

The following Motions and Documents were considered by the GFC Facilities Development Committee at its Thursday, February 27, 2014 meeting:

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Agenda Title: **East Campus Village (ECV) Infill Housing Residences at 90 Avenue – Schematic Design Report**

CARRIED 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 East Campus Village (ECV) Infill Housing Residences at 90 Avenue - Schematic Design Report (set forth in Attachment 2) as the basis of further planning.

Final Item: 4

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Agenda Title: **East Campus Village (ECV) Saskatchewan Drive Residence – Schematic Design Report**

CARRIED 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 East Campus Village (ECV) Saskatchewan Drive Residence – Schematic Design Report (as set forth in Attachment 2, as amended) as the basis for further planning.

Final Amended Item: 5

[Note: This item was formerly known as the **East Campus Village (ECV) Leadership Residence – Schematic Design Report.**]

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**OUTLINE OF ISSUE**
**Agenda Title: East Campus Village (ECV) Infill Housing Residences at 90 Avenue – 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 East Campus Village (ECV) Infill Housing Residences at 90 Avenue - Schematic Design Report (set forth in Attachment 2) as the basis of 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	Doug Dawson, Executive Director, Ancillary Services, Facilities and Operations
Presenters	Doug Dawson, Executive Director, Ancillary Services, Facilities and Operations; Kelly Hopkin, Senior Campus Planner (Architecture), Office of the University Architect, Facilities and Operations
Subject	East Campus Village (ECV) Infill Housing Residences at 90 Avenue – Schematic Design Report

**Details**

Responsibility	Vice-President (Facilities and Operations)
The Purpose of the Proposal is (please be specific)	This project will increase the amount of purpose-built student housing on campus in alignment with the University's goal of accommodating 25% of the University's full-time enrollment in residence housing. Students who reside in purpose-built on-campus housing with supportive programming tend to have a more fulfilling and enriching academic experience at the university. Expanding on-campus housing assists the University in meeting institutional goals and objectives by providing a learning environment conducive to personal and academic success. Smart growth campus development enhances community building, student life, and campus experience, all while reducing greenhouse gas emissions. The development will be a financially-viable project enhancing the residence portfolio through resource stewardship and reducing deferred maintenance.
The Impact of the Proposal is	A total of four (4) houses (11009, 11013, 11029, and 11031) on the south side of 90 Avenue between 110 Street and 111 Street will be removed to make room for the new infill development. This development consists of two new on-campus cohort residences for approximately 70 new graduate, international, and upper years' student bed spaces. The façades on the new buildings will replicate the form of select existing houses in the ECV district consistent with the Preservation Plan, Design Guidelines for Infill development, and the Long Range Development Plan.
Replaces/Revises (eg, policies, resolutions)	N/A
Timeline/Implementation Date	Concept design – September, 2013 to February, 2014; Schematic Design (approval) – February 27, 2014; Design Development (approval) – April 24, 2014; Construction start – Summer, 2014; Occupancy – September, 2015
Estimated Cost	N/A
Sources of Funding	N/A
Notes	N/A





**Alignment/Compliance**

<p>Alignment with Guiding Documents</p>	<p><i>Dare to Discover</i>, Academic Plan (<i>Dare to Deliver</i>); Preservation Plan; Long Range Development Plan (LRDP); University of Alberta Comprehensive Institutional Plan (CIP)</p>
<p>Compliance with Legislation, Policy and/or Procedure Relevant to the Proposal (please <u>quote</u> legislation and include identifying section numbers)</p>	<p>1. <b>Post-Secondary Learning Act (PSLA)</b>: The <i>PSLA</i> 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 <i>PSLA</i> 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 <i>Act</i> 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 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 <i>Act</i> 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> <p>1. To approve proposed General Space Programmes (Programs) for academic units.</p> <p>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.</p> <p>(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)</p> <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</b></p>



FINAL Item No. 4

	<p><b>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> <p>To access this policy suite on line, go to: <a href="http://www.uappol.ualberta.ca">www.uappol.ualberta.ca</a>.</p> <p><b>4. UAPPOL Preservation of University Facilities and Grounds Policy:</b> The University of Alberta is committed to preserving its history while planning for the continued growth and expansion that facilitates its mission and vision.</p> <p>To access this policy suite on line, go to: <a href="http://www.uappol.ualberta.ca">www.uappol.ualberta.ca</a>.</p>

**Routing** (Include meeting dates)

<p>Consultative Route (parties who have seen the proposal and in what capacity)</p>	<ul style="list-style-type: none"> <li>• March, 2005 to September, 2008 – 12 facilitated community dialogues with Garneau resulting in the creation of the Design Guidelines for Infill Development</li> <li>• Open House Sectors 7 and 8 Sector Plans – March 19, 2012</li> <li>• Formalization of Sector Plans for Sectors 7 and 8 – March 28, 2013</li> <li>• Garneau Community League Focus Group <i>per</i> East Campus Village Implementation Plan – September 16, 2013</li> <li>• GFC Facilities Development Committee <i>per</i> East Campus Village Implementation Plan – October 24, 2013</li> <li>• Residence Life and Residence Operations <i>per</i> East Campus Village Implementation Plan – November 12, 2013</li> <li>• Ancillary Services met with the University of Alberta Students' Union and Graduate Students' Association – January 8, 2014</li> <li>• U of A's Internal and External Community Open Houses <i>per</i> East Campus Village Implementation Plan for substantial development – January 8, 2014</li> <li>• GFC Facilities Development Committee <i>per</i> East Campus Village Infill Housing Residence at 90 Avenue Proposed Concept Plans (for discussion) – January 30, 2014</li> </ul>
<p>Approval Route (Governance) (including meeting dates)</p>	<p>GFC Facilities Development Committee – February 27, 2014 (for final approval of the East Campus Village Infill Housing Residences at 90 Avenue–Schematic Design)</p>
<p>Final Approver</p>	<p>GFC Facilities Development Committee</p>

Attachments:

1. Attachment 1 (pages 1 – 2) - Briefing Note (2 pages)
2. Attachment 2 (pages 1 – 24) - East Campus Village Infill Housing Residences at 90 Avenue – Schematic Design Report (February 27, 2014)

Prepared by: Kelly Hopkin, Senior Campus Planner (Architecture), Office of the University Architect, Facilities and Operations, [kelly.hopkin@ualberta.ca](mailto:kelly.hopkin@ualberta.ca)



## East Campus Village (ECV) Infill Housing Residences at 90<sup>th</sup> Avenue - Schematic Design Report

Attachment 1

### Background

Students residing on campus – and the institution at which those students are enrolled – derive numerous benefits from their living-learning communities. The students' academic experience is enriched by linking learning with other aspects of their lives, and many institutional goals are met related to student recruitment, retention and achievement.

An outline of the challenges, issues and constraints related to the development of additional student housing in Alberta was presented to the President and her team by the Vice-President, Facilities and Operations, in November 2011, as part of the President's Executive Committee (PEC) 2015 visioning exercise. In preparation for the PEC presentation, Facilities and Operations examined numerous models for the development of student housing across Canada.

The 2012 Comprehensive Institutional Plan (CIP) identifies the expansion of the student housing portfolio as a strategic priority for the University of Alberta. In support of the CIP, the proposed new residences will feature individual functional self-contained apartments in multiple bedroom configurations with natural light designed to be attractive to graduate, international and upper years' students. The buildings will contain the appropriate amount of indoor and outdoor amenity space required to support services for students residence life programs and foster a sense of community.

Following the completion of the Graduate Students Residences, Pinecrest House and Tamarack House, Facilities and Operations is proposing to construct two new multi-unit buildings for a total of approximately 70 beds on the south side of 90<sup>th</sup> Avenue. A total of four (4) houses (11009, 11013, 11029, 11031) in the area must be removed to make room for the new development. The façades on the new buildings will replicate the form of select existing houses in the East Campus Village (ECV) district per the preservation plan and consistent with the design guidelines for infill development and the long range development plan. The proposed infill development will complement the four (4) buildings retained per the University's Preservation Plan and sector plan.

No additional parking provisions would be required beyond current surface lots between 111<sup>th</sup> and 110<sup>th</sup> Street (Lots 87, 88 and 89) based on projected residence parking demand of 6% of the total resident population, as well as the recent trend where the lots are not full.

Furthermore, Lot U (the SE portion of the large surface lot east of HUB) is dedicated to visitor parking, capacity 224 stalls, and there is also visitor capacity on 90<sup>th</sup> Avenue.

As part of the community consultation process, the University has committed to taking design options to the community for input. The proposed building concept plans being presented to Facilities Development Committee (FDC) are similar to recent East Campus Village Student Housing Projects and are in alignment with the Garneau Neighbourhood Infill Design Guidelines. The proposed infill development aims to respect the existing tree-lined grid, front yard set-backs, pedestrian movements and the street entrance off of 90<sup>th</sup> Avenue, as well as the style of architecture in the neighbourhood. Some of the neighbourhood architectural elements which have been incorporated into the concepts and will complement the four (4) existing houses on 90<sup>th</sup> Avenue to remain will include:

- Replication of the front façade of four (4) houses in the East Campus Village (ECV) district
- Window styling to replicate the four (4) houses and neighbouring houses to be retained
- The composition of gabled roofs is styled to reduce roof line and mirror adjacencies as buildings transition from the Garneau neighbourhood
- Building form and materials to reflect existing character (reclaimed clinker brick) and provide sustainable and durable end product

Landscape plans are being developed connecting the proposed new layouts and spaces to existing site features and typography. Exterior social spaces are proposed to enhance and support the residence life program. Proposed tree and plant material lists are suitable for the neighbourhood setting and seek to preserve and enhance the quality of the natural landscape, including the allée of ash trees along 90<sup>th</sup> Avenue.

The houses to be removed from the site have been offered to interested parties to relocate off campus per the House Removal Process.

The East Campus Village Infill Housing Residences at 90<sup>th</sup> Avenue will have a number of submissions and presentations for review, comment and approval.

- Garneau Community Consultation, Design Development Review – March 2014 to April 2014
- FDC – Schematic Design Approval – February 27, 2014
- FDC – Design Development review/approval – April 24, 2014

#### Construction

- Construction Start – Summer 2014
- Project completion (occupancy) - September 2015

#### **Recommendation**

THAT the GFC Facilities Development Committee approve under delegated authority from General Facilities Council, and on the recommendation of Planning and Project Delivery, the proposed East Campus Village (ECV) Infill Housing Residences at 90<sup>th</sup> Avenue – Schematic Design Report (as set forth in Attachment 2) as the basis of further planning.





Existing houses (11003 & 11007 - 90th Avenue) retained as per preservation plan.



Existing houses (11019 & 11023 - 90th Avenue) retained as per preservation plan.

## East Campus Village (ECV) Infill Housing Residences at 90th Avenue Schematic Design Report

Facilities Design Committee - February 27, 2014







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View North to City of Edmonton Adair Park from 90th Avenue.



## 1.0 INTRODUCTION

This Schematic Design Report summarizes the planning and design efforts that have taken place during the schematic design phase for the East Campus Village (ECV) Infill Housing Residences at 90th Avenue project for the University of Alberta. The design proposes the construction two new multi-unit student housing residence buildings that will provide total of (71) bedroom units on the south side of 90th Avenue.

Students residing on campus – and the institution at which those students are enrolled – derive numerous benefits from their living learning communities. The students' academic experience is enriched by linking learning with other aspects of their lives, and many institutional goals are met as they relate to student recruitment, retention and achievement.

The 2012 Comprehensive Institutional Plan (CIP) identifies the expansion of the student housing portfolio as a strategic priority for the University of Alberta. In support of the CIP, the proposed new residences will feature individual functional self-contained apartments in multiple bedroom configurations with natural light designed to be attractive to graduate, international and upper years' students. The buildings will contain the appropriate amount of indoor and outdoor amenity space required to support services for students' residence life programs and foster a sense of community.

A total of four houses (11009, 11013, 11029, 11031 – 90th Avenue) in the area must be removed to make room for the new development. Four (4) neighbouring houses to remain - 1003, 11007, 11019 and 11023 - 90 Ave. The façades on the new buildings will replicate the form of select existing houses (11029 & 10039 Saskatchewan Drive, and 11044 & 11050 – 90th Avenue) in the East Campus Village (ECV) district per the preservation plan and consistent with the design guidelines for infill development and long range development plan (LRDP). The proposed infill development will complement the four buildings retained per University's Preservation Plan and sector plan.



House 11045 Saskatchewan Drive (to be relocated in ECV) with architectural element replicated on residence B1.



## 2.0 ARCHITECTURAL DESIGN

### 1. PROJECT GOALS

- The two developments in this project will increase the amount of purpose-built student housing on campus in alignment with the University's goal of accommodating 25% of the University's full time enrollment in residence housing
- Support student's academic success, leadership development, engagement, recruitment, retention and enduring relationship with Alma Mater
- Smart growth campus development enhances community building, student life and campus experience while reducing greenhouse gas emissions
- Build a financially viable project to enhance the residence portfolio through resource stewardship and reducing deferred maintenance costs

### 2. CHALLENGES AND OPPORTUNITIES

As part of the community consultation process, the University has committed to taking design options to the community for input. The proposed Schematic Design Plans submitted to FDC in this report are similar to recent East Campus Village Student Housing Projects and are in alignment with the neighbourhood Infill Design Guidelines, preservation plan and LRDP.

The two proposed infill housing developments balance functionality, student life, capital cost, architectural design integrity, operations and maintenance cost and curb appeal. Achieving harmony with the new developments and existing fabric of the neighborhood will be realized through preserving building scale, character and streetscape. The proposed designs will respect and, where appropriate, enhance the existing allee of trees along 90th Avenue, front yard setbacks, pedestrian circulation routes, and the street entrance off of 90th Avenue as well as the architectural style of the area.

