeds for mechanical equipment where required.

2.4.2. Duplex receptacles to be provided every 10m along usable wall space, except where receptacle are provided at a higher density for specific room types.

2.4.3. Additional receptacles to be provided based on area type as described in sections 3-7. Additional receptacles to the one specified in these sections shall be added at the Client's request.

2.4.4. All raceways to be concealed where possible. Where surface mount raceway is required it must be painted as per University requirements. Surface mounted raceway shall only be used after confirmation with the Client that it is an acceptable solution.

2.4.5. All raceways for new floor feeds to be new and be provided from floor below. Existing in floor raceways to be abandoned. Remove all unused conduit and wiring back to source and make safe. Where conduit and wiring cannot be removed, wiring to be made safe and left in place.

2.4.6. All conduits for floor feeds in existing library to be poke through unless otherwise noted. All conduits for floor feeds in new building extension to be cast-in place unless otherwise noted.

2.4.7. Special care to be taking with floor boxes above any archive spaces in the basement. Above archives, mounting of receptacles on columns shall be a suitable alternative to floor boxes, pac poles will not be permitted.

2.4.8. Provide a quadraplex receptacle next to every wall mounted communication outlet.

2.5. Lighting

2.5.1. All luminaires to be LED and be rated for at least 50,000 hours, have a colour temperature of 3500˚K, be 80 CRI, be rated for 120V and include all drivers for control as required for each space. Refer to section 2.6 and 3 to 7 for more details on lighting control.

2.5.2. Existing LED luminaires that are part of a space to be demolished to be re-used where possible. All LED luminaires, which are not being re-used to be turned over to the University, all other luminaires to be disposed of.

2.5.3. All lighting to be recessed 1’ x 4’ fixtures in T-bar, unless otherwise noted. All luminaires to be chain hung and supported from slab above. Luminaire to be a Visioneering LRTH and be complete with 0-10V dimming or equivalent alternative.
2.5.4. Illumination levels and lighting power density provided as per latest ASHRAE 90.1, University’s standards, and OBC. A summary of the requirements at the time of this report is shown in Table 1.

### Table 1: Lighting Requirements in Library Spaces

<table>
<thead>
<tr>
<th>Area for lighting</th>
<th>Maximum power density (W/ft²)</th>
<th>Average illumination at floor level (lx)</th>
<th>Average emergency lighting illumination at floor level [minimum level] (lx)</th>
<th>Specialty lighting required</th>
</tr>
</thead>
<tbody>
<tr>
<td>Corridor</td>
<td>0.66</td>
<td>250</td>
<td>10 [1]</td>
<td>No</td>
</tr>
<tr>
<td>Open Study/Graduate Commons/Study Carrels and Computers/LAS Services</td>
<td>0.82</td>
<td>400</td>
<td>10 [1]</td>
<td>No</td>
</tr>
<tr>
<td>Book Stacks</td>
<td>1.2</td>
<td>400</td>
<td>10 [1]</td>
<td>No</td>
</tr>
<tr>
<td>Exam Centre/Lecture Rooms</td>
<td>0.92</td>
<td>400</td>
<td>10 [1]</td>
<td>No</td>
</tr>
<tr>
<td>Group Rooms/Individual Offices</td>
<td>0.82</td>
<td>400</td>
<td>N/A</td>
<td>No</td>
</tr>
<tr>
<td>Open Office/Help Desk</td>
<td>0.82</td>
<td>400</td>
<td>10 [1]</td>
<td>No</td>
</tr>
<tr>
<td>Café Expansion</td>
<td>0.63</td>
<td>400</td>
<td>10 [1]</td>
<td>No</td>
</tr>
<tr>
<td>Meeting Rooms</td>
<td>1.07</td>
<td>400</td>
<td>0</td>
<td>Yes</td>
</tr>
<tr>
<td>Exit Stairwell</td>
<td>0.58</td>
<td>300</td>
<td>N/A</td>
<td>No</td>
</tr>
<tr>
<td>Feature Stairwell</td>
<td>0.82</td>
<td>300</td>
<td>10 [1]</td>
<td>Yes</td>
</tr>
<tr>
<td>Washrooms</td>
<td>0.85</td>
<td>250</td>
<td>10 [1]</td>
<td>No</td>
</tr>
<tr>
<td>Electrical and mechanical rooms</td>
<td>0.43</td>
<td>300</td>
<td>50 [10]</td>
<td>No</td>
</tr>
<tr>
<td>Elevator pit and hoist way</td>
<td>0.43</td>
<td>300</td>
<td>N/A</td>
<td>No</td>
</tr>
</tbody>
</table>
2.5.5. Emergency lighting to be reworked to achieve light levels as described in Table 1. Revised emergency lighting layouts in renovated spaces to be fed by existing essential circuits in ceiling space. Revise wiring to suit new layout as required. Provide additional circuits in existing essential lighting panels where required.

2.5.6. Exit Signs

All renovated and new spaces to contain green running man pictogram signs to highlight the path of egress. New exit signs to match existing green running man exits signs installed in renovated library spaces. All exit signs to meet CSA standards and have universal mounting. All exit signs to be supplied by a dedicated exit sign breaker on nearest essential lighting panel. All exit signs to be Beghelli Quadra RM or equal with universal mounting and universal voltage.

2.6. Lighting Controls

2.6.1. All lighting controls to be Wattstopper. The lighting control must be controlled by individual zones as per University's direction.

2.6.2. Existing library space lighting control is a stand alone Wattstopper control system. All lighting control systems to connect to existing stand alone lighting control system.

2.6.3. Daylight sensors to be provided to control the two rows of lights closest to the window. Daylight sensors to be provided in any room with a window. Lights controlled by daylight sensor to dim to maintain a constant light level at floor or applicable work surface as per Table 1 throughout the day.

2.6.4. Lights in renovated spaces in the existing library to be connected to existing master lighting controls for quadrant. Existing lights are on a time clock to turn off between the hours of 2 A.M. and 7A.M., with manual override located at each exit stair zoned per quadrant. Manual override to for all lights in section to be turned on for one hour, before being switched back to normal lighting control conditions.

2.6.5. Additional lighting controls to be added as per sections 3-7.

2.7. Fire Alarm

2.7.1. All new fire alarm systems and devices to match existing fire alarm manufacturer and to be addressable. The existing library fire alarm control panel is a single stage Notifier
NFS-640 system and is located in the basement. Refer to section 2.1 for key plan indicating the fire alarm panel location. Existing fire alarm control panel is at full capacity.

2.7.2. Any work on the fire alarm system needs to be tested and verified as per CAN-ULC standards.

2.7.3. All fire alarm devices which are removed are to be turned over to the University.

2.7.4. Existing library is not sprinklered, new library addition to be sprinklered. Coordinate exact location of sprinklered portion of building with mechanical designer.

2.7.5. Fire alarm zones in existing library to be maintained as is. Revise zones to suit new layouts where required. Additional zones to be added for new building extension.

2.7.6. Add additional fire alarm signalling and initiating circuits on existing Notifier system. Provide all necessary amplifiers, end-of-line-resistors, and additional panels as required for any additional circuits.

2.7.7. Initiating Devices

   .1 Fire Alarm pull stations to be provided at all exits from the library and at entrance to exit stairs on each floor.

   .2 Smoke detectors to be provided throughout non-sprinklered space. No smoke detectors are required throughout sprinklered space unless otherwise noted elsewhere in this report.

   .3 Where smoke detectors are required, spacing shall be as per current CAN-ULC-S524. Existing smoke and heat detector locations to be revised to suit new proposed library layout as required. Provide additional smoke detectors in existing building where required.

2.7.8. Signalling Devices

   .1 Fire alarm bells to be provided throughout space and achieve audibility as required by OBC.

   .2 Where strobes are required, placement and candela rating to be provided to achieve full coverage of space as per current CAN-ULC-S524.

   .3 Existing signalling device locations to be revised to suit new proposed library layout as required.

   .4 Provide additional horns and strobes throughout all areas to meet OBC and CAN-ULC-S524 requirements.

2.8. Communications

2.8.1. Existing communications system manufacturer is Commscope/Systimax. All new cabling and devices to be by Commscope/Systimax.

2.8.2. Provide new category 6 patch panel in existing IT rooms as required. Any existing category 5E and lower patch panels to be replaced with new category 6 patch panels. New patch panel to match existing library standard and adhere to Computing and Communication Services (CCS) requirements.
2.8.3. All communications cabling to be UTP category 6 cable and run to nearest communications closet, refer to section 2.1 for key plan indicating communication closet locations. Existing category 5E cabling and lower to be replaced with new UTP category 6 cabling in renovated spaces.

2.8.4. All communications cabling to be 90m or less from patch panel to termination point.

2.8.5. Wireless access points (WAPs) to be provided to cover entire library. WAPs have a coverage area with a radius of 25 feet. Revise current WAP locations to suit new proposed room layouts. Additional WAPs to be installed at the request of CCS to achieve adequate coverage throughout space.

2.8.6. Re-use existing WAPs in library to achieve coverage throughout space. Additional WAPs required to reach adequate coverage in space will be provided by CCS. Any WAPs that are removed are to be turned over to CCS.

2.8.7. Coordinate with University and Bell for any additional requirements to maintain operation of the Bell LTE system in the existing building space.

2.8.8. Pull boxes to be provided for all communication conduits every 27m, with a maximum of 180° bends between pull boxes.

2.8.9. Cabling to be free air above T-bar ceiling, and in conduit elsewhere. Conduit sizes to be sized as per Table 2.

<table>
<thead>
<tr>
<th>Conduit inside diameter (mm)</th>
<th>Trade Size (in)</th>
<th>Number of maximum cat. 6 cables capacity calculated at 40% conduit fill</th>
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</thead>
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</tr>
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<td>24</td>
</tr>
<tr>
<td>75</td>
<td>3</td>
<td>34</td>
</tr>
</tbody>
</table>
2.9. Security

2.9.1. All new security panels and devices to match existing security manufacturer. The existing library security controller is a Genetech device and is located in service closets at either end of the facility, refer to section 2.1 for key plan indicating security closet locations.

2.9.2. All new security devices to connect to nearest existing security controller.

2.10. Demolition

2.10.1. Refer to conceptual floor plans and sections 4-7 and conceptual layouts for scope of demolition work.

2.10.2. Remove and disconnect all existing electrical systems in demolished space, including but not limited to: lighting, lighting controls, power, mechanical connections, fire alarm devices, telecommunication devices, security devices, and AV devices.

2.10.3. Leave circuiting for removed lighting in ceiling space to be re-used as possible. Re-work existing lighting circuitry to suit new lighting layouts.

2.10.4. All unused conduit and wiring for electrical systems to be removed back to source and made safe.

2.10.5. Existing pathways to existing floor boxes to be abandoned. All new devices that are to be fed by new raceways. Remove all wiring from conduit embedded in concrete back to source and made safe. Where existing wiring cannot be removed from pathways, remove completely from panel and make safe.

2.10.6. Coordinate with University prior to initiating any demo work.

2.10.7. Maintain minimum light levels and fire alarm requirement as specified by OBC and m while areas are under construction.

3. Typical Areas Types

3.1. The following is additional requirement to section 2 for each area type described below. Unless otherwise noted, items in section 2 to be provided throughout area types unless otherwise noted.

