



The following Motion and Document was considered by the GFC Facilities Development Committee at its December 20, 2012 meeting:

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Agenda Title: **Students' Union Building: Addition and Renovation – Schematic Design Report**

APPROVED MOTION: THAT the GFC Facilities Development Committee approve, under delegated authority from General Faculties Council, and on the recommendation of Planning and Project Delivery, the proposed Students' Union Building: Addition and Renovation – Schematic Design Report (as set forth in Attachment 2) as the basis for further planning.

Final Item: [3](#)

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**OUTLINE OF ISSUE**

 Agenda Title: **Students' Union Building: Addition and Renovation – Schematic Design Report**

**Motion:** THAT the GFC Facilities Development Committee approve, under delegated authority from General Faculties Council, and on the recommendation of Planning and Project Delivery, the proposed Students' Union Building: Addition and Renovation – Schematic Design Report (as set forth in Attachment 2) as the basis for further planning.

**Item**

Action Requested	<input checked="" type="checkbox"/> Approval <input type="checkbox"/> Recommendation <input type="checkbox"/> Discussion/Advice <input type="checkbox"/> Information
Proposed by	Ben Louie, University Architect, Facilities and Operations Andy Cheema, Vice-President (Operations and Finance), Students' Union
Presenters	Ben Louie, University Architect, Facilities and Operations Andy Cheema, Vice-President (Operations and Finance), Students' Union Stephen Boyd, Principal, Dialog
Subject	Students' Union Building: Addition and Renovation – Schematic Design Report

**Details**

Responsibility	Vice-President (Facilities and Operations)
The Purpose of the Proposal is (please be specific)	To approve the Students' Union Building: Addition and Renovation – Schematic Design Report which expands student engagement activity, improves provision of student services, and enhances the long term viability of the Students' Union Building.
The Impact of the Proposal is	To renovate the lower level to increase and improve the student services and club space; create additional meeting rooms for student groups; increase study, relaxation, and social space while contributing positively to create an inviting and engaging south face to the Students' Union Building, and providing an active and vibrant exterior outdoor patio which ties to the long term plan of the campus pathway system.
Replaces/Revises (eg, policies, resolutions)	N/A
Timeline/Implementation Date	Design development will proceed immediately following with the estimated construction timeline from May 2013 to August 2014
Estimated Cost	N/A
Sources of Funding	N/A
Notes	N/A

**Alignment/Compliance**

Alignment with Guiding Documents	Academic Plan, Long Range Development Plan, Deferred Maintenance Master Plan, Comprehensive Institutional Plan, Students' Union 2011 Strategic Plan, Dare to Discover Academic Plan
Compliance with Legislation, Policy and/or Procedure Relevant to the Proposal (please quote legislation and include identifying section numbers)	<b>Post-Secondary Learning Act (PSLA):</b> The PSLA gives GFC responsibility, subject to the authority of the Board of Governors, over academic affairs (Section 26(1)) and provides that GFC may make recommendations to the Board of Governors on a building program and related matters (Section 26(1) (o)). Section 18(1) of the PSLA give the Board of Governors the authority to make any bylaws "appropriate for the management, government and control of the university buildings and land." Section 19 of the Act requires that the Board "consider the recommendations of the general faculties council, if any, on matters of academic import prior to providing for (a) the support and maintenance of

**Approved Item No. 3**

	<p>the university, (b) the betterment of existing buildings, (c) the construction of any new buildings the board considers necessary for the purposes of the university [and] (d) the furnishing and equipping of the existing and newly erected buildings [.] [...]" Section 67(1) of the Act governs the terms under which university land may be leased.</p> <p><b>2. GFC Facilities Development Committee (FDC) Terms of Reference – Section 3. Mandate of the Committee: “[...]”</b></p> <p><b>2. Delegation of Authority</b></p> <p>Notwithstanding anything to the contrary in the terms of reference above, the Board of Governors and General Faculties Council have delegated to the Facilities Development Committee the following powers and authority:</p> <p><b>A. Facilities</b></p> <ol style="list-style-type: none"> <li>1. To approve proposed General Space Programmes (Programs) for academic units.</li> <li>2. (i) To approve proposals concerning the design and use of all new facilities and the repurposing of existing facilities and to routinely report these decisions for information to the Board of Governors. (ii) In considering such proposals, GFC FDC may provide advice, upon request, to the Provost and Vice-President (Academic), Vice-President (Facilities and Operations), and/or the University Architect (or their respective delegates) on the siting of such facilities. (GFC SEP 29 2003)</li> </ol> <p><b>B. Other Matters</b></p> <p>The Chair of FDC will bring forward to FDC items where the Office of the Provost and Vice-President (Academic) and/or the Office of the Vice-President (Facilities and Operations), in consultation with other units or officers of the University, is seeking the advice of the Committee.</p> <p><b>3. UAPPOL Space Management Policy and Space Management Procedure:</b> The respective roles of GFC FDC and the Vice-President (Facilities and Operations) with regard to institutional space management are set out in this Board-approved Policy and attendant Procedure.</p> <ul style="list-style-type: none"> <li>• To access this policy suite on line, go to: <a href="http://www.uappol.ualberta.ca">www.uappol.ualberta.ca</a> .</li> </ul>
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**Routing (Include meeting dates)**

Consultative Route (parties who have seen the proposal and in what capacity)	<ul style="list-style-type: none"> <li>• Students in Referendum – March 8, 2012</li> <li>• Students’ Union Road Show – November 27 – 30, 2012</li> <li>• Students’ Union Open House – December 4, 2012</li> <li>• Students’ Union Building Renovation Steering Committee Endorsement of Schematic Design Report – December 13, 2012</li> <li>• Students’ Union Council (For Information) – January 8, 2013</li> </ul>
Approval Route (Governance) (including meeting dates)	<ul style="list-style-type: none"> <li>• Students’ Union Building Lower Level Renovation Feasibility Study – Facilities Development Committee (For Discussion) – April 26, 2012</li> <li>• Students’ Union Building: Addition and Renovation - Schematic Design Report – Facilities Development Committee (For Approval) – December 20, 2012</li> </ul>
Final Approver	<ul style="list-style-type: none"> <li>• Students’ Union Building: Addition and Renovation - Design Development – Facilities Development Committee (For Approval) – early 2013</li> </ul>

Attachments:

1. Attachment 1 (Page 1-2): Briefing Note Students' Union Building: Addition and Renovation - Schematic Design Report
2. Attachment 2 (Pages 1-50): Students' Union Building: Addition and Renovation - Schematic Design Report

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*Last Revised: 12/21/2012*



## **Students' Union Building: Addition and Renovation Schematic Design Report**

### **Background**

*"One simply cannot have a vibrant campus community without a strong student community and culture. The heartbeat of that student community is the student centre"*, from The Role of Student Centres, Students' Union Building Renovation Project Report submitted to Facilities Development Committee on April 12, 2012.

The Students' Union Building (SUB) itself has been renovated and expanded as enrolment has grown and needs changed. SUB remains a contemporary and vibrant part of the campus mosaic and is the foremost hub of service and social life on campus.

Over the last few years, needs for additional, better quality space of various types have grown as evidenced in the completion of the 2010 General Space Program. The Students' Union has also committed itself to a series of strategic initiatives, aligned with the University's own strategic documents that require a reconsideration of how space is utilized in SUB. The Students' Union has explored and discussed a wide range of potential solutions to these demands and needs with the University, from expansion opportunities to reconfigurations of the existing building.

After determining that a full expansion to accommodate program needs would not be possible at this time, the Students' Union turned its attention to what could be done to ameliorate the critical space issues identified in the 2010 General Space Program. The Students' Union began reviewing other alternatives to improve utilization of space, and to create the kinds of space required by its strategic initiatives, within the general footprint of the building and its immediate environs. It was also necessary to assess what these changes might cost, so that the affordability of any project could be assessed. The Students' Union elected to conduct a feasibility study to address these questions.

Based on the Feasibility Study, Students' Council approved a referendum for a \$9.00 per term fee for Students' Union facility development. The referendum passed in March 2012. Over the summer and fall of 2012, the Students' Union has met with stakeholders and worked with DIALOG to create this Schematic Design Report.

### **Issues**

The Students' Union has established three key goals for this project:

- Expand student engagement activity on campus;
- Improve provision of student services; and,
- Enhance the long-term viability of Students' Union Building.

These goals are tightly aligned with the Students' Union's 2011 Strategic Plan and its engagement goal, in particular, is in direct alignment with the Dare to Discover Academic Plan. The project is aligned with the Long Range Development Plan of the University, and its derivative sector plans. SUB is located in Sector 3 (Long Range Development Plan 2002, Sector Plan 3 & 4 December 2004).

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## **Students' Union Building: Addition and Renovation – Schematic Design Report**

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In terms of physical space, the project presents net increases to common spaces – lounges and bookable spaces and maximizing utilization of program space through shared use. Greater use of open-plan workspaces and an improvement in circulation efficiency will make better use of existing square footage within the Student Services area. Extensive discussions with the Bookstore have identified their space needs as fundamentally seasonal, and the design has been developed to accommodate dedicated Bookstore usage of some common space during high demand periods which has allowed for a substantial reduction in their space allocation.

The existing main entrance on the south side of SUB is removed to accommodate the atrium and the lower plaza. A new Main Level entrance is provided on the east side of the atrium adjacent to the existing covered walkway in the southeast corner. This entrance has doors facing east along the walkway and south towards the Van Vliet Centre. The quiet lounge that previously occupied this space is relocated to the lower level. This entrance serves pedestrian traffic using 89th Avenue east of SUB and the Van Vliet Centre. This redevelopment will facilitate abundant natural light and improve the quality of social space. In addition, an exterior plaza is provided to support student social activities and special occasions.

### **Recommendation**

THAT the GFC Facilities Development Committee approve, under delegated authority from General Faculties Council and on the recommendation of Planning and Project Delivery, the proposed Students' Union Building: Addition and Renovation – Schematic Design Report (as set forth in Attachment 2) as the basis for further planning.

UNIVERSITY OF ALBERTA

# Students' Union Building: Addition and Renovation



SCHEMATIC DESIGN REPORT

Project No. 01257E0200 | 2012.12.10

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## 1. INTRODUCTION

### 1.1 Purpose of the Report

This report documents the schematic design for the redevelopment of the Students' Union Building Addition and Renovation. Schematic design defines the primary elements of the project in terms of architectural and interior space planning, massing and preliminary material selections. It provides for preliminary engineering system descriptions and layouts. The schematic design estimate of construction costs confirms alignment of project scope with budget. Schematic design sets the direction for continued refinement and development of the design to the next level of detail.

Schematic design continues to progress the design concept established by the feasibility study completed in January 2012. The feasibility study established a reference point from which overall project goals and priorities were reconfirmed. The study also served as a point of departure from which new options were explored and the design refined.

The design team continued to meet with stakeholder groups and the steering committee to confirm user requirements, review design updates and confirm overall project direction. The Steering Committee was expanded to include representatives from the University Facilities and Operations and the University Bookstore.

DIALOG's architectural and engineering teams confirmed existing conditions through the review of existing drawings, on-site visits and meetings with the University's operations staff. The design recommendations provided in this report are based on the information gathered in this process and the proposed design solution.

### 1.2 Acknowledgements

The Students' Union Building Addition and Renovation 2012 was prepared by DIALOG in consultation with the Students' Union and University of Alberta representatives and the Students' Union Project Manager R.C. Steffes Management Ltd. The valuable contribution of these participants is acknowledged and greatly appreciated.

#### Students' Union Project Steering Committee

##### Students' Union Executive Committee Members

Andy Cheema, Vice President (Operations & Finance)  
Saadiq Sumar, Vice President (Student Life)

##### Members of Students' Council

Eric Bellinger, Councillor (Faculty of Nursing)  
Kevin Smith, Councillor (Faculty of Education)  
Lyndon Crone, Councillor (Faculty of Engineering)  
Josh Le, Councillor (Faculty of Business)

##### Dean of Students

Dr. Frank Robinson, Vice Provost and Dean of Students  
Cheryl Luchkow, Assistant Dean of Students  
Rob Washburn, Supervisor, Information Technology

##### University Facilities and Operations

Ben Louie, University Architect, P & PD  
Keith Hollands, Associate Director, Design and Technical Services, P & PD

##### Stakeholders

Keith Schmiedl, Director (University Bookstore)

##### Students' Union Management

Marc Dumouchel, General Manager  
Margriet Tilroe-West, Senior Manager (Facilities & Operations)

##### Project Management

Russell Steffes, R.C. Steffes Management Ltd.

**Consultants**

Rob Swart, Principal (DIALOG)

Stephen Boyd, Principal (DIALOG)

**Project Support Staff**

Zach Fentiman, SUB Renovation Project Coordinator

**Design Subcommittee**

Andy Cheema, Students' Union Vice President (Operations &amp; Finance)

Marc Dumouchel, General Manager of the Students' Union

Jane Lee, Senior Manager (Student Services)

Margriet Tilroe-West, Senior Manager (Facilities &amp; Operations)

Russell Steffes, R.C. Steffes Management Ltd. Project Management

Rob Swart, Principal (DIALOG)

Stephen Boyd, Principal (DIALOG)

**DIALOG Project Team**

Rob Swart, Architect

Stephen Boyd, Architect

Darin Harding, Intern Architect

Ryan Renihan, Structural Engineer

Grant Kidd, Mechanical Engineer

Dianna Williamson, Mechanical Engineer

Larry Meszaros, Electrical Engineer

The Students' Union wanted the process followed in the development of this project to manifest the SU's core values. To that end, the SU has sought to create a design process that is inclusive of all stakeholders, respectful and mindful of stakeholder and user priorities, and collaborative in character.

Overall guidance of the project rests with a Project Steering Committee, with the detailed design/consultation process overseen by a Design Subcommittee of that Steering Committee. The Dean of Students and Facilities and Operations each provided representation to the Steering Committee, and have been active participants at the Design Subcommittee level as well.

On June 4, the SU hosted a kickoff presentation with all stakeholders to outline the project goals and concept, and to outline the consultation process. Following that, from June through August, the SU hosted a series of stakeholder, design, and Steering Committee meetings – over 40 in total - to discuss the renovation and its purpose, assess the needs of stakeholders, and identify risk, conflicts, and opportunities that arise. In the fall, DIALOG and the Design Subcommittee have brought this information together in this Schematic Design Report.

Currently, a second round of consultations with stakeholders to discuss the Schematic Design Report is ongoing. In addition, the Students' Union is taking the proposed design to students directly, via road shows and two planned open houses, to garner additional feedback for inclusion in Design Development.

In terms of project management and architectural work, the Students' Union is working with Russell Steffes as the Project Management consultant, and with DIALOG as the project Architect. Russell was the Project Manager on the 1993 renovation and 2003 expansion projects. He knows the facility and our needs, and has a demonstrated record of success. Russell has worked with the Students' Union on the Feasibility Study, and is up-to-speed on the project.

DIALOG was originally selected by the Students' Union to assist in developing the Feasibility Study after a competitive RFP process. Dialog has University of Alberta alumni working on the project, and is receiving advice on the project from the Vancouver lead of the new UBC SUB, another Dialog project.

The University Architect's Office has also provided essential and timely feedback during the drafting of the Schematic Design Report.

**1.3 Project Methodology**

The Students' Union completed a feasibility study in January of 2012, which subsequently led to a referendum providing funding for this renovation project. Work on program issues and Schematic Design began in May 2012.



## 2. OVERVIEW

### 2.1 History of SUB

The Students' Union Building was constructed as a collaborative project between the Students' Union and the University in 1967, gaining national recognition in TIME magazine as an innovative approach to meeting the needs of a growing campus.

That productive collaboration between the Students' Union and the University that began with building SUB has continued through to today, and has been a driver of a level of cooperation between students and administration in the provision of student services that is unmatched in Canada.

The building itself has been renovated and expanded as enrolment has grown and needs changed. SUB remains a contemporary and vibrant part of the campus mosaic and is the foremost hub of service and social life on campus.

This continued vibrancy did not occur by accident, but rather as the result of conscious choices made by the University and the Students' Union to maintain and upgrade the building as the needs of the campus have evolved. Since 1993, SUB has undergone two major renovations and one expansion, which together have resulted in greatly increased usage, the cementing of SUB as a key meeting point for the entire University community, and enhanced service provision through the creation of a 'one-stop' facility for most non-academic student services.

Year	Major Areas Affected	Project Synopsis	Lead	Approx. Cost
1993	Main Level, Lower Level	Creation of food court, relocation of Student Union services	SU	\$2.2 million (1993 \$) \$3.2 million (2012 \$)
1996	2nd Floor	Centralization of University Student Services (USS)	University	\$2.8 million (1996 \$) \$3.8 million (2012 \$)
2002	Infill of courtyard	Creation of additional USS and social space	SU	\$6.9 million (2002 \$) \$8.3 million (2012 \$)

Student enrolment continues to grow, increasing from 26,749 FLE in 2000 to 34,923 in 2012 (*2002-03 Data Book; 2012 Institutional Fact Sheet*). Enrolment growth is expected to continue for the foreseeable future.

### 2.2 2012 Renovation Project Background

SUB remains a solid, well-run and heavily-used facility that, in some ways, is a victim of its own success.

Over the last few years, demands for more and better quality space of various types have been supported through the 2010 General Space Program for SUB. The Students' Union has also committed itself to a series of strategic initiatives, aligned with the University's own strategic documents that require a reconsideration of how space is utilized in SUB.

The Students' Union has explored and discussed a wide range of potential solutions to these demands and needs with the University, from expansion opportunities to reconfigurations of the existing building. Immediate expansion of the building, the Students' Union's initially-preferred option, was not found to be currently feasible, though it remains a possibility in the longer term.

After determining that expansion would not be possible at this time, the Students' Union turned its attention to what could be done to ameliorate the space issues identified in the General Space Program. The SU began reviewing other alternatives to improve utilization of space, and to create the kinds of space required by its strategic initiatives, within the general footprint of the building and its immediate environs. It was also critical to assess what these changes might cost, so that the affordability of any project could be assessed. The Students' Union elected to conduct a feasibility study to address these questions.

To do this analysis, the Students' Union retained the services of the project manager who managed the 1993 renovation and the 2002 expansion as a consultant. DIALOG was selected as the consultant on the feasibility study. The costs of the Feasibility Study were borne by the Students' Union through an allocation from capital reserve funds.

After several months of consultations and discussions with stakeholders, the team completed a formal Feasibility Study. This defined the general parameters of a renovation that would address many of the issues the Students' Union was seeking to resolve, and provided an estimate of the financial scale of such a project.

Based on the Feasibility Study, Students' Council approved a referendum for a \$9 per term fee for Students' Union facility development. The referendum passed in March 2012.