Architectural elements from the neighbourhood have been incorporated into the Schematic Designs for the two new residences to complement the character of the four existing houses on the south side of 90th Avenue that are to remain. The front or north facades of the two developments are replications of four houses in the ECV district. Gabled roof forms have been composed so as to reduce the massing, roof line and to mirror adjacencies as the buildings transition from the Garneau neighborhood. Fenestration styles have been retained in the proposed new developments as well as building forms and material selections (new and reclaimed) resulting in a respectful, durable and sustainable design.

The new streetscape of both infill and retained houses will be a composed, contiguous design and will continue the development of the ECV into a vibrant, student-focused neighbourhood that is walkable to both the campus and amenities in the adjacent community and will reduce parking requirements for North Campus.

The developments seek to provide student friendly interior design of social and support spaces, welcoming entrances in the vernacular of the area, and enhanced landscaping to connect proposed exterior social spaces to the existing site features and enhance the residence life program. Plant materials for use in landscape design will be from approved lists suitable for the neighborhood setting.

### 3. SUSTAINABLE DESIGN

The proposed developments will follow the Green Globes process and strive to lead the market and drive change towards to sustainable design through education, awareness and engagement. Base (or market) Building energy models will be used as benchmark to review multiple energy management initiatives including:

- Triple Glazed – Hi Performance Glass
- Increased R-value for walls and roof
- Ventilation heat recovery
- Drain water heat recovery
- Condensing boilers with properly matched heating system
- Optimised lighting placement, controls and high efficient luminaires
- Investigate integrated solar PV, PV tiles in particular and/or standard roof mounted solar PV modules. Solar PV shading to help lower cooling demand
- Solar Thermal heating
- Careful consideration to electrical panels and distribution for the purpose of monitoring/metering



## 2.4 BUILDING ORGANIZATION AND PROGRAM

The East Campus Village Infill Student Housing designs begin with the replication of the front elevations of four (4) homes identified by the Preservation Plan as having architectural character elements typical in the Garneau area. The proposed new residences for students have been redesigned behind the façade by placing the new façades side by side to create the effect of separate homes, preserving the rhythm of the streetscape, and linking the structure with a setback portion. This organization allows the development of a program with higher yield in terms of bedrooms and services than would have been possible by re-purposing the existing homes.

The reintroduction of 'in-kind' facades as indicated in the streetscape sketch illustrates the effect of infilling the street to a cohesive unit. The two buildings, though marginally higher, are proportional to the existing fabric. The rear or south elevations connect the front facades. Care was taken to treat the massing of all the 'new' elevations with different projected elements such as bay windows characteristic of the neighborhood. Exposure to the west of building B1 to a proposed pedestrian corridor predicated the stepped plan, which was emulated in building B2, with rear deck exposure and access to the rear parking area via an accessible ramp to the main floor.

The two residences are organized in a similar fashion. The variations required to emulate the existing home facades allowed for building B1 to achieve a slightly larger yield (37 bedrooms) than the B2 building (34 bedrooms). The interior programming is spread over 3 floors. The lower level is set half in the ground to support large windows to maintain access to natural light and provide secondary egress from the bedrooms in case of fire. The proposed new residences are both sprinklered.

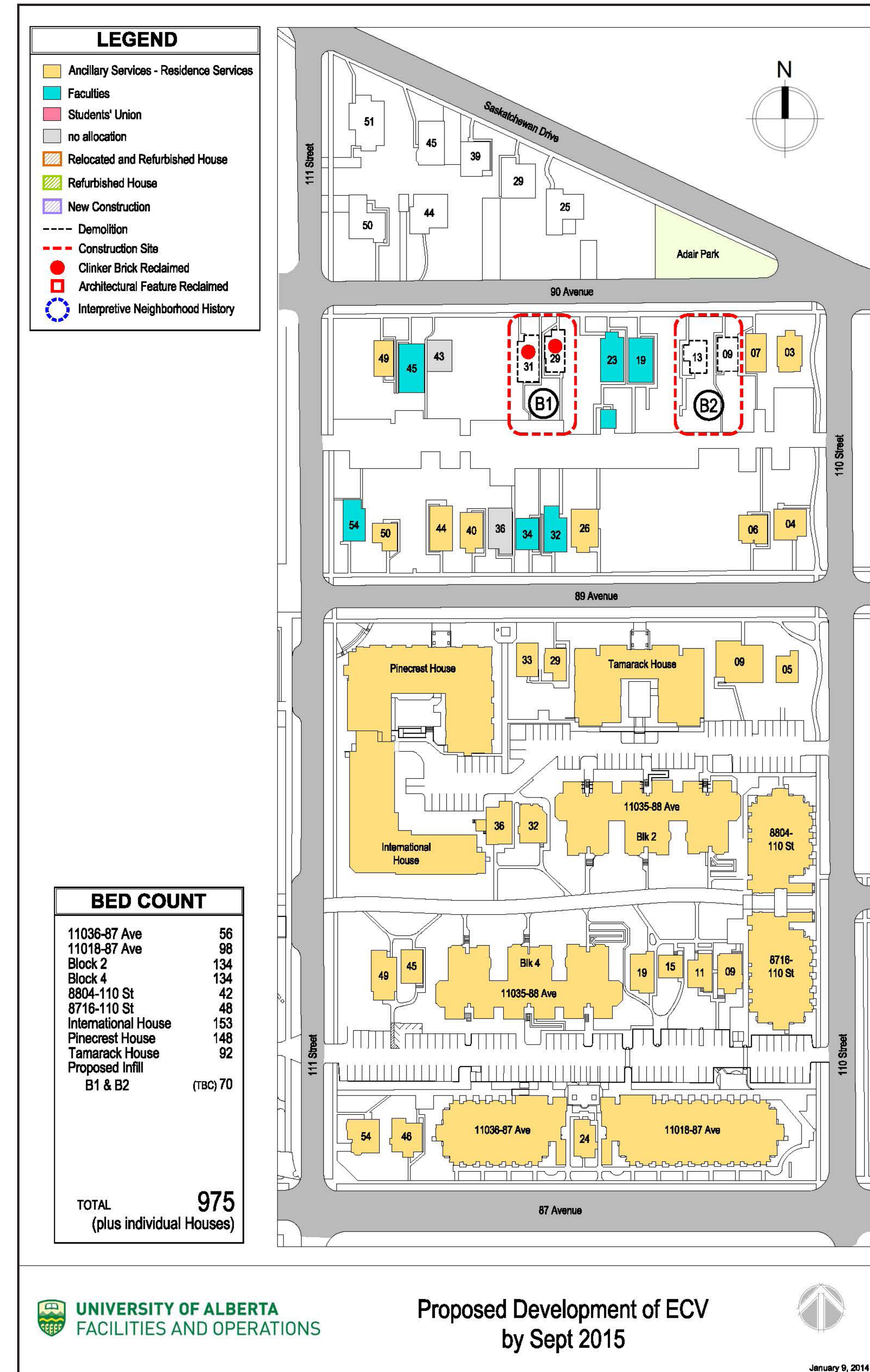
The floors have bedrooms and washrooms located predominantly on the exterior wall with access to light and views. A communal corridor circulating around a washroom and service core, links the bedroom units with large social commons and support areas. The main floor houses a large common kitchen with direct access to an outside deck for BBQing and supporting residence life programs. The laundry is located in the lower level of the buildings, acoustically separated but visually connected and accessible by all floors via two staircases. There are two main entries at the main level on the North or Streetfront facade for each residence. The intercom panel, mailboxes and annunciator panel for the fire department is located on the East main entry.

Located off the rear of the main floor is an accessible ramp which connects the rear parking area to the building. West of the ramp is a grade level patio area to be used as an outdoor amenity area for the building. This area is also connected to the southwest deck location via a stair to the main level allowing residents to flow from lower patio directly to the kitchen area. Building B1 has 37 bedrooms and 18 bathrooms and building B2 has 34 bedrooms and 18 bathrooms allowing for a ratio of 2.05 bed/bath in B1 and 1.88 beds/bath in B2.

Deliveries, garbage and bicycle parking as well as minimal vehicle parking are available off the alley. Although the original houses had designs which allowed for front facing living rooms, it was possible to revamp the space and move towards common communal areas being located in the rear of the building, making them more in tune with modern residential accommodations and new homes. Ample light and views to communal landscaped rear yards should enhance the livability of the buildings as well as offer a sense of internal community to residents and connection to the neighborhood and university.



## 2.5 SECTOR 8 PLAN





## 2.6 ARCHITECTURAL DRAWINGS

### RESIDENCE B1 - Lower Level

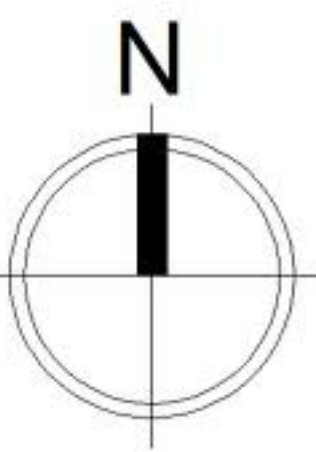


#### UNIT COUNT LEVELS 1-3

1-BED UNITS - 36  
 (rooms range from 108 ft<sup>2</sup> to 252 ft<sup>2</sup>)  
 ACCESSIBLE 1-BED UNITS - 1  
 (277 ft<sup>2</sup>)  
 TOTAL BEDS: 37

GROSS FOOTPRINT AREA = 4,295 ft<sup>2</sup>  
 @ 3 LEVELS = 12,885 ft<sup>2</sup>

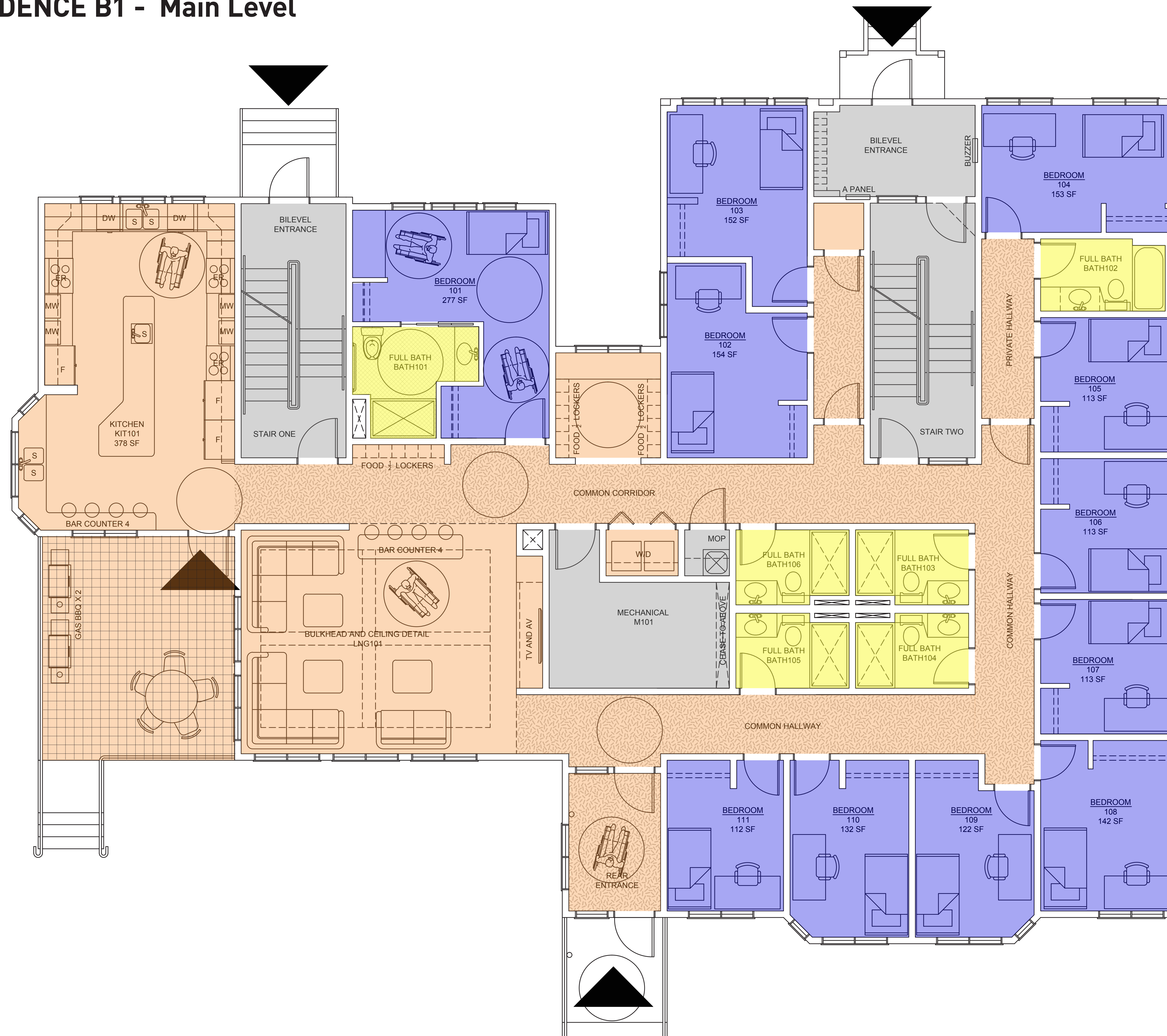
- COMMUNAL SPACES  
(653 ft<sup>2</sup>)
- COMMUNAL CIRCULATION
- BEDROOMS  
12 Bedroom Units
- WASHROOMS
- BUILDING SERVICES /  
VERTICAL CIRCULATION





# 2.6 ARCHITECTURAL DRAWINGS

## RESIDENCE B1 - Main Level

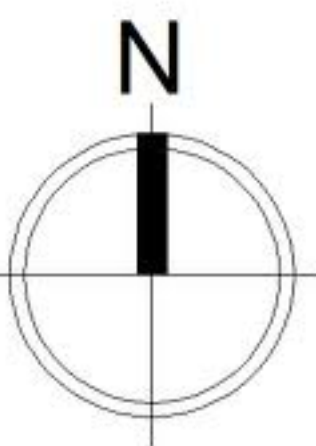


### UNIT COUNT LEVELS 1-3

1-BED UNITS - 36  
 (rooms range from 108 ft<sup>2</sup> to 252 ft<sup>2</sup>)  
 ACCESSIBLE 1-BED UNITS - 1  
 (277 ft<sup>2</sup>)  
 TOTAL BEDS: 37