3.2. Open Study

3.2.1. Branch Wiring

.1 Provide a wall mounted quadruplex outlet with USB at each furniture location along wall. If wall space is not accessible a receptacle mounted on a column is a suitable alternative.
.2 Where a wall mounted receptacle can not be provided at furniture location, floor boxes to be provided throughout space at all furniture locations and as required by the Client.
.3 Provide branch wiring as per section 2.4.

3.2.2. Lighting
.1 New LED cove lighting to be provided around all columns to replace existing lighting. New cove lighting to match cove lighting installed in basement around columns. Cove lighting to be indirect low profile lensed luminaire, Visioneering LCOM with 120V LED driver or equivalent alternative.
.2 Provide pendant mount linear LED luminaire in between all wood slats of ceiling. Light fixtures cables and housing to be hidden by wood slats. Fixture length to be provided to suit wood slat length. Strip light to be AXIS Lighting MBLED or equivalent alternative.
.3 Provide lighting as per section 2.5.

3.2.3. Lighting Control
.1 Existing building lighting control to have master control as per section 2.6.
.2 New building expansion lighting control to be as per section 7.

3.2.4. Fire Alarm
.1 Initiating Devices
   .1 Provide initiating devices as per section 2.7.
.2 Signalling Devices
   .1 Bells and strobes to be provided throughout space as per section 2.7.

3.2.5. Communications
.1 Provide communications devices as per section 2.8.

3.3. Graduate Commons

3.3.1. Power
.1 All desk locations not along wall to be bottom fed with a direct connection through the leg of the desk. Provide one circuit and one feed to furniture for 10 workstations.
.2 Desks along wall to have duplex receptacles with USB charging clipped on to the desk. Wiring for clipped to run along the underside of the table to a receptacle along wall. Where there is no accessible wall to mount a receptacle, receptacle to be mounted on the nearest column for power, receptacle on column to be hidden from view. Ensure all wiring is secured to the underside of the table. Receptacle on column to be hidden from view where possible.
.3 Provide branch wiring as per section 2.4.

3.3.2. Lighting
.1 New LED cove lighting to be provided around all columns to replace existing lighting. New cove lighting to match cove lighting installed in basement around columns. Cove lighting to be indirect low profile lensed luminaire, Visioneering LCOM with 120V LED driver or equivalent alternative.
.2 Lighting to be as per section 2.5.
3.3.3. Lighting Control
.1 Lighting control to be as per section 2.6.

3.3.4. Fire Alarm
.1 Initiating Devices
   .1 Provide initiating devices as per section 2.7.
.2 Signalling Devices
   .1 Bells and strobes to be provided throughout space as per section 2.7.

3.3.5. Communications
.1 Provide communications devices as per section 2.8.

3.4. Book Stacks/Compact Shelves

3.4.1. Branch Wiring
.1 Provide one direct connection for every ten bookshelves where there is compact shelves.
.2 Provide branch wiring as per section 2.4.

3.4.2. Lighting
.1 New LED cove lighting to be provided around all columns to replace existing lighting. New cove lighting to match cove lighting installed in basement around columns. Cove lighting to be indirect low profile lensed luminaire, A LCOM with 120V LED driver or equivalent alternative.
.2 Provide pendant mount 6ft linear LED luminaire in aisles of all book stacks. Strip light to be AXIS Lighting MBLED or equivalent alternative.
.3 Lighting to be as per section 2.5.

3.4.3. Lighting Control
.1 Existing building lighting control to have master control as per section 2.6.
.2 New building lighting control to be as per section 4.

3.4.4. Fire Alarm
.1 Initiating Devices
   .1 Provide initiating devices as per section 2.7.
.2 Signalling Devices
   .1 Bells and strobes to be provided throughout space as per section 2.7.

3.4.5. Communications
.1 Provide communications devices as per section 2.8.

3.5. Study Carrels/Computers

3.5.1. Branch Wiring
.1 All desk locations not along wall to be bottom fed with a direct connection through the leg of the desk. Provide one circuit and one feed to furniture for 10 workstations.
.2 Desks along wall to have duplex receptacles with USB charging clipped on to the desk. Wiring for clipped to run along the underside of the table to a receptacle along wall. Where there is no accessible wall to mount a receptacle, receptacle to be mounted on the nearest column for power, receptacle on column to be hidden from view. Ensure all wiring is secured to the underside of the table. Receptacle on column to be hidden from view where possible.

3.5.2. Lighting
.1 New LED cove lighting to be provided around all columns to replace existing lighting. New cove lighting to match cove lighting installed in basement around columns. Cove lighting to be indirect low profile lensed luminaire, Visioneering LCOM with 120V LED driver or equivalent alternative.
.2 Lighting to be as per section 2.5.

3.5.3. Lighting Control
.1 Existing building lighting control to have master control as per section 2.6.
.2 New building lighting control to be as per section 4.

3.5.4. Fire Alarm
.1 Initiating Devices
   .1 Provide initiating devices as per section 2.7.
.2 Signalling Devices
   .1 Bells and strobes to be provided throughout space as per section 2.7.

3.5.5. Communications
.1 Provide one communications outlet to each fixed workstation in computer area.
.2 Provide communications devices as per section 2.8.

3.6. Copy Area

3.6.1. Branch Wiring
.1 Provide one dedicated T-slot quadraplex receptacle for each printer and copier.
2.2 Provide branch wiring as per section 2.4.

3.6.2 Lighting
.1 Lighting to be as per section 2.5.

3.6.3 Lighting Control
.1 Provide ceiling mounted occupancy sensor for control of space.
.2 Existing building lighting control to have master control as per section 2.6.
.3 New building lighting control to be as per section 4.

3.6.4 Fire Alarm
.1 Initiating Devices
   .1 Provide initiating devices as per section 2.7.
.2 Signalling Devices
   .1 Bells to be provided throughout space as per section 2.7.

3.6.5 Communications
.1 Provide one communications outlet for each printer and copier.
.2 Provide communications devices as per section 2.8.

3.7 Display Area

3.7.1 Branch Wiring
.1 Provide one quadraplex receptacle for each TV display.
.2 Provide branch wiring as per section 2.4.

3.7.2 Lighting
.1 New LED cove lighting to be provided around all columns to replace existing lighting. New cove lighting to match cove lighting installed in basement around columns. Cove lighting to be indirect low profile lensed luminaire, Visioneering LCOM with 120V LED driver or equivalent alternative.
.2 Lighting to be as per section 2.5.

3.7.3 Lighting Control
.1 Existing building lighting control to have master control as per section 2.6.
.2 New building lighting control to be as per section 4.
3.7.4. Fire Alarm
   .1 Initiating Devices
      .1 Provide initiating devices as per section 2.7.
   .2 Signalling Devices
      .1 Bells to be provided throughout space as per section 2.7.

3.7.5. Communications
   .1 Provide one communications outlet for each TV display.
   .2 Provide communications devices as per section 2.8.

3.8. LAS Services

3.8.1. Branch Wiring
   .1 Provide one duplex receptacle with USB charging at every workstation.
   .2 Provide one dedicated T-slot quadraplex receptacle for each printer and copier.
   .3 Provide branch wiring as per section 2.4.

3.8.2. Lighting
   .1 Lighting to be as per section 2.5.

3.8.3. Lighting Control
   .1 Provide ceiling mounted occupancy sensor for control of space.
   .2 Existing building lighting control to have master control as per section 2.6.
   .3 New building lighting control to be as per section 4.

3.8.4. Fire Alarm
   .1 Initiating Devices
      .1 Provide initiating devices as per section 2.7.
   .2 Signalling Devices
      .1 Bells and strobes to be provided throughout space as per section 2.7.

3.8.5. Communications
   .1 Provide one communications outlet for each printer.
   .2 Provide one communications outlet to each workstation.
   .3 Provide communications devices as per section 2.8.

3.9. Institutional Priority Rooms

3.9.1. Branch Wiring
   .1 Duplex receptacles to be provided every 5m along usable wall space.
   .2 Provide branch wiring as per section 2.4.

3.9.2. Lighting
   .1 Lighting to be as per section 2.5.

3.9.3. Lighting Control
1. Provide ceiling mounted occupancy sensor with override dimming capability at each entrance to the room.
2. Two dimmers to be provided in each exam centre. One dimmer switch to control the row of lights closest to the front of the exam centre. The other dimmer switch is to control the rest of the lights in the space.
3. Existing building lighting control to have master control as per section 2.6.
4. New building lighting control to be as per section 4.

3.9.4. Fire Alarm
   1. Initiating Devices
      1. Provide initiating devices as per section 2.7.
   2. Signalling Devices
      1. Bells to be provided throughout space as per section 2.7.

3.9.5. Communications
   1. Provide communications devices as per section 2.8.

3.10. Group Room
3.10.1. Branch Wiring
   1. Provide one duplex receptacle on each wall of every room.
   2. Provide branch wiring as per section 2.4.

3.10.2. Lighting
   1. All lighting to be recessed 2’ x 2’ fixtures in T-bar. All luminaires to be chain hung and supported from slab above. Luminaire to be a Visioneering LRTH and be complete with 0-10V dimming or equivalent alternative.
   2. Lighting to be as per section 2.5.

3.10.3. Lighting Control
   1. Provide ceiling mounted occupancy sensor with override dimming capability at entrance to the room.
   2. Existing building lighting control to have master control as per section 2.6.
   3. New building lighting control to be as per section 4.

3.10.4. Fire Alarm
   1. Signalling Devices
      1. Audibility levels in offices upon fire alarm activation to be as per OBC. Bells are not to be provided in offices.
      2. Special care to be taken with rooms to achieve required audibility levels as they will be acoustically lined.

3.10.5. Communications
   1. Provide one wall mounted communications outlet in each room.
   2. Provide communications devices as per section 2.8.

3.11. Help Desks
3.11.1. Branch Wiring
   .1 Provide one quadraplex receptacle for every workstation located at help desks.
   .2 All power to be fed from floor below. All coring required to be provided to allow for necessary receptacles.
   .3 Provide branch wiring as per section 2.4.

3.11.2. Lighting
   .1 New LED cove lighting to be provided around all columns to replace existing lighting. New cove lighting to match cove lighting installed in basement around columns. Cove lighting to be indirect low profile lensed luminaire, Visioneering LCOM with 120V LED driver or equivalent alternative.
   .2 Lighting to be as per section 2.5.

3.11.3. Lighting Control
   .1 Existing building lighting control to have master control as per section 2.6.
   .2 New building lighting control to be as per section 4.

3.11.4. Fire Alarm
   .1 Initiating Devices
      .1 Provide initiating devices as per section 2.7.
   .2 Signalling Devices
      .1 Bells and strobes to be provided throughout space as per section 2.7.

3.11.5. Communications
   .1 Provide one communications outlet for every workstation. Conduit for all communication outlets to be poke through conduits from floor below. All coring to be provided for the required communication outlets.
   .2 Provide communications devices as per section 2.8.

3.12. Individual Offices

3.12.1. Branch Wiring
   .1 Provide one duplex receptacle on each wall of every staff office.
   .2 Provide branch wiring as per section 2.4.

3.12.2. Lighting
   .1 All lighting to be recessed 2’ x 2’ fixtures in T-bar. All luminaires to be chain hung and supported from slab above. Luminaire to be a Visioneering LRTH and be complete with 0-10V dimming or equivalent alternative.
   .2 Lighting to be as per section 2.5.