Over the summer and fall of 2012, the Students' Union has met with stakeholders and worked with DIALOG to create this Schematic Design Report.

## 2.3 Project Goals

The Students' Union has established three key goals for this project:

- Expand student engagement activity on campus;
- Improve provision of student services; and
- Enhance the long-term viability of SUB.

These goals are tightly aligned with the Students' Union's 2011 Strategic Plan and its engagement goal, in particular, is in direct alignment with the Dare to Discover Academic Plan.

## 2.4 Expand Student Engagement Activities

The Students' Union, in its conduct of business, strives to provide students with an experience of engaged involvement that demonstrates the power of individuals, working together, to promote real change. In this, we directly align with the University's thematic goal of creating better citizens.

True engagement, the driver of both student success and long-term connection to the institution, requires both curricular and extracurricular components. Cultivating the extracurricular component of engagement is, in the Students' Union's view, one of its key responsibilities, a duty under the PSLA, and the most effective way for it to support the University's academic plan and to create the kinds of school bonds upon which long-term alumni support rests.

With that in mind, a key program driver of this renovation project is the question of how we can adapt the building to foster greater student engagement. In our vision, this entails creating the spaces and facilities required to allow students to come together: social and study space, as well as much-improved facilities to support our over 400 student groups.

A key part of this vision includes the creation of an involvement centre that connects students with volunteer and student group opportunities, works with the University to promote the many academically-oriented involvement options available to students, and provides information on involvement in University and Students' Union governance.

## 2.5 Improve Service Provision

A key goal of the renovation is to improve service provision. In planning this project, considerable attention has been paid to the interplay of space design and operational impacts, with an eye to both improve efficiency and effectiveness.

The renovation will improve service provision by:

- Creation of a Student Involvement Centre, as noted above;
- Providing easier access and improved visibility to Students' Union-operated services;
- Intelligent co-location of services to generate efficiencies, increased collaboration, and improved integration;
- Interior design centered around collaborative workspace concepts and greater use of open workspaces – fewer hallways and doors, more spaces designed for impromptu meetings and discussions; and
- The addition of select retail and/or personal care services.

## 2.6 Enhance the Long-Term Viability of SUB

SUB, as a key facility on campus, needs to be kept current and relevant if it is to fulfill the college union role. This renovation project is intended to address current weak spots in how the building has been stacked and developed over time.

SUB also plays a key role in the long-term financial viability and operational capability of the Students' Union. From providing consistent, significant long-term business and lease revenue to ensuring that there are unique programming capacities that both the Students' Union and student groups can use, SUB plays a central role in the Students' Union's daily activities.



In order to ensure the continued ability of the facility to meet changing campus needs, there are a number of specific design priorities that this project is intended to address:

- Improved utilization of existing space.
- Improve the quality of the space. Currently the Student Groups and Services are located in a "rabbit's warren" of small offices and shared work spaces.
- Improved permeability of the building to foot traffic, including direct access to the Lower Level, and improve circulation. Developing cohesive, more walking-friendly frontage will help draw people into the building and create an active front door.
- Improved visibility of, and access to, Lower Level operations. The Lower Level is underutilized and, while not hard to access, is somewhat hidden. There are no clear sightlines into the Lower Level, and access points are not always obvious to building users. Access to and visibility of the Lower Level will greatly increase the usefulness of Lower Level space and increase usage of the building.
- Introduction of natural light into the Lower Level, particularly in areas where student social activities occur. Natural light, particularly in winter months improves the quality of social spaces and is generally more attractive than space that receives no natural light.
- Reconfiguration of select tower floors and allocation of space to meet emerging needs and better align with the General Space Program.
- Provide additional space to accommodate immediate needs that cannot be met through redevelopment and improved utilization alone.

## 2.7 Referendum Requirements

In addition to the primary goals, the renovation must meet certain criteria laid out in the funding referendum, specifically:

- Minimize the environmental footprint of SU operations;
- Increase and improve the student services and club space;
- Create more meeting rooms for student groups;
- Increase study, relaxation, and social space; and
- Alignment to University Strategy and Planning.

## 2.8 Dare to Discover

The Students' Union's engagement-related goals for the renovation are in alignment with and in direct support of three of the four *Dare to Discover* cornerstones:

- **Talented People:** Specifically, supporting leadership development and diversity. The 'involvement centre' idea is also akin, conceptually, to the principles behind welcome centres.
- **Learning, Discovery, and Citizenship:** The Students' Union's focus on supporting student groups, and providing additional related services and leadership programming, is an effort to create the best possible leadership and citizenship experiences for our students. This is what the Students' Union, in the abstract, is about. It is a key driver in our engagement efforts.
- **Connecting Communities:** Global and local engagement are outcomes of the increased effort to support the incredibly diverse range of student groups and activities that this renovation represents. The renovation also seeks to develop more of the kind of social spaces that foster interaction and a sense of community.

## 2.9 Long-Range Development and Sector Planning

The project aligns with the Long Range Development Plan of the University, and its derivative sector plans. The Students' Union Building is located in Sector 3 (LRDP 2002, Sector Plan 3&4 Dec. 2004) and serves as a primary interior node. The proposed redevelopment of the south of SUB seeks to contribute to elements of the sector vision, notably:

- Developing new, and reinforcing existing, pathways (both interior and exterior) within a hierarchy that creates: distinct zones for pedestrian and/or vehicular access and movement; ease of way-finding; desirable Campus character development; and appropriate interfaces with other University Sectors and neighbourhoods.
- Introducing pedestrian pathway, node and landmark enhancements that promote interaction, animation, interpretation, accessibility, way-finding, and activity within a safe, secure, attractive and pedestrian-scaled environment
- Implementation of the principles of sustainability, wellness, flexibility, adaptability, manageability, safety, and universal accessibility (including a strategic servicing strategy) in the design and development of Sector buildings, pathways and open space.

- Development of strong and meaningful visual and physical connections between interior and exterior spaces that define and enrich public space, create focal and activity points, and enhance way-finding.

It is important to note that, while the LRDP provides for SUB to grow to the west and southwest, this development relieves the pressure for a true expansion of the Students' Union Building for five to ten years. The proposed renovation allows for the redevelopment of the Lower Level, which has become overly compartmentalized and challenging to navigate for building users. In essence, the addition of a "front porch" allows the Students' Union to channel and reproduce the Building's current strengths in order to unlock the potential of its less-effective space inventory. Further, it is intended to serve as a more welcoming face, aligning with the Students' Union Building's mandate as a welcoming, "living room" on campus.

bookable spaces with appropriate sound-dampening and technical infrastructure to allow for these uses.

The common theme in how this project is approaching the needs identified in the GSP is the idea of space efficiency. For example, with student services, greater use of open-plan workspaces and an improvement in circulation efficiency will greatly help make better use of existing square footage.

Extensive discussions with the Bookstore have identified their space needs as fundamentally seasonal. In order to improve overall space utilization and accommodate additional programming, the design reduced Bookstore space but makes allowances for Bookstore usage of some common space during rush periods.

## 2.10 SUB Space Program

A General Space Program (GSP) for SUB was developed in 2010, and identified a number of areas for improvement or expansion. Given the current constraints on expansion, it is impossible to address all the needs identified in the GSP, but this project does seek to address many of the core concerns. It should also be noted that the GSP is a tool to quantify space needs but as these are constantly changing, it becomes a starting point for initiating the design process.

In addressing the needs identified in the GSP, the project has implemented two key strategies for making better use of existing space: increasing space efficiency through operational changes that reduce per-person and circulation requirements; and re-thinking whether particular space needs are occasional/seasonal or constant.

In terms of physical space, the project presents significant net increases to common spaces – lounges and bookable spaces – and small increases to the usable space allocated to Students' Union services and student groups.

CJSR and the Chaplains Association will experience some small losses in net space, which are to be mitigated by policy regarding bookable spaces that essentially replaces desired dedicated space with shared space. An example of this is studio space; the Gateway, CJSR, and select Students' Union departments have indicated that one of their needs is for space suitable for audio and video production, and we are planning to meet this need by equipping one of the

### 3. ARCHITECTURAL DESIGN

#### 3.1 Site Analysis

##### 3.1.1 Site Context

The Students' Union Building (SUB) is located on the north side of 89th Avenue between the Administration Building to the east and the Industrial Design Studio to the West. Other buildings adjacent to SUB include:

- Van Vliet Centre (VVC) Centre and University Hall - on the south side of 89<sup>th</sup> Avenue
- Pembina Hall and the Agriculture Forestry Centre to the North

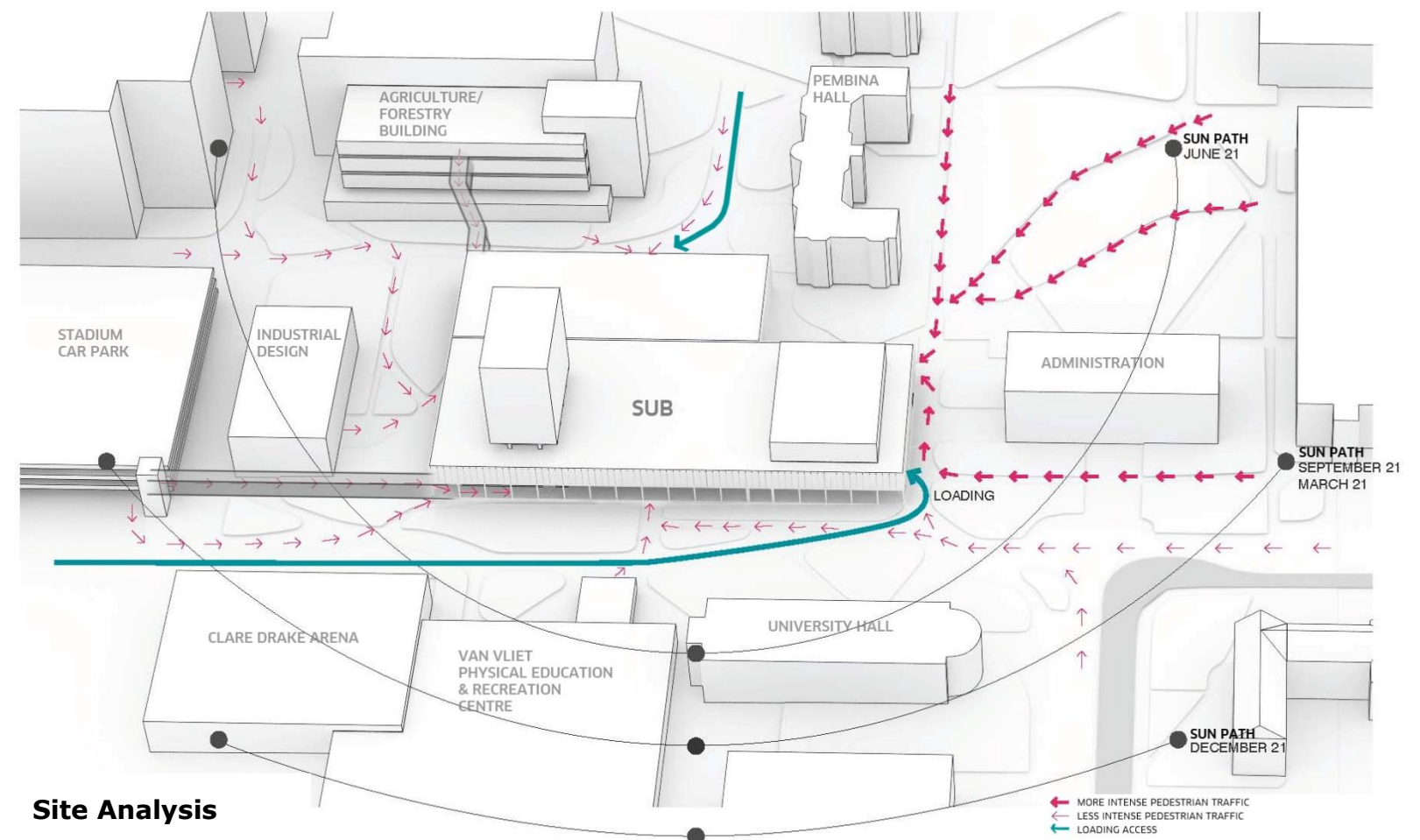
The topography on the north and east side of SUB is generally flat and aligns with the Main Level elevation. On the south side, 89th Avenue starts to slope down on the east side of SUB dropping approximately four metres in elevation at the west end of the site.

Between 114th Street and the entrance to the Stadium Car Park, 89th Avenue is configured as a well landscaped pedestrian bicycle mall with an asphalt path approximately 9m wide. This path also provided service vehicle access to the Horowitz theatre loading dock on the east side of SUB and DATS access to the Steward Centre within the VVC. A restricted vehicle access road on the north side of SUB provides access to the existing loading dock.

##### 3.1.2 Existing Building Entrances

SUB is served by seven entrances of which five are primary pedestrian entrances:

- South Entrance off of 89th Avenue immediately north of the VVC
- North East Entrance with access to the Alumni Walk and the Central Quad
- New Exit Stair Entrance with access to Pembina Hall and Central Quad
- North West Level 2 pedestrian bridge to the Agriculture Forestry Centre
- Level 1 west entrance to the Stadium Car park pedestrian bridge and the outdoor stair down to 89 Avenue



Site Analysis

The north entrances providing access to the Quad and the Engineering precinct experience the highest pedestrian volumes as most of the other academic buildings on campus are located north or north east of SUB. The west entrance experiences pedestrian traffic from the Windsor Park residential area, the student residences and the Stadium Car Park. The south entrance is used primarily by students accessing the VVC and the Health Sciences Precinct south of 87 Avenue.

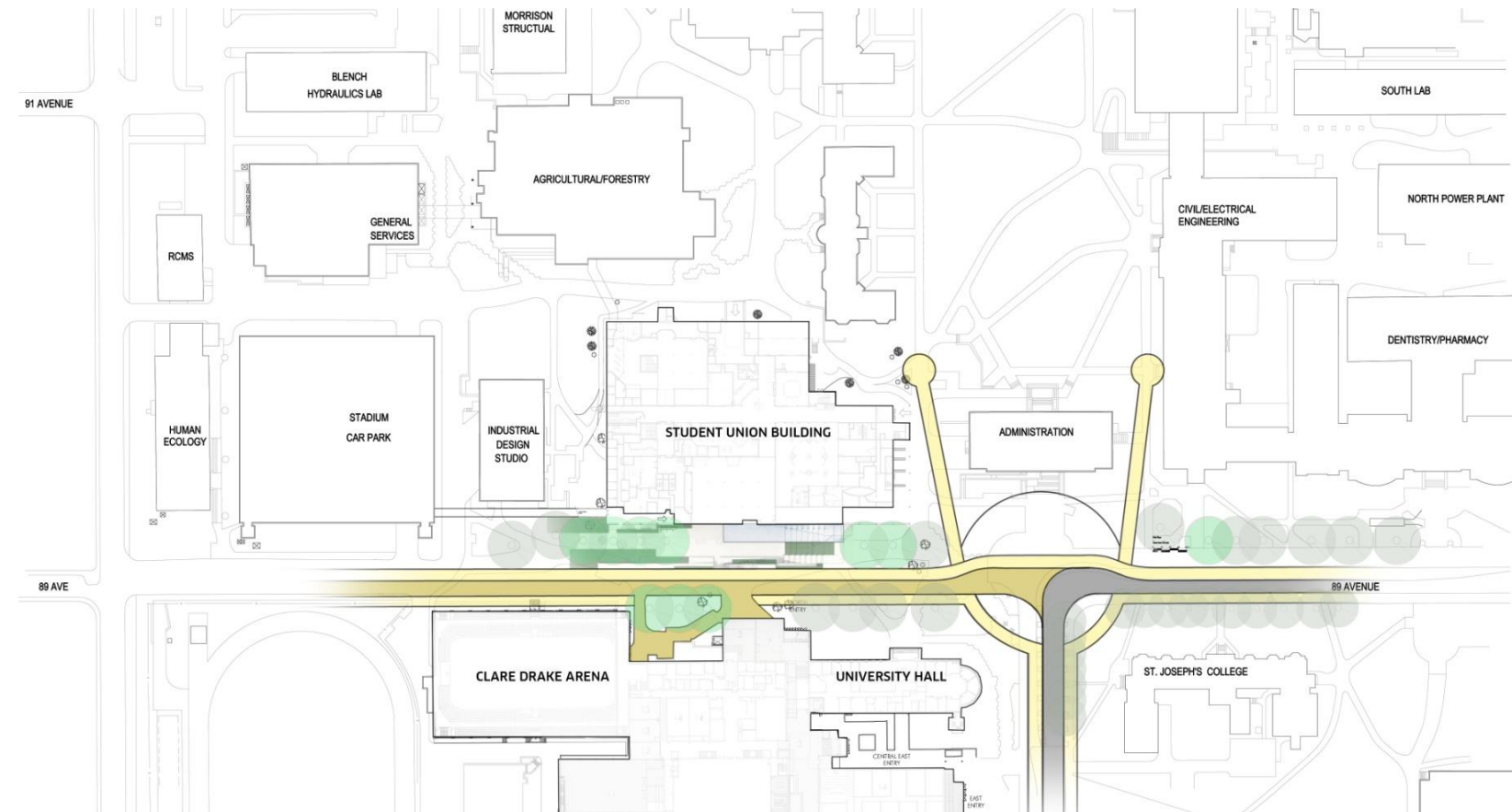
### 3.1.3 University of Alberta Planning Context

The 2012 Addition and Renovation Project is designed to conform to the University of Alberta's Long Range Develop Plan and in particular the Sector 3 Plan in which it is located. The Sector Plan defines 89th Avenue as:

*"A major pedestrian spine that should be enhanced in its surfacing, landscaping and activity areas. Sufficient distance should be maintained to this pathway to enhance sunlight penetration, landscaped verges, space that does not feel confined, and some views from the pathway to nearby and some distant facilities. The pathway should engender a sense of continuity, anticipation, and integrity, without further encroachment or constraint from facilities... Consideration should be given to developing exterior nodes to the northeast and south of the building to increase the outdoor potentials for student/staff passive activities."*

(University of Alberta Long Range Development Plan: Sector Plans 3 and 4, Prepared by Gibbs and Brown Landscape Architects 2004, Page 113)

This project is designed to reinforce 89<sup>th</sup> Avenue as a major, landscaped pedestrian spine and to create a node on the south side of SUB that provides inviting and engaging spaces for student/ staff social activities.



### 89<sup>th</sup> Avenue Pedestrian Spine



## 3.2 Preliminary Project Description

### 3.2.1 Overview

The architectural and interior design themes established in concept design are continued and refined in schematic design. The Lower Forecourt and interconnected atrium space on the south side of the building are maintained and further refined to more effectively integrate SUB into the University's Sector Plan and to more effectively integrate Lower Level and Main Level activities.