GROSS FOOTPRINT AREA = 4,295 ft<sup>2</sup>  
 @ 3 LEVELS = 12,885 ft<sup>2</sup>

- COMMUNAL SPACES  
(862 ft<sup>2</sup>)
- COMMUNAL CIRCULATION
- BEDROOMS  
11 Bedroom Units  
(including 1 Accessible Unit)
- WASHROOMS
- BUILDING SERVICES /  
CIRCULATION





# 2.6 ARCHITECTURAL DRAWINGS

## RESIDENCE B1 - Upper Level

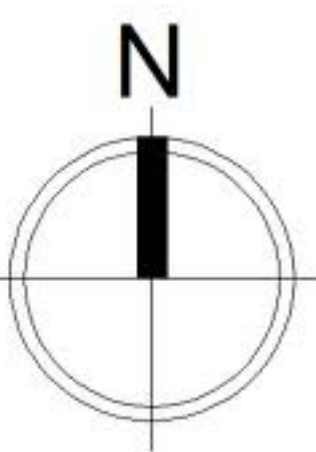


### UNIT COUNT LEVELS 1-3

1-BED UNITS - 36  
 (rooms range from 108 ft<sup>2</sup> to 252 ft<sup>2</sup>)  
 ACCESSIBLE 1-BED UNITS - 1  
 (277 ft<sup>2</sup>)  
 TOTAL BEDS: 37

GROSS FOOTPRINT AREA = 4,295 ft<sup>2</sup>  
 @ 3 LEVELS = 12,885 ft<sup>2</sup>

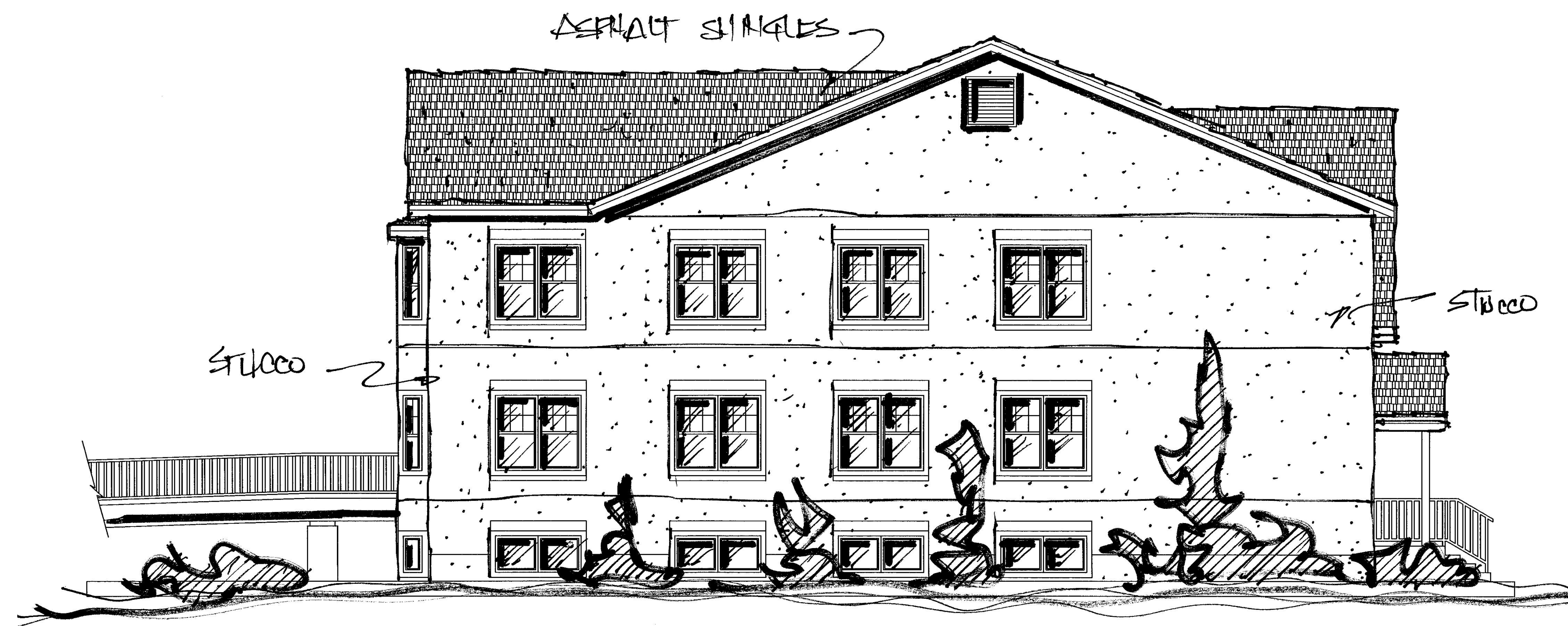
- COMMUNAL SPACES  
(377 ft<sup>2</sup>)
- COMMUNAL CIRCULATION
- BEDROOMS  
14 Bedroom Units
- WASHROOMS
- BUILDING SERVICES /  
CIRCULATION