3.12.3. Lighting Control
   .1 Provide ceiling mounted occupancy sensor with override dimming capability at entrance to the room.
   .2 Existing building lighting control to have master control as per section 2.6.
   .3 New building lighting control to be as per section 4.

3.12.4. Fire Alarm
.1 Signalling Devices
   .1 Audibility levels in offices upon fire alarm activation to be as per OBC. Bells
   are not to be provided in offices.

3.12.5. Communications
   .1 Provide one wall mounted communications outlet in each office on the wall where
   the desk is located for a computer connection.
   .2 Provide communications devices as per section 2.8.

3.13. Open Office Area

3.13.1. Branch Wiring
   .1 Provide floor fed furniture whips to all desks in space. One circuit to be provided
   for every three workstations.
   .2 Provide a direct connection to each height adjustable table to office spaces.
   .3 Provide branch wiring as per section 2.4.

3.13.2. Lighting
   .1 New LED cove lighting to be provided around all columns to replace existing
   lighting. New cove lighting to match cove lighting installed in basement around
   columns. Cove lighting to be indirect low profile lensed luminaire, Visioneering
   LCOM with 120V LED driver or equivalent alternative.
   .2 Lighting to be as per section 2.5.

3.13.3. Lighting Control
   .1 Existing building lighting control to have master control as per section 2.6.
   .2 New building lighting control to be as per section 4.

3.13.4. Fire Alarm
   .1 Initiating Devices
   .1 Provide initiating devices as per section 2.7.
   .2 Signalling Devices
   .1 Bells and strobes to be provided throughout space as per section 2.7.

3.13.5. Communications
   .1 Provide one communication outlet to each workstation. Conduit for
   communication outlet to be floor fed. All conduits are to be concealed.
   .2 Provide communications devices as per section 2.8.

3.14. Café Expansion

3.14.1. Branch Wiring
   .1 Power to be provided as per section 2.4.

3.14.2. Lighting
   .1 Lighting to be as per section 2.5.

3.14.3. Lighting Control
3.14.4. Fire Alarm
   .1 Initiating Devices
      .1 No smoke detectors are required throughout space.
   .2 Signalling Devices
      .1 Bells and strobes to be provided throughout space as per section 2.7.

3.14.5. Communications
   .1 Provide communications devices as per section 2.8.

3.15. Meeting and Program Rooms

3.15.1. Branch Wiring
   .1 Provide a receptacle every 2m along wall space. Provide one receptacle on each wall for walls that are shorter than 2m.
   .2 Provide one quadraplex outlet at TV location.
   .3 Provide a floor box with a quadraplex outlet in centre of room.
   .4 Provide branch wiring as per section 2.4.

3.15.2. Lighting
   .1 Add specialty lighting, including but not limited to, pot lights and pendants as required by user needs.
   .2 The light nearest to the exit door to be provided by essential power.
   .3 Lighting to be as per section 2.5.

3.15.3. Lighting Control
   .1 Add specialty lighting control by Crestron. Scenes to be programmed as required by user needs.
   .2 Existing building lighting control to have master control as per section 2.6.
   .3 New building lighting control to be as per section 4.

3.15.4. Fire Alarm
   .1 Initiating Devices
      .1 Provide initiating devices as per section 2.7.
   .2 Signalling Devices
      .1 Bells audibility to be provided throughout space as per section 2.7.

3.15.5. Communications
   .1 Provide one communications outlet for TV location.
   .2 Provide one communications outlet in floor box in centre of the room.
   .3 Provide communications devices as per section 2.8.

3.15.6. AV
   .1 Provide one AV outlet at TV location.
   .2 Provide one AV outlet in floor box at centre of meeting room.
.3 Provide conduit to connect AV outlet at floor box to AV outlet at TV.

3.16. **Feature Stairwells**

3.16.1. Branch Wiring
.1 Provide branch wiring as per section 2.4.

3.16.2. Lighting
.1 Specialty lighting to be provided on second floor to provide light in entire stairwell. Lights to be suspend linear 4 ft fixtures, fixtures to be Starfire 4” VersaLux LED Slot with 0-10V dimming or equivalent alternative.
.2 Lighting to be as per section 2.5.

3.16.3. Lighting Control
.1 Lighting control to be as per section 2.6.
.2 Existing building lighting control to have master control as per section 2.6.
.3 New building lighting control to be as per section 4.

3.16.4. Fire Alarm
.1 Initiating Devices
   .1 Provide a smoke detector around interconnected space on the second floor with spacing as per CAN-ULC-S524.
.2 Signalling Devices
   .1 Bells and strobes to be provided throughout space as per section 2.7.

3.16.5. Communications
.1 Provide communications devices as per section 2.8.

3.17. **Exit Stairwells**

3.17.1. Branch Wiring
.1 Provide one receptacle in exit stairwells on every second floor.

3.17.2. Lighting
.1 Provide wall mounted LED strip lights at every stairwell landing. All lights to be on emergency power. Fixture to be Metalumen Rail2 with 0-10V dimming or equivalent alternative.

3.17.3. Lighting Control
.1 All lights to not have controls. Lights to remain on at all times.

3.17.4. Fire Alarm
.1 Initiating Devices
   .1 Provide a smoke detector on the top floor of every stairwell and on every third floor below that.
.2 Signalling Devices -
   .1 Bells to be provided on every floor that contains a smoke detector.
3.17.5. Communications
   .1 Provide communications devices as per section 2.8.

3.18. **M & E Spaces**

3.18.1. Branch Wiring
   .1 20A T-slot receptacles to be provided every 4m in all spaces.
   .2 At least one receptacle in each room to be on essential power.
   .3 Provide branch wiring as per section 2.4.

3.18.2. Lighting
   .1 Provide suspended LED strip lights throughout space. All strip lights to be suspended below any equipment or piping supported from the ceiling. All lights to be on emergency. Fixture to be Metalux SNLED series with LED driver or equivalent alternative.

3.18.3. Lighting Control
   .1 Light Switch to be provided to allow for on/off control of all lights in space.

3.18.4. Fire Alarm
   .1 Initiating Devices
      .1 Provide heat and smoke detectors in electrical and IT rooms with spacing as per CAN-ULC-S524.
      .2 Provide one heat detector in all mechanical rooms.
   .2 Signalling Devices
      .1 Bells and strobes to be provided throughout space as per section 2.7.

3.18.5. Communications
   .1 Provide one communications outlet at entrance to each space.
   .2 Provide communications devices as per section 2.8.
3.19. **Washroom**

3.19.1. **Branch Wiring**

.1 Provide direct connection to low voltage transformers for auto-flush and auto-faucet sensors for all sinks, toilets, and urinals in washrooms.

.2 Provide direct connection for all hand dryers in washrooms.

.3 Provide a 120V for all door operators where required as specified by architect. Provide back box for all push button locations as indicated by architect. Provide a ¾” conduit from the automatic door operator to each required push button location.

.4 Provide branch wiring as per section 2.4.

3.19.2. **Lighting**

.1 Lighting to be as per section 2.5.

3.19.3. **Lighting Control**

.1 Provide PIR occupancy ceiling mount occupancy sensor for all open washrooms.

.2 For any individual washrooms provide wall mount occupancy sensor with an integrated on/off switch.

3.19.4. **Fire Alarm**

.1 Signalling Devices -

   .1 Provide bells and strobes in washrooms as per section 2.7.
3.19.5. Communications  
   .1 Provide communications devices as per section 2.8.

3.20. Elevator Pit and Hoist Way

3.20.1. Branch Wiring  
   .1 Provide one dedicated GFI receptacle at top of shaft and the pit.

3.20.2. Lighting  
   .1 Provide wall mounted LED strip light on emergency power in elevator pit and top of shaft. Fixture to be water proof. Fixture to be Metalux Vaporite series with LED driver or equivalent alternative.

3.20.3. Lighting Control  
   .1 Lights in elevator shaft to be controlled by an on/off light switch which can be reached from the elevator doors.

3.20.4. Fire Alarm  
   .1 Initiating Devices  
      .1 Provide heat and smoke detectors in elevator pit and at top of shaft.
      .2 Provide heat and smoke detector in every elevator lobby.

4. PRIORTY 1 – TRANSFORM MAIN ENTRY LEVEL

4.1. This section indicates the work flow for this priority only. All electrical work to be completed as is described in sections 2 and 3.

4.2. Refer to conceptual floor plans for layouts and scope of demo and new rooms.

4.3. Provide new electrical systems for a new welcome desk as per help desk typical room in section 3.

4.4. New main entrance to be provided on north façade to Winegard Walk. Provide new door security at all new entrances into library space. Security at entrances to include; automatic door operators, card reader, electric strikes, and door contacts. Doors at entrance to be swing doors with an automatic door opener or automatic sliding doors to be confirmed with architect prior to installation. A new air curtain will also be incorporated into the main entrance and therefore will require 120/208V power from the panel that serves the space.

4.5. Relocate staff space on first floor to other locations to allow for temporary workstation as construction is being completed. Staff to be relocated to basement level room 019 and other spaces as directed by the University staff.

4.5.1. Remove all electrical devices in the spaces to be demolished on the main floor in the staff areas as per section 2.10 as indicated on architectural conceptual plans.

4.6. Create new help desk locations, staff spaces, washrooms, meeting rooms, and open study space on first floor as per typical room layouts of the existing library space as indicated on conceptual floor plans.
5. **PRIORTY 2 – TRANSFORM ASEDEMIC LIBRARY LEVEL 1 & LEVEL 6**

5.1. This section indicates the work flow for this priority only. All electrical work to be completed as is described in sections 2 and 3.

5.2. Refer to conceptual floor plans for layouts and scope of demo and new rooms.

5.3. **Level 6**

5.3.1. Remove all electrical devices in existing space on sixth floor to be demolished unless noted otherwise in this section as per requirements of section 2.10.

5.3.2. All individual rooms on the sixth floor to be designed to the group room requirements.

5.3.3. Provide new electrical systems as per graduate commons typical room in section 3 for Phase 1 in all open study areas.

5.3.4. Reuse existing wiremold and receptacle for carrel seating as a part of Phase 2.

5.3.5. Provide new power for carrel seating layout as per graduate commons typical room in section 3 for Phase 2 in open workstations area.

5.3.6. Prove card readers, electric strikes, and door contacts for all entrance to graduate commons area.

5.4. **Level 1**

5.4.1. Remove all remaining electrical devices in the spaces to be demolished on the main floor in the staff areas as per section 2.10 as indicated on architectural conceptual plans.

5.5. Create new help desk locations, staff spaces, washrooms, meeting rooms, LAS service, lounge area and open study space on first floor as per typical room layouts of the existing library space as indicated on conceptual floor plans.

6. **PRIORTY 3 – TRANSFORMING LEVELS 2-5**

6.1. This section indicates the work flow for this priority only. All electrical work to be completed as is described in sections 2 and 3.

6.2. Refer to conceptual floor plans for layouts and scope of demo and new rooms.

6.3. **Level 2**

6.3.1. Remove all electrical devices in closed office spaces as per section 2.10.

6.3.2. Expand existing study carrels into demolished space as per study carrels typical room.

6.4. **Level 3**

6.4.1. Remove all electrical devices in closed office spaces as per section 2.10.

6.4.2. Expand existing study carrels into demolished space as per study carrels typical room.

6.5. **Level 4 & 5**

6.5.1. Consolidate collections on floors 4 and 5
6.5.2. Expand seating area on floors 4 and 5 as per open study typical rooms where indicated on architectural conceptual plans.