### 3.2.2 Atrium

A two storey glazed atrium, 6m wide by 33m long and encompassing the Lower Level and the Main Level, is added onto the south side of the SUB. The primary purpose of the atrium is to provide a visual and spatial connection between the Lower Level and the Main Level; it is not required for program space. The atrium is constructed in a new Lower forecourt, to provide for daylight penetration into the lower level and to make the Lower Level and the activities it accommodates more visible from the street.

At the existing south perimeter of the Lower Level, the existing concrete planter is removed and the foundation wall between the building's structural column grid is removed to connect the Lower Level to the atrium. The remaining structure is reinforced to accommodate the existing building loads (see Section 4.0 Structural).



**Aerial view showing the Lower Plaza, landscaped terrace, atrium and entry canopy.**

The east 15m of the atrium accommodates a tiered floor area that provides a transition from the Main Level to the Lower Level. Seven tiers, each 2,000mm deep by 600mm high and 6,000mm wide provide a natural area in which students can lounge and view activities on both the lower and Main Level levels. A staircase approximately 2m wide is incorporated into the tiers, providing access between the two floors and to each tier. In the lower forecourt, concrete tiers with landscaped surfaces match the tiers in the atrium. These matched tiers, separated only by the atrium glazing reinforces the role of the atrium as a transition between the indoors and the out of doors.

The three perimeter walls of the atrium will be glazed with triple pane "spider" glass to maximize the buildings transparency while still providing for improved energy performance. A fritted pattern with approximately 60% opacity is applied to the glazing to moderate solar height gain during the summer and provides visual interest and texture to the façade while still permitting a high degree of transparency.

The atrium roof is aligned with the atrium perimeter to enhance the overall simplicity of the atrium massing. The atrium roof is approximately 300mm below the second level. The atrium roof will be designed to accommodate a green roof at some point in time in the future but will not be installed at this point in time. The atrium ceiling is designed to align with the existing Main Level ceiling to provide for a more seamless transition between the two. With regards to maintenance, both interior and exterior windows can be cleaned by genie lifts or window washers on bosun's chairs, particularly where the tiers occur. Ceiling mounted fixtures can be accessed by a genie lift and over the tiered area, by a "zoom boom".



**Atrium looking east towards the tiers.**

### 3.2.3 Lower Plaza

A lower plaza aligned with the Lower Level, extends along the south face of SUB from the east side of the atrium approximately 25m beyond the west end of SUB where it meets the existing building grade. The plaza extends 7.5m beyond the existing atrium face into 89th Avenue. The east side of the Plaza has seven landscaped tiers that cascade down from the street level to the Lower Level plaza. These are identical in size to the interior tiers described in 3.2.2. The exterior tiers are designed to accommodate hardy ground cover that can withstand student seating. A low head underground sprinkler system is contemplated for these tiers. The lower plaza is designed to drain naturally to the west as 89<sup>th</sup> Avenue continues to slope to the west.

Tiered retaining walls on the south side of the plaza provide a transition from the lower plaza level to 89th Avenue. This retaining wall incorporates a landscaped terrace that is 500mm below the main level. This terrace is landscaped with hardy, indigenous woody ornamentals and other perennial plants. A glazed guard is provided at this level in conformance with the building code. As this terrace is less than 600mm below the main street level, a guard is not required at street level. This enhances the visibility of the lower plaza and Main Level by providing a more unobstructed view from street level. The retaining wall transitions in height with the sloping grade so that at the west end of the plaza where it aligns with the existing 89<sup>th</sup> Avenue grade, the retaining wall is terminated. During the Design Development phase options to minimize the possibility of vehicles inadvertently contacting the glazed guard will be considered.

An entry stair provided access from street level to the lower plaza is located along this retaining wall. The stair is located so that it forms part of a convenient pedestrian pathway from the VVC to SUB's Lower Level entrance off the plaza.



**View of Lower Plaza looking east.**



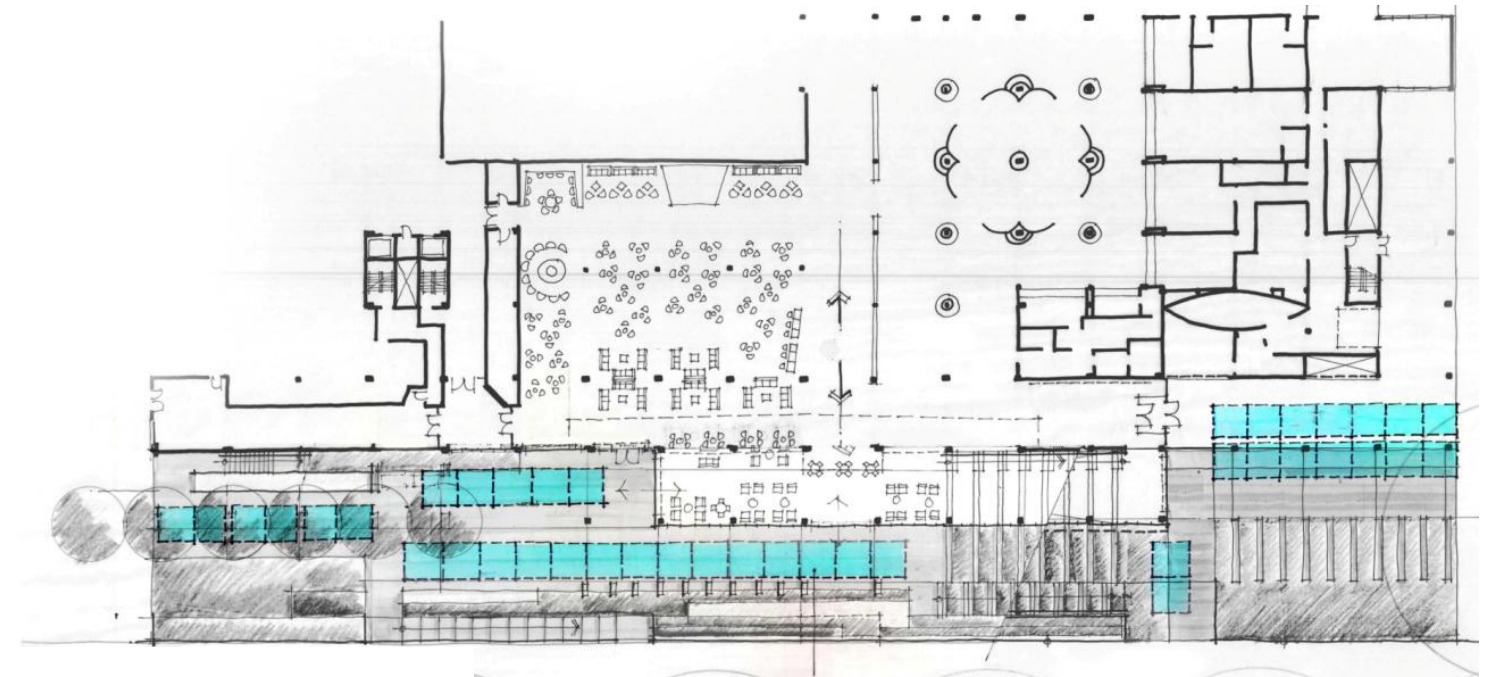
The lower plaza is intended to accommodate student social activities and special occasions such as farmers markets and flea markets, pancake breakfasts, and performances by individuals and small troupes. In this respect it is expected to function as the node identified in the Sector Plan. Services including natural gas outlets for a mobile gas barbeque and, weather proof electrical outlets are provided to support these activities.

The lower plaza and upper pedestrian paths are designed to accommodate genie lifts, zoom booms, trucks and snow removal equipment. Snow removal from the lower plaza and the street level can be undertaken with machines. Snow removal at the steps leading to the lower plaza will be done by hand.

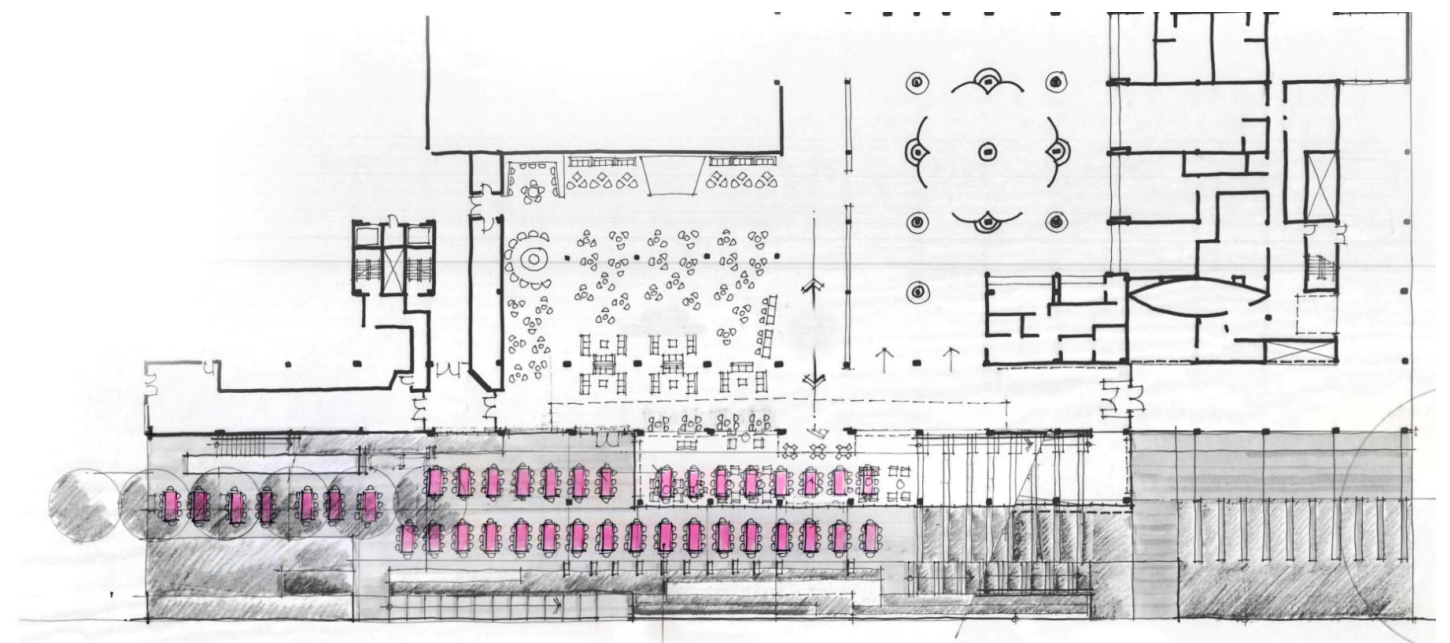
### 3.2.4 Entrances and Openings

The existing main entrance on the south side of SUB is removed to accommodate the atrium and the lower plaza. A new Main Level entrance is provided on the east side of the atrium adjacent to the existing covered walkway in the southeast corner. This entrance has doors facing east along the walkway and south towards the VVC. The quiet lounge that previously occupied this space is relocated to the Lower Level. This entrance serves pedestrian traffic using 89th Avenue east of SUB and the VVC.

On the Lower Level a new entrance opening onto the lower plaza is located immediately west of the atrium. This entrance provides access from the Lower Level to the VVC via the plaza stair case or west along 89<sup>th</sup> Avenue via the lower plaza.



**Lower Plaza Farmers' Market layout.**



**Lower Plaza – Pancake Breakfast layout.**



During the Design Development Phase the possibility of providing canopies over the new Main Level entrance and the Lower Level entrance will be explored.

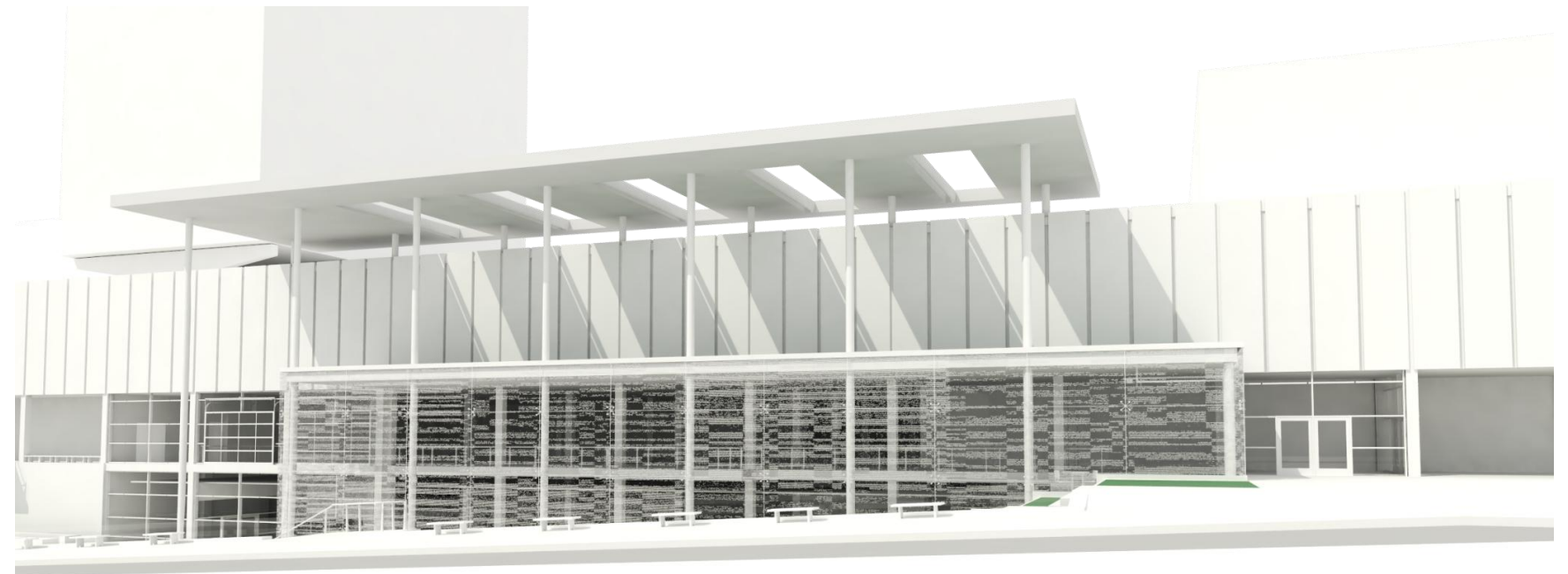
A new stair in the building's south west corner provides access from level 1 to 89<sup>th</sup> Avenue west of SUB.

Glazed overhead doors that provide access to the outdoors are provided on the west side of the atrium and the south side of the Main Level adjacent to the atrium. These doors can be opened on special occasions during clement weather to facilitate student social activities that span indoors and outdoors. They will be interlocked with the building's mechanical system.

A concern associated with openings to the outdoors is the possibility of increased dust accumulation and insect, bird and rodent infestation. The Students' Union Building currently operates with the loading dock doors open for extended periods during the summer and has not experienced an increased incidence of infestation or dust control. It is anticipated that the controlled use of similar wall openings can be operationally accommodated by the Students' Union.

### 3.2.5 Entrance Canopy

A slotted entry canopy extending beyond the 2nd Floor roof gives the new addition a more significant presence, celebrates the new addition and entry plaza as a node and engages the Lower Level plaza entrance. The canopy slots allow for the play of light and shadow on the building's façade increasing visual interest and making the overall design composition more dynamic.



**New atrium and entrance canopy viewed from 89<sup>th</sup> Avenue.**

### 3.3 Program Spaces

#### 3.3.1 Student Services

##### Students' Union Services

Two "collections" of student services adjacent to one another are located on the Lower Level. This will allow current operational requirements to be met, while also allowing for modest program expansion of 54.5 m<sup>2</sup> (587 ft<sup>2</sup>). This increase addresses some of the need identified in the 2010 General Space Program and reflects ex-post needs assessments (e.g. Co-curricular Record Coordinator.) The spaces maintain separate offices for senior staff, and include open-plan spaces for associate director and coordinator level staff members. Utilization of open space work environments for student services allows the Students' Union to stem expansion needs, by utilizing the space it currently controls more efficiently.

The north services "collection" is proposed to hold the Centre for Student Development, Orientation, SustainSU, and Safewalk. The key feature and similarity of these services is the use of a volunteer component for service delivery. The proposed space plan allows for an appropriate shared volunteer muster/staging zone, a staff/volunteer servery, and adjacent meeting spaces. A separable, lockable servery will serve the needs of service staff and volunteers and also function as the home base for the SustainSU reusable dish program. The servery will not be public, but would have the flexibility to be used for private bookings (e.g. potlucks) and for temporary storage of food product during events taking place in the exterior plaza. The servery would be equipped with a sink, sanitizer unit, microwave, refrigerator and freezer. The only program element in this category not being considered for inclusion is the SustainSU Bike Library project, as discussions are proceeding to relocate this service to the building's exterior or elsewhere on campus are ongoing.

The south services "collection" is proposed to hold the administrative components of both Infolink and Student Group Services. Again, in this collection, the Students' Union seeks to implement an open space concept, while maintaining private offices for service management. The combination of these two services allows the Students' Union to implement a "Student Involvement Centre" front desk jointly staffed by employees of Infolink and Student Group Services. Queuing ability is considered for this area, as it is

anticipated to serve as a U-Pass Distribution point. This area also requires secure space for cash processing and exam registry functions.

Both "collections" allow for the services to maintain a highly visible and accessible storefront. Visibility and the "desire for an address" represents a major need identified in the 2010 General Space Program.

In conjunction with the improvements to student group spaces addressed in a subsequent section, the proposed program allows for the following 2012 Renovation Referendum criterion to be met: "The goal of the renovation shall be to increase and improve the student services and club space."

##### Student Governance

The Students' Union proposes that the Dean of Students Office assumes control of Students' Union controlled spaces on the 4th Floor (currently programmed as meeting rooms and a private office) and the Students' Union assumes control of Dean of Students controlled spaces on the 6th Floor. It is expected that spaces on the 4th Floor would be reconfigured to meet functional requirements of the Office of the Dean of Students, is included in the project budget, and has the support in principle of Office of the Dean of Students. The 6th Floor is proposed to serve as the primary hub for non-executive student governance operations.

Student Governance includes the Students' Union's elections office (currently occupying part of the 3rd Floor); Discover Governance (occupying an office couplet on the Lower Level). The program is achieved with a combination of private offices, bookable meeting rooms, informal, public meeting spaces, and open-concept workspaces. Furthermore, the adjacencies of these departments will allow for a more productive work environment, and meets targets established in both the 2010 General Space Program and subsequent needs assessments.