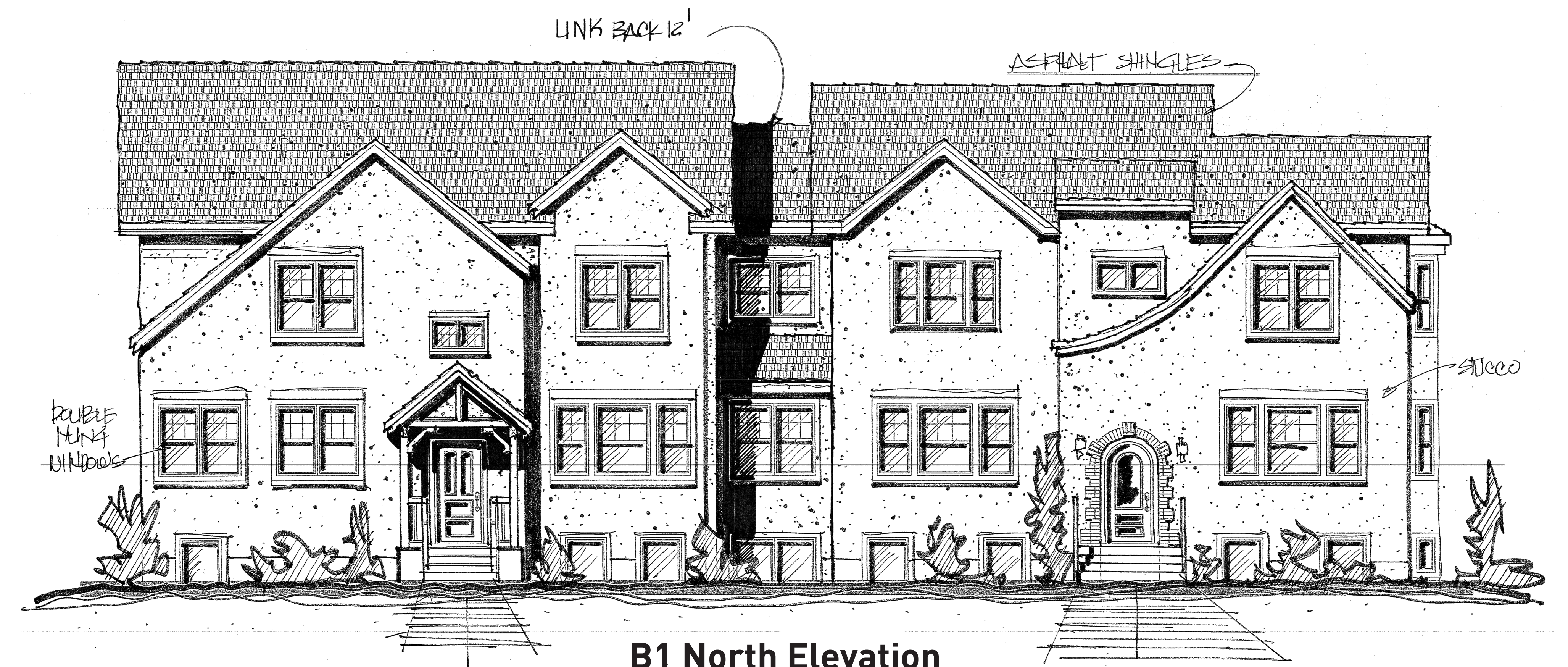


# 2.7 ARCHITECTURAL ELEVATIONS

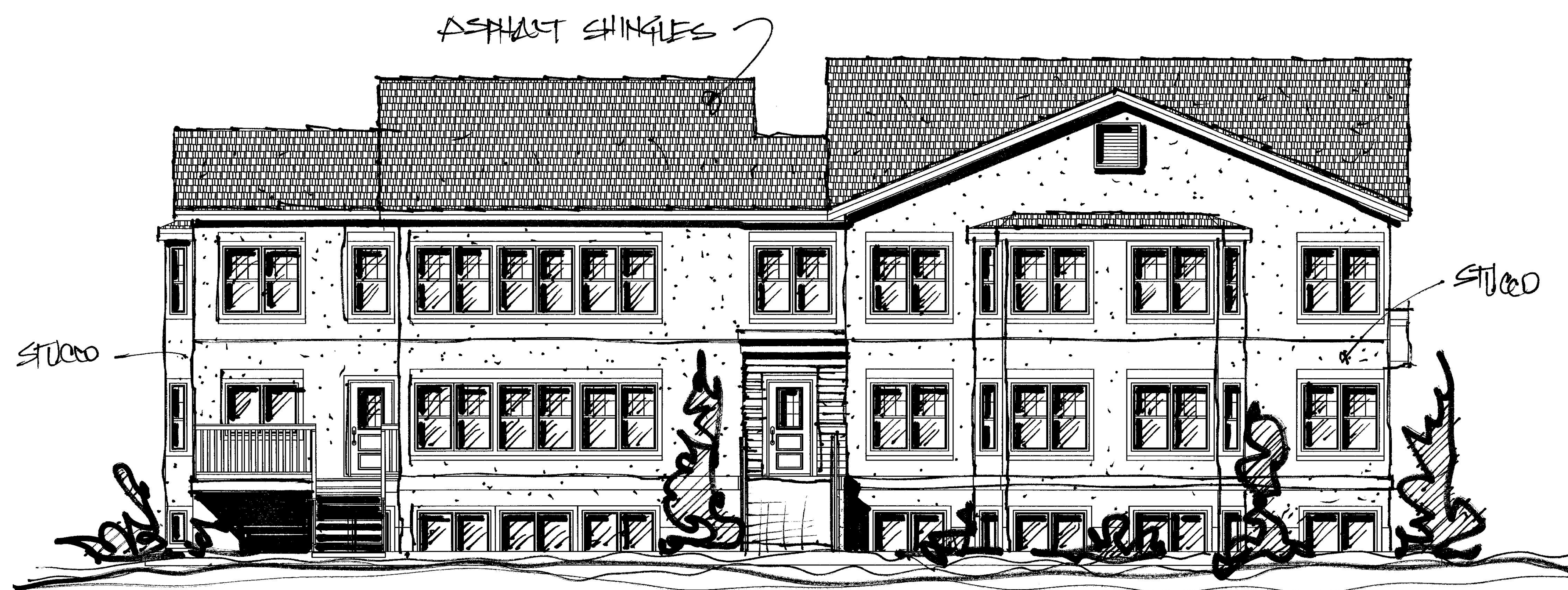
## RESIDENCE B1



B1 East Elevation



B1 North Elevation



B1 South Elevation



B1 West Elevation

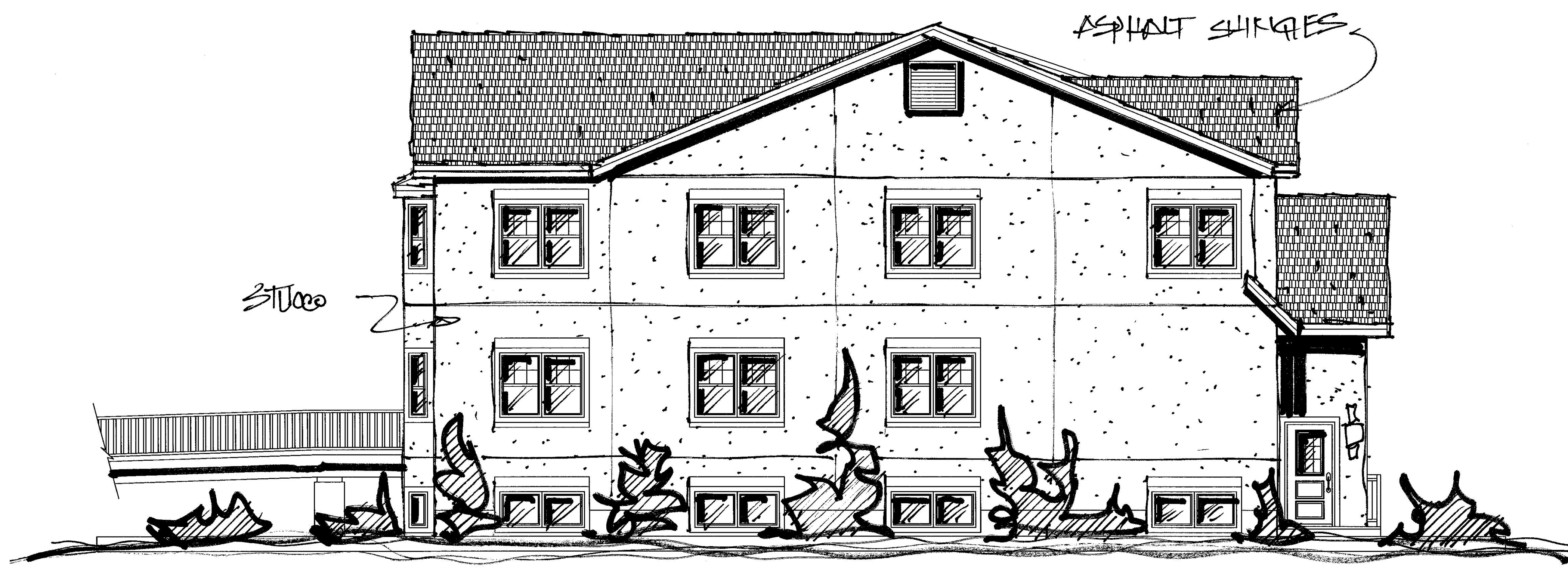




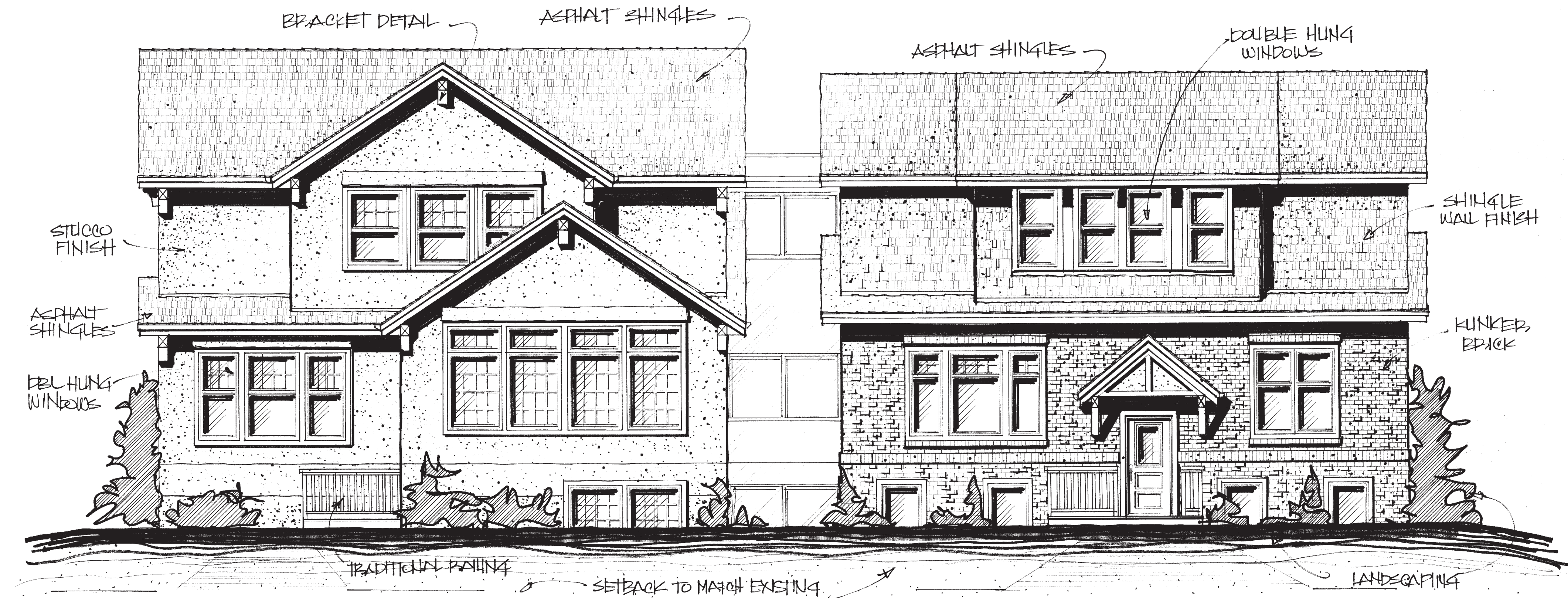


# 2.9 ARCHITECTURAL ELEVATIONS

## RESIDENCE B2



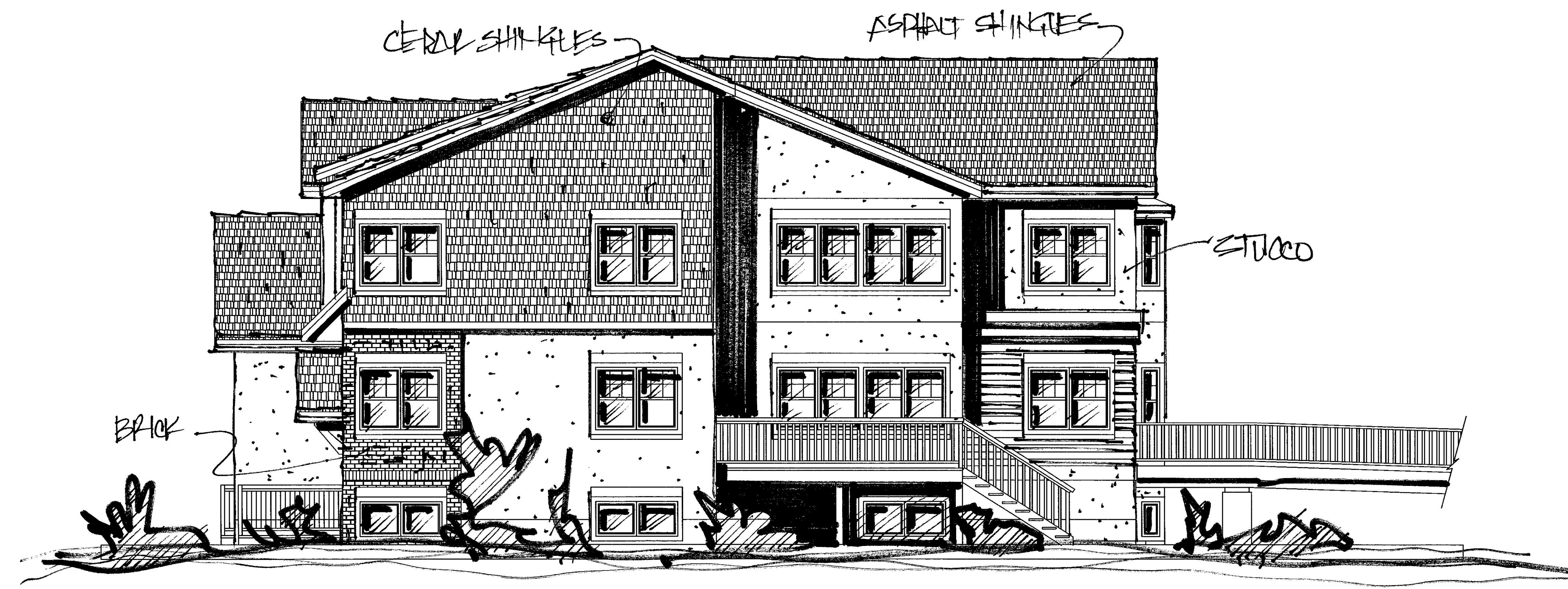
B2 East Elevation



B2 North Elevation



B2 South Elevation



B2 West Elevation



## 2.10 ARCHITECTURAL SITE

### Trees suitable for neighbourhood settings:

Elm  
Spruce  
Larch  
Pine  
Maple  
Flowering crab and hawthornes

### Shrubs suitable for neighbourhood settings:

Snowberry  
Coralberry  
Dwarf European  
Cranberry  
Red Twig and Yellow Twig  
Dogwood  
Dwarf Korean Lilac  
Burning Bush  
Spirea  
Meyer Lilac  
False Spirea  
Mock Orange  
Nanny Berry



#### B1 F.A.R. & SITE COVERAGE

SITE AREA: 14,850 ft<sup>2</sup> / 1,379.6 m<sup>2</sup>  
 BUILDING FOOTPRINT: 4,294 ft<sup>2</sup> / 398.9 m<sup>2</sup>  
 TOTAL BUILDING AREA: 12,728 ft<sup>2</sup> / 1,182.5 m<sup>2</sup>

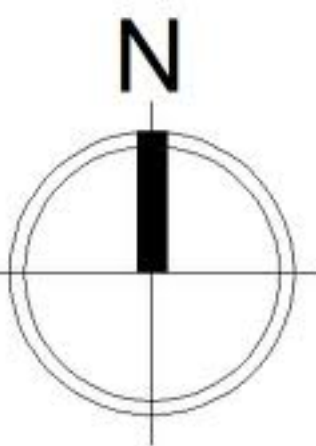
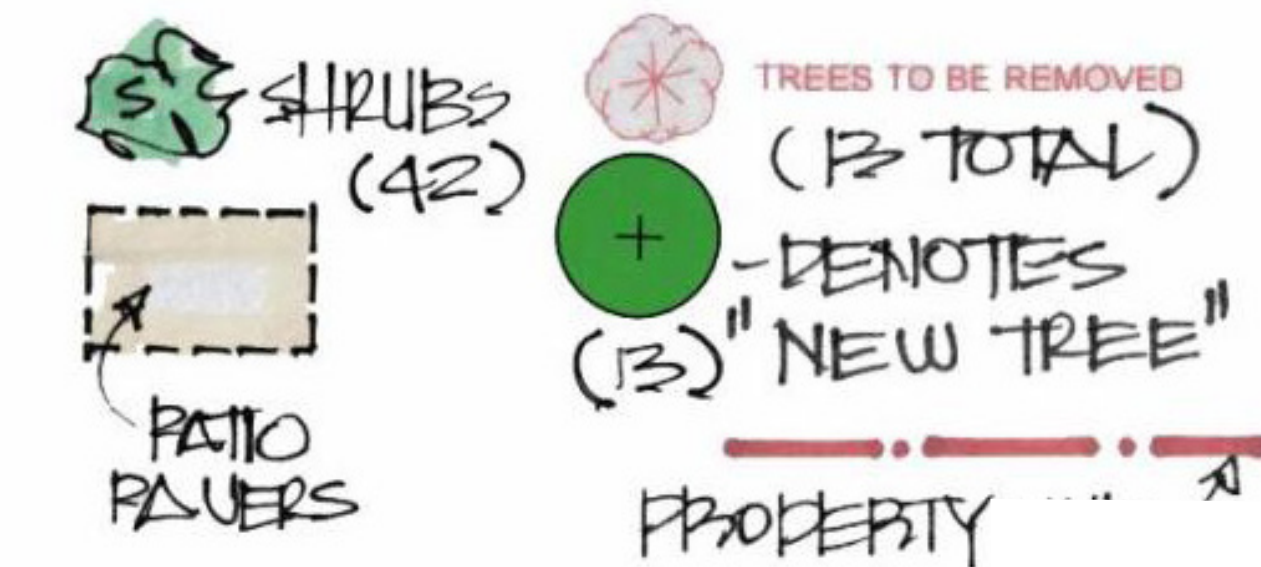
F.A.R.: 0.83  
 SITE COVERAGE: 28.2%

#### B2 F.A.R. & SITE COVERAGE

SITE AREA: 14,850 ft<sup>2</sup> / 1,379.6 m<sup>2</sup>  
 BUILDING FOOTPRINT: 4,185 ft<sup>2</sup> / 388.8 m<sup>2</sup>  
 TOTAL BUILDING AREA: 12,272 ft<sup>2</sup> / 1,140.1 m<sup>2</sup>

F.A.R.: 0.83  
 SITE COVERAGE: 28.2%

#### LEGEND





## 2.10 ARCHITECTURAL SITE



Site Section B Looking East at Residence B1



90th Avenue Streetscape Looking South



## 3.0 STRUCTURAL DESIGN

### 3.1 Structural Design Description

The design of the new Residential Dorm B1 is subject to the National Building Code of Canada 2010 (NBCC 2010) and Alberta Building Code 2006 (ABC 2006). A revised edition of the Alberta Building Code is scheduled to be released in February of 2014, however, this schedule is not firm and the design for this structure may commence prior to the anticipated release of the new ABC. Regardless, it is anticipated that changes to the new ABC will be reflected in the NBCC 2010 and should not impact this project.

The structural design and construction of this building is subject to the clauses in Part 4 – Structural Design and Part 9 – Housing and Small Buildings of the Codes. The primary applicable CSA Standards for this project include (but not limited to):

1. A23.3-04 – “Design of Concrete Structures”;
2. A23.1-04/23.2-04 – “Concrete materials and Methods of Concrete construction/Methods of Test and Standard Practices for Concrete”;
3. O86-09 – “Engineering Design in Wood.”

The design intent for the new structure comprises of conventional residential wood framing founded on cast-in-place reinforced concrete perimeter basement walls on strip footings with concrete pads for interior columns. The framing utilizes dimensional lumber, plywood and/or OSB sheathing for the exterior walls, shear walls and flooring, and pre-engineering roof and floor trusses constructed from dimensional lumber. Utilization of dimensional lumber offers cost and scheduling benefits provided by a large and common housing construction market. The following provides additional details regarding the various building elements.

### 3.2 Foundations

The building is to be constructed on a site where existing houses and their foundations are to be removed. The resulting void shall form part of the excavation area for the

new basement. It will be necessary to engage a qualified Geotechnical Engineer to inspect the site once the old houses are removed and provide recommendations for subgrade preparation to achieve proper bearing of the new structure.

Conventional residential foundations as per Part 9 of the Code comprises of cast-in-place concrete walls on strip footings with 2-10M bar placed at the top and bottom of the wall. This practice cannot be applied to this structure as the walls shall have deeper backfill and longer spans than what Part 9 pertains to. It is anticipated that some vertical reinforcing will be necessary in the foundation walls to resist the lateral earth pressure forces over the long lengths of wall. This reinforcement will provide better long term performance of the foundations from that observed in typical houses where it is not uncommon to have deleterious cracks form in the foundations within the first 20 years of life of the house.

### 3.3 Walls

The exterior walls shall comprise of 2x6 wood stud walls with plywood and/or OSB sheathing and shall act as shear walls for the building. The interior walls shall comprise of 2x4 wood studs for common space. Interior party walls shall have 2 runs of 2x4 staggered studs to facilitate in sound attenuation.

The design may establish that some lengths of interior walls will also serve as shear walls to compensate for the numerous windows in some of the exterior walls that reduce the shearwall potential of the exterior walls.