7. **PRIORITY 4 – CONSTRUCT A FOUR-STOREY ADDITION**

7.1. **Essential Electrical Distribution**

7.1.1. Extension to be added to basement electrical room. All new electrical equipment to be located in this room unless otherwise noted. The room size shall be approximately 100sq.ft (10’ x 10’).

7.1.2. Provide new 200A, 600V essential splitter #1 in new electrical room extension fed from existing 200A fused disconnect on existing essential panel from existing essential distribution loop.

7.1.3. Provide new 200A, 200AF, 600V fused disconnect for existing essential feed to manual transfer switch from essential splitter #1.

7.1.4. Provide new 100A, 100AF, 600V fused disconnect for new essential feed to new automatic transfer switch from essential splitter #1.

7.1.5. Provide new 100A automatic transfer switch #1 in new electrical room extension. The essential feed for the transfer switch to be fed from essential splitter #1. The normal feed of the transfer switch to be fed from a new 100A breaker on existing normal panel BP1 located in basement electrical room.

7.1.6. New Automatic transfer switch one to feed 125A, 600V, 3PH, 3W essential distribution panel #1.

7.1.7. New 15 HP fire pump to be fed from 600V essential distribution panel #1.

7.1.8. Provide 15kVA essential transformer #1 in new electrical extension fed from essential distribution panel #1. New essential transformer #1 to feed a new 125A, 120/208V essential panel #2 located in new electrical room extension.

7.1.9. Essential panels #1 and #2 to feed all life safety essential loads in new extension.

7.1.10. Provide new 200A, 150AF, 600V fused disconnect for new non-life safety essential feed to new automatic transfer switch from essential splitter #1.

7.1.11. Provide new 150A automatic transfer switch #2 in new electrical room extension. The essential feed for the transfer switch to be fed from essential splitter #1. The normal feed of the transfer switch to be fed from a new 150A breaker on existing normal panel BP1 located in basement electrical room.


7.1.13. Provide 15kVA non-life safety essential transformer #1 in new electrical extension fed from non-life safety essential distribution panel #1. New non-life safety essential
transformer #1 to feed a new 125A, 120/208V non-life safety essential panel #2 located in new electrical room extension.

7.1.14. - Non-life safety essential panels #1 and #2 to feed all non-life safety essential loads in new extension.

7.2. Normal Electrical Distribution

7.2.1. Provide new 200A, 600V splitter #3 in new electrical room extension for normal electrical power. Replace spare 70A breaker in panel BP1 with a 200A breaker. New normal splitter to be fed from new 200A breaker on existing normal panel BP1 located in basement electrical room.

7.2.2. All large mechanical equipment to be fed from 600V power by splitter #3. Mechanical equipment includes, but is not limited to:
- Air handling units
- Chilled water pumps
- Exhaust fans
- Force flow heater
- Heating pumps
- VAVs
- Elevators
7.2.3. Provide 150kVA transformer in new electrical room extension to feed new 400A, 120/208V distribution panel #2 in new electrical penthouse from new splitter #2.
7.2.4. Panel #2 to feed new 125A, 120/208V panel #3 in new electrical room extension for all loads in electrical and basement extension.

7.2.5. Panel #2 to feed new 125A, 120/208V panel #4 in mechanical penthouse for all loads in electrical and mechanical penthouse.

7.2.6. Panel #2 to feed one 125A, 120/208V power and one 125A, 120/208V lighting panel in new proposed electrical closet location on each floor. Power and lighting panel on each floor to feed all power and lighting in new proposed extension.

7.3. Branch Wiring
7.3.1. Outlets to be provided as per typical rooms in sections 2 and 3.

7.3.2. All floor mounted receptacles to be cast-in-place.

7.4. Lighting
7.4.1. Lighting to be provided as per typical rooms in sections 2 and 3.

7.4.2. All exit signs in new extension to be green running man. Any areas in the existing building that currently contain red exit signs to be replaced with new green running man exit signs.

7.5. Lighting Controls
7.5.1. Lighting controls to be provided as per typical rooms in sections 2 and 3.

7.5.2. All lights to be on a time clock to turn off between the hours of 2 A.M. and 7 A.M., with manual override located at stairs for new section. Manual override to be dimming and
allow for all lights in section to be turned on for one hour, before being switched back to normal lighting control conditions.

7.5.3. Lighting control system in new extension shall be tied into building BAS system. Tie new stand alone system into existing Wattstopper system in existing library space.

7.6. Fire Alarm

7.6.1. New extension to be sprinklered.

7.6.2. New extension to have fire alarm zones to match sprinkler zones. Provide additional fire alarm zones as required by the OBC.

7.6.3. Existing fire alarm zones shall not be extended into new building extension.

7.6.4. Initiating Devices
.1 Initiating devices to be provided as per typical rooms in sections 2 and 3.
.2 On the second floor around the interconnected floor space.
.3 Provide contacts for control of all supervised valves and flow switches for new sprinkler system connected to new data gathering panel.
.4 Provide duct type smoke detectors for all air handling devices that serve more than one floor.

7.6.5. Signalling Devices
.1 Signalling devices to be provided as per typical rooms in sections 2 and 3.
.2 Provide a new remote data gathering panel near new entrance in extension that is connected to existing fire alarm panel.

7.7. Communications

7.7.1. Communication devices to be provided as per typical rooms in sections 2 and 3.

7.7.2. All communications devices in new extension to be run back to nearest existing IT closet.

7.8. Security

7.8.1. Provide necessary security requirements for main entrance in Priority 1. Security at entrance to match new entrance requirements of new building extension as described in section 4.

7.9. AV

7.9.1. AV devices to be provided as per typical rooms in sections 2 and 3.
Contents

1.0 Introduction 1
2.0 Executive Summary 2
3.0 Development Cost Summary 3
4.0 Basis & Assumptions 5
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8.0 Taxes 7
9.0 Project Schedule & Escalation 8
10.0 Pricing 8
11.0 Risk Mitigation 8
12.0 Contingencies 8
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    Appendices 10

Prepared By | Reviewed By | Date
---|---|---
Annie Liu | Scott Wilkinson | August 27, 2019
1.0 Introduction

1.1 Instructions Received

This report has been prepared by BTY Group (“BTY”) at the request of McCallum Sather Architects (the “Client”). McCallum Sather Architects has appointed BTY to provide a Class D estimate developed for the Renovation & Addition of McLaughlin Library at the University of Guelph (the “Project”). The delivery model has yet to be determined and, therefore, BTY strongly recommends that estimates are prepared at each of the key design milestones.

Information related to the Project for the purposes of this report was received by BTY between April “July, 2019. Please refer to Section 13.0 for confirmation of what information has been reviewed for the purposes of producing this report.

1.2 Report Reliance

This report has been prepared in accordance with the scope of our Fee Proposal dated September 14, 2018. This report is for the sole and confidential use and reliance of the Client. BTY Group, it’s Directors, staff or agents do not make any representation or warranty as to the factual accuracy of the information provided to us, the Client or other third party consultants or agents, upon which this report is based. BTY Group will not be liable for the result of any information not received which, if produced, could have materially changed the opinions or conclusions stated in this report. This report shall not be reproduced or distributed to any party without the express permission of BTY Group.

Any advice, opinions, or recommendations within this document should be read and relied upon only in the context of this report as a whole. The contents of this report do not provide legal, insurance or tax advice or opinion. Opinions in this report are not an advocate for any party and if called upon to give oral or written testimony it will be given on the same assumption.

1.3 Contacts

Should you have any queries regarding the content of this report, please do not hesitate to contact either of the following:

Annie Liu, PQS, GSC
Senior Cost Consultant
Tel: 416-596-9339
Email: AnnieLiu@bty.com

Scott Wilkinson, MRICS, PQS
Director
Tel: 416-596-9339
Email: ScottWilkinsonon@bty.com
2.0 Executive Summary

2.1 Report Purpose

The purpose of this report is to provide a realistic assessment of the Project cost based on the information available at the time of writing.

The opinion expressed in this report has been prepared without the benefit of reviewing any detailed architectural, structural, mechanical or electrical drawings and should, therefore, be considered as a Class D estimate. Based on the documents reviewed, our opinion on cost would be correct within a range of approximately +/- 20% to 30%.

In order to provide an accurate cost estimate for the Project, BTY Group strongly recommends that a Professional Quantity Surveying organization, such as BTY Group, be retained to provide a detailed analysis of any design information produced on behalf of the Client during the design development and construction phases.

2.2 Project Background and Description

McLaughlin Library was built in 1968 and has remained the sole research library since then. The purpose of existing area renovations and new addition are to meet future students and staff needs, like library’s programs, space allocations, add spaces for increased students etc.

The scope of work consists of demolition works, interior fit-ups and making good of existing. Also, the construction of a new building addition including structural work, building envelope and full interior fit-up.

Mechanical and Electrical work include new Plumping, HVAC, Fire protection, Services and distribution, Lighting, Devices and Heating, System and Ancillaries, as well as modify the existing system.

It has been requested that we forecast escalation for the project to commence in 2020, 2025 and 2030. The results of such have been included within this report.
2.3 Project Overview

<table>
<thead>
<tr>
<th>Construction Budget (2020)</th>
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<th>2025</th>
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<td>$39,700,000</td>
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<td>118,750 ft²</td>
<td>118,750 ft²</td>
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<td>2023</td>
<td>2028</td>
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<td>Construction Completion (assumed)</td>
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<td>21.7%</td>
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<td>Construction Contingency</td>
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3.0 Development Cost Summary

The current estimated cost of the project if construction during 2020-2022 may be summarized as follows:

<table>
<thead>
<tr>
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<th>Estimated Costs ($)</th>
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<tr>
<td>A Land Cost (Excluded)</td>
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</tr>
<tr>
<td>B Construction</td>
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</tr>
<tr>
<td>C Allowances</td>
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</tr>
<tr>
<td>D Professional Fees</td>
<td>0</td>
</tr>
<tr>
<td>E Municipal &amp; Connection Fees</td>
<td>0</td>
</tr>
<tr>
<td>F Management &amp; Overhead</td>
<td>0</td>
</tr>
<tr>
<td>G Project Contingency</td>
<td>0</td>
</tr>
<tr>
<td>H Furnishing, Fittings &amp; Equipment</td>
<td>0</td>
</tr>
<tr>
<td>I Financing Costs</td>
<td>0</td>
</tr>
<tr>
<td>J Harmonized Sales Tax</td>
<td>0</td>
</tr>
<tr>
<td><strong>Total Project Cost</strong></td>
<td><strong>$27,474,000</strong></td>
</tr>
<tr>
<td>K Escalation 9.7%</td>
<td>2,676,000</td>
</tr>
<tr>
<td><strong>Escalated Project Cost (2022)</strong></td>
<td><strong>$30,150,000</strong></td>
</tr>
</tbody>
</table>
The current estimated cost of the project if construction during 2023-2025 may be summarized as follows:

<table>
<thead>
<tr>
<th>Item</th>
<th>Estimated Costs ($)</th>
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<tbody>
<tr>
<td>A Land Cost (Excluded)</td>
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<td>D Professional Fees</td>
<td>0</td>
</tr>
<tr>
<td>E Municipal &amp; Connection Fees</td>
<td>0</td>
</tr>
<tr>
<td>F Management &amp; Overhead</td>
<td>0</td>
</tr>
<tr>
<td>G Project Contingency</td>
<td>0</td>
</tr>
<tr>
<td>H Furnishing, Fittings &amp; Equipment</td>
<td>0</td>
</tr>
<tr>
<td>I Financing Costs</td>
<td>0</td>
</tr>
<tr>
<td>J Harmonized Sales Tax</td>
<td>0</td>
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<tr>
<td><strong>Total Project Cost</strong></td>
<td><strong>$27,474,000</strong></td>
</tr>
<tr>
<td>K Escalation 21.7%</td>
<td>$5,954,000</td>
</tr>
<tr>
<td><strong>Escalated Project Cost (2025)</strong></td>
<td><strong>$33,428,000</strong></td>
</tr>
</tbody>
</table>

The current estimated cost of the project if construction during 2028-2030 may be summarized as follows:

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<thead>
<tr>
<th>Item</th>
<th>Estimated Costs ($)</th>
</tr>
</thead>
<tbody>
<tr>
<td>A Land Cost (Excluded)</td>
<td>0</td>
</tr>
<tr>
<td>B Construction</td>
<td>$27,474,000</td>
</tr>
<tr>
<td>C Allowances</td>
<td>0</td>
</tr>
<tr>
<td>D Professional Fees</td>
<td>0</td>
</tr>
<tr>
<td>E Municipal &amp; Connection Fees</td>
<td>0</td>
</tr>
<tr>
<td>F Management &amp; Overhead</td>
<td>0</td>
</tr>
<tr>
<td>G Project Contingency</td>
<td>0</td>
</tr>
<tr>
<td>H Furnishing, Fittings &amp; Equipment</td>
<td>0</td>
</tr>
<tr>
<td>I Financing Costs</td>
<td>0</td>
</tr>
<tr>
<td>J Harmonized Sales Tax</td>
<td>0</td>
</tr>
<tr>
<td><strong>Total Project Cost (September 2016 Dollars)</strong></td>
<td><strong>$27,474,000</strong></td>
</tr>
<tr>
<td>K Escalation 44.5%</td>
<td>12,226,000</td>
</tr>
<tr>
<td><strong>Escalated Project Cost (2030)</strong></td>
<td><strong>$39,700,000</strong></td>
</tr>
</tbody>
</table>

*Please note that, where zero dollar values are stated, BTY has excluded these costs and the values should be carried in a separate budget (if applicable).*
4.0 Basis & Assumptions

The construction estimate is based on the following list of assumptions:

- Structural work is based on design brief and is derived by GFA $/ft^2$
- Architectural work is based on middle specification and is derived by GFA $/ft^2$ also
- All works to be carried out during normal working hours.
- No modification of domestic cold-water lines considered in L1
- No modification considered for fire protection system in L1 to L6, existing areas is not sprinkled
- No asbestos removal is included
- No site works is included
- Existing building just underwent renovations that included new windows, doors, and mechanical louvers, also some renovations work is completed, these works are not included in this estimate, please refer to Cost Plan for details
- Escalation has been applied in three scenarios being – 2020, 2025 and 2030

Please note that BTY is not qualified to act as engineering and architectural consultants. Where assumptions have been made these assumptions cannot be relied upon as accurate assessments and should be reviewed by the design team.

5.0 Exclusions

The construction estimate includes all direct and indirect construction costs identified in the drawings and other information provided by the Prime Consultant.

The estimate specifically excludes the following:

- Land costs
- Professional fees and disbursements
- Planning, administrative and financing costs
- Legal fees and agreement costs / conditions
- Building permits
- Temporary facilities for user groups during construction
- Unforeseen ground conditions and associated extras
- Environmental remediation outside building footprint
- On-site and off-site works
- Decanting & moving
- Project commissioning to be carried out by an independent consultant
- Erratic market conditions, such as lack of bidders, proprietary specifications
- Unforeseen existing building conditions
- Cost escalation past 2022 (Scenario 1), 2025 (Scenario 2) & 2030 (Scenario 3)
### 6.0 Construction Cost Summary

The estimated construction cost of the project if construction period during 2020-2022 may be summarized as follows:

<table>
<thead>
<tr>
<th>Description</th>
<th>Total $</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>New Building Addition-Include Structural, Architectural, Mechanical and Electrical Work</td>
<td>13,128,000</td>
<td>60%</td>
</tr>
<tr>
<td>Building Renovation-Architectural</td>
<td>2,091,000</td>
<td>10%</td>
</tr>
<tr>
<td>Building Renovation-Mechanical</td>
<td>2,693,000</td>
<td>12%</td>
</tr>
<tr>
<td>Building Renovation-Electrical</td>
<td>2,886,000</td>
<td>13%</td>
</tr>
<tr>
<td>Building Renovation-Demolition Works-Included in Architectural</td>
<td>0</td>
<td></td>
</tr>
<tr>
<td>General Requirements &amp; Fees</td>
<td>920,000</td>
<td>4%</td>
</tr>
<tr>
<td><strong>Net Construction Cost</strong></td>
<td>$21,718,000</td>
<td>100%</td>
</tr>
<tr>
<td>Design Allowance (15%)</td>
<td>3,258,000</td>
<td></td>
</tr>
<tr>
<td>Construction Allowance (10%)</td>
<td>2,498,000</td>
<td></td>
</tr>
<tr>
<td><strong>Total Construction Cost</strong></td>
<td>$27,474,000</td>
<td></td>
</tr>
<tr>
<td>Escalation Allowance 9.7%</td>
<td>2,676,000</td>
<td></td>
</tr>
<tr>
<td>FFE</td>
<td>0</td>
<td></td>
</tr>
<tr>
<td><strong>Escalated Construction Cost</strong></td>
<td>$30,150,000</td>
<td></td>
</tr>
<tr>
<td>Gross Floor Area (ft²)</td>
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</tr>
<tr>
<td>Escalated Construction Cost /ft²</td>
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</tr>
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The estimated construction cost of the project if construction period during 2023-2025 may be summarized as follows:

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<thead>
<tr>
<th>Description</th>
<th>Total $</th>
<th>%</th>
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</thead>
<tbody>
<tr>
<td>New Building Addition-Include Structural, Architectural, Mechanical and Electrical Work</td>
<td>13,128,000</td>
<td>60%</td>
</tr>
<tr>
<td>Building Renovation-Architectural</td>
<td>2,091,000</td>
<td>10%</td>
</tr>
<tr>
<td>Building Renovation-Mechanical</td>
<td>2,693,000</td>
<td>12%</td>
</tr>
<tr>
<td>Building Renovation-Electrical</td>
<td>2,886,000</td>
<td>13%</td>
</tr>
<tr>
<td>Building Renovation-Demolition Works-Included in Architectural</td>
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<td></td>
</tr>
<tr>
<td>General Requirements &amp; Fees</td>
<td>920,000</td>
<td>4%</td>
</tr>
<tr>
<td><strong>Net Construction Cost</strong></td>
<td>$21,718,000</td>
<td>100%</td>
</tr>
<tr>
<td>Design Allowance (15%)</td>
<td>3,258,000</td>
<td></td>
</tr>
<tr>
<td>Construction Allowance (10%)</td>
<td>2,498,000</td>
<td></td>
</tr>
<tr>
<td><strong>Total Construction Cost</strong></td>
<td>$27,474,000</td>
<td></td>
</tr>
<tr>
<td>Escalation Allowance 21.7%</td>
<td>5,954,000</td>
<td></td>
</tr>
<tr>
<td>FFE</td>
<td>0</td>
<td></td>
</tr>
<tr>
<td><strong>Escalated Construction Cost</strong></td>
<td>$33,428,000</td>
<td></td>
</tr>
<tr>
<td>Gross Floor Area (ft²)</td>
<td>118,750 ft²</td>
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<tr>
<td>Escalated Construction Cost /ft²</td>
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The estimated construction cost of the project if construction period during 2028-2030 may be summarized as follows:

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<th>Description</th>
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<th>%</th>
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<tr>
<td>New Building Addition-Include Structural, Architectural, Mechanical</td>
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<td>60%</td>
</tr>
<tr>
<td>Building Renovation-Architectural</td>
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<td>10%</td>
</tr>
<tr>
<td>Building Renovation-Mechanical</td>
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<td>12%</td>
</tr>
<tr>
<td>Building Renovation-Electrical</td>
<td>2,886,000</td>
<td>13%</td>
</tr>
<tr>
<td>Building Renovation-Demolition Works-Included in Architectural</td>
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<td>0%</td>
</tr>
<tr>
<td>General Requirements &amp; Fees</td>
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<td>4%</td>
</tr>
<tr>
<td><strong>Net Construction Cost</strong></td>
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<td>100%</td>
</tr>
<tr>
<td>Design Allowance (15%)</td>
<td>3,258,000</td>
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</tr>
<tr>
<td>Construction Allowance (10%)</td>
<td>2,498,000</td>
<td></td>
</tr>
<tr>
<td><strong>Total Construction Cost</strong></td>
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<td></td>
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<tr>
<td>Escalation Allowance 44.5%</td>
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<td>FFE</td>
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<tr>
<td><strong>Escalated Construction Cost</strong></td>
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</tr>
<tr>
<td>Gross Floor Area (ft²)</td>
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</tr>
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<td><strong>Escalated Construction Cost /ft²</strong></td>
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### 7.0 Areas

The gross floor area of the project measured in accordance with the guidelines established by the Canadian Institute of Quantity Surveyors is:

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<th>Location</th>
<th>GFA (ft²)</th>
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<tr>
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</tr>
<tr>
<td><strong>Total:</strong></td>
<td><strong>118,750</strong></td>
</tr>
</tbody>
</table>

### 8.0 Taxes

The estimate excludes the Harmonized Sales Tax (H.S.T.).
9.0 Project Schedule & Escalation

Cost escalations from 2020 along with 5 and 10 year has been included in the estimate, rates are approx. 9.7%, 21.7% and 44.5% respectively. Our current projected escalation forecast rates are shown below.

<table>
<thead>
<tr>
<th>Currently BTY Group Forecast</th>
<th>2020-2030</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>3.5%</td>
</tr>
</tbody>
</table>

10.0 Pricing

The estimate has been priced at current rates taking into account the size, location and nature of the project. The unit rates utilized are considered competitive for a project of this type, bid under a stipulated lump-sum form of tender in an open market, with a minimum of five (5) bids, supported by the requisite number of subcontractors.

The estimate allows for labour, material, equipment and other input costs at current rates and levels of productivity. It does not take into account extraordinary market conditions, where bidders may be few and may include in their tenders disproportionate contingencies and profit margins.

11.0 Risk Mitigation

BTY Group recommends that the Owner, Project Manager and Design Team carefully review this document, including exclusions, inclusions and assumptions, contingencies, escalation and mark-ups. If the project is over budget, or if there are unresolved budgeting issues, alternative systems/schemes should be evaluated before proceeding into the next design phase.

Requests for modifications of any apparent errors or omissions to this document must be made to BTY Group within ten (10) days of receipt of this estimate. Otherwise, it will be understood that the contents have been concurred with and accepted.

It is recommended that BTY Group design and propose a cost management framework for implementation. This framework would require that a series of further estimates be undertaken at key design stage milestones and a final update estimate produced which is representative of the completed tender documents, project delivery model and schedule. The final updated estimate will address changes and additions to the documents, as well as addenda issued during the bidding process. BTY Group is unable to reconcile bid results to any estimate not produced from bid documents including all addenda.