##### SU Health & Dental Plan

The studentcare.net/works ("SU Health and Dental Plan") office currently occupies the Lower Level and will be relocated to the 6th Floor. Program elements included are anticipated to be identical to the current configuration (i.e.: small reception and seating

area with front desk, along with a separate private space to accommodate administrative functions.

### Student Group Spaces

The Students' Union believes in the vital contributions of student groups to forming a well rounded, vibrant, and creative campus community, and endeavors to support the coordinators and members of these groups by providing spaces that give student groups an "address" and visibility. (Note that the administrative component of Student Group Services proper is discussed in the previous section.)

In conjunction with the improvements to the student services spaces addressed previously, the proposed program allows for the following 2012 Renovation Referendum criterion to be met: "The goal of the renovation shall be to increase and improve the student services and club space."

Currently some offices are used for storage/administration on the 6th Floor. The 2010 General Space Program expects provision of proper storage facilities (e.g. designated storage rooms, lockers, and mailboxes) will reduce the demand for private office spaces, and allow these spaces to be better distributed for their intended/program use. In order to achieve this, it is proposed that all student group office spaces are proposed to be co-located on the Lower Level, and dedicated storage/lockers/mailboxes provided.

### 3.3.2 Common Space

Common spaces – those parts of the building available to be enjoyed by all members of the University community – activate the building and showcase its personality and its amenities. Lounges, hallways and plaza space work together as a system that links together each functional area while behaving as a canvas for the users that converge within it. Collectively, these interstitial spaces encourage SUB's role as a living room on campus – a destination for people, especially students, to gather, learn and relax in a dynamic, community environment.

The proposed design provides a substantial increase in common space, including a new Lower Level lounge and atrium, an adjacent outdoor plaza and added circulation.

The Lower Level lounge is inspired by the successful and heavily used great room on the Main Level. The lounge will extend from the atrium, including the indoor terrace, towards the Bookstore, and will offer high quality day-lit space. An additional 125 seats will serve customers of new retail space as well as overflow from the Main Level food court during peak hours. Added capacity reflects the expectation that the renovation will draw more traffic into SUB, and the addition of natural light in the Lower Level is itself expected to be an attractive feature. Through its adjacency to services and student group space, the lounge is expected to enhance visibility of these operations and in turn promote student engagement.

Two new entrances are added to the building – one at the southwest into the Lower Level and one at the southeast into the Main Level, replacing the current south entrance. The southeast entrance displaces an existing quiet room, known colloquially as the "nap room." A similar space is added near the aforementioned southeast entrance.

Lower Level common space extends beyond the south curtain wall into an open outdoor plaza. This space, which occupies 580m<sup>2</sup> or 6,240 square feet, is a key feature of the redeveloped south face, adding functionality, presence and penetrability to the building. The plaza may serve as passive common space with seating and radiant heat, weather dependent. The plaza may also serve as an active programmable venue. Potential uses include farmers markets, outdoor yoga, theatre, concerts, barbeques and pancake breakfasts. These uses require provision of power, sound amplification and gas in later design.

### 3.3.3 Events and Meeting Space

All but two of the Students' Union's existing bookable meeting rooms are located in the tower – the exceptions are the Lower Level Meeting Room and the Student Group Services meeting room. These rooms serve the needs of Students' Union departments and Student Groups and are available from time to time for booking by other user groups.

In addition to the Lower Level meeting rooms, there is currently one bookable meeting room on the 3rd floor, four on the 4th and one on the 6th. These rooms lack appropriate audiovisual functionality, and the smaller rooms are overly narrow, resulting in increased wear and tear and reduced user comfort.

This proposal deletes each of the above-mentioned rooms and develops ten bookable meeting rooms in four locations: one on the 6th floor, one adjacent to student group and student services offices, three adjacent to Lower Level retail and five located in a bank on the north end of the Lower Level. The first will serve student governance functions, especially committees of Students' Council. The second will be reserved for the use of student services staff and student group members. The two clusters of meeting rooms will create a versatile meeting, event and conference facility to serve the needs of internal, University and community users. These latter rooms will be fully equipped, and one meeting room pod will be adaptable into a single larger space.

Overall, this represents an increase from 8 to 10 bookable meeting rooms and to 460 m<sup>2</sup> (4,951 ft<sup>2</sup>) of bookable meeting and event space, and meets the expanded need envisioned as resulting from expanded student group-related activities.

The plan also anticipates the possible use of one of these spaces as a multi-purpose, studio-style facility appropriate for audio and video production.

### 3.3.4 Retail Space

#### Bookstore

The University Bookstore is a key anchor in SUB and is a hybrid of leased space and University controlled space. The renovation proposes that 270m<sup>2</sup> (2,906 ft<sup>2</sup>) of Lower Level space currently leased to the Bookstore be repurposed towards the goals of the renovation. While this will require some internal reorganization within the store, this creates an opportunity to improve the Lower Level storefront. The corridor immediately adjacent to the south boundary of the bookstore will be reserved to accommodate tills and queuing during the highest volume weeks in fall and winter.

#### SUBprint

SUBprint is a full service printing facility offering a comprehensive range of products. In addition to producing the vast majority of custom courseware at the University, SUBprint offers retail services to members of the University and surrounding community. A forefront location in the Lower Level will facilitate a shift to higher emphasis in the retail arena, a strategic priority for the business.

The proposal adds 48m<sup>2</sup> or 520 square feet (a 23% increase) and relocates the operation to a more visible space. This is aligned with the GSP, which anticipated a 25-40% required increase in space and identified the current location as a marketing limitation. Access to the Bookstore and the freight elevator is retained.

#### SUBtitles

SUBtitles primarily sells used textbooks on consignment and also offers eco-friendly products and general merchandise. We propose converting the space it occupies into offices and meeting rooms and merging the existing business with SUBmart on the Main Level. The SUBmart-SUBtitles combination has previously operated successfully and a return to this model adds assignable square footage to the project scope. Textbook consignment will continue and other product lines will be consolidated with those of SUBmart, where work is currently being done to increase product density and remove low-turnover products.

### Added Commercial Retail Units

Two to three new commercial retail units are envisioned – one is to be a food and beverage operation and the other is yet to be determined, with the possibility of a kiosk also under examination. This will allow a diversification of the services provided by the building while buffering the financial impact of the project and contributing to the operating costs of the building. The units are given a direct interface with lounge space to maximize their commercial viability and convenience for building occupants. The inclusion of retail space contributes to our intent to reproduce the success of the Main Level atmosphere on the Lower Level.

### 3.3.5 Other SUB Tenants

#### University Chaplains

The Chaplaincy unit is proposed to relocate from its current home on the Lower Level to the 3rd Floor (the spaces are currently allocated to Students' Union Elections and Students' Union Technical Support, both being relocated to the 6th Floor and Lower Level, respectively). The program is achieved with the inclusion of a meeting room, two private office/consult spaces, a small kitchenette, and a large meditation space equipped with separate ablution facilities. While the intended space does address immediate concerns, notably with respect to ablution facilities, it is not intended to solve the issue of peak-period prayer space demands identified in the 2010 General Space Program. Currently, peak-period prayer services are being accommodated by the Faculty of Physical Education and Recreation.

### CJSR

CJSR FM 88.5 will retain its address on the Lower Level, but is proposed to reduce in area in order to allow for a larger allocation space for the adjacent student group offices hub. While the 2010 General Space Program anticipates a need for additional space, ex-post needs and program assessments/consultations may allow the development team to move forward with the assumption that a reduction in contiguous space is feasible. This reduction is under review and may be amended in Design Development.

### Building Services

The mission of Students' Union building services is to provide a welcoming environment for students and staff by maintaining a clean, well run building with a variety of businesses, services, and relaxation opportunities.

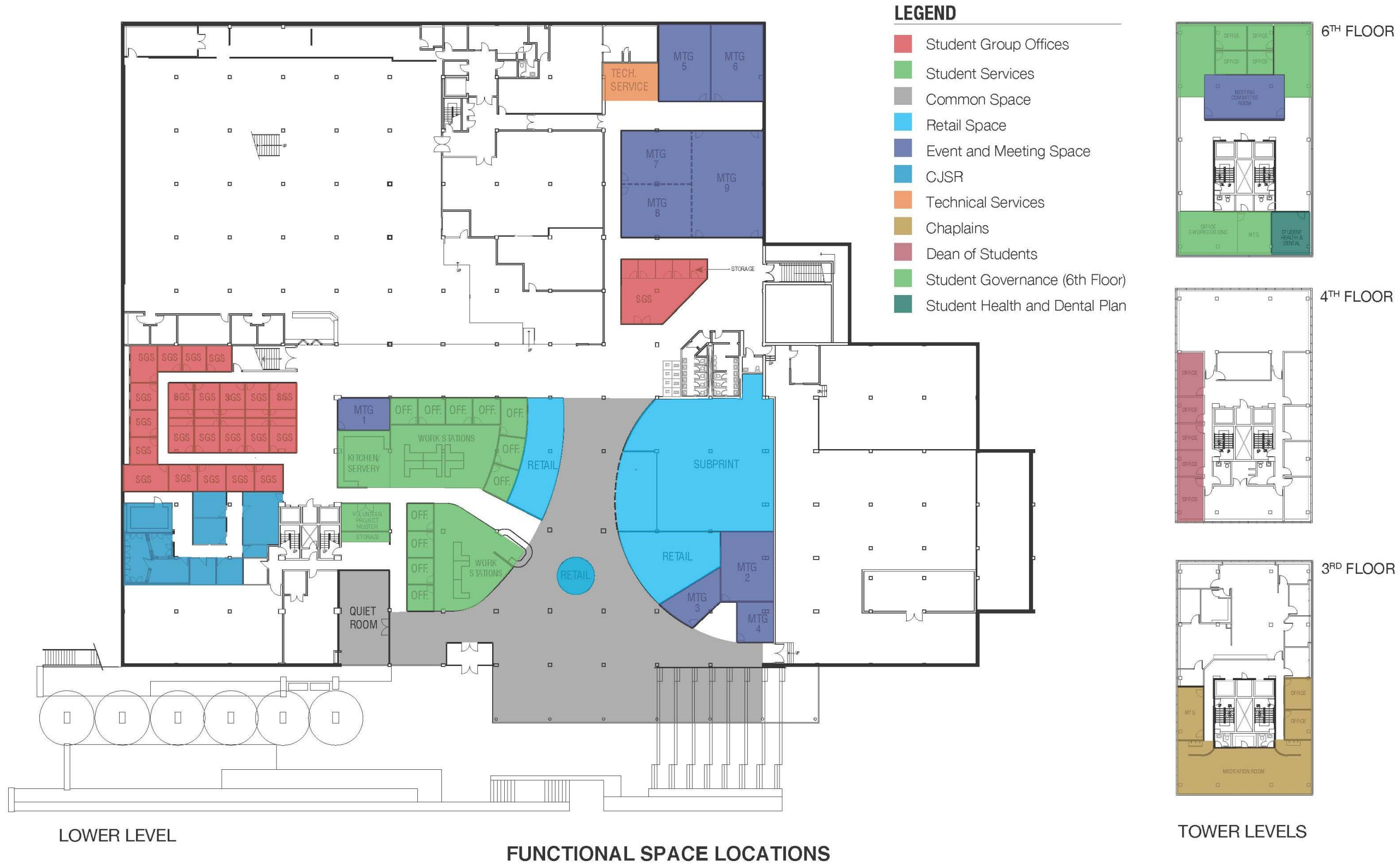
In order to meet this mission, adequate storage spaces for equipment must be provided. The renovation proposal maintains current storage allocations, which are sufficient to be able to provide the excellent level of custodial and maintenance services enjoyed by building users to date.

Students' Union technical support is proposed to move adjacent to the meeting room cluster in the northeast corner of the Lower Level. Power and network requirements are considered for this space. This allocation will meet the long identified needs for their program, notably temperature requirements for equipment.



01257E0200 - December 10, 2012

Table 2: Functional Space Analysis						
Function	Component	Current Location	NASM	Proposed Location	NASM	Notes
<b>Student Services</b>	<b>All components</b>		<b>375.8</b>		<b>529.0</b>	
	<i>Students' Union Services</i>	<i>Lower Level</i>	297.5	<i>Lower Level</i>	352.0	<i>Bike Library Excluded</i>
	<i>Student Governance</i>	<i>Lower Level</i>	46.8	<i>6th Floor</i>	155.0	
	<i>Health and Dental Plan</i>	<i>Lower Level</i>	31.5	<i>6th Floor</i>	22.0	
<b>Student Group Spaces</b>	<b>Group Offices</b>	<b>Lower Level and 6th Floors</b>	<b>276.6</b>	<b>Lower Level</b>	<b>282.0</b>	
<b>Common Space</b>	<b>Study, social and relaxation space</b>	<b>Main and Lower Level</b>	<b>246.4</b>	<b>Lower Level</b>	<b>733.0</b>	<i>Includes Quiet Lounge</i>
<b>Event &amp; Meeting Space</b>		<b>Lower Level and 6th Floors</b>	<b>279.5</b>	<b>Lower Level</b>	<b>459.8</b>	
<b>Retail Spaces</b>	<b>All components</b>		<b>3562.0</b>		<b>3217.3</b>	
	<i>Bookstore</i>	<i>Main and Lower Levels</i>	3086.1	<i>Main and Lower Levels</i>	2816.1	
	<i>SUBprint</i>	<i>Lower Level</i>	210.5	<i>Lower Level</i>	262.4	
	<i>SUBtitles</i>	<i>Lower Level</i>	265.4	<i>Main</i>	0.0	<i>Merged with SUBmart</i>
	<i>Added Retail</i>	<i>Lower Level</i>	0.0		138.8	
<b>Other Tenants</b>	<b>All components</b>		<b>352.0</b>		<b>250.4</b>	
	<i>University Chaplains</i>	<i>Lower Level</i>	181.5	<i>3rd Floor</i>	126.4	
	<i>CJSR</i>	<i>Lower Level</i>	170.4	<i>Lower Level</i>	124.0	
<b>Building Services</b>	<b>All components</b>		<b>16.5</b>		<b>27.0</b>	
	<i>Storage and service</i>	<i>No changes</i>				<i>Additional washrooms to be added</i>
	<i>Technical Services</i>	<i>3rd Floor</i>	16.5	<i>Lower Level</i>	27.0	
<p>Current Net Assignable Square Metres based on actual usage. Excludes circulation space.</p> <p><b>Legend</b> NASM = Net Assignable Square Meters</p>						



### 3.4 Material and Finishes

Generally the interiors will be completed to an institutional level of quality. The following table provides a general list of materials and finishes that will be incorporated into the interior design.

Table 3: Interior Design Finishes				
Description	Floors/ Base	Walls	Borrowed Lights/Doors	Ceilings
Lower Level				
Student Lounge Space	P-CT	GB	N/A	ACT/ GB
Work/ Project Rooms	SV/ R	GB/MW	WD/ MF	ACT
Meeting Rooms/ Offices	CPT/R	GB/MW	WD/ MF	
Retail Spaces	NIC	GB	NIC	NIC
Level 3 and Level 6	CPT/R	GB	WD/ MF	ACT

Legend			
P-CT	Porcelain- Ceramic Tile floor and base (Slip resistant)	WD	Wood Doors
SV	Sheet Vinyl	MW	Mobile walls between meeting rooms
R	Rubber Base	MF	Metal Frames
GB	Gypsum Bd. Painted	NIC	Note in Contract
ACT	Acoustic Ceiling Tile		
CPT	Carpet		

Enhanced finishes and detailing that includes materials such as porcelain tile, wood paneling and integrated seating is provided in the atrium, the terraced transition between the main and Lower Levels on the east side of the atrium, and main student space on the Lower Level. The extent of these enhanced details and finishes will be explored during the subsequent phase of Design Development.

### 3.5 Building Code Review

The purpose of this building code review is to review determine changes to fire, life safety and plumbing on the Lower Level and identify the additional measures, if any, required to

accommodate the proposed design within the existing building, particularly the interconnection between the Main Level and the Lower Level. The Authority Having Jurisdiction is the University of Alberta which in turn has contracted The Inspections Group Inc. to achieve compliance. The applicable building code is the 2006 Alberta Building Code. This review is based on the understanding that the renovations undertaken in 1993 and 2002 significantly upgraded the fire and life safety measures. In those renovations, a new exit stair compliant to current standards was added to the east side of the facility. The existing open stair, north of the existing elevator core, that serves the Lower Level, Main and 2nd Floors was separated from the remainder of the floor areas it serves and an exit corridor to the exterior was established.

#### 3.5.1 Lower Level

Table 4 lists the Lower Level occupied areas and the occupant load associated with each area as determined under ABC 3.1.17.1. In practice these occupant load will rarely, if ever, be attained. Table 5 lists the exits that serve the Lower Level, their width and the exiting capacity lists as persons. This table demonstrates that the exiting capacity provided in this table exceeds the occupant load provided in Table 4. Table 6 provides the minimum number of water closets required. New washroom facilities will be provided to accommodate this occupant load. Layouts of these will be provided in the Design Development Phase.

Table 4: Lower Level Occupant Load			
Description	Area (SM)	Area/ Person	Total Occupancy (people)
Office	583.0	9.3	63
Retail	2001.2	3.7	541
Meeting Rooms	431.0	1.85	233
Lounge Areas	733.5	1.85	396
Service	2209.0	46	48
Net Building Area	5957.7		1281
Gross Building Area	6651.0		



<b>Table 5: Lower Level Exiting Requirements</b>			
<b>Description</b>	<b>Width (mm)</b>	<b>Width / Person (mm)</b>	<b>Total Exiting Capacity (People)</b>
Lower Level Entrance	2700	6.1	443
N.E. Stair	2100	8.0	263
North Stair	940	9.2	102
West Stair	2400	8.0	300
Tower Stairs	1880	9.2	204
Total Exiting Capacity			1312

<b>Table 6: Lower Level Plumbing Facilities</b>			
<b>Gender</b>	<b>No. of People</b>	<b>Fixtures Required</b>	<b>Fixtures to be Provided</b>
Males	640	8	8
Females	640	15	15

### Interconnected Floor Space

When the existing light wells were roofed over in 2002, what had been an exterior area became interior space. These spaces are now classified as interconnected floor spaces under the terms of the building code. Interconnected floor spaces that only connect two floors do not require any onerous measures, particularly as the existing glass windows provide for a smoke separation.

With this design, however, three floors become interconnected: the Lower Level, the Main Level and the 2nd Floor. Three storey interconnected floors require more stringent and costly measures including: mechanically vented smoke control systems, the creation of areas of protection or additional exists from all floor areas.