### 3.4 Floors

The design intent is to utilize pre-engineered wood trusses for floor joists which are comprised of dimensional lumber with the members oriented with the large dimension on the flat. Dimensional lumber and TJI (engineering joists) are under consideration, however, the pre-engineering wood truss system is preferred because they provide natural

openings through which electrical and mechanical piping and ducting can pass through. This simplifies and expedites the mechanical and electrical installations and should preclude most unwanted destruction of structural members by the electrical and mechanical trades as they install their elements. A cost benefit is anticipated with a simpler E&M installation process.

The floor surface shall be sheathed with 1¼” plywood or OSB in areas that will receive tile and ¾” sheathing in all other areas and shall be glued and screwed to the floor joist-trusses. Although conventional residential construction utilizes 5/8” floor sheathing, a thicker sheathing is intended for this building in order to improve the stiffness of the floor to minimize floor creaking. The floor truss chords placed on the flat will also facilitate in improving the stiffness of the floor system.

### 3.5 Roof

The roof is to be surfaced with asphalt or metal shingles. The roof shall comprise of pre-engineered gang-nailed wood trusses at 16 inches on-centre sheathed with ¾” plywood or if the roof truss spacing is increased to 2’-0”, then the sheathing would increase to ½” in thickness. In the event that the desired roof finish is to change to clay tile, then the roof sheathing or the roof truss spacing will have to accommodate the higher dead load developed from a clay tile system.

### 3.6 Ramps

An accessible ramp will be provided from the rear parking area to the main floor of the building and will be constructed of a steel channel structure with grated decking complete with either wrought iron or pipe handrails. The ramp will be supported by cast in place reinforced concrete piles. All steel elements will be powder coated for longevity and minimize maintenance requirements.



## 4.0 MECHANICAL DESIGN

### 1. GENERAL

The following preliminary design development report captures the contents of the planning discussions to date regarding proposed mechanical systems. It outlines the general basis for design and brings forward options that have been considered by the design team. The final mechanical design basis will be employed for both ECV infill housing residences B1 and B2.

The mechanical systems for the infill housing residences will be designed to meet the following goals:

- Fulfill the program requirements
- Meet the operational needs of Ancillary Services
- Align with the operational need of Facilities and Operations and to explore opportunities to partner with Energy Management to demonstrate higher performance buildings
- Provide system solutions that are practical from a maintenance perspective
- Provide practical sustainability solutions that contribute to decreased overall building energy usage
- Provide life safety systems as required by the Alberta Building Code, Alberta Fire Code, and other relevant standards such as NFPA and CSA
- Provide mechanical systems consistent with the UofA Facilities and Operations (F&O) Design Guidelines as they apply

### 2. MECHANICAL DESIGN CRITERIA

The following Codes and Standards will be incorporated into the mechanical design as they apply to this project:

- Alberta Building Code 2006
- National Fire Code 2010
- National Plumbing Code 2010
- CSA B149.1-10, Natural Gas and Propane Installation Code
- ASHRAE Standard 62.1-2013, Ventilation for Acceptable Indoor Air Quality
- ASHRAE Standard 90.2-2007, Energy-Efficient Design of Low-Rise Residential Buildings
- NFPA 13-2013, Standard for the Installation of Sprinkler Systems
- UofA F&O Design Guidelines

### 3. HEATING SYSTEMS

Building energy use software calculations will be performed for both infill residences as a basis for design.

The heating design conditions will be based on data for Edmonton, Alberta per the Alberta Building Code 2006 Appedix C climatic information for building design in Alberta as follows:

- Winter outside air temperature: January, 1%, -34°C

Other design criteria as follows:

- Indoor air temperature: 22°C

The heating system will consist of two hi-efficiency condensing boilers sized for 60% of the heating load requirements. Each boiler will be equipped with a dedicated circulation pump on a primary loop. Building heating water supply will be distributed using a secondary loop with primary/standby circulation pumps equipped with speed drives. The heating media will be chemically treated water.

Heating will be achieved throughout the building with hydronic terminal heating units. Perimeter spaces will be supplied with finned-tube wall-mounted radiation suitable for a dorm environment. Each perimeter room will be equipped with its own thermostatic temperature control for resident comfort. Common areas with perimeter millwork cabinetry such as laundry facilities or kitchens will be equipped with overhead radiant panels and/or hydronic forced flow under-cabinet kickspace heaters. Entrances will be equipped with hydronic forced flow wall mounted heaters.

The hydronic terminal heating components will be sized to accommodate low supply water temperatures (54°C) to allow low return water temperatures in order to maximize the condensing benefit of the high efficiency boilers.

Where possible, all motors over 1 HP will be specified with 3-phase (208 Volt) electrical to gain slight energy consumption advantages.



## 4.0 MECHANICAL DESIGN

### 4. COOLING SYSTEMS

Mechanical cooling was not a program requirement and will not be part of the mechanical system design. Natural ventilation will be achieved through openable windows throughout the building. The intent of operations is to run the fan coil/heat recovery systems continuously throughout the year which will provide more comfortable conditions to the residents in the hottest summer months.

### 5. HUMIDITY CONTROL SYSTEMS

Humidity control will only be achieved through exhausting typical areas containing humidity sources such as bathrooms and kitchens and by the introduction of outside air through heat recovery ventilators. Refer to Ventilation Systems for a complete description. Humidification will not be included in this design.

### 6. VENTILATION SYSTEMS

Ventilation will be achieved with 3 zones: lower level, main level, and second level. Each zone will be equipped with a fan coil unit that will distribute air supply to the perimeter spaces which will achieve a minimal amount of space pressurization. Each fan coil unit will be paired with a dedicated heat recovery ventilator to satisfy the outdoor air requirements set out in ASHRAE Standard 62.1. Exhaust requirements will meet the Alberta Building Code or ASHRAE Standard

62.1, whichever is greater. The exhaust portion of the heat recovery ventilator will be draw continuous exhaust from the bathrooms and janitor rooms within the zone. Tempered outdoor air will be ducted into the return air plenum of the fan coil unit. The fan coil unit heating coil will be sized based on full outdoor air supply temperatures without assistance from the heat recovery unit for times when the heat recovery unit is in a defrost cycle or is down for maintenance. Supply air temperatures will be consistent with typical make-up air system supply temperatures without reheat. There will be no dedicated corridor ventilation, air circulation will be achieved by circulating air from perimeter room door gaps into the corridors to the areas equipped with exhaust and to a single fan coil return air grille in the corridor.

Continuous exhaust from the bathrooms and janitor rooms will be ducted to the heat recovery ventilator. Continuous minimum general kitchen exhaust will be taken from the ceiling at the backside of the refrigerators (source of heat gain) and ducted to the heat recovery ventilator. Supplemental exhaust for the kitchen will be achieved with range hoods exhausting directly to the exterior of the building with no heat recovery. Clothes dryer exhaust ducts from each machine will be directly vented to the exterior of the building with no heat recovery. Upon activation of the kitchen supplemental exhaust or the clothes dryers, the heat recovery ventilator will go to a higher outdoor air fan speed for increased make-up air requirements.

Outdoor air filtration will be MERV 8.

### 7. CONTROL SYSTEMS

Where equipment, such as boilers, have the capability to control other system components, such as circulating pumps and setpoint temperatures, those pieces of equipment will perform that control. Where components are standalone and require an external automation signal to be controlled, those components will be controlled by the F&O Building Automation System (BAS). Hydronic heating components that have integral heating controls or wall mounted electronic thermostats will be self-regulating and not tied into the F&O BAS. Where applicable and practical, any monitoring or controlling points tied into the F&O BAS may be done through F&O's RCMS. Certain monitoring points such system component alarms and system temperatures may be included in the control system configuration as practical.

Temperature control will be achieved in each individual perimeter room with wall mounted electronic space thermostats or integral temperature controls as applicable.



## 4.0 MECHANICAL DESIGN

### 8. DOMESTIC WATER SYSTEMS

Domestic hot water demands will be met with an indirect heated water storage tank. Heating water from the high-efficiency boilers' primary loop will be used for indirect water-to-water heat exchange. Circulation for the indirect heated storage tank will be achieved with primary/standby circulation pumps with no speed drives.

Domestic water piping systems will be specified as copper only. All other plumbing systems will be specified in accordance with the National Plumbing Code. A hot water recirculation system will be incorporated into the design. Domestic hot, cold, and recirc water piping will be insulated.

As a measure of reducing water consumption, low flow fixtures such as lav faucets, kitchen sink faucets, and shower heads will be specified as low consumption units. Water closets will be specified as dual flush units.

Showers will be specified as one piece acrylic units with glass doors.

Domestic water supply will be taken from the City of Edmonton water supply line located at the street complete with backflow preventor in the building.

Irrigation systems or water meters will not be included in this design. Non-freeze hose bibbs will be provided exterior to the building for cleaning purposes.

### 9. SANITARY AND STORM SYSTEMS

The sanitary system plumbing materials will be connected below grade to the City of Edmonton sanitary sewer system.

The storm system will consist of roof gutters and downspouts splashing on grade.

A weeping tile system, sump, and pump will be provided. Discharge will be splashed on grade.

### 10. NATURAL GAS SYSTEMS

All mechanical heating appliances will utilize natural gas with a gas meter located exterior to the building.

### 11. FIRE PROTECTION SYSTEMS

The building will be sprinklered and will have a dedicated sprinkler room. The sprinkler system will be designed and installed by a qualified sprinkler contractor in strict accordance with NFPA 13 meeting the building occupancy classification.

### 12. SUSTAINABILITY CONSIDERATIONS

Sustainability options that will be employed in the mechanical design are as follows:

- Heat recovery from bathroom, general kitchen, and janitor room exhaust sources
- Heat recovery from kitchen fridge heat gains
- Low temperature heating water system with high-efficiency boilers
- Low temperature hydronic terminal heating components
- Indirect domestic water heating with high-efficiency boilers
- Utilizing 3 phase electrical for motors over 1 HP
- Variable speed pump on the heating water distribution system
- Low consumption fixtures such as faucets, shower heads, and water closets

Sustainability options being discussed which may affect the mechanical design are as follows:

- High performance glazing options
- Non-standard insulation options for foundation floors and walls
- Increased R-value for walls and roof
- Solar domestic hot water heating
- Sanitary drain heat recovery on simultaneous flows (eg: showers)
- Metering and/or measurement and verification options



# 5.0 ELECTRICAL DESIGN

## 1.0 GENERAL

The following draft design development report captures the results of planning discussions to date regarding proposed electrical systems for the two East Campus Village Infill houses. These facilities will reflect a residential “house-like” living environment in two, approximately 13,000 square foot, three level structures. Each one will house approximately 35 residents. Both inside and out the facility should emulate a standard residential house as closely as possible.

The work shall include but not limited to the following:

- Complete power distribution system. Grounding system, panelboards, wiring, etc. provided and installed by the electrical contractor;
- Power connections to mechanical equipment including boilers, hotwater heaters, fancoils, HRVs, starters, contactors and disconnect switches;
- Complete infrastructure and wiring for building wide battery backed night/emergency lighting system, or local battery ballast system, or local wall-pacs and heads;
- Complete indoor and outdoor lighting systems, including local control/occupancy switches & sensors;
- Complete power supplies, motor starters, contactors and disconnect switches for all equipment supplied by others, as required;
- Complete life safety systems (voice communication fire alarm system, CO detection, emergency lighting (as mentioned), and exit lighting);
- Complete infrastructure for datacom, telecommunications, A/V, and security/intercom systems (raceways, cabling, wall jacks, all head end and terminal devices, etc);
- Commissioning, start-up and training.

## 2.0 ELECTRICAL DESIGN CRITERIA

### 2.1. OVERALL GOALS

- Fulfill the program requirements
- Meet the operational needs of Ancillary Services
- Align with the operational need of Facilities and Operations
- Provide electrical systems consistent with the UofA Facilities and Operations (F&O) Design Guidelines
- Provide system solutions that are practical from a maintenance perspective
- Provide practical sustainability solutions that reduce overall building energy usage
- Provide life safety systems as required by the Alberta Building Code, Alberta Fire Code, and other relevant standards including NFPA and CSA.

### 2.2. GENERAL DESIGN PROVISIONS

#### 2.2.1. APPLICABLE CODES & REGULATIONS

The electrical systems will be designed in accordance and in keeping with the intent of all applicable codes, ordinances, standards and regulations. The following will be incorporate into the electrical design as appropriate to this facility:

- Alberta Building Code 2010; (in anticipation of adoption)
- Alberta Fire Code 2010; (in anticipation of adoption)
- WorkSafe Alberta Regulations;
- Applicable NFPA Regulations;
- Canadian Electrical Code 2012 & Municipal Affairs Standata Amendments;
- Other applicable CSA Standards;
- CAN/ULC Standards for Fire Alarms;
- IESNA (Illuminating Engineering Society) Recommended Practices;
- UofA Facility and Operations Design Guidelines and Ancillary Services & Utilities standards and requirements.

#### 2.2.2. SCOPE

Complete, fully tested and operational electrical systems will be provided to meet the requirements described herein and in complete accordance with applicable codes and ordinances, and good installation practices.

Connection to equipment specified in other sections and to equipment supplied and installed by other contractors and/or by the Owner.

#### 2.2.3. SUSTAINABLE DESIGN

The design and operation of an energy efficient facility is an important goal. The following are energy efficient design elements that will be incorporated into the project design where practicable and economical:

- Occupancy/Vacancy sensing for lighting where applicable;
- LED & Fluorescent luminaires/lamps throughout with architectural coordination in terms of luminaire efficiency, paint reflectivity and other finishes.
- Exterior light pollution and glare reduction for exterior/site lighting;
- As budget allows, and pending building roof exposure review, a solar PV array will be considered. There exists an opportunity to incorporate some storage with emergency power supply.

#### 2.2.4. MATERIALS

All materials and equipment specified and installed to be new and of a heavy duty residential or institutional grade and sourced from a manufacturer with a significant North American presence and history.