12.0 Contingencies

12.1 Design Contingency

A design contingency of Fifteen Percent (15%) has been included in the estimate to cover modifications to the program, drawings and specifications during the design.
12.2 Construction Contingency

An allowance of Ten Percent (10%) has been included in the estimate for changes occurring during the construction period of the project. This amount may be expended due to site conditions or if there are modifications to the drawings and specifications.

13.0 Documents Reviewed

The list below confirms the information that we have reviewed in order to prepare our opinion contained within this report:

<table>
<thead>
<tr>
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<td>April 12, 2019</td>
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<td>Appendix A_UofG LSMP Functional Programme</td>
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<td>LSMP Refresh_190315 Draft reduced</td>
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</tr>
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<td>Appendix B Mechanical Brief</td>
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<td>mcCallumSather</td>
<td>Appendix C Mechanical Brief</td>
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<td>Costing Summary Spread</td>
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<td>Costing Summary</td>
<td>July 25, 2019</td>
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COST MANAGEMENT REPORT

University of Guelph: McLaughlin Library Master Plan Update
Class D Estimate

APPENDICES

Appendix 1: Construction Cost Summary – 2020
Appendix 2: Construction Cost Summary – 2025
Appendix 3: Construction Cost Summary – 2030
Appendix 4: Cost Plan
APPENDIX 1

Construction Cost Summary - 2020

1 PAGE
# Construction Cost Summary - 2020

<table>
<thead>
<tr>
<th>Description</th>
<th>Total Cost</th>
<th>Unit Cost $/ft²</th>
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</thead>
<tbody>
<tr>
<td>A. New Building Addition</td>
<td>13,128,000</td>
<td>272.37</td>
</tr>
<tr>
<td>Include Structural, Architectural, Mechanical and Electrical Work</td>
<td></td>
<td></td>
</tr>
<tr>
<td>B. Building Renovation-Architectural</td>
<td>2,091,000</td>
<td>29.64</td>
</tr>
<tr>
<td>C. Building Renovation-Mechanical</td>
<td>2,693,000</td>
<td>38.17</td>
</tr>
<tr>
<td>D. Building Renovation-Electrical</td>
<td>2,886,000</td>
<td>40.91</td>
</tr>
<tr>
<td>E. Building Renovation-Demolition Works (Incl. in B.)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>F. General Requirements &amp; Fees</td>
<td>920,000</td>
<td>7.75</td>
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<tr>
<td><strong>SUB-TOTAL CONSTRUCTION COST</strong></td>
<td><strong>21,718,000</strong></td>
<td><strong>182.89</strong></td>
</tr>
<tr>
<td>G. Contingencies</td>
<td></td>
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</tr>
<tr>
<td>Design Contingency</td>
<td>3,258,000</td>
<td>27.44</td>
</tr>
<tr>
<td>Construction Contingency</td>
<td>2,498,000</td>
<td>21.04</td>
</tr>
<tr>
<td><strong>TOTAL CONSTRUCTION COST</strong></td>
<td><strong>27,474,000</strong></td>
<td><strong>231.36</strong></td>
</tr>
<tr>
<td>H. Escalation (2020)</td>
<td>2,676,000</td>
<td>22.53</td>
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<td>I. Allowance for FFE</td>
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</table>

- **New Addition Area**: 48,200 ft²
- **Renovation Area**: 70,550 ft²
- **Total of Renovation and New addition**: 118,750 ft²
- **Unit Cost ($/ft²)**: $254 ft²
APPENDIX 2

Construction Cost Summary - 2025

1 PAGE
## CONSTRUCTION COST SUMMARY-2025

<table>
<thead>
<tr>
<th>Description</th>
<th>Total Cost $</th>
<th>Unit Cost $/ft²</th>
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</thead>
<tbody>
<tr>
<td>A. New Building Addition</td>
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<td>272.37</td>
</tr>
<tr>
<td>Include Structural, Architectural, Mechanical and Electrical Work</td>
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</tr>
<tr>
<td>B. Building Renovation-Architectural</td>
<td>2,091,000</td>
<td>29.64</td>
</tr>
<tr>
<td>C. Building Renovation-Mechanical</td>
<td>2,693,000</td>
<td>38.17</td>
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<tr>
<td>D. Building Renovation-Electrical</td>
<td>2,886,000</td>
<td>40.91</td>
</tr>
<tr>
<td>E. Building Renovation-Demolition Works (Incl. in B.)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>F. General Requirements &amp; Fees</td>
<td>920,000</td>
<td>7.75</td>
</tr>
<tr>
<td>G. Contingencies</td>
<td></td>
<td></td>
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<tr>
<td>Design Contingency</td>
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<td>27.44</td>
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<tr>
<td>Construction Contingency</td>
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<td>H. Escalation (2025)</td>
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<td>I. Allowance for FFE</td>
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<td><strong>182.89</strong></td>
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<td><strong>TOTAL CONSTRUCTION COST</strong></td>
<td><strong>27,474,000</strong></td>
<td><strong>231.36</strong></td>
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<td><strong>ESCALATED PROJECT COST</strong></td>
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<td><strong>281.50</strong></td>
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</table>

**New Addition Area** 48,200 ft²
**Renovation Area** 70,550 ft²
**Total of Renovation and New addition** 118,750 ft²
**Unit Cost ($/ft²)** $281 /ft²
APPENDIX 3

Construction Cost Summary - 2030

1 PAGE
## CONSTRUCTION COST SUMMARY-2030

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<tr>
<th>Description</th>
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<td>Include Structural, Architectural, Mechanical and Electrical Work</td>
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<tr>
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<td>29.64</td>
</tr>
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<td>C. Building Renovation-Mechanical</td>
<td>2,693,000</td>
<td>38.17</td>
</tr>
<tr>
<td>D. Building Renovation-Electrical</td>
<td>2,886,000</td>
<td>40.91</td>
</tr>
<tr>
<td>E. Building Renovation-Demolition Works (Incl. in B.)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>F. General Requirements &amp; Fees</td>
<td>920,000</td>
<td>7.75</td>
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<td>G. Contingencies</td>
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<td></td>
</tr>
<tr>
<td>Design Contingency</td>
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<td>27.44</td>
</tr>
<tr>
<td>Construction Contingency</td>
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<td>21.04</td>
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<td>I. Allowance for FFE</td>
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<td><strong>ESCALATED PROJECT COST</strong></td>
<td><strong>39,700,000</strong></td>
<td><strong>334.32</strong></td>
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- **New Addition Area**: 48,200 ft²
- **Renovation Area**: 70,550 ft²
- **Total of Renovation and New addition**: 118,750 ft²

Unit Cost ($/ft²) $334
## Description

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<th>Quantity</th>
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<th>Rate</th>
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<td><strong>Phase / Location</strong></td>
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<td><strong>A. New Building Addition</strong></td>
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<tr>
<td><strong>Structural work of new building addition</strong></td>
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<td>sf</td>
<td>151.02</td>
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<td>Allowance for structural work @ New building</td>
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<tr>
<td>addition, the building cell would be structure</td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>steel and load bearing wall system, the exterior</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>envelope consists of mostly high performing</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>curtain wall (70-80%) with an opaque high</td>
<td></td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>performing, stone/zinc panel clad wall elsewhere</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>(20%)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Incl. Building foundation, structure work,</td>
<td></td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>exterior enclosure and roof structure &amp; covering</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Level 0</td>
<td>1,600</td>
<td>sf</td>
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<tr>
<td>Level 1</td>
<td>11,000</td>
<td>sf</td>
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<tr>
<td>Level 2</td>
<td>11,300</td>
<td>sf</td>
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<tr>
<td>Level 3</td>
<td>11,300</td>
<td>sf</td>
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<tr>
<td>Level 4</td>
<td>10,000</td>
<td>sf</td>
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<td></td>
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<tr>
<td>Level 5</td>
<td>3,000</td>
<td>sf</td>
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<tr>
<td>Level 6</td>
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<tr>
<td>Allowance for Misc. Structural work @ break</td>
<td>1</td>
<td>sum</td>
<td>65,000.00</td>
<td>65,000</td>
</tr>
<tr>
<td>through existing building exterior wall at north</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>side lead to new additional building</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Architectural work of new building addition</strong></td>
<td>48,200</td>
<td>sf</td>
<td>30.00</td>
<td>1,446,000</td>
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<tr>
<td>Allowance for Full Interior Fit-Out; partitions</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>and doors, floor, ceiling wall finishes,</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>millwork and specialties</td>
<td></td>
<td></td>
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<td></td>
</tr>
<tr>
<td><strong>Mechanical work of new building addition</strong></td>
<td>48,200</td>
<td>sf</td>
<td>55.00</td>
<td>2,651,000</td>
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<td>Plumbing &amp; Drainage</td>
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<td>Fire Protection</td>
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<td>HVAC; AHU-6 110T/35,000CFM, AHU-7 11T/5,150CFM</td>
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<tr>
<td>Controls</td>
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</tr>
<tr>
<td><strong>Electrical work of new building addition</strong></td>
<td>48,200</td>
<td>sf</td>
<td>35.00</td>
<td>1,687,000</td>
</tr>
<tr>
<td>Services and distribution</td>
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<tr>
<td>New Lighting and lighting control</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>New power receptacle</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>New WAP, security and data (excludes Active</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>equipment)</td>
<td></td>
<td></td>
<td></td>
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</tr>
<tr>
<td><strong>Total New Building Addition</strong></td>
<td></td>
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<td>$13,128,300</td>
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BTY GROUP
### Description

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<th>Quantity</th>
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<th>Rate</th>
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<td><strong>Phase / Location</strong></td>
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#### B. Building Renovation-Architectural

**Level 0 Renovation (overall 48,070 sf)-Reno GFA 2,062 sf**

- Allowance for Refresh work of RM 019-2,062 sf  
  
<table>
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<th>Quantity</th>
<th>Unit</th>
<th>Rate</th>
<th>Amount</th>
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</thead>
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<tr>
<td>Allowance for Refresh work of RM 019 -2,062 sf</td>
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<td>sum</td>
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<td>4,100</td>
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**Level 1 Renovation (Overall 48,050 sf)-Split into 3 projects-Reno GFA 41,850 sf**

- L1: Entrance & Feature Space @ 6,000 SF (Earlier Phase)
  - Allowance for New North Entrance (vestibule & connect with existing building)
  - Allowance for Hardware upgrade on existing entrance
  - Allowance for New Glass wall & doors to separate feature space
  - Allowance for Paint refresh, new floors & feature wall
  - Allowance for Blackout blinds
  - Allowance for remove exterior wall to allow new entrance