The least costly approach is to provide new sprinkler lines with individual sprinkler heads at each 2nd Floor window in the existing light wells. The Authority Having Jurisdiction may accept the introduction of the sprinklers alone or may require that the existing aluminum windows be replaced with new windows in fire rated steel frames. With this approach, only the lower two floors would be classified as interconnected.

### 3.6 Construction Sequence

This section briefly describes the approach and phasing to the construction of this project including interior renovations and the new addition. This approach will be re-confirmed once a construction manager has been selected.

The first phase of construction is anticipated to include minor renovations on Floors Three, Four and Six so that the functions so identified in Table 2 can be relocated from the Lower Level prior to construction commencing on that level. During this phase, which is expected to occur between July and August of 2013, demolition for the Lower Plaza and the atrium foundations will commence. The balance of the work including the construction of the superstructure and the interior fit up is anticipated to commence in September of 2013 and be completed by the 3<sup>rd</sup> quarter 2014.

On the Main Level the areas that will be affected by construction are the quiet lounge; the existing south perimeter adjacent to the new addition, including the front entrance; and the opening in the floor adjacent to the bookstore. A horizontal dust hoarding will be provided at the opening. The quiet lounge will not be temporarily located elsewhere during construction. A construction hoarding offset approximately 2m will be provided adjacent to the south perimeter. During the construction period the west pedestrian entrance to the Stadium Parkade walkway will be maintained and a temporary emergency exit through the former quiet room will be provided.

On the Lower Level a construction hoarding will be provided in the Bookstore and in CJSR's space. CJSR will also be provided with a temporary access to the west stair in the tower core. Student Groups and Student Services will be temporarily decanted from the Lower Level to other areas in SUB. The new SUBprint space will be completed before the existing area is demolished so that decanting this function is not necessary.

### 3.7 Sustainability

This project incorporates a number of sustainable design features including:

- Energy Management Strategies designed to reduce overall energy consumption including natural ventilation to reduce summer cooling, radiant heating to produce effective warmth close to the user, and radiant cooling to reuse chilled water that may not be fully utilized in the building, improving power plant chiller operation and efficiency. Upgrades to air handling units include addition of variable speed operation of the fans to reduce air volumes and fan power at partial loads.
- Maximizes daylight penetration into the Main and Lower Levels in the student activity areas.
- Daylight/ occupancy sensors to control the use of electric lighting during daylight hours and when spaces are not occupied.
- Energy efficient lighting and outdoor lighting that is night sky friendly.
- Enhance building envelope for the atrium. The options that are being explored here include: triple glazing, frameless glazing to reduce perimeter heat transfer; low 'e' coatings; gas filled cavities and ceramic frits to reduce solar heat gain.
- High albedo or green roof to reduce solar heat gain. These options will be explored in Design Development.
- Where new washroom facilities are required, provide low flow fixtures, hands free operation and high efficiency hand dryers instead of paper towels.
- Maximizing the use of materials that are recycled, locally sourced or sustainably produced.
- Avoiding the use of any materials that emit volatile organic chemicals (VOC's).

In addition to these measures the Students' Union is contemplating a number of operational changes incorporating zero or minimal waste systems. These include:

- Mechanical strategies to reduce heat loss through food court/ kitchen exhaust.
- Reduce the amount of disposal materials used in food court operations.
- Provide sustainable, enviro-friendly housekeeping products and practices.
- Implement an education/ feedback program that informs students and helps them gauge the extent to which their choices are sustainable.
- Continue programs developed through Sustain SU.

## 4. STRUCTURAL REPORT

### 4.1 Introduction / Scope

The scope of this report is to provide an update on the structural progress for the expansion of the Students' Union Building following the schematic design phase. This report is based solely on the latest architectural drawings and renderings of the proposed expansion and on record base building structural drawings prepared by B. W. Brooker Engineering Ltd., dated September, 1965. Information on subsequent refurbishments and renovations were not available for review. No inspections of the existing building have been performed at this time.

The proposed addition at the south end of the existing building involves demolition and alteration of the existing structural systems along this face. Strengthening works are required to the existing concrete framing to accommodate the proposed openings and additional imposed loads. The addition structure will consist of a 2-storey high clear-span steel frame supporting a green roof at the existing second floor level. The framing extends an additional storey to support a decorative feature high roof level.

An approximately 4m high concrete retaining wall is required along the site boundary at the south side to accommodate proposed grading. Proposed landscaping features, including stairs and planters, will be formed with reinforced concrete.

### 4.2 Existing Building Structural Systems

The existing building consists of a 2 storey concrete frame on a single level basement. The framing system at the main, second and roof levels consist primarily of concrete joists spanning between concrete girders. The girders are supported by concrete columns and, in less frequent cases, by concrete shear walls and foundation walls. Building columns are typically on a 6.1m x 6.1m grid and are supported by concrete piles below basement level. Foundation walls are also supported on concrete piles. It is not clear from the drawings what type of concrete pile construction was used. The basement floor consists of a concrete slab on grade of varying thicknesses ranging from 125mm to 150mm.

Stability for the building is presumed to be provided by the concrete shear walls, which typically form stair and elevator core walls within the building. Perimeter foundation walls could also form part of this system although this is not anticipated. This will need to be investigated as the

design progresses to determine if the proposed alterations to these walls have any effect on the lateral load resisting system.

### 4.3 Foundations and Lower Level Alterations

The proposed addition provides an expansion to the existing basement level and requires the removal of the existing foundation wall. Strengthening of the existing wall will be required above the new openings to create a beam along this edge. Strengthening will likely be in the form of steel plates or channels bolted through the existing concrete wall above the new opening locations. Retained beams will be in the order of 600mm – 750mm deep. Superficial cracking may result from this change of structural systems however, these cracks will be an aesthetic issue and not structural.

350mm x 350mm pilasters are currently located from basement to main level below the perimeter building columns on the south face and will be retained to transfer the loads down to the piled foundations. Due to the removal of the restraint previously provided by the foundation wall and due to the increased load to these pilasters, strengthening of these columns may be required. Steel plates or channels are again anticipated as the method of column strengthening if deemed required. It is expected that the existing foundations will see no significant net increase in load as a result of the proposed addition.

Based on previous experience with buildings near the proposed site, the foundation system for the steel columns and perimeter grade beams of the addition is envisaged as belled concrete piles. A geotechnical investigation and report is currently being prepared by Thurber Engineering Ltd. to confirm the ground conditions and give recommendations regarding foundations and retaining structures. This report is being prepared based on historical reports and experience in the university area. New test holes are not required to form these recommendations.

Barring any unforeseen conditions from the geotechnical investigation, the basement floor in the new atrium space will be a 125mm thick slab on grade that will tie into the existing building. It is anticipated that the existing slab on grade will be broken out locally to facilitate demolition of the foundation wall, and reinstated as part of the new slab.

The geotechnical report should confirm the presence and the anticipated level of groundwater on the site. This will be further investigated during the design development phase once the geotechnical investigations have been completed. Based on previous experience with soils in the area, a groundwater level below the proposed structural formation level is anticipated.

#### 4.4 Superstructure

The superstructure for the addition will consist of steel columns spanning 2 storeys supporting a low roof located near the existing second floor level. These columns will extend an additional storey to support a decorative feature roof located slightly above the existing roof level.

Columns will be formed with closed hollow structural sections, either rectangular or circular in shape. The columns will likely be approximately 273mm diameter or 300x200 rectangular in order to support the anticipated gravity and wind loads.

A girt system is not anticipated for the perimeter curtain wall. The architectural team is investigating glazing solutions that would eliminate the requirement for these intermediate supports. Should girts be required in the future, column sizes may have to be increased.

The low roof structure is anticipated as a lightweight steel deck roof supported by wide flange members. This roof is currently seen as a potential extensive green roof space with the potential to be accessible as a terrace in the future. An extensive green roof system typically weighs 200-250kg/m<sup>2</sup> and an appropriate live loading for this type of assembly occupancy would be 4.8kPa. A likely overall "structural depth" at this level is therefore in the order of 300mm to 400mm. The steel deck at this level will act as a diaphragm and form part of the lateral load resisting system for the addition. In-plane steel bracing may also be required to stabilize the roof structure.

This usage and the associated loading for the low roof will be discussed and studied further during the design development phase. The steel roof structure will be designed to cater for all current and anticipated future loading scenarios at the discretion of the owner. It should be noted that the option for an accessible roof should be assessed considering costs from increased steel tonnage, larger foundations, and increased strengthening requirements of existing second floor beams and fire rating of structure which is likely to include intumescent paint for all architecturally exposed structural steel (AESS).

The high roof is also anticipated as steel construction, with light weight steel deck supported by wide flange members. The steel deck at this level will act as a diaphragm and form part of the lateral load resisting system. It is anticipated that the northernmost steel columns will cantilever from the existing roof to provide lateral stability.

Loads resulting from snow, wind and rain ponding will be assessed on each roof level. Snow drift loads may exert lateral on the existing building at the low roof level. We anticipate that the drifting will be minimal and that the wall system will be capable of withstanding these loads. This will be further investigated during the design development phase.

It is anticipated that lateral stability of the addition will be provided by the lateral load resisting system of the existing building. Localised loads from the addition will be transferred to the existing structure via concentrically braced frames and sway frames. The type and extent of these frames will depend on the selected column type, architectural constraints, and a more thorough assessment of the existing structural system. The requirement to consider lateral forces due to earthquake will be determined following receipt of the geotechnical report.

#### 4.5 Landscaping Structure – Retaining Walls and Stairs

In order to accommodate the final grading arrangement at the site, retaining walls are required along the south perimeter of the building. These retaining walls will effectively replace the existing foundation walls in separating the road grade from the basement level. Depending on the geotechnical recommendations, soil conditions, and wall location with respect to the site boundary, various retaining system options are available.

A traditional concrete retaining wall system would consist of a vertical reinforced concrete wall designed to cantilever from the base structure. The base structure would either consist of a continuous concrete "heel" embedded below the retained soil or, alternatively in this specific case, a toe formed as part of the courtyard slab spanning to the building perimeter columns. The latter option requires less excavation and is thus preferable. Wall thicknesses will likely vary from 300mm – 500mm at the base of the wall, depending on height of soil retained, which varies along the length. A requirement for piled foundations below this wall is likely, but is dependent on geotechnical recommendations.

An alternative system, space permitting, is to use soil stabilization behind the line of the retaining structure with horizontal reinforcement layers (commonly called reinforced earth retaining walls). This option requires a significant over-excavation behind the line of the retaining wall. Soil is then replaced between layers of horizontal reinforcement, e.g. steel mesh or woven geotextile fabric, essentially anchoring the soil using its own mass. The wall can then be faced with a concrete panel, brick or other non-loadbearing cladding systems.

Soil retention systems will be designed using an appropriate lateral loading to represent the in-situ soils and heavy traffic loads from the adjacent road. During construction of the retaining walls, the proximity to the adjacent 89 Avenue should be closely considered. Temporary shoring may be required and should limit deflections to avoid damage to road structures and buried services.

The stepped platforms and stairs near the south-east corner of the addition will be formed with reinforced concrete. Raking concrete walls will form the edges of the exterior structure with concrete beams and slabs spanning between these supports to form the individual platforms. A similar system will be used for the interior platform system. A full isolation joint in the structure will be required at the interface between the exterior and interior structure to prevent thermal bridging.

## 5. MECHANICAL

### 5.1 Summary

This section outlines the Mechanical Design for the new University of Alberta Students' Union Building (SUB). Estimates of mechanical systems have been based on preliminary architectural layouts of the new atrium and revised lower level areas. System capacities will be finalized with detailed heating and cooling load calculations through the design development phase and in conjunction with the details of the atrium envelope construction to be developed by the architectural team.

#### 5.1.1 Code and Code-Referenced Standards

The following are applicable codes, and standards that are referenced by those codes. The requirements of these codes and standards will be met by the mechanical design.

- Alberta Building Code – 2006
- Alberta Fire Code – 2006
- ANSI/ASHRAE 62.1- 2010; Ventilation for Acceptable Indoor Air Quality
- NFPA 10-07; Standard for Portable Fire Extinguishers
- NFPA 13-07; Standard for the Installation of Sprinkler Systems
- NFPA 14-03; Standard for the Installation of Standpipe and Hose Systems

#### 5.1.2 Standards and Guidelines

The following publications are accepted standards and guidelines of good engineering practice. These recommendations contained in these standards will generally be adhered to in the mechanical design.

- ANSI/ASHRAE 55-1982 Thermal Environmental Conditions for Human Occupancy

#### 5.1.3 Design Criteria and Standards

Heating and cooling load calculations are based on the 2006 Alberta Building Code and the 2009 ASHRAE Handbook of Fundamentals.

The design conditions for the spaces within the Main Level and Lower Level will be:

Winter: Outdoor Temp: -34°C DB; Elevation: 645 m

Indoor Temp: 20°C to 22°C DB

Indoor Humidity: 30% RH at -20°C or above

Indoor Humidity: 20% RH at temps lower than -20°C

Summer: Outdoor Temp: 28°C DB/19°C WB; Elevation: 645 m

Indoor Temp: 22°C to 24°C DB

Indoor Humidity: 60% RH Maximum

Outdoor Air: Outdoor air requirements for ventilation will be based on the most stringent requirements of ASHRAE 62.1 – 2010

The design conditions for the proposed Atrium will be:

Winter: Outdoor Temp: -34°C DB (1% ABC 2006 Heating Design); Elevation: 645 m

Indoor Temp: 20°C to 22°C DB

Indoor Humidity: 30% RH at -20°C or above

Indoor Humidity: 20% RH at temps lower than -20°C

Summer: Outdoor Temp: 28°C DB/19°C WB; Elevation: 645 m

Indoor Temp: 23°C to 24°C, Natural Ventilation – Varies, up to 28°C DB at the low level.

Indoor Humidity: 50% RH

Natural Vent Mode: Uncontrolled, temperature at occupied space level will be based on Outside Air Temperature.

Outdoor Air: Outdoor air requirements for ventilation will be based on the most stringent requirements of ASHRAE 62.1 – 2010. The new retail occupant load will require additional outside air.



The atrium will be designed with a combination of natural ventilation, solar shading, and radiant cooling to achieve thermal comfort. Thermal comfort is dependent on more than just air temperature, since total air velocity and the radiant effect can provide equivalent thermal comfort, ie a fan on a warm day, a gas fired radiant heater on a cold day. Therefore, a thermal comfort model will be completed to compare air velocity, air temperature, and mean radiant temperature to establish comfort conditions.

The occupancy of the atrium and basement area will be limited to the maximum allowed by fire code and it is not anticipated full assembly occupancies will be accommodated in this space. It is assumed that any potential for markets would mostly be accommodated outside the building.

## 5.2 Plumbing Revisions

### 5.2.1 Domestic Water

Existing domestic water will be modified to suit revised plumbing fixture locations in the revised Lower Level layout. New retail food areas may require domestic water services and main domestic line capacities will be checked with the additional loads.

### 5.2.2 Storm Drainage

The atrium addition will add to net roof area of the Students' Union Building. Green roof drains will be added to collect any rain that collects under the overhead canopy. Drainage will be brought down to the existing storm system through a rain water leader. Existing capacities will be confirmed during the design phase.

It is not clear where the existing storm main leaves the building and at what elevation. Based on the shallow storm manhole inverts shown on the existing survey, the main may have to be re-routed due to the designed excavation of the site. The storm main will be exposed within the new Lower Plaza or will have insufficient cover. Therefore, the storm main within the building will have to be relocated to a new exit point. A full civil survey will be completed to confirm the storm lines running through the affected area. Storm drainage from the new Lower Plaza created by the atrium should be controlled by surface runoff to the existing lower grade. It is not anticipated that the Lower Plaza will form a depressed area at this time, but if this occurs a new catch basin will have to be installed.

It is assumed that the existing Lower Level has weeping tile and new weeping tile will be extended around the new perimeter atrium.

### 5.2.3 Sanitary Drainage

Existing under-slab sanitary drainage will be modified to suit revised plumbing fixture locations in the revised Lower Level layout.

Sanitary services will be modified and added to for new washrooms required for the proposed occupant loading.

### 5.2.4 Plumbing Fixtures

New plumbing fixtures will be required where washrooms are added to meet required washroom counts. It is recommended that all plumbing fixtures in the lower level washrooms be upgraded to high efficiency water conserving fixtures. Infra-red hands free sensors should be provided to limit contact since the lower level will be a food serving area.

## 5.3 Central Heating System

### 5.3.1 Primary Source

Steam is supplied from the University of Alberta Central Plant to hot water heat exchangers to provide hot water for radiation, force flows, and unit heaters. Reheat coils will be added to the variable air volume boxes in the Lower Level to provide space heating.

Dual-circuit radiant panels are proposed above the seating areas along the Main Level overlooking the atrium. These radiant panels will provide additional thermal comfort to offset the mean radiant effect of a large glazed area. These radiant panels will be connected to the existing heating piping along the Main Level area, since part of the existing envelope will be displaced by the new Atrium.

Hot water radiant tubing is proposed for the new Atrium slab on grade at the Lower Level and the tiered interior seating. This will increase the appeal of the stairs to become a student gathering area in the winter months by improving thermal comfort. Due to overhead doors in the Atrium, 20% propylene glycol will be used in the loops to prevent freezing. A hot water to glycol heat exchanger will be provided in the mechanical room, along with pumps and controls

for the radiant slab system. The new Atrium slab will also require below grade insulation to allow the radiant heating to operate efficiently.

An extruded aluminum floor grille is proposed along the perimeter walls of the atrium with a combination of displacement air outlets and heating fin for supplemental heat. Ducts for ventilation and cooling will be installed under slab and connect to grilles in the floor. Radiant fin piping will be installed under the floor grilles outside of the displacement outlets. Warm air will rise by convection preventing frost and aiding to cover envelope losses. This in-floor grille system avoids taking up program space.

### 5.3.2 Vestibule Heating

A local vestibule cabinet heater will be provided to offset infiltration heating loads through the new entry vestibules at both the Main Level and in the Lower Level. Supplemental fan powered heaters will be provided at the overhead doors to offset infiltration losses. The intent is to provide a well sealed overhead door that is not typically opened in the winter.