## 5.0 ELECTRICAL DESIGN

All major equipment to have a complete nameplate with manufacturer's name, model number, and serial number. All major pre-assembled equipment or systems to be supplied with operations and maintenance manuals/instructions.

Materials and equipment of a similar type (e.g. panelboards, wall switches, etc.) shall be supplied by the same manufacturer.

### 3.0 ELECTRICAL SYSTEMS

#### 3.1. POWER DISTRIBUTION

##### 3.1.1. UTILITY FEED

The main utility feeds will be 225A-120/208V, 3 phase underground services supplied from a new outdoor UofA utilities substation located within 25m of the buildings. The new substation will also serve current and future demands on the block. Primary cable will be supplied and installed by the electrical contractor as directed by the U of A. Service entrance will be in the building's lower floor electrical/datacom room. All secondary cable, duct and terminations supplied and installed by the electrical contractor

##### 3.1.2. METERING

Each building shall have a single interior utility meter between the service entrance feed and the main distribution panelboard. Supplied as specified by UofA Utilities

##### 3.1.3. POWER DISTRIBUTION

A main 225A-120/208V, service entrance rated, distribution panel will be provided in the electrical room and will house the main circuit breaker, lower

floor distribution breakers, and secondary panel breakers. Any locally generated PV or similar power will also connect here. Two secondary power panels will be installed in the combined mechanical/electrical rooms on the main (150A-120/208V feed) and second (100A-120/208V feed) floors.

All bedroom suites and bathrooms will have one 20A-120V circuit for lighting and power. These will be dedicated to that location for isolation and potential load monitoring. The assumption is also that for safety and efficiency we do not size the bedrooms feeds to generally support space heaters, fridges, kettles, irons, etc. Bedroom breakers will be of the AFCI type and bathroom of the GFCI type. Kitchen and Laundry areas will be circuited as appropriate for appliances. Other common areas will have circuits for equipment there and convenience use.

##### 3.1.3.1.1. RECEPTACLES

All receptacles to be of tamper resistant (TR) T-type. Install GFCI receptacles where required and no GFCI breaker on circuit. Public spaces will have sufficient outlets for entertainment equipment and laptop/portable device charging. Consideration will be given for some public or suite outlets to be installed with 5V USB charging outlets.

#### 3.2. LIGHTING

##### 3.2.1. EXTERIOR

Exterior lighting in the front either building or pole mounted with reflect residential sensibilities and be of that architectural type. Back of house, any pole lighting in yard or parking areas will follow existing UofA site lighting standards and fed off block site lighting circuits. Spill light attenuation patterns will be used as appropriate.

##### 3.2.2. INTERIOR

All fixtures are to be specified with T8 or T5HO linear fluorescent lamps and electronic ballasts or LED E26 Base lamps. Color temperature will be in the 2700K – 4100K as appropriate to the location and application. Light fixtures will be preferentially residential style surface ceiling mounted or wall mounted. Recessed may be considered in some particular areas for functional or architectural reasons. Fixtures will be controlled using standard 120V switches/dimmers/sensors. To conserve energy suite switches and most public areas will have a vacancy sensor. Some areas may also couple this with a time clock feature. For night lighting safety some corridor lights may remain energized 24 hours and/or incorporate occupancy sensors. If this direction is finalized these lights should be considered to become combined emergency lighting.

#### 3.3. AUXILIARY SYSTEMS

##### 3.3.1. INFRASTRUCTURE

In general to provision the auxiliary systems the following infrastructure will be required:

- 3 fibre optic cable feeds from the UofA to lower level electrical/datacom room – FMnet, IST, & Fire alarm network.
- Fibre optic and/or copper feeds from telecom services providers/ISPs (eg. Telus) to lower level electrical/datacom room.
- Distribution cabling for Fire alarm system (armoured FAS cable or FAS WIC) between panel and devices.
- Distribution cabling for Lenel access control system between lower level electrical/datacom room and main floor doors.
- Distribution cabling for DSC security system between lower level electrical/datacom room and remote devices.



## 5.0 ELECTRICAL DESIGN

- CAT 6 cable from lower level electrical/datacom room patch panel to locations of any equipment plus common room jacks and two jacks per suite; on the order of 100 runs.
- Intercom cabling from main door panels to suites and other locations; on the order of 40 runs.

### 3.3.2. SECURITY AND SURVEILLANCE

These services are provisioned over a connection to the UofA facilities network, FMnet. A fiber optic cable will be pulled to lower floor electrical/datacom room from nearest building/tunnel location for connection to FMnet. The UofA will provide direction to the tie in location. Fiber cables and terminations are to be provided by the electrical contractor along with a UPS backed, 24 port PoE switch, fibre to Cat6, for distribution.

#### 3.3.2.1. ACCESS CONTROL

UofA standard Lenel card access readers and electric strikes/latches are to be provided on all external doors. All access control equipment, including door position switches, electric strikes, main building controller, wiring, & installation, etc. included in project and to meet UofA specifications. Head end equipment for building operations and connecting local system to FMnet installed in lower level electrical/datacom room..

#### 3.3.2.2. INTRUSION DETECTION

UofA standard "DSC" alarm controller to be installed in lower level electrical/datacom room and connected to FMnet. System sized to support sufficient alarm and I/O points for lower and main floor glass break; force and long term hold open on exterior doors; and local alarm output and remote control panel. Provide intrusion detection system devices such as door contacts, glass break, remote control panel (located

on main floor near public area) etc. Separate security systems will not be provided for individual suites.

#### 3.3.2.3. CCTV

A total of 4 IP style security cameras (4 exterior and 0 interior) are to be provided and installed in this project and connected to UAPS surveillance system via FMnet PoE switch. CCTV cameras are to be located at exterior entrance doors. Allow for complete installation including cameras, camera equipment, and wiring with terminations to UofA specifications.

#### 3.3.2.4. EMERGENCY "BLUE" PHONES

NO PROVISION.

### 3.3.3. DATACOM/TELECOM

#### 3.3.3.1. INTERCOM

A standalone intercom panel system will be provided at the main entrance with remote stations in each room and one outside of each common area on the floors. This will not tie into any other datacom system.

#### 3.3.3.2. CATV

There will be no provision of cable TV via RG6/RG59 coaxial cable in the buildings. See Telephone & Data section.

#### 3.3.3.3. SATELLITE

NO PROVISION.

#### 3.3.3.4. WIFI

UofA 'UWS' wireless access to be provided throughout the building and will be available to all residents. Rough-in and cabling will be provided for 3 WAPs per floor from basement electrical/datacom room. End devices not included; to be provided and commissioned by IST.

#### 3.3.3.5. TELEPHONE & DATA

External duct to, and back board space in, lower level electrical/datacom room will be provided for Telecom providers/ISPs to run and locate services. These services will include Telephone, Data, & Television/Streaming.

Provisions will be made for private telephone and/or data service (including television over cat6 cable) to each bedroom. This will be via 2 CAT6 cable runs to each unit from lower level electrical/datacom room patch panel. Also there will be provisions for same in entertainment and other public areas as appropriate. In particular one shared public phone line will be provided near common area on each floor proximate to intercom station.

The above runs will be connected as required to Telecom provider's equipment or possibly IST supplied services.

### 3.3.4. LIFE SAFETY

#### 3.3.4.1. FIRE ALARM SYSTEM

In general the fire alarm system is to be designed and installed in accordance with UofA Fire Alarm System Design Guidelines and all applicable municipal, provincial, and national codes.



## 5.0 ELECTRICAL DESIGN

UofA F/A systems are networked to provide notification to the Facilities Control Centre and UAPS and thus allow for fire department dispatch. As such a fibre optic cable must be provisioned for connection to that network. The fibre optic cable will be pulled to lower floor electrical/datacom room from nearest building/tunnel location for connection to the F/Anet.

F/A system to be an addressable Simplex model with emergency communications capability. UAPS will have access to the emergency paging functionality via network connection.

F/A annunciator panel to be located in main, front entrance vestibule adjacent to intercom system.

F/A system to be configured for single stage operation.

### 3.3.4.1.1. SIGNALING DEVICES

Fire alarm speaker/strobe units will be provided in corridors and common areas to ensure adequate audibility for occupants in each sleeping room suite and allow emergency paging for fire fighters & UAPS. Exterior weather proof fire alarm speaker horns will be provided on the exterior of the building. Allow for 2 locations with one located near the fire alarm response point.

### 3.3.4.1.2. INITIATING DEVICES

#### 3.3.4.1.2.1. FIRE DETECTORS

##### 3.3.4.1.2.1.1. Heat Detectors

Building will be sprinklered throughout and does not require heat detectors.

##### 3.3.4.1.2.1.2. Smoke Detectors

As an alternative to local smoke alarms in each sleeping room suite requiring 120V circuits and batteries, smoke detectors wired to the building F/A system may be installed in each sleeping room suite. Local silence requirement to be investigated.

#### 3.3.4.1.2.2. Sprinkler Flow

Sprinkler flow switch alarm to be installed at sprinkler tree.

#### 3.3.4.1.2.3. Manual Pull Stations

Located on every floor beside shared exits to stairs and/or exterior as per code.

### 3.3.4.2. SMOKE ALARMS

Smoke detectors on F/A system in each sleeping room suite may be considered as an alternative otherwise local smoke alarms in each sleeping room suite requiring 120V circuits and batteries are required. Local silence requirement to be investigated.

### 3.3.4.3. CO DETECTOR ALARMS

CO alarms are required. Due to hydronic system it will be evaluated if detectors in each sleeping unit may be replaced by central detection in service room coupled with alerting through existing F/A system. Otherwise combine system with suite smoke alarms may be preferable.

## 3.4. ELEVATORS

NO PROVISION

## 4.0 MISCELLANEOUS ITEMS

### 4.1. UNIVERSAL ACCESS

Universal access or barrier free suites will be provided as indicated on the architectural drawings. To accommodate this, electrical device locations will be adjusted in these suites as per ADA guidelines. Also in suite F/A speaker-strobes will be provided for the hard of hearing.

### 4.2. "ONE CARD" PAYMENT SYSTEM

Network connection via IST fiber to UofA Ancillary Services "One Card" payment system required. Head end equipment to be determined.

#### 4.2.1. LAUNDRY EQUIPMENT

Laundry equipment in this project will be installed such that users can pay for use via UofA "One Card" payment system. As such CAT 6 datacom runs back to the lower floor electrical/datacom room will be required for card readers at both locations and one per each washer and dryer. Card readers also require 120V cct.

### 4.3. EXISTING CONDITIONS

It is the responsibility of the electrical contractor and design team to identify and include in contract resolving any conflicts between new construction and existing equipment such as (but not limited to): pedestals, landscape receptacles, phone booths, lighting, vaults etc. identify existing gas lines, steam lines, water lines, hydrants, sanitary lines, storm lines etc. and ensure proper clearances are maintained.



## 6.0 CODE REVIEW

The buildings will be classed as Group C occupancies and be constructed with combustible material. Sprinkler systems will be installed and required fire ratings will be provided. Final calculations will be done on building side yards where exposed to building faces and area of unprotected openings will be quantified, although there is a high degree of compartmentalization therefore no issues are expected. Exterior claddings will be non-combustible as cementitious stucco products and cement based trims and soffits will be incorporated. Stairwells and mechanical areas including shafts will receive 1 hour rated enclosures. See the excerpt below from the Alberta Building Code 2006.

### 3.2.2.48. Group C, up to 3 Storeys, Sprinklered

- 1) A building classified as Group C is permitted to conform to Sentence (2) provided
  - a) except as permitted by Sentences 3.2.2.7.(1) and 3.2.2.18.(2), the building is sprinklered throughout,
  - b) it is not more than 3 storeys in building height, and
  - c) it has a building area not more than
    - i) 5400 m<sup>2</sup> if 1 storey in building height,
    - ii) 2700 m<sup>2</sup> if 2 storeys in building height, or
    - iii) 1800 m<sup>2</sup> if 3 storeys in building height.
- 2) The building referred to in Sentence (1) is permitted to be of combustible construction or noncombustible construction used singly or in combination, and
  - a) except as permitted by Sentences (3) and (4), floor assemblies shall be fire separations with a fire-resistance rating not less than 45 min,
  - b) mezzanines shall have, if of combustible construction, a fire-resistance rating not less than 45 min, and
  - c) loadbearing walls, columns and arches shall have a fire-resistance rating not less than that required for the supported assembly.

3) In a building that contains dwelling units that have more than one storey, subject to the requirements of Sentence 3.3.4.2.(3), the floor assemblies, including floors over basements, which are entirely contained within these dwelling units, shall have a fire-resistance rating not less than 45 min but need not be constructed as fire separations .

4) In a building in which there is no dwelling unit above another dwelling unit, the fire-resistance rating for floor assemblies entirely within the dwelling unit is waived.