<table>
<thead>
<tr>
<th>Item Description</th>
<th>Quantity</th>
<th>Unit</th>
<th>Rate</th>
<th>Amount</th>
</tr>
</thead>
<tbody>
<tr>
<td>Allowance for New North Entrance (vestibule &amp; connect with existing building)</td>
<td>1</td>
<td>sum</td>
<td>58,780.00</td>
<td>58,800</td>
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<tr>
<td>Allowance for Hardware upgrade on existing entrance</td>
<td>1</td>
<td>sum</td>
<td>8,000.00</td>
<td>8,000</td>
</tr>
<tr>
<td>Allowance for New Glass wall &amp; doors to separate feature space</td>
<td>6,000</td>
<td>sf</td>
<td>20.00</td>
<td>120,000</td>
</tr>
<tr>
<td>Allowance for Paint refresh, new floors &amp; feature wall</td>
<td>1</td>
<td>sum</td>
<td>22,000.00</td>
<td>22,000</td>
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<tr>
<td>Allowance for Blackout blinds</td>
<td>1</td>
<td>sum</td>
<td>8,500.00</td>
<td>8,500</td>
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- L1: Transform main floor @ 33,925 SF (Later Phase – tied w/ staff renovations on Level 2)
  - Allowance for Floor, ceiling & wall finishes
  - Allowance for millwork & furniture for open seating
  - Allowance for Staff & Library Areas @ 11,000 SF:
    - Allowance for new walls / doors & millwork for workstations
    - Allowance for Demo walls, finishes In existing staff & services areas (16,000 SF)

<table>
<thead>
<tr>
<th>Item Description</th>
<th>Quantity</th>
<th>Unit</th>
<th>Rate</th>
<th>Amount</th>
</tr>
</thead>
<tbody>
<tr>
<td>Allowance for Floor, ceiling &amp; wall finishes</td>
<td>33,925</td>
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<td>18.00</td>
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<tr>
<td>Allowance for millwork &amp; furniture for open seating</td>
<td>33,925</td>
<td>sf</td>
<td>2.50</td>
<td>84,800</td>
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<td>Allowance for Staff &amp; Library Areas @ 11,000 SF:</td>
<td>11,000</td>
<td>sf</td>
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<tr>
<td>Allowance for new walls / doors &amp; millwork for workstations</td>
<td>16,000</td>
<td>sf</td>
<td>5.00</td>
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- L1: café renovation – 1,925 SF
  - Allowance for floor, ceiling & wall finishes
  - Allowance for reconfigure counter
  - Allowance for demolish existing walls to connect with addition, finishes and counter

<table>
<thead>
<tr>
<th>Item Description</th>
<th>Quantity</th>
<th>Unit</th>
<th>Rate</th>
<th>Amount</th>
</tr>
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<tbody>
<tr>
<td>Allowance for floor, ceiling &amp; wall finishes</td>
<td>1,925</td>
<td>sf</td>
<td>18.00</td>
<td>34,700</td>
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<tr>
<td>Allowance for reconfigure counter</td>
<td>1</td>
<td>sum</td>
<td>15,000.00</td>
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<tr>
<td>Allowance for demolish existing walls to connect with addition, finishes and counter</td>
<td>1</td>
<td>sum</td>
<td>9,625.00</td>
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</table>
### B. Building Renovation-Architectural

**Level 2 Renovation (overall 47,765 sf) -Split into 3 projects -Reno GFA 11,185 sf**

<table>
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<tr>
<th>Description</th>
<th>Quantity</th>
<th>Unit</th>
<th>Rate</th>
<th>Amount</th>
</tr>
</thead>
<tbody>
<tr>
<td>L2: Staff Reconfigure &amp; new WC @ 5,300 SF</td>
<td>5,300</td>
<td>sf</td>
<td>5.00</td>
<td>26,500</td>
</tr>
<tr>
<td>The floor and ceiling finishes were replaced in 2017, allowance for “Rework” these finishes</td>
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<tr>
<td>Allowance for new walls / doors @ entrance &amp; millwork for workstations</td>
<td>5,300</td>
<td>sf</td>
<td>30.00</td>
<td>159,000</td>
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<td>Allowance for fixtures / fittings for washroom, only washroom accessories, fixtures etc. M&amp;E</td>
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<tr>
<td>L2: Decant Exam Centre &amp; New Programme Space @3,000 SF</td>
<td>3,000</td>
<td>sf</td>
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<tr>
<td>The floor and ceiling finishes were replaced in 2017, allowance for “Rework” these finishes</td>
<td>3,000</td>
<td>sf</td>
<td>5.00</td>
<td>15,000</td>
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<tr>
<td>Allowance for new walls / doors @ entrance</td>
<td>3,000</td>
<td>sf</td>
<td>30.00</td>
<td>90,000</td>
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<tr>
<td>Allowance for specialties (multipurpose space w/ tech)</td>
<td>3,000</td>
<td>sf</td>
<td>2.50</td>
<td>7,500</td>
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<tr>
<td>L2: Renovation to connect addition @ 585 SF</td>
<td>585</td>
<td>sf</td>
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<td>Allowance for new floor, ceiling &amp; wall finishes</td>
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<td>Allowance for specialties (multipurpose space w/ tech)</td>
<td>585</td>
<td>sf</td>
<td>5.00</td>
<td>2,900</td>
</tr>
<tr>
<td>Description</td>
<td>Quantity</td>
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<tr>
<td><strong>B. Building Renovation-Architectural</strong></td>
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<tr>
<td><strong>Level 3 Renovation (Overall 47,765 sf)-Split into 2 projects -Reno GFA 2,635 sf</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>L3: Seating Expansion @ 2,050 SF</td>
<td>2,050</td>
<td>sf</td>
<td>3.00</td>
<td>6,200</td>
</tr>
<tr>
<td>Allowance for Patching &amp; painting</td>
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<td>sum</td>
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<td>Allowance for Soft seating (no millwork)</td>
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<td>Architectural part</td>
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<tr>
<td>Allowance for remove stacks</td>
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<tr>
<td>Allowance for demo walls, doors, finishes for group @ 585 SF</td>
<td>585</td>
<td>sf</td>
<td>5.00</td>
<td>2,900</td>
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<tr>
<td>L3: Renovation to connect addition @ 585 SF</td>
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<tr>
<td>Allowance for demo Walls (Group Rooms)</td>
<td>1</td>
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<td>5,000.00</td>
<td>5,000</td>
</tr>
<tr>
<td>Allowance for new floor, ceiling &amp; wall finishes</td>
<td>585</td>
<td>sf</td>
<td>15.00</td>
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</tr>
<tr>
<td>Allowance for specialties (multipurpose space w/ tech)</td>
<td>1</td>
<td>sum</td>
<td>8,000.00</td>
<td>8,000</td>
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<tr>
<td><strong>Level 4 Renovation (Overall 23,415 sf)-Reno GFA 4,700 sf</strong></td>
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<tr>
<td>L4: Seating Expansion @ 4,700 SF</td>
<td>4,700</td>
<td>sf</td>
<td>15.00</td>
<td>70,500</td>
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<tr>
<td>Allowance for patching &amp; painting</td>
<td>2</td>
<td>ea.</td>
<td>25,000.00</td>
<td>50,000</td>
</tr>
<tr>
<td>Allowance for W/Cs</td>
<td>320</td>
<td>sf</td>
<td>30.00</td>
<td>9,600</td>
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<tr>
<td>Allowance for Partitions &amp; Doors @ 2 group rooms</td>
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<tr>
<td>Allowance for Soft seating (no millwork)</td>
<td>1</td>
<td>sum</td>
<td>8,000.00</td>
<td>8,000</td>
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<tr>
<td>Allowance for Walls &amp; finishes @ new Washrooms (160 SF x2 )</td>
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<tr>
<td>Allowance for Patch &amp; Make good , Remove stacks</td>
<td>1</td>
<td>sum</td>
<td>6,000.00</td>
<td>6,000</td>
</tr>
</tbody>
</table>
B. Building Renovation-Architectural

**Level 5 Renovation (overall-23,415 sf)-Reno GFA-4,830 sf**

- L5: Seating Expansion @ 4,830 SF
  - Allowance for patching & painting (tying in to sounding areas) 4,830 sf 3.00 14,500
  - Allowance for Soft seating (no millwork) 1 sum 8,000.00 8,000
  - Allowance for patch & Make good, Remove Stacks 1 sum 6,000.00 6,000

**Level 6 Renovation (overall-18,235 sf)-Reno area 5,350 sf**

- L6: Grad Commons @ 5,350 SF
  - Allowance for new floor & ceiling finishes 5,350 sf 15.00 80,300
  - Allowance for Partitions & Doors: Separate from open to below area & 4 group rooms 800 sf 30.00 24,000
  - Allowance for Carrel seating & Lockers 1 sum 15,000.00 15,000
  - Allowance for Patch & Make good, remove carrels 1 sum 6,000.00 6,000

**Total Building Renovation-Architectural** $2,091,100
## Phase / Location

### C. Building Renovation-Mechanical

Note: For HVAC, replacement of AHU 2 & 4, 65,000CFM total airflow capacity

#### Level 0 Renovation (Overall 48,070 sf)-Reno GFA 2,062 sf

<table>
<thead>
<tr>
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<th>Quantity</th>
<th>Unit</th>
<th>Rate</th>
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<tr>
<td>No renovation work</td>
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<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Tie into new mechanical/electrical room of the</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>addition</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>New main DCW, CWS/R, FP, LTHW pipes (as per</td>
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<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Mechanical brief)</td>
<td></td>
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<td></td>
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</tbody>
</table>

#### Level 1 Renovation (Overall 48,050 sf)-Split into 3 projects-Reno GFA 41,850 sf

**L1: Entrance & Feature Space @ 6,000 SF (Earlier Phase)**

- Plumbing and drainage renovation 6,000 sf 6.00 36,000
- HVAC
  - Reconfigure diffusers for ceiling 6,000 sf 12.00 72,000
  - Controls Upgrade 6,000 sf 2.40 14,400