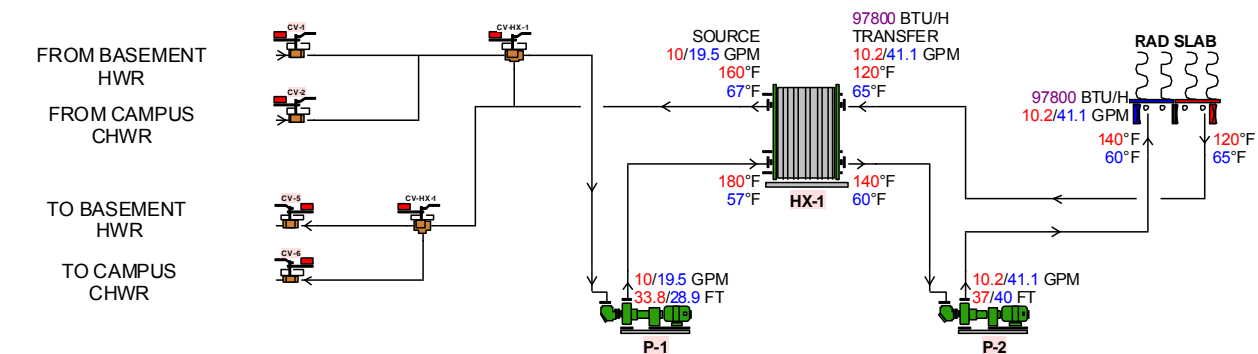
## 5.4 Cooling System

### 5.4.1 Building Distribution

Chilled water for the University of Alberta Students' Union Building (SUB) is supplied by the University of Alberta Central Plant. There is sufficient capacity in the chilled water system to accommodate the new loads. A new cooling loop connected to the existing return chilled water will supply the radiant slab (in cooling mode) and the dual circuit radiant panels. This chilled water supply will be controlled above dew-point temperature to prevent condensation. New pumps and a mixing station will be required to supply the warmer chilled water to these radiant elements. Using return chilled water for this service will also widen the temperature differential back to the University of Alberta cooling plant, which is desirable for load matching of chillers.

In addition to improved thermal comfort, the floor heating system has the advantage of operating as a floor cooling system in summer. Radiant floor cooling systems have a very high performance in spaces where significant direct solar radiation strikes the floor (such as atriums). Chilled water will be supplied to the radiant floor slab through a switchover manifold that will switch from heating to cooling function in the summer. The radiant cooling slab will

have substantial capacity where direct sunlight strikes the slab and will provide localized cooling comfort for people in the occupied zone. The stairs will be separately controlled from the atrium floor, to provide avoid discomfort from sitting on a slab that is too cool. The proposed schematic is as follows:



Chilled water will be supplied to the dual circuit radiant cooling panels in the summer, control offset will be provided to ensure simultaneous heating and cooling does not occur.

A study was completed to find the optimal roof overhang dimension and location. It was recommended that a length of 10m be installed 1.6m above the top of the atrium which would reduce peak cooling by 40% and have energy savings of 20%. Fritted glazing will be explored to reduce solar heat gain.

## 5.5 Ventilation System

### 5.5.1 Air Supply – General Description

Currently the Lower Level ventilation is composed of a mixture of systems. Constant volume boxes with reheat coils were installed on a few branches during the club offices renovations. Variable air volumes terminal units were installed in a couple areas; however the main unit fan was not upgraded with variable speed control. When the VAV boxes call for a variation in air, the system pressure changes and distribute air into adjacent spaces.

All constant volume boxes will be replaced with VAV terminal units in the Lower Level and zone control will be provided.



It is intended to supply ventilation air from the existing air handling unit through displacement diffusers located along the tiered interior seating and through the floor grilles. Warmer air will be supplied at approximately 17-18°C along the occupied area to provide ventilation by displacement. A fan powered box or fan coil will mix cooler primary air with return air from the space to provide warmer air. This displacement air will provide primary ventilation for the Atrium.

To limit the additional air volume required to serve the Atrium, natural ventilation and radiant floors and cooling panels will be utilized. Overhead and sliding doors are installed in the Atrium and when open will send a signal to automated openings in the roof. In natural ventilation mode, the atrium displacement ventilation systems serving the atrium will be shut off for energy savings. The interior VAV boxes will continue to operate to serve their respective zones. Operable mechanical openings inlets located at lower levels with operable dampers and insect screen will also be used for natural ventilation when the overhead doors are closed.

### 5.5.2 Air Supply Equipment

The existing Curling/Club Offices supply unit has sufficient air volume for the revised basement space layout including the expanded footprint of the Atrium. This unit has a capacity of approximately 10,613 l/s (22,500 cfm) which is adequate for the proposed load. As well, the outdoor air volume capability will be sufficient. The unit was recently upgraded with a new cooling coil in 2008. This unit is a simple built up unit with a steam heating coil, chilled water cooling coil, and roll filters. It is recommended that the supply fan motor be replaced and retrofitted with a variable speed drive to provide true variable speed control. Currently the fan rides the fan curve when boxes throttle back, severely limiting energy savings opportunities.

It is also recommended that the Curling/Club Offices unit be refurbished during construction including possible fan replacement, new steam coil, new filter section, and possible air handling unit panel repair. The existing mixing section and dampers will also be replaced and a better mixing section provided to properly mix cold outside air and return air. The existing return/outdoor air mixed air duct may be converted to outside air only as part of other project work, which will require better mixed air performance at the air handling unit level. The outside air quantity for this unit will have to be adjusted based on the calculated occupant level.

The existing Bowling/Games & Student Services supply unit is also affected by the scope of the basement renovations. This unit has sufficient air volume for the revised basement space layout. This unit has a capacity of approximately 9,217 l/s (19,540 cfm) which is adequate for

the proposed load. As well, the outdoor air volume capability will be sufficient. This unit is a simple built up unit with a steam heating coil, chilled water cooling coil, and roll filters. It is recommended that the supply fan motor be replaced and retrofitted with a variable speed drive to provide true variable speed control. Currently the fan rides the fan curve when boxes throttle back, severely limiting energy savings opportunities.

It is also recommended that the Bowling/Games & Student Services unit be refurbished during construction including possible fan replacement, new steam coil, new filter section, and possible air handling unit panel repair. The existing mixing section and dampers will also be replaced and a better mixing section provided to properly mix cold outside air and return air. The existing return/outdoor air mixed air duct may be converted to outside air only as part of other project work, which will require better mixed air performance at the air handling unit level. The outside air quantity for this unit will have to be adjusted based on the calculated occupant level.

It will be evaluated during design development if air handling unit replacement is a more economical option compared to piece-meal reconstruction of the existing air handling units. A May 2011 report by ReLumen Engineering noted that the mixing dampers for all air handling units should be replaced to provide better mixing conditions, particularly if the common outside air/return air duct is revised to outside air only. Therefore, a significant portion of the air handling unit will be affected by upgrading and saving the casing may not be worth it. The logistics of installing new units into the space will also be reviewed during design development.

The west exhaust louver on the south wall of SUB was investigated during schematic design to see if it could be partially covered. The louver was found to be completely inactive and all the exhaust for the building exits through the east exhaust louver. The building operator noted that the building is now short of relief air capacity in full economizer mode. A potential option during full economizer mode is to use the new atrium as a relief air path through the roof openings. This relief path could also be used when the overhead doors are open, to create a positive velocity out the openings and discourage insect entry.

### 5.5.3 Exhaust

Grease exhaust from the lower level is currently not anticipated or allowed for and it is assumed that lower level retail will not involve cooking operations.

Washroom exhaust from the renovated washrooms will be adjusted and increased based on the revised washroom floor area and layout.

#### 5.5.4 Air Supply and Cooling – Tower Building

The scope of work in the existing tower building is small in nature and the mechanical upgrades will consist of a tenant retrofit. This will involve moving existing HVAC zones and sprinkler heads as required to suit the new layout. A separate study was conducted to determine the scope of potential upgrades for the Tower, but the costs associated with these upgrades is outside the scope of this project.

#### 5.5.5 Humidification

Direct injection steam humidifiers are installed in the air handling units, these will be retained and refurbished if required.

#### 5.6 Fire Protection and Life Safety Protection

Sprinkler coverage will be required at the top of the atrium, new sprinkler heads will be installed at high level. Sprinklers within the Lower Level will be adjusted as required to suit the new layout. If a new storage space is created under the stairs, this space will have to be sprinklered as well.

Hand held extinguishers will be provided throughout in compliance with NFPA 10 and local authorities.

All ducts and piping passing through a fire separation will be provided with fire stopping in accordance with the building code. Any ducts passing through a fire-rated wall will provided with an approved fire damper.

It was noted during a site visit that the fire departments Siamese connection was located in the corner of the bay adjacent to the proposed new main entrance. This may need to be adjusted based on architectural design.

The interconnection of the floor spaces only consist of the basement and the main floor, so dedicated smoke exhaust will not be required. The second floor interconnection will be isolated from the main floor by a fire rating and sprinkler heads on the glazing.

#### 5.7 Control Systems

##### 5.7.1 General

An extension of direct digital control (DDC) building management and controls system (BMCS) will control and monitor all mechanical equipment and will provide zone HVAC control. It is intended that the existing air handling unit, the terminal boxes in the zone, and new radiant cooling and heating equipment be upgraded to DDC control.

Space temperature control will be provided through terminal controllers, electronic room temperature sensors, and electronic reheat and heating control valves.

Standalone remote control panels will operate and monitor major mechanical equipment. All field devices including valve and damper actuators, room temperature controllers, and HVAC system and equipment control and monitoring devices will be electronic.

It is recommended that some form of demand control ventilation be implemented in assembly and meeting spaces such as carbon dioxide sensors. This will allow reduction in outside air volumes when the space is partially occupied.

## 6. ELECTRICAL SYSTEMS

### 6.1 Summary

This review assesses the capabilities of the existing electrical systems to facilitate the concept proposed to expand and renovate the Students' Union Building on the University of Alberta Campus. The review covers power, communications (data, voice, audio/visual), fire alarm, security and lighting. It is based on visual walk-through on October 2, 2011 and November 8, 2011 and a recent review of drawings, in particular those drawings associated with more recent renovations.

Generally the electrical systems are in good condition; consistent with what is normally expected based on the equipment's age and type of facility.

### 6.2 Power

#### 6.2.1 Demolition-Related Notes

The electrical feeds and other utilities to the building from outside are carried in an east-west utility corridor (tunnel) south of the building, beneath the lane between Van Vliet Centre and SUB, bordering the Van Vliet edge of the lane. While this corridor should be quite safe from the excavation proposed, investigation will be needed to determine if that is the case along the entire affected area, or whether there are any significant-length northward projections of the corridor.

There two more-recent 120/208V panels, "J", located on grid C, between grids 3 and 4, and "K", on grid 3, between grids F and G, installed during a renovation in 1995-96, and ostensibly having breaker spaces in them. Panel "K" appears to be in a renovation area, so accommodating its presence should be kept in mind.

The to-be-demolished section of the south foundation wall should be carefully examined by penetrating radar or other similar scanning methodology. The drawings available are not a great deal of help in indicating what, if any, electrical services are encased in it. Other electrical runs in furred-out portions along this wall will have to be identified and demolished or relocated.

#### 6.2.2 Normal Power

The Students' Union Building receives its power through the utility corridor, noted in 1.2.1, from a dual primary feed. There is a high voltage substation located within the Lower Level of the facility, adjacent to the mechanical room, where the 13.8kV utility power is transformed to 347/600V power for use within the building. The service is sized at 1500kVA.

600V to 120/208V transformers are located in local electrical rooms throughout the facility, with distribution panels within the same rooms. Some of the equipment was upgraded or replaced through previous renovations. Panels that are original to the building are typically fully utilized and at the end of their service life.

There is sufficient capacity within the system to handle the upgrades required for the proposed expansion and renovation. New branch panels are recommended for all service revisions and changes, since the local branch panels are fully utilized, with no spares or spaces, and are typically original to the building. The new branch panels will be located in the existing mechanical/electrical room space, or in the existing transformer room behind the elevators. Power distribution to new receptacles and equipment will be coordinated with through the design process.

Connections required for the new mechanical equipment will be determined through the design process. Since many of the CDPs were upgraded and replaced in the early 2000's, additional breakers will be added to the CDPs as required, and an MCC will be added for the new equipment. Depending on the size, nature, and location of any new mechanical equipment, and determined by what, if any, starter components are still available and/or will fit into the few spaces left in the existing MCC, options such as a new, smaller MCC or standalone starters will have to be considered.

#### 6.2.3 Emergency Power

There is a small, 30kVA 208V emergency generator located within the mechanical room, serving the life safety needs of the Students' Union Building, including emergency egress lighting and the fire alarm panel. The small number of additional emergency lighting required for the expansion should be able to be served through this generator, particularly due to the energy management upgrade done in 2009/2010 which reduced the power draw of all of the lighting, including emergency lighting, in the facility.

Normal power on the campus utility is a reliable power supply. The University of Alberta utilities department has not recorded an outage of longer than two minutes for the past three years, and they have a robust maintenance program that is designed to reduce frequency and duration of outages. As such, the probability of losing normal power is low, and the generator is considered sufficient for the existing building and proposed expansion.

No mechanical equipment will be added to the emergency power system.

## 6.3 Lighting

The lighting in the Students' Union Building is typically 347V, operated with low voltage lighting controls through local switching. There is a mixture of fixture types, suited to the spaces, including multi-lamp round fixtures in the bookstore area, and 1'X4' fixtures in other areas.

- Some new fixtures were added in the 2009/2010 lighting upgrade, primarily in rooms 021A, B, C, D, E and 022, utilizing T8 fluorescent lamps with instant start ballasts, or compact fluorescent lamps, depending on the fixture type.
- Other lighting fixtures are typically original to the building, but they were upgraded for energy efficiency in 2009/2010, using T8 linear fluorescent lamps with instant start ballasts.
- The pot lights in main corridor 012ZZ appear to be outfitted with compact fluorescent lamps.

This proposed renovation is typically in areas where the original fixtures were relamped and rebalasted. As such, new fixtures will be required to suit the new space. New fixtures will also be required in the expansion area.

The nature and control of lighting will reflect new room and space boundaries and functions.

- New luminaire types will consist of pendant fixtures with ceramic metal halide or fluorescent lamping, linear fluorescent fixtures, indirect ceramic metal halide fixtures and/or LED fixtures, as appropriate.
- Lighting will be added to the low voltage lighting control system, through a new low voltage relay panel tied to the overall system.
- Subject to discussion will be whether any meeting rooms will be outfitted to the extent that boardrooms would be, with their own dimming and switching controls.

- In areas with intermittent occupancy, vacancy sensors will be installed to turn the lighting off when the space is unoccupied. The sensors will be designed for manual on/automatic off operation.
- Once the new boundaries are established, an inventory of potentially-reusable luminaires (both for the space and future use) will be taken in cooperation with the Owner.

### 6.3.1 Day Lighting

The expansion to the facility will enable the expansion to be fully day-lit, along with a portion of the renovation. Glare control may be required, depending on the uses of the space. Providing there are no other obstructions, it is expected that a zone up to 8m deep into the floor space will be day-lit, in addition to the new atrium. This brings daylight in past the first row of columns.

To facilitate day lighting and reduce electric lighting power consumption, photo sensors will be installed to turn lights on and off as appropriate and dimming ballasts will be used where dimming is more appropriate than on/off sequencing.

### 6.3.2 South Exterior Lighting

There are a number of street lamps in the excavation area. These will require relocation at the very least, or relocation and replacement under the University's program of replacement with LED-lit street lamps.

The new steps being constructed should have illumination. Therefore, at the very least, street lamps should be placed along the upper perimeter of the steps.

- Consideration should be given to working with the University to have some degree of local control over these luminaires, such as dimming them or shutting them off during certain special events. If this is pursued, however, safety concerns should be paramount. A bonus would be to have the luminaires as RGB colour-shiftable. Possibly some cost-sharing with the University will have to be discussed.

Further to the local control of street lights, provisions should be made for controllable additional lighting in the future, especially if lighting displays are held to be among the top-priority uses for the area. To achieve this, powered pedestals and/or secondary poles could be installed, with the poles having other functions such as banner poles or the like.

- Some of the pedestals would also have communications provisions for cases where the controlled lighting would be computer-dimmed or choreographed. There would be one or more computer ports inside the building able to do the same thing, but in climate or access-controlled conditions. Power for the computer would be totally separate from any power for lights.
- The pedestals would also carry power for other functions requiring it.

The above augmented lighting control need not be part of the current project, but its conduiting, poles, and pedestal infrastructure should be. Additionally, some location for the future specialized lighting control equipment should be made available in the building, possibly on Storage 004A (directly west of the wall-cut). The special-system conduits from the exterior and the power-supply conduits from the nearby transformer/CDP room would each terminate in this area.

## 6.4 Low Tension Systems

### 6.4.1 Fire Alarm System

The existing fire alarm system for the Students' Union Building is a Notifier system employing pull stations, sprinkler monitoring devices, fire detectors and audible and visual signaling devices, and is suitable for the building expansion. The system consists of a control panel located in the main mechanical room, with annunciator panels at the fire fighter entrances, complete with phones to call the University Control Centre.

The fire alarm system is able to be expanded into the expansion area, and reconfigured to suit the new arrangements. The main panel locations will remain unchanged.

### 6.4.2 Security System

CCTV, access control and other security measures will need to be designed for the specifics of the open access environment with University of Alberta security. Cameras may be desired for specific areas.

### 6.4.3 Data and Telephone

The existing data closet is located between the elevators, on a rack mounted above head height. A proper analysis of the data and telephone cables was unable to be completed, due to this location, and it is beyond the scope of this review to confirm end-to-end integrity of the cabling.

Data and telephone will be expanded and relocated to suit the expansion and renovation. Due to the location of the existing data closet, it would be appropriate to locate a new data closet within the expansion and renovation area.

A radio-coverage study of the renovated area may be needed to determine if the existing wireless-access-point coverage will be adequate for its needs. The building's IT Department will likely need to be involved if there is going to be significant change in usage.