**OUTLINE OF ISSUE**

Agenda Title: **East Campus Village (ECV) Saskatchewan Drive Residence – 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 East Campus Village (ECV) Saskatchewan Drive Residence – Schematic Design Report (as set forth in Attachment 2, as amended) 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	Doug Dawson, Executive Director, Ancillary Services, Facilities and Operations
Presenters	Doug Dawson, Executive Director, Ancillary Services, Facilities and Operations; Kelly Hopkin, Senior Campus Planner (Architecture), Office of the University Architect, Facilities and Operations; Martin Jones, Principal, GEC Architecture
Subject	East Campus Village (ECV) Saskatchewan Drive Residence – Schematic Design Report (formerly the East Campus Village (ECV) Leadership Residence – Schematic Design Report)

**Details**

Responsibility	Vice-President (Facilities and Operations)
The Purpose of the Proposal is (please be specific)	This project will increase the amount of purpose-built student housing on campus in alignment with the University’s goal of accommodating 25% of students in residence housing. Students who reside in purpose-built on-campus housing with supportive programming tend to have a more fulfilling and enriching academic experience at the University than those who do not. Expanding on-campus housing assists the University in meeting institutional goals and objectives by providing a learning environment conducive to personal and academic success. Providing smart growth development enhances community building, student life, and campus experience while reducing greenhouse gas emissions. The development will be a financially-viable project that will enhance the residence portfolio through resource stewardship and reduce deferred maintenance cost.
The Impact of the Proposal is	<p>The University proposes to construct 144 new student spaces in a multi-purpose building on Saskatchewan Drive between 110 Street and 111 Street in ECV.</p> <p>This development will be a multi-purpose residential building featuring bedroom configurations of one and two bedrooms. The residence will have common areas, a dining hall, and the appropriate amount of amenity and programmable space to deliver support services and host lectures. In order to foster a sense of community, students will take meals together in a dining hall (meal plan) to be designed as a “flex” space able to accommodate guest speakers and host functions. A total of (seven) 7 houses along Saskatchewan Drive between 110 and 111 Streets will be removed to accommodate this development. All students and faculty affected by the construction will be accommodated elsewhere within the institutional building inventory. The proposed residence will contribute 9.6% additional beds towards the 1500 bed full build out of the ECV district.</p> <p>A total of seven (7) houses (11025, 11029, 11039, 11045 and 11051 Saskatchewan Drive and 11044 and 11050 – 90 Avenue) between</p>

**FINAL Item No. 5**

	Saskatchewan Drive and 90 Avenue and between 110 Street and 111 Street will be impacted as <i>per</i> the Preservation Plan and Sector Plan.
Replaces/Revises (eg, policies, resolutions)	N/A
Timeline/Implementation Date	Initial concept design – September, 2013 to February, 2014; Schematic Design (approval) – February 27, 2014; Design Development (approval) – April 24, 2014; Construction start – Summer, 2014; Occupancy – September, 2016
Estimated Cost	N/A
Sources of Funding	N/A
Notes	N/A

**Alignment/Compliance**

Alignment with Guiding Documents	<i>Dare to Discover</i> ; Academic Plan ( <i>Dare to Deliver</i> ); Preservation Plan; Long Range Development Plan (LRDP); University of Alberta Comprehensive Institutional Plan (CIP)
Compliance with Legislation, Policy and/or Procedure Relevant to the Proposal (please <u>quote</u> legislation and include identifying section numbers)	<p>1. <b>Post-Secondary Learning Act (PSLA)</b>: The <i>PSLA</i> 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 <i>PSLA</i> 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 <i>Act</i> 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 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 <i>Act</i> governs the terms under which university land may be leased.</p> <p>2. <b>GFC Facilities Development Committee (FDC) Terms of Reference – Section 3. Mandate of the Committee:</b> “[...]”</p> <p style="padding-left: 40px;"><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 style="padding-left: 40px;"><b>A. Facilities</b></p> <p>1. To approve proposed General Space Programmes (Programs) for academic units.</p> <p>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.</p> <p style="padding-left: 80px;">(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</p>

	<p>the University Architect (or their respective delegates) on the siting of such facilities. (GFC SEP 29 2003)</p> <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>[...]"</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> <p>To access this policy suite on line, go to: <a href="http://www.uappol.ualberta.ca">www.uappol.ualberta.ca</a>.</p> <p><b>4. UAPPOL Preservation of University Facilities and Grounds Policy:</b> The University of Alberta is committed to preserving its history while planning for the continued growth and expansion that facilitates its mission and vision.</p> <p>To access this policy suite on line, go to: <a href="http://www.uappol.ualberta.ca">www.uappol.ualberta.ca</a>.</p>
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**Routing (Include meeting dates)**

<p>Consultative Route (parties who have seen the proposal and in what capacity)</p>	<ul style="list-style-type: none"> <li>• March, 2005 to September, 2008 – 12 facilitated community dialogues with Garneau resulting in the creation of the Design Guidelines for Infill Development</li> <li>• Open House Sector 7 and 8 Sector Plans – March 19, 2012</li> <li>• Formalization of Sector Plans for Sectors 7 and 8 – March 28, 2013</li> <li>• Garneau Community League Focus Group <i>per</i> East Campus Village Implementation Plan – September 16, 2013</li> <li>• GFC Facilities Development Committee <i>per</i> East Campus Village Implementation Plan – October 24, 2013</li> <li>• Residence Life and Residence Operations <i>per</i> East Campus Village Implementation Plan – November 12, 2013</li> <li>• Ancillary Services met with the University of Alberta Students' Union and Graduate Students' Association on January 8, 2014</li> <li>• University of Alberta's Internal and External Community Open Houses <i>per</i> East Campus Village Implementation Plan for substantial development – January 8, 2014</li> <li>• GFC Facilities Development Committee <i>per</i> East Campus Village Leadership Residence and Proposed Preliminary Functional Program and Concept Plans – (For Discussion) – January 30, 2014</li> <li>• Leadership Residence Project Steering Committee – February 12, 2014</li> <li>• Leadership College Academic Coordinating Committee – February 13, 2014</li> </ul>
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**FINAL Item No. 5**

Approval Route (Governance) (including meeting dates)	GFC Facilities Development Committee – February 27, 2014 (for final approval of the East Campus Village Saskatchewan Drive Residence–Schematic Design Report [formerly known as the East Campus Village Leadership Residence-Schematic Design Report])
Final Approver	GFC Facilities Development Committee

Attachments:

1. Attachment 1 (pages 1 – 2) - Briefing Note
2. Attachment 2 (pages 1 – 58) - East Campus Village Saskatchewan Drive Residence – Schematic Design Report (February 2014) (formerly known as the East Campus Village Leadership Residence – Schematic Design Report (February 2014))

*Prepared by:* Kelly Hopkin, Senior Campus Planner (Architecture), Office of the University Architect, Facilities and Operations, [kelly.hopkin@ualberta.ca](mailto:kelly.hopkin@ualberta.ca)



## East Campus Village (ECV) Saskatchewan Drive Residence - Schematic Design Report BRIEFING NOTE

Attachment 1

### Background

University historical data indicates at no time in the last ten (10) years has the demand for on-campus residence spots been met. In fact, between 2007 and 2011, the number of applicants has exceeded 5,000. Due to the number of returning students each term there are only approximately 2,500 spots available.

The University of Alberta is proposing to build a residential residence focusing on leadership development. The University proposes to construct 144 new student spaces in a multi-purpose building on Saskatchewan Drive between 110<sup>th</sup> Street and 111<sup>th</sup> Street in East Campus Village (ECV).

This building will feature multiple bedroom configurations of 1 and 2 bedrooms. The buildings will feature the appropriate amount of amenity or programmable space required to deliver support services for students, host lectures in the evenings and on weekends. In order to foster a sense of community, students will take meals together in a dining hall (meal plan to be designed as a “flex” space able to accommodate guest speakers and host functions). A total of seven (7) houses along Saskatchewan Drive between 110<sup>th</sup> and 111<sup>th</sup> Streets will be removed and relocated to accommodate this development. All students and faculty affected by the construction will be accommodated elsewhere within the institutional building inventory. The building represents 9.6% towards the total 1500 bed spaces in the East Campus Village (ECV) district.

No additional parking provisions would be required beyond current surface lots between 111<sup>th</sup> and 110<sup>th</sup> Street (Lots 87, 88 and 89) based on projected residence parking demand of 6% of the total resident population, as well as the recent trend where the lots are not full.

Furthermore, Lot U (the SE portion of the large surface lot east of HUB) is dedicated to visitor parking, capacity 224 stalls, and there is also visitor capacity on 90<sup>th</sup> Avenue.

### Issues

The University is proposing to construct 144 beds in the residence building in the East Campus Village (ECV) district. The building will be located on an existing lot currently occupied by seven (7) homes which will be removed and relocated as part of the Sector 8’s preservation plan. The new building will align with the East Campus Village (ECV) design guidelines for Infill development. The development will be an innovative new building typology to support an innovative program without constraining property lines. The residence will provide pleasant and commodious interior design including welcoming entrances, natural light and functional social spaces for residents; integrating them with active outdoor spaces for the wider university community. The new residence will anchor and further develop the East Campus Village (ECV) into a safe, walkable, student focused and vibrant neighbourhood that connects the campus to adjoining amenities.

The proposed schematic design includes 144 bed spaces in 1 and 2 bedroom configurations, common areas include a common living room and social spaces, laundry, study areas, six (6) guest suites, outdoor



amenity space, large dining hall, fitness room, as well as other programmable space to build community and deliver support services to students.

The proposed new building will occupy a site vacated by seven (7) houses that are relocated, replicated and removed in accordance with the preservation plan and the formalized sector 8 sector plan. Front façades of four (4) of the houses formerly on the site will be replicated in two (2) infill housing residences on 90<sup>th</sup> Avenue. Houses to be removed are being offered to interested parties to relocate off campus as per the house removal process.

The construction of the proposed buildings will impact trees in the immediate area. Mitigation plans will be developed to retain, relocate and replant trees to be removed.

### **Recommendation**

See the Motion approved by the GFC Facilities Development Committee at its meeting of February 27, 2014 with regard to this report.





University of Alberta

# Saskatchewan Drive Residence

*Schematic Design Report*

February 2014

Attachment 2







# Saskatchewan Drive Residence

## *Schematic Design Report*

February 2014

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# Executive Summary

This report summarizes the Schematic Design stage of the Saskatchewan Drive Residence. The Schematic Design refines the space parameters as well as concept design options against priorities and program objectives. Key deliverables of the Saskatchewan Drive Residence include:

- 144 student residence beds
- Residence units are arranged in cohort mixes of 12 students
- Dining Hall that also serves as flex space for programming and supports community building
- A City Room to accommodate events, lectures, presentations and receptions
- Meet the University of Alberta accessibility and safety standards
- Meet a Green Globe, 4 globe sustainability standard

To ensure that project deliverables are maintained the design team in collaboration with the Project Steering Committee developed four key Architectural Guiding Principles along with a series of Design Principles. The Architectural Guiding Principles include:

- Engaging the Identity of a Place
- Interpreting the Context
- Creating a Third Place: Activate Community Building
- Transcending the Present: Traditional and Modern

Key opportunities and challenges presented by the Saskatchewan Drive Residence which are also outlined in this report.

## Site and Sector Analysis

The Saskatchewan Drive Residence is located within Sector 8 or the East Campus Village on the North Campus. East Campus Village is to be developed as a vibrant and integrated student-residential neighbourhood while respecting the character of this mature neighbourhood. The Saskatchewan Drive Residence is identified within the Sector 8 Plan and its programming supports the development goals of this part of campus. The massing and architectural detailing has been designed in response to the Design Guidelines for Infill Development within the East Campus Village.

Response to environmental and site conditions are major considerations in the Schematic Design of the Saskatchewan Drive Residence. Edmonton is the most northerly major city in Canada. Strategies are established to transforming Edmonton into a proud winter city. The design supports these goals and provide opportunities to engage with the environment throughout the year.

## Program

The Saskatchewan Drive Residence will provide an impactful, and intentional residential experience. To help support this goal, the Saskatchewan Drive Residence contains a diverse set of program elements that provide a wide range of student oriented amenity space. This diversity of program elements will help support positive social interaction, academic achievement and establish a sense of community. The main floor primarily functions as an amenity level combining administrative and program functions with social and dining spaces. The second, third and fourth floors are dedicated to student residences organized around 12 cohort groupings of 12 students. Finally, the fifth floor contains a City Room; a flexible gathering space that can host a variety of different events.

The Schematic Design is based on the preliminary space program provided during the RFP process. As programmed requirements develop, the overall net floor area of the building has increased by 10% and gross floor area has also increased by 30% in response to program flexibility and increased social space requirements. Detailed space summary charts are provided within this report.

## Design Option

Massing and formal resolution of the Saskatchewan Drive Residence has been developed in response to the East Campus Village Design Guidelines for Infill Development, the Sector 8 Plan, and the overarching Guiding Principles and aspirational goals of this project. The result is a unique architectural expression for the Saskatchewan Drive Residence that provides an intentional and enriching student residential experience that is also contextual to East Campus Village.

A courtyard building typology has been employed to help create a sense of place and community for the students who will live at the Saskatchewan Drive Residence as well as a neighbourhood amenity for students in the East Campus Village. The programmatically rich main floor will engage both visually and physically with the courtyard and animate it throughout the year. Upper residence floors are ringed by a perimeter corridor and integrated student spaces. The glazed corridor will help reveal and connect the life within the building. The organization of the residence floors are based on 12 cohort groupings of 12 students. This organization is also expressed in the overall building massing as a composition of 6 interconnected housing blocks which reinforces the residential nature of the project. The fifth floor contains the City Room and provides inspirational space for social gatherings, lectures and seminars. Adjacent to the City Room is an exterior terrace. The terrace will provide overflow space for social gatherings or an informal social space during regular operations. To support the City Room's function as an event and gathering space a small servery will be located on the fifth floor. Finally, the Dining Hall is located at the eastern end of the site and addresses the City owned Adair Park. The Dining Hall will play an important day-to-day role as the primary food service for the Saskatchewan Drive Residence flex-space for programming as well as a special events that would include students beyond those in residence. Additional pre-function crush space has been provided outside of the Dining Hall to receive visitors and guests of students and visitors. An event entry has been included to provide convenience for guest drop-off adjacent to the Dining Hall.

## Sustainability

The Saskatchewan Drive Residence is targeting Green Globes certification for new construction to a level of 4 Green Globes. The project will incorporate sustainable strategies that employ durable and reliable sustainable technologies. The incorporation of renewable energies and other sustainable strategies will be explored and seek support from the University's Energy Management and Sustainable Operations.



# 1.0 Project Charter

The follow Schematic Design Report is intended to document the development of the project concept requirements into refined space parameters as well as concept design options against priorities and program objectives. The Schematic Design documents presented illustrate the functional relationships of key project elements as well as the Saskatchewan Drive Residence's scale and character.