**L1: Transform main floor @ 33,925 SF (Later Phase – tied w/ staff renovations on Level 2)**

- Plumbing and drainage renovation 33,925 sf 6.00 203,600
  - replace all existing drainage piping from fixtures and connect to existing stacks
  - replace existing branches of domestic hot water lines
- HVAC
  - Upgrade of existing HVAC as per brief 33,925 sf 42.00 1,424,900
  - Renovation to connect addition 1 sum 30,000.00 30,000
- Controls
  - Upgrade to existing controls system 33,925 sf 2.40 81,400
<table>
<thead>
<tr>
<th>Description</th>
<th>Quantity</th>
<th>Unit</th>
<th>Rate</th>
<th>Amount</th>
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<tr>
<td>C. Building Renovation-Mechanical</td>
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<td></td>
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<tr>
<td>L1: café renovation – 1,925 SF</td>
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<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Plumbing and drainage renovation</td>
<td>1,925</td>
<td>sf</td>
<td>6.00</td>
<td>11,600</td>
</tr>
<tr>
<td>HVAC</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>-Reconfigure diffusers for ceiling</td>
<td>1,925</td>
<td>sf</td>
<td>18.00</td>
<td>34,700</td>
</tr>
<tr>
<td>Controls</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>-Upgrade to existing controls system</td>
<td>1,925</td>
<td>sf</td>
<td>4.80</td>
<td>9,200</td>
</tr>
<tr>
<td>Level 2 Renovation (overall 47,765 sf) -Spilt into 3 projects -Reno GFA 11,185 sf</td>
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<td></td>
<td></td>
</tr>
<tr>
<td>L2: Staff Reconfigure&amp; new WC @ 5,300 SF</td>
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<td></td>
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</tr>
<tr>
<td>Plumbing and drainage renovation and new plumbing fixtures to new WC</td>
<td>1 sum</td>
<td></td>
<td>3,000</td>
<td>3,000</td>
</tr>
<tr>
<td>HVAC</td>
<td></td>
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</tr>
<tr>
<td>-Minimal rework to HVAC diffusers</td>
<td>1 sum</td>
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<td>25,000</td>
<td>25,000</td>
</tr>
<tr>
<td>Controls</td>
<td></td>
<td></td>
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<td></td>
</tr>
<tr>
<td>-Upgrade to existing controls system</td>
<td>5,300</td>
<td>sf</td>
<td>4.80</td>
<td>25,400</td>
</tr>
<tr>
<td>L2: Decant Exam Centre &amp; New Programme Space @3,000SF</td>
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<td></td>
<td></td>
</tr>
<tr>
<td>Plumbing and drainage renovation (not required)</td>
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<td></td>
</tr>
<tr>
<td>HVAC</td>
<td></td>
<td></td>
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</tr>
<tr>
<td>-Minimal rework to HVAC diffusers</td>
<td>1 sum</td>
<td></td>
<td>20,000</td>
<td>20,000</td>
</tr>
<tr>
<td>Controls</td>
<td></td>
<td></td>
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<td></td>
</tr>
<tr>
<td>-Upgrade to existing controls system</td>
<td>3,000</td>
<td>sf</td>
<td>4.80</td>
<td>14,400</td>
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<tr>
<td>L2: Renovation to connect addition @ 585 SF</td>
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<td></td>
</tr>
<tr>
<td>-Allowance for connection to existing HVAC</td>
<td>1 sum</td>
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<td>10,000</td>
<td>10,000</td>
</tr>
<tr>
<td>Description</td>
<td>Quantity</td>
<td>Unit</td>
<td>Rate</td>
<td>Amount</td>
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</tr>
<tr>
<td><strong>Phase / Location</strong></td>
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<tr>
<td><strong>C. Building Renovation-Mechanical</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Level 3 Renovation (Overall 47,765 sf)-Split into 2 projects -Reno GFA 2,635 sf</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>L3: Seating Expansion @ 2,050 SF</td>
<td>2,050</td>
<td>sf</td>
<td>18.00</td>
<td>36,900</td>
</tr>
<tr>
<td>Allowance for plumbing and drainage to new washroom</td>
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</tr>
<tr>
<td>HVAC</td>
<td>2,050</td>
<td>sf</td>
<td>18.00</td>
<td>36,900</td>
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<td>-Allowance for HVAC (Connect to new ducts above MSK-05)</td>
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<tr>
<td>Controls</td>
<td>2,050</td>
<td>sf</td>
<td>4.80</td>
<td>9,800</td>
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<tr>
<td>-Upgrade to existing controls system</td>
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<td>L3: Renovation to connect addition @ 585 SF</td>
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<td>10,000.00</td>
<td>10,000</td>
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<tr>
<td>-Allowance for connection to existing HVAC</td>
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<tr>
<td><strong>Level 4 Renovation (23,415 sf)-Reno GFA 4,700 sf</strong></td>
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<td></td>
<td></td>
</tr>
<tr>
<td>L4: Seating Expansion @ 4,700 SF</td>
<td>320</td>
<td>sf</td>
<td>18.00</td>
<td>5,800</td>
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<tr>
<td>Allowance for plumbing and drainage to new washroom</td>
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<td></td>
<td></td>
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<tr>
<td>HVAC</td>
<td>4,700</td>
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<td>-Allowance for HVAC (Connect to new ducts above MSK-06)</td>
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<td>Controls</td>
<td>4,700</td>
<td>sf</td>
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<td>22,600</td>
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</tbody>
</table>
### C. Building Renovation-Mechanical

#### Level 5 Renovation (overall-23,415 sf)-Reno GFA-4,830 sf

- **L5: Seating Expansion @ 4,830 SF**
  - Allowance for plumbing and drainage to new washroom (Not required, No WC)

  **HVAC**
  - Allowance for HVAC (connection to new ducts) 4,830 sf 18.00 86,900

  **Controls**
  - Upgrade to existing controls system 4,830 sf 4.80 23,200

#### Level 6 Renovation (overall-18,235 sf)-Reno area 5,350 sf

- **L6: Grad Commons @ 5,350 SF**
  - Allowance for plumbing and drainage to new washroom (Not required, No WC)

  **HVAC**
  - Allowance for HVAC (reconfiguration of ceiling diffusers) 5,350 sf 18.00 96,300
  - Connection to existing hydronic heating 2,140 sf 18.00 38,500

  **Controls**
  - Upgrade to existing controls system 5,350 sf 4.80 25,700

---

**Total Building Renovation-Mechanical** $2,692,800
<table>
<thead>
<tr>
<th>Description</th>
<th>Quantity</th>
<th>Unit</th>
<th>Rate</th>
<th>Amount</th>
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</thead>
<tbody>
<tr>
<td><strong>Phase / Location</strong></td>
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<tr>
<td><strong>D. Building Renovation-Electrical</strong></td>
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<tr>
<td><strong>Level 0 Renovation (overall 48,070 sf)-Reno GFA</strong></td>
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<tr>
<td>2,062 sf</td>
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<tr>
<td>Rework power and lighting to suit new layout</td>
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<tr>
<td><strong>Level 1 Renovation (overall 48,050 sf)-Split into 3 projects-Reno GFA 41,850 sf</strong></td>
<td></td>
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<td></td>
<td></td>
</tr>
<tr>
<td>L1: Entrance &amp; Feature Space @ 6,000 SF (Earlier Phase)</td>
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<td></td>
</tr>
<tr>
<td>Allowance for modification to services and distribution</td>
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<td>sf</td>
<td>6.00</td>
<td>36,000</td>
</tr>
<tr>
<td>Allowance for rework to power and lighting</td>
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<td>sf</td>
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<td>72,000</td>
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<td>Allowance for modification to fire alarm</td>
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<tr>
<td>Allowance for modification to data and WAP and security devices</td>
<td>6,000</td>
<td>sf</td>
<td>14.40</td>
<td>86,400</td>
</tr>
<tr>
<td>L1: Transform main floor @ 33,925 SF (Later Phase – tied w/ staff renovations on Level 2)</td>
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<td></td>
<td></td>
</tr>
<tr>
<td>Allowance for modification to services and distribution</td>
<td>33,925</td>
<td>sf</td>
<td>9.60</td>
<td>325,700</td>
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<td>sf</td>
<td>18.00</td>
<td>610,700</td>
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<tr>
<td>Allowance for modification to fire alarm</td>
<td>33,925</td>
<td>sf</td>
<td>4.80</td>
<td>162,800</td>
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<tr>
<td>Allowance for modification to data and WAP and security devices</td>
<td>33,925</td>
<td>sf</td>
<td>14.40</td>
<td>488,500</td>
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<tr>
<td>L1: café renovation – 1,925 SF</td>
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<tr>
<td>Allowance for modification to services and distribution</td>
<td>1,925</td>
<td>sf</td>
<td>6.00</td>
<td>11,600</td>
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<tr>
<td>Allowance for rework to power and lighting</td>
<td>1,925</td>
<td>sf</td>
<td>18.00</td>
<td>34,700</td>
</tr>
<tr>
<td>Allowance for modification to fire alarm</td>
<td>1,925</td>
<td>sf</td>
<td>4.80</td>
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<tr>
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<td>1,925</td>
<td>sf</td>
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</tr>
<tr>
<td>Description</td>
<td>Quantity</td>
<td>Unit</td>
<td>Rate</td>
<td>Amount</td>
</tr>
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<tr>
<td><strong>Phase / Location</strong></td>
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<tr>
<td><strong>D. Building Renovation-Electrical</strong></td>
<td></td>
<td></td>
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</tr>
<tr>
<td><strong>Level 2 Renovation (overall 47,765 sf) - Split into 3 projects - Reno GFA 11,185 sf</strong></td>
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<tr>
<td>L2: Staff Reconfiguration &amp; new WC @ 5,300 SF</td>
<td>5,300</td>
<td>sf</td>
<td>9.60</td>
<td>50,900</td>
</tr>
<tr>
<td>Allowance for modification to services and distribution</td>
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<tr>
<td>Allowance for rework to power and lighting</td>
<td>5,300</td>
<td>sf</td>
<td>18.00</td>
<td>95,400</td>
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<tr>
<td>Allowance for modification to fire alarm</td>
<td>5,300</td>
<td>sf</td>
<td>4.80</td>
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</tr>
<tr>
<td>Allowance for modification to data and WAP and security devices</td>
<td>5,300</td>
<td>sf</td>
<td>9.60</td>
<td>50,900</td>
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<tr>
<td>L2: Decant Exam Centre &amp; New Programme Space @ 3,000 SF</td>
<td>3,000</td>
<td>sf</td>
<td>9.60</td>
<td>28,800</td>
</tr>
<tr>
<td>Allowance for modification to services and distribution</td>
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<tr>
<td>Allowance for rework to power and lighting</td>
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<td>sf</td>
<td>18.00</td>
<td>54,000</td>
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<td>sf</td>
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<td>L2: Renovation to connect addition @ 585 SF</td>
<td>585</td>
<td>sf</td>
<td>18.00</td>
<td>10,500</td>
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<tr>
<td>Allowance for rework to power and lighting</td>
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<tr>
<td>Allowance for modification to fire alarm</td>
<td>585</td>
<td>sf</td>
<td>4.80</td>
<td>2,800</td>
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<tr>
<td>Allowance for modification to data and WAP and security devices</td>
<td>585</td>
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</tr>
<tr>
<td><strong>Level 3 Renovation (Overall 47,765 sf) - Split into 2 projects - Reno GFA 2,635 sf</strong></td>
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<tr>
<td>L3: Seating Expansion @ 2,050 SF</td>
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<td>Allowance for modification to fire alarm</td>
<td>2,050</td>
<td>sf</td>
<td>4.80</td>
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<td>sf</td>
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<td>L3: Renovation to connect addition @ 585 SF</td>
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<td>sf</td>
<td>18.00</td>
<td>10,500</td>
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<tr>
<td>Allowance for rework to power and lighting</td>
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</tr>
<tr>
<td>Allowance for modification to fire alarm</td>
<td>585</td>
<td>sf</td>
<td>4.80</td>
<td>2,800</td>
</tr>
<tr>
<td>Allowance for modification to data and WAP and security devices</td>
<td>585</td>
<td>sf</td>
<td>14.40</td>
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<tr>
<td>Description</td>
<td>Quantity</td>
<td>Unit</td>
<td>Rate</td>
<td>Amount</td>
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<tr>
<td><strong>D. Building Renovation-Electrical</strong></td>
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</tr>
<tr>
<td><strong>Level 4 Renovation (Overall 23,415 sf)-Reno GFA</strong></td>
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<tr>
<td>4,700 sf</td>
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<tr>
<td>L4: Seating Expansion @ 4,700 SF</td>
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<tr>
<td><strong>Level 5 Renovation (overall-23,415 sf)-Reno GFA-</strong></td>
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<tr>
<td>4,830 sf</td>
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<tr>
<td>L5: Seating Expansion @ 4,830 SF</td>
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<td><strong>Level 6 Renovation (overall-18,235 sf)-Reno area</strong></td>
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<td>5,350 sf</td>
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<td>5,350</td>
<td>sf</td>
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<td>25,700</td>
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<tr>
<td>Allowance for modification to data and WAP and security devices</td>
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</tr>
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</table>

**Total Building Renovation-Electrical** $2,886,200
Phase / Location

E. Building Renovation-Demolition Works (Incl. in B.)

   Included in architectural work Item B.

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Total Building Renovation-Demolition Works (Incl. in B.)