## **7. PROJECT BUDGET AND ORDER OF MAGNITUDE COST ESTIMATE (Forthcoming)**

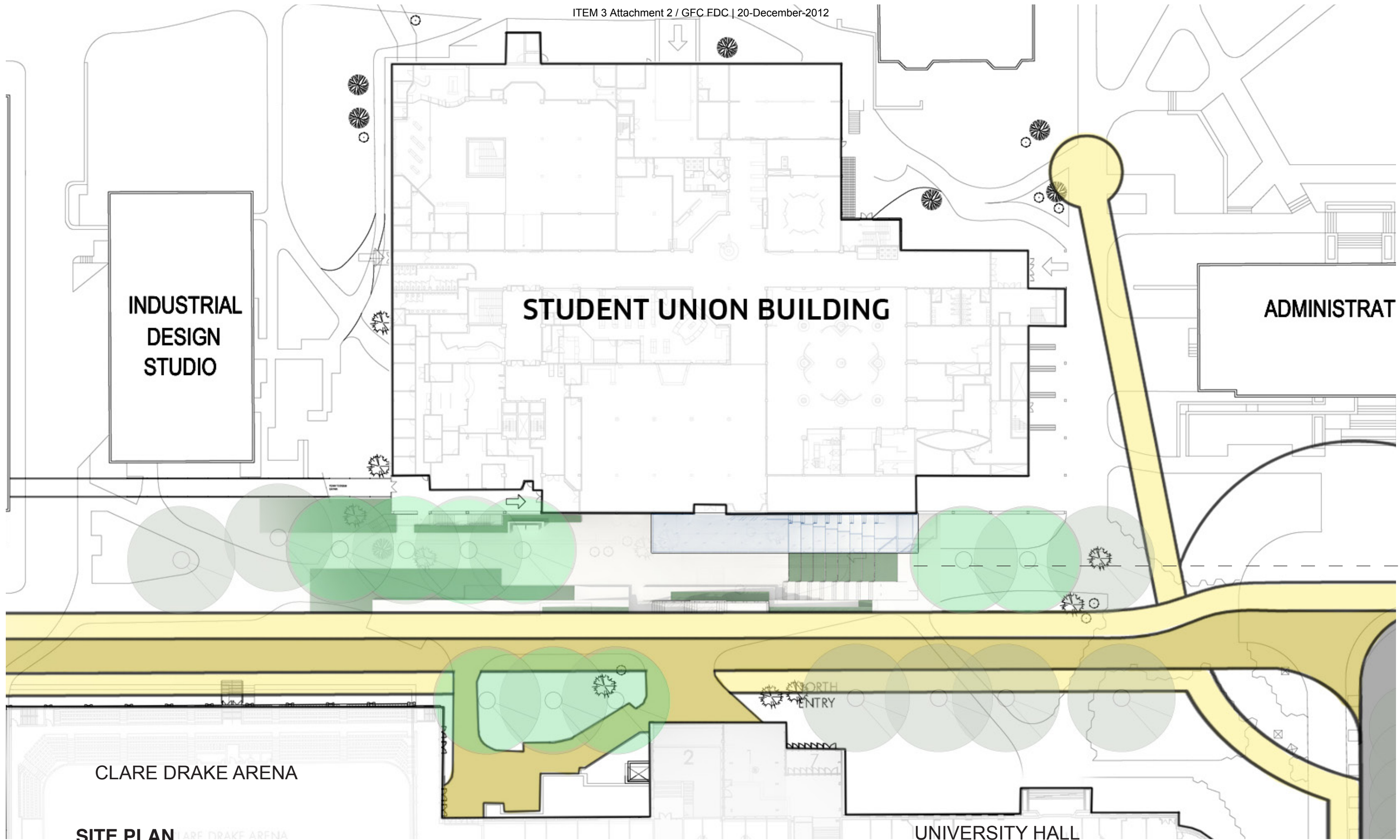
An Order of Magnitude construction cost estimate developed by Turner and Townsend is based on the preliminary design concepts and engineering systems developed by DIALOG. These concepts were communicated through the exchange of drawing materials, outline specifications and information gathered in team meetings.

A detailed breakdown and description of the costs included can be found in Appendix A in the form of Turner and Townsend's cost report. The project soft costs were arrived at based on input from the Project Management Consultant, Russell Steffes based on historical data and experience.

Substantial contingencies are included to cover risks that may be experienced by way of market escalation, hazardous material discovery during demolition, soil contamination or concealed conditions that cannot otherwise be discovered without invasive inspections and testing. Based on the information gathered to date, we believe these contingencies should be adequate.

## **8. APPENDIX A – DRAWINGS AND RENDERINGS**

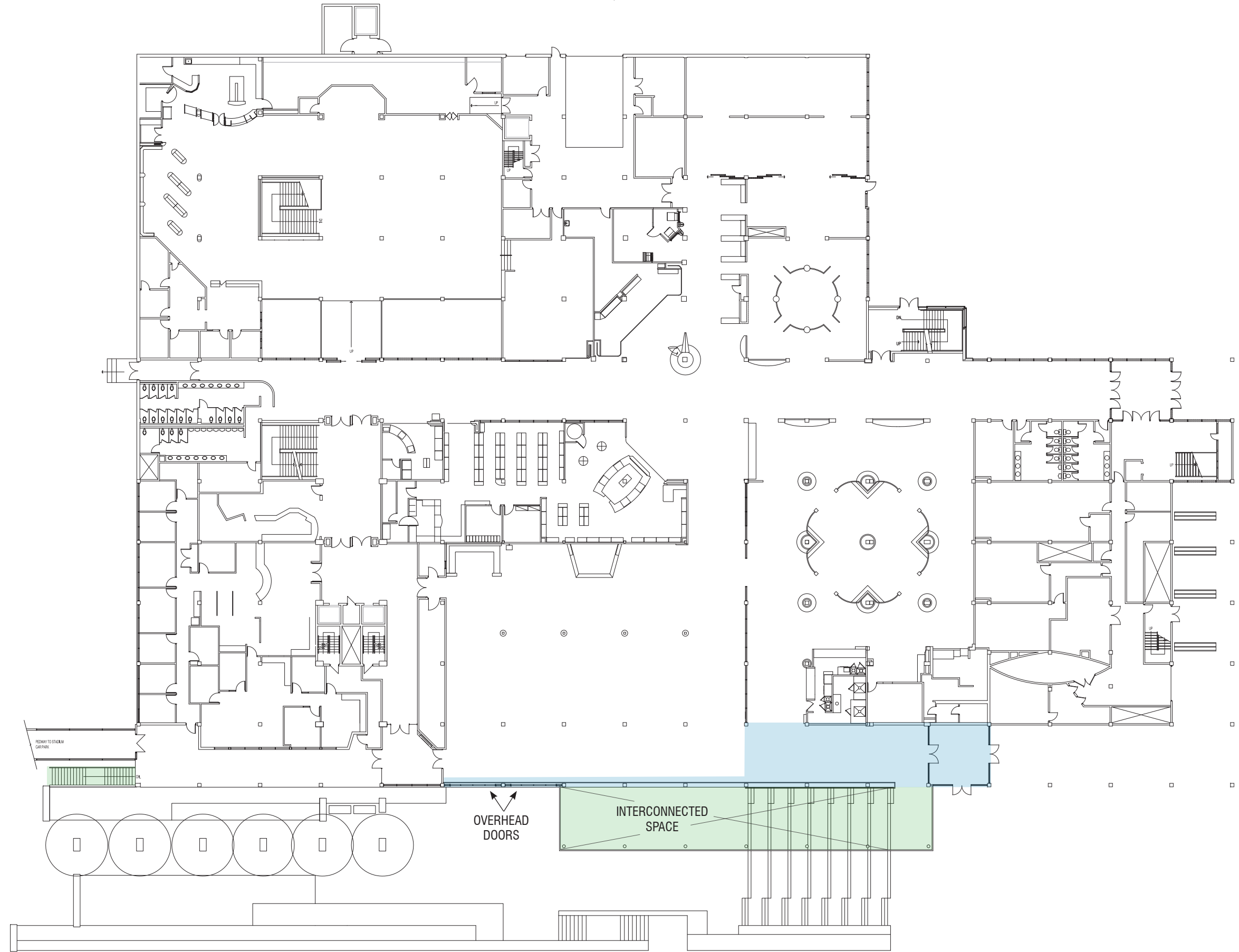
- Site Plan
- Main Level
- Lower Level
- Tower Levels
- Interior
- South Elevation
- SE Perspective
- SW Aerial
- Section A
- Section B
- Optional Phase Site Development
- Main Level Demo
- Lower Level Demo



**SITE PLAN** OF CLARE DRAKE ARENA

U OF A STUDENTS' UNION BUILDING

NTS



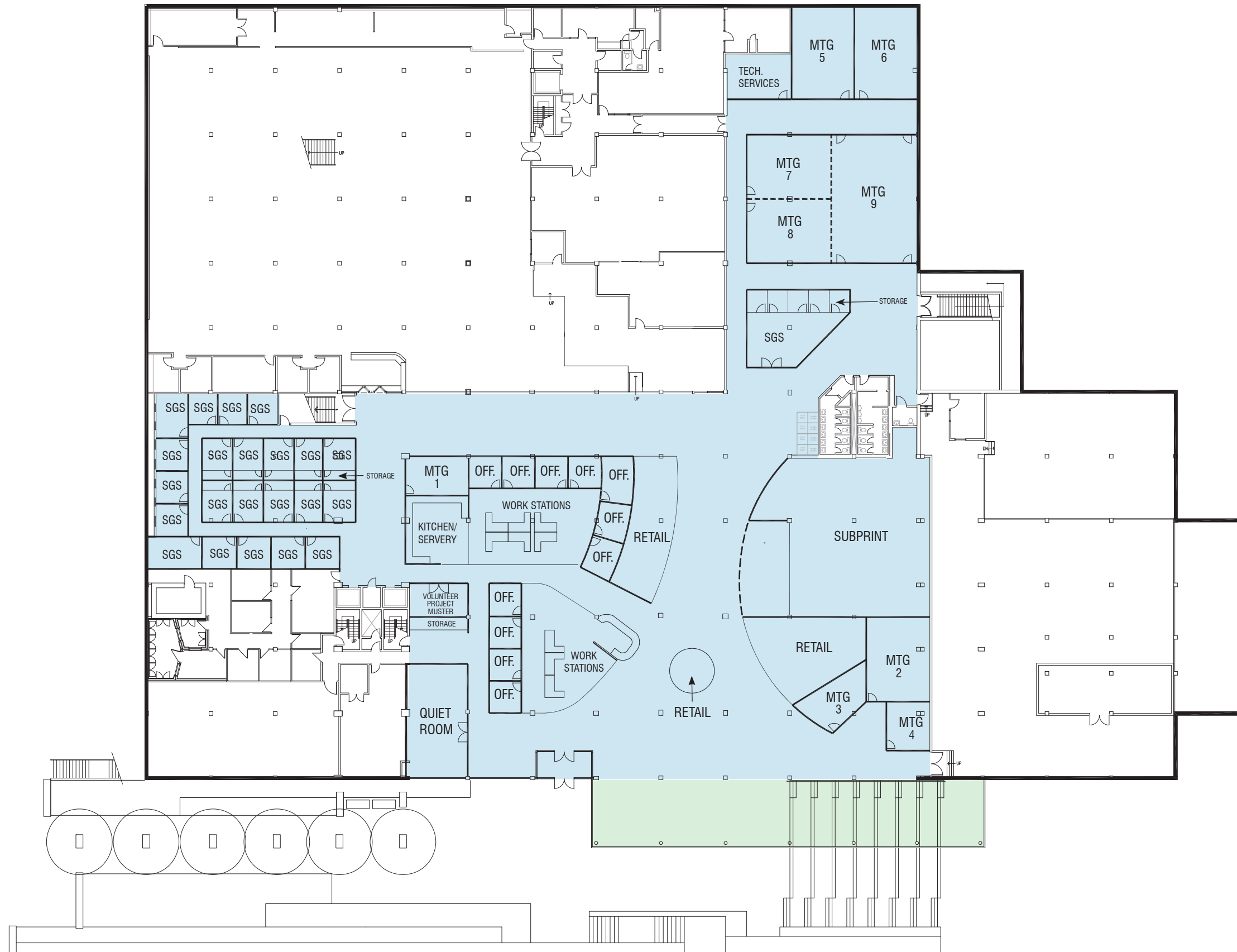
# MAIN LEVEL

U OF A STUDENTS' UNION BUILDING

1:400

RENOVATED AREA

NEW CONSTRUCTION AREA



### LOWER LEVEL

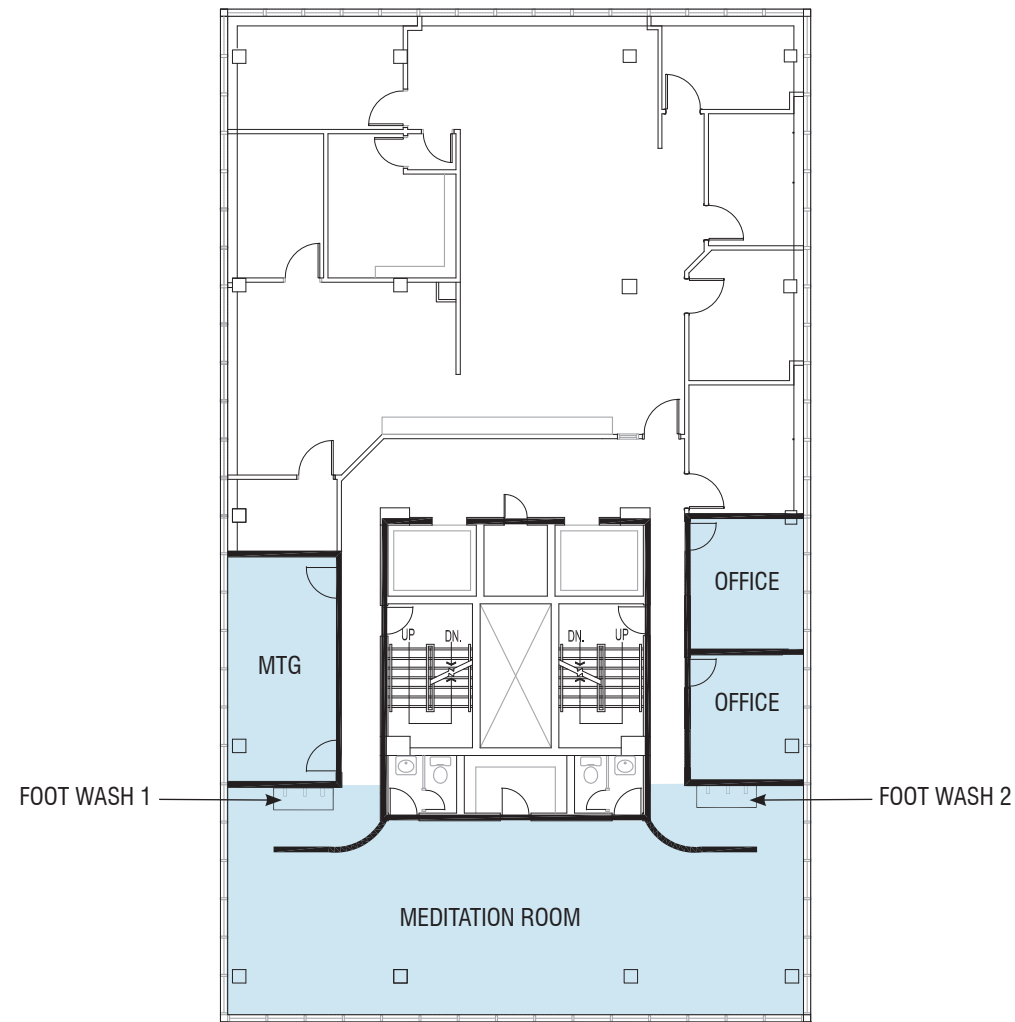
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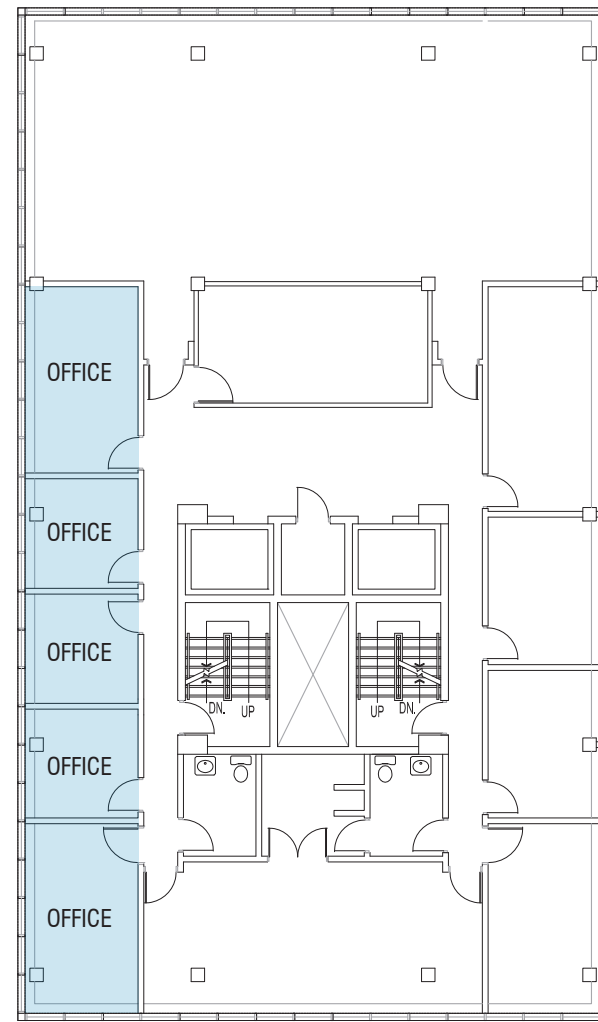
RENOVATED AREA

NEW CONSTRUCTION AREA

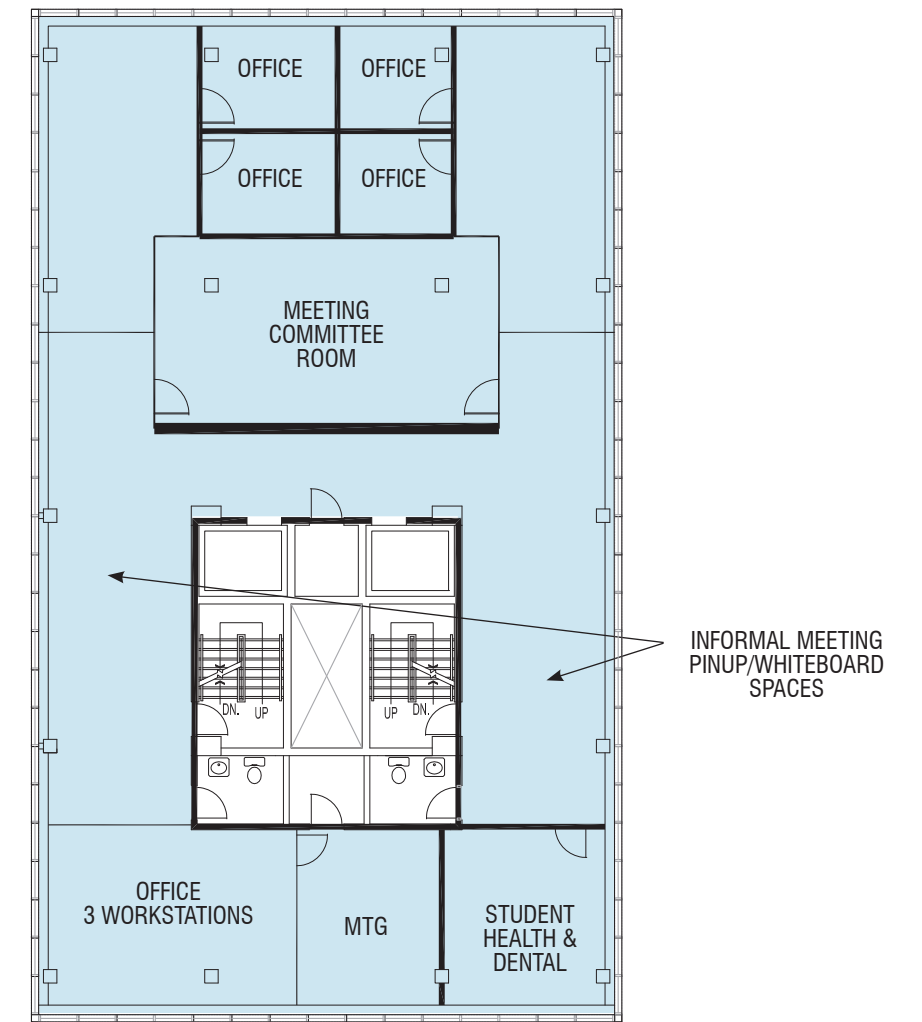




3<sup>RD</sup> FLOOR



4<sup>TH</sup> FLOOR



6<sup>TH</sup> FLOOR

## TOWER LEVELS

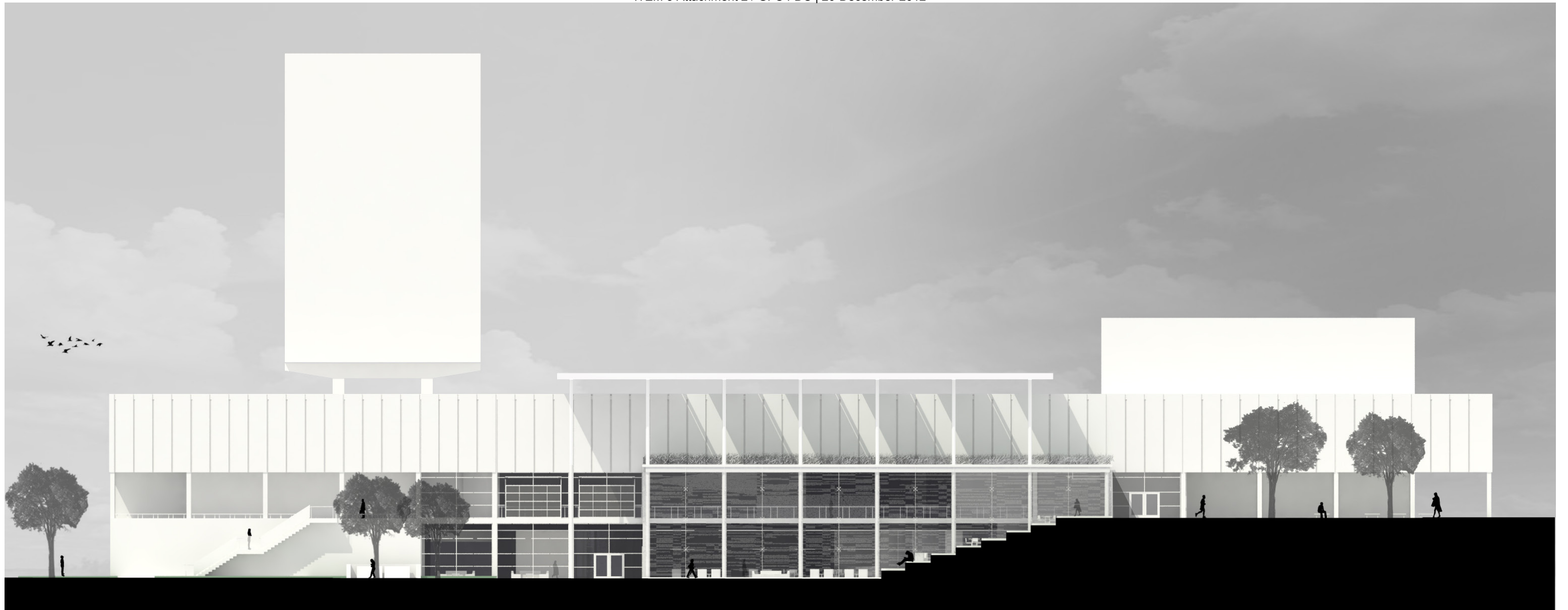


## INTERIOR

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**SOUTH ELEVATION**

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**SE PERSPECTIVE**

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**SW AERIAL**

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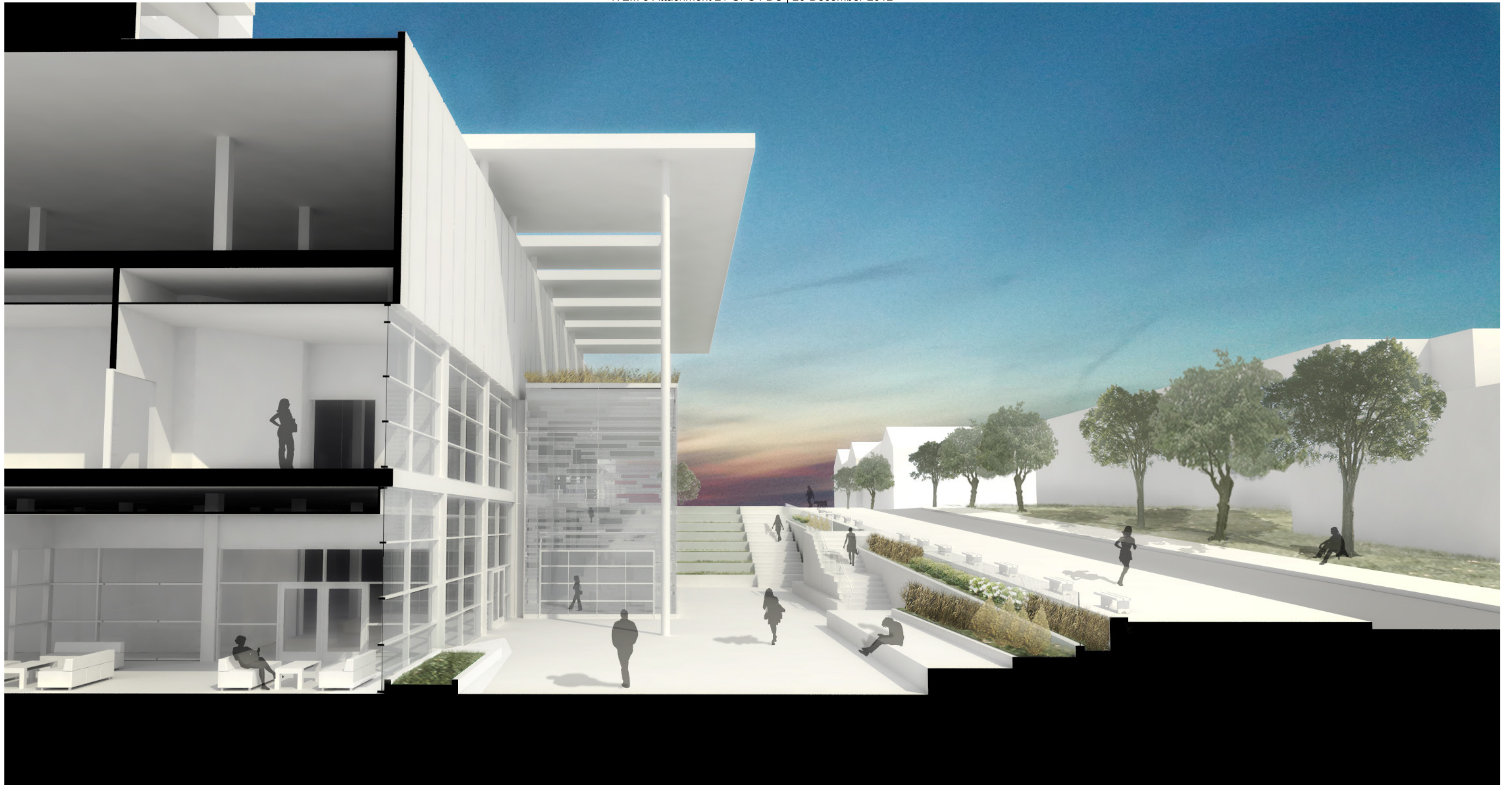


**SECTION A**

U OF A STUDENTS' UNION BUILDING

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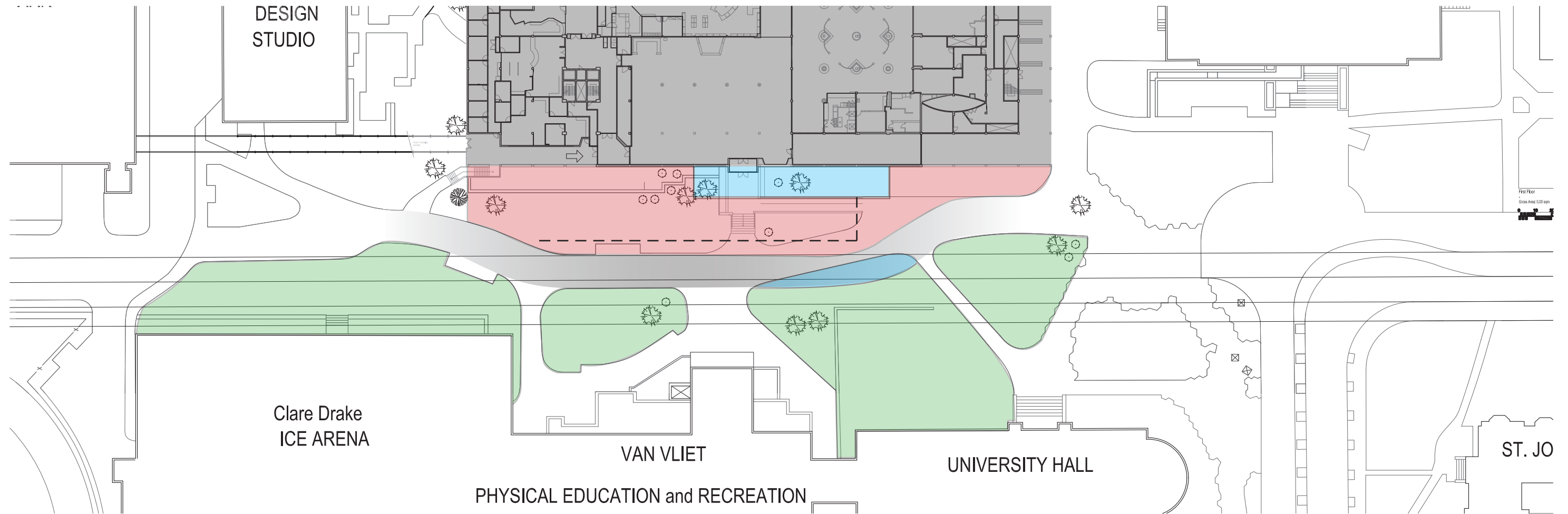




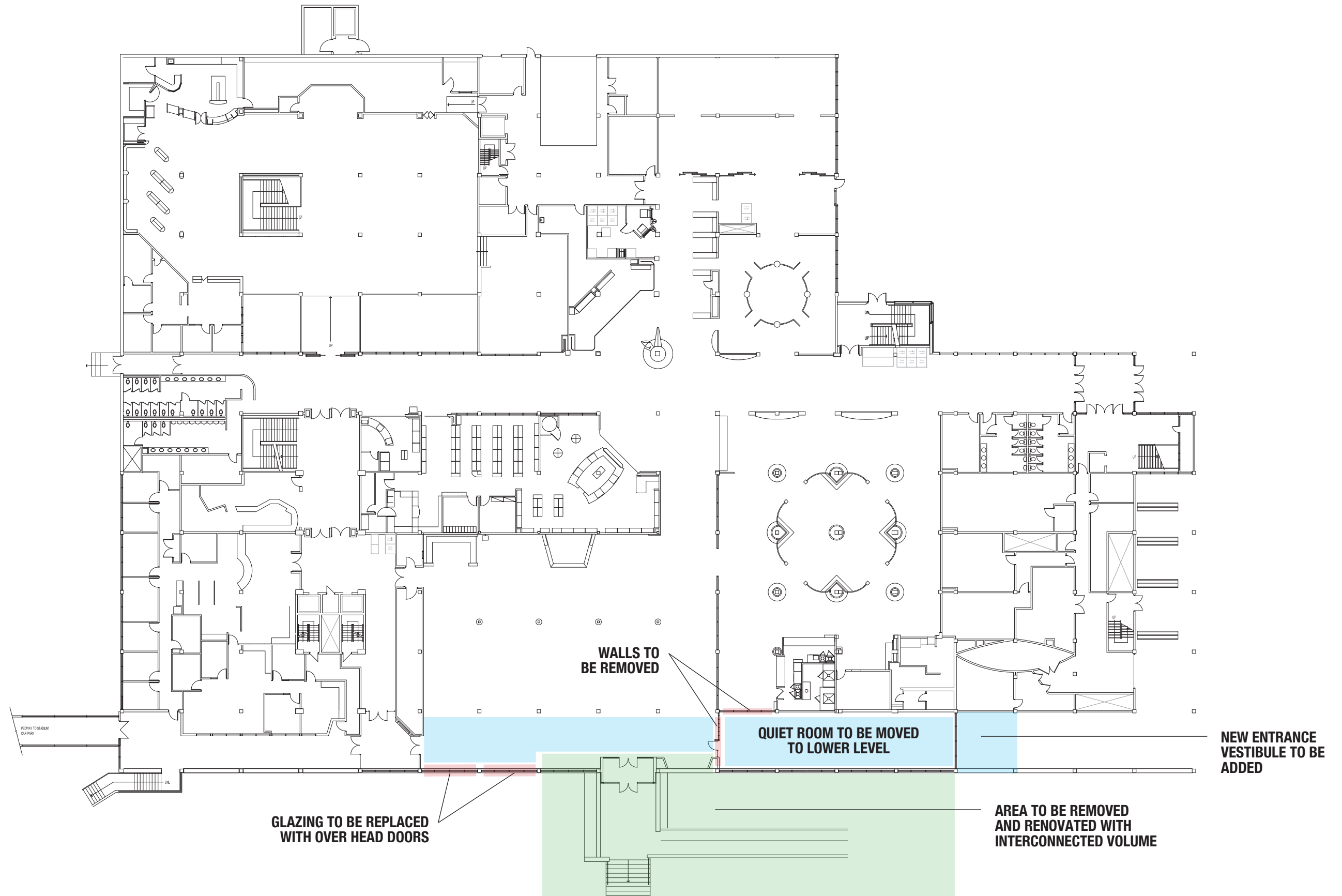
**SECTION B**

U OF A STUDENTS' UNION BUILDING

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## OPTIONAL PHASE SITE DEVELOPMENT

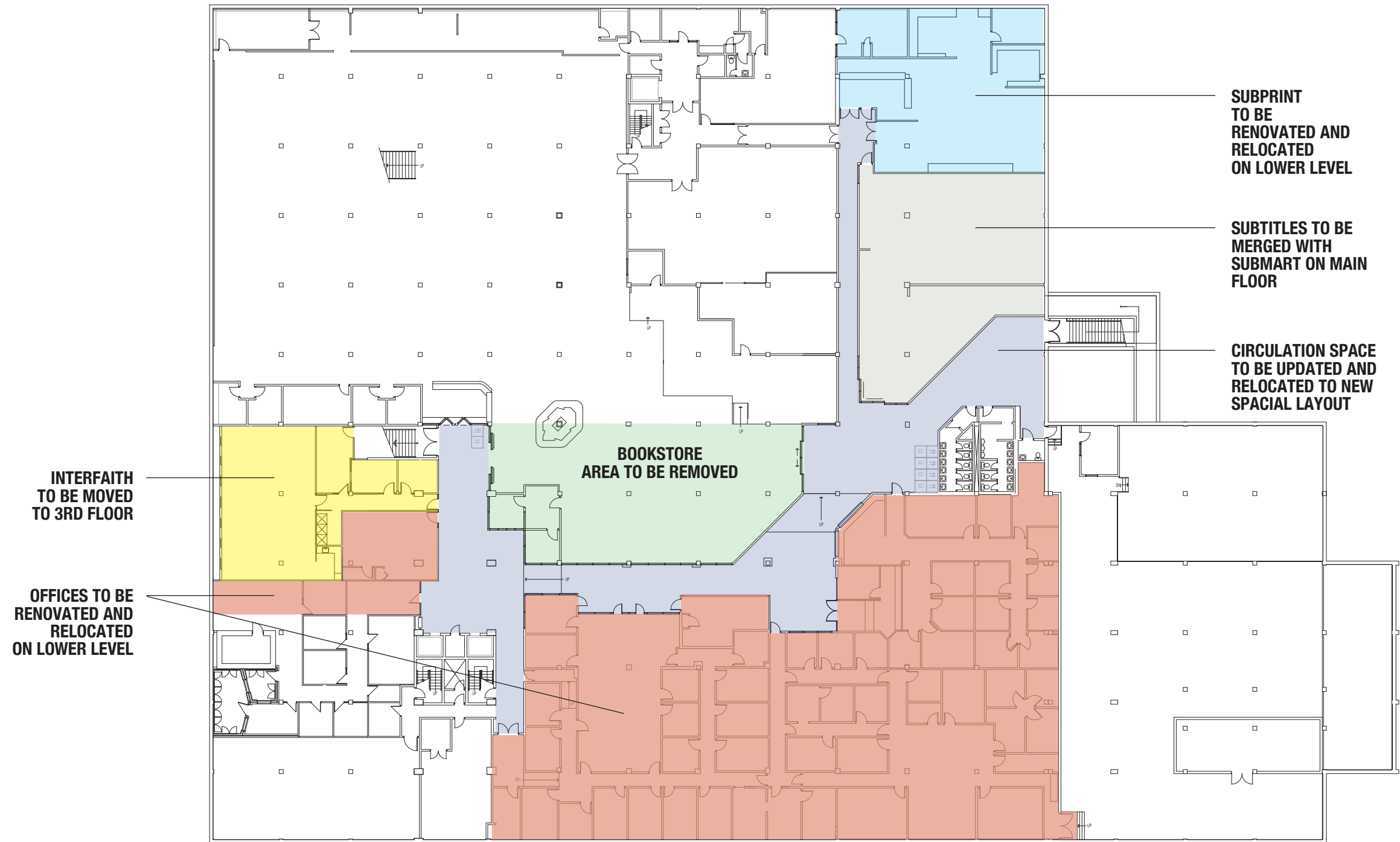


## MAIN LEVEL DEMO

U of A STUDENTS' UNION BUILDING

1:400





## LOWER LEVEL DEMO