## Project Goals:

- Supports the University's goal of accommodating 25% of the University's full-time enrolment on campus in purpose built student housing
- Support students' academic success, leadership development, engagement, recruitment, retention and enduring relationship with Alma Mater with a new attractive cohort residence
- Implement sector plan and provide smart growth development—reduce green house gas, integrate neighbourhood and enhance liveability
- Build financially viable project to enhance residence portfolio per resource stewardship while reducing deferred maintenance cost

The Saskatchewan Drive Residence will provide an impactful, and intentional residential experience. The key deliverables of the Saskatchewan Drive Residence include:

- 144 student residence beds in 1 and 2 bed unit configurations
- Residence units are arranged in forum configurations that will permit a cohort mix of 12 students, including one unit for a residence assistant
- A top floor gathering hall or City Room with a view of the River Valley, which will service to accommodate approximately 80 people for events, lectures, presentations and receptions
- The design shall meet University of Alberta accessibility and safety standards
- The design to meet a Green Globe, 4 globe sustainability standard
- The design needs to capture the spirit of Alberta and the West – past, present and future
- Easily recognizable, the design must be respectful to its program goals, prominent campus setting, the Province and the City
- The Saskatchewan Drive Residence, whilst providing reference to the history and tradition of the University, will build on the present and present a distinguished environment to foster leadership development



View of the Saskatchewan Drive Residence looking southeast towards the Urban Plaza and main entry

## 1.1 Opportunities and Challenges

The following are key opportunities and challenges presented by the Saskatchewan Drive Residence.

### Opportunities

- Innovative new building typology to support an innovative program without constraining property lines
- Provide pleasant and commodious interior design including welcoming entrances, natural light and functional social spaces for residents; integrating them with active outdoor spaces for the wider university community
- Sustainable design through building footprint, massing and efficiency while reducing parking requirements for North Campus
- Further develop East Campus Village into a safe, walkable, student-focused, vibrant neighbourhood that connects the campus to adjoining amenities
- Engage with the City of Edmonton's WinterCity Strategy

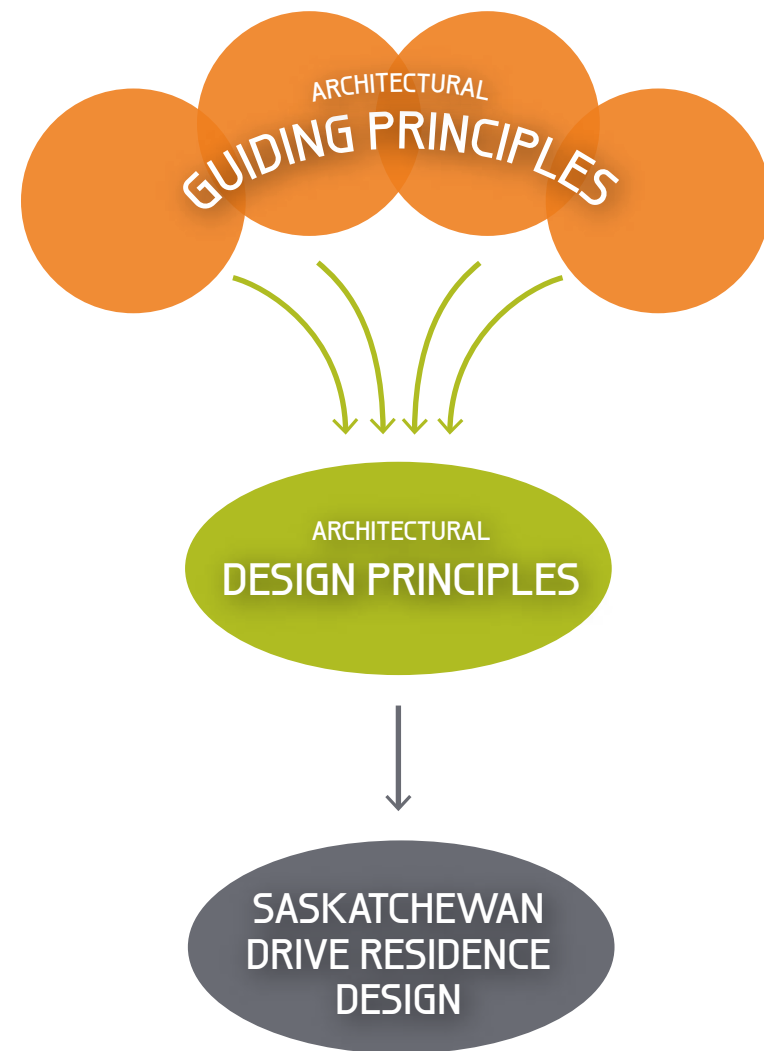
### Challenges

- Support an intentional but evolving interdisciplinary cohort community as academic, residential and operational programs are being developed and confirmed
- Balance functionality, flexibility, student life, capital cost, architectural design integrity, operations/maintenance cost and curb appeal
- Distribute a functional program that is necessarily flexible on an irregular site to satisfy design guidelines, sector plan and LRDP
- Exemplifying design excellence in contemporary architectural design vocabulary while being contextual and respecting the character of the Garneau neighbourhood and East Campus Village
- Not negatively impacting the quality of the surrounding natural landscape, including the City Owned Adair Park to the east of the Saskatchewan Drive Residence



## 1.2 Architectural Guiding Principles and Design Principles

Four key Architectural Guiding Principles were developed to guide a series of Design Principles, that direct the Schematic Design. The Guiding Principles are broad overarching goals for the project. The Design Principles are focused individual goals that draw from aspects of some or all of the Architectural Guiding Principles. They help establish a framework for the Schematic Design development, and ensure that project deliverables are maintained.



### 1.2.1 Architectural Guiding Principles

#### *Engaging the Identity of a Place*

"...we are laying the foundation of a university which will be for the benefit and upbuilding of the province as a whole."

—Dr. Henry Marshall Tory

This Principle proposes the goal to make connections between the University of Alberta, Edmonton and its River Valley implicit and realized in the Saskatchewan Drive Residence's architecture and programming. The project site's connection to the North Saskatchewan River Valley's natural and human history, and Edmonton's early settlement patterns needs to be express in the landscape and building design. Furthermore, the Saskatchewan Drive Residence needs to create a place with the East Campus Village. The project must integrate and support existing amenities, as well as prominent campus entry points.

#### *Interpreting the Context*

"A local pride does not exclude the rest of the world, or other experiences; rather it makes them possible. It creates an organizing centre. Or as Williams puts it, more radically: the acquiring of a local pride enables us to create our own culture-by lifting an environment to expression"

—Robert Kroetsch, The Moment of the Discovery of America Continues

This principle proposes a need for the design to draw upon the site's spectacular location to create a building that is at once an interpretation of the natural environment and of the political, social and cultural environment. It is at once inspired by and about Alberta, and about the world beyond Alberta. It is about both the particular and the universal.

#### *Creating a Third Place: Activate Community Building*

"The character of a third place is determined most of all by its regular clientele and is marked by a playful mood, which contrasts with people's more serious involvement in other spheres...they are the heart of a community's social vitality."

—Ray Oldenburg, The Great Good Place

This principle proposes a need to provide quality student oriented spaces within the Saskatchewan Drive Residence. These third places are social spaces separated from the two usual social environments of home and the workplace. They are the anchors of community life, and facilitate and foster broader interaction. The Saskatchewan Drive Residence should connect to and support adjacent amenities in East Campus Village and the surrounding community, like the North Saskatchewan River Valley, Adair Park and ECV Community Garden. Similarly, the project must make connections back to North Campus and support broader campus activities and programming.

#### *Transcending the Present: Traditional and Modern*

"We ought to realize that we cannot cut loose from tradition. We must use tradition as a guide and take from it the best that it contains as a lead for us in our work."

—Dr. Henry Marshall Tory

Leadership is progressive and oriented towards the future and the Saskatchewan Drive Residence need to reflect this stance while still integrating into the local context. The building should provide spaces that can lay the social, academic and cultural foundation to foster future leaders. The project's architecture should build on tradition in a modern way that is optimistic and forward thinking.





## 1.2.2 Architectural Design Principles

The following design principles were established to help provide a framework for the development of the Schematic Design.

### Courtyard Typology

A courtyard typology forms the basis for the project's overall organization and massing. The courtyard provides an outdoor space that belongs to the community, and the residents. A node that incorporates the importance of health and wellness, where students can socialize, study and learn.

### Single Loaded Corridor

A single loaded corridor forms the basis for the project's residence floor organization. As students move through the light-filled corridors, views of student's gathering in amenity spaces, and moving through the building and courtyard will be experienced, creating a sense of community and student wellness.

### Student Amenity Spaces

Student Amenity Spaces should contribute to and support the community that is created by the courtyard. Social activities should be on display to reinforce comradery among students.

### Dining Hall

Communal place for community building and providing a dining experience.

### AM & PM Activities

Activities on the main floor should be organized around AM and PM activities providing a rhythm and organization life within the residence.

### Cohort Organization

The cohort organization of 12 block of 12 units should be expressed in the overall massing of the building. This helps give identity to individual groups within the overall composition of the architecture.

### City Room

The City Room is a gathering hall located on the fifth floor of the Saskatchewan Drive Residence, it provides inspirational space for social gatherings, lectures and seminars that can help engage students and members of the community.

### Addressing Surrounding Context

The design of the Saskatchewan Drive Residence aims to be sympathetic to the surrounding context in terms of the University as well as the existing neighbourhood. The Residence should also reflect the infill nature of the East Campus Village.

### Sensitivity to Massing

Ensuring that the Saskatchewan Drive Residence's form and mass is well suited given the vernacular of the surrounding area. This is exemplified with the small scale units at street level, and the building stepping down to the South to allow light to flow into the courtyard.

### A Functional & Operational Building

Creating a building that is specifically designed to meet the requirements and operations of the University of Alberta.

### Creating Elements of Delight

The design of the Saskatchewan Drive Residence strives to create moments of delight both in and around the building for its residents and the community to enjoy on a daily basis.

### Student Interaction

The Saskatchewan Drive Residence is to be designed around the way student interact, work and socialize.

### Flexibility and Loose Fit

Employ a design philosophy that promotes long-term flexibility and adaptability. Materials, building systems and design solutions are developed to enhance versatility, durability and adaptive reuse potentials.





# 2.0 Site

## 2.1 Contextual Relationships

The Saskatchewan Drive Residence is located on the North Campus of the University of Alberta within Sector 8 or the East Campus Village. East Campus Village is located in the northeast corner of the North Campus and is the eastern gateway into the North Campus Academic area. As described in the Sector Plan, Sector 8 is to be developed as a vibrant and integrated student-residential neighbourhood while respecting the character of this mature neighbourhood. The Saskatchewan Drive Residence is identified within the Sector 8 Plan and its programming supports the goal to develop this part of campus with student residences.

The Saskatchewan Drive Residence's site is located on the northern edge of East Campus Village on one of the Sector's special sites. The site has the opportunity for direct views of the North Saskatchewan River Valley, Alberta Legislature and Downtown Edmonton. The views, however, can only truly be appreciated from above a typical fourth floor elevation. Below that height the views are camouflaged by the mature street tree canopy and river valley vegetation that is typical of East Campus Village.

Saskatchewan Drive separates the Saskatchewan Drive Residence site from the North Saskatchewan River Valley and represents both the northern boundary of our site and of the North Campus. It is used by neighbourhood and commuter traffic with vehicular flow one-way west. The current amendments proposed for the Long Range Development Plan recommend that Saskatchewan Drive become two-way traffic between 111th and 110th Streets.

The site is bordered by 90th Avenue to the south. It is identified as a major east/west connection through the East Campus Village and will represent an important pathway for students to and from the Saskatchewan Drive Residence. 90th Avenue can be characterized by its mature tree-lined boulevards and former single family residential houses.

To the west, the site is bounded by 111th Street which is identified within the Sector 8 Plan to be become an "Urban Boulevard" between Saskatchewan Drive and 87th Avenue. The intersection of 111th Street and Saskatchewan Drive also represents a major gateway entry into the North Campus. A piece of Garneau's history is a Manitoba maple tree planted originally in front of his cabin in 1874, which is now to the west of the site across 111th Street.

Lastly, to the east is Adair Park. A small City of Edmonton owned and maintained park that is outside of the University boundary. The Park is dedicated to Laurent and Eleanor Garneau who were among Edmonton's early settlers. A small cairn and plaque are located on the eastern tip of the park. Adair Park represents a unique opportunity for the Saskatchewan Drive Residence to once again connect to a piece of Edmonton's settlement history.



Site Photos from top to bottom: view of River Valley, view of the corner of Saskatchewan Drive and 111<sup>th</sup> Street, view of the corner of 111th Street and 90th Avenue, and view east down 90th Avenue



## 2.2 Sector Analysis

East Campus Village is unique as developments within this Sector need to respond to the University of Alberta's Design Guidelines for Infill Development. The Design Guideline's performance requirements are intended to establish a planning and design framework for development within East Campus Village. The Saskatchewan Drive Residence's Schematic Design will also need to respond to the Design Guidelines for Infill Development.

Unlike smaller infill projects within the East Campus Village, the Saskatchewan Drive Residence will occupy the entire site with Adair Park being its only neighbouring property. Although there is no existing houses on the site that will remain to help influence the design, efforts have been made to maintain the scale and general character of the existing neighbourhood. The Guidelines require that developments shall be made to transition scale from zones of lower height along 110th Street to higher heights on 111th Street. The Saskatchewan Drive Residence's massing does just that with the project's highest massing along the northern Saskatchewan Drive edge of the site which then steps down towards the residential development to the south with the lowest massing occurring adjacent to Adair Park. Similarly, transition zones should be incorporated into the facades avoiding large flat walls. The Saskatchewan Drive Residence's massing incorporating the cohort groupings allows each façade to maintain a residential character and breaks down the overall length of the building facades.

Ground floor guest suites are located along 90th Avenue to help maintain the streets residential character. As outlined in the Design Guidelines, transition spaces will be created between the street and the ground floor entries to the guest suites. This will be created through a layering and elevation change. Front porches and landscaping will create the separation between public and private realms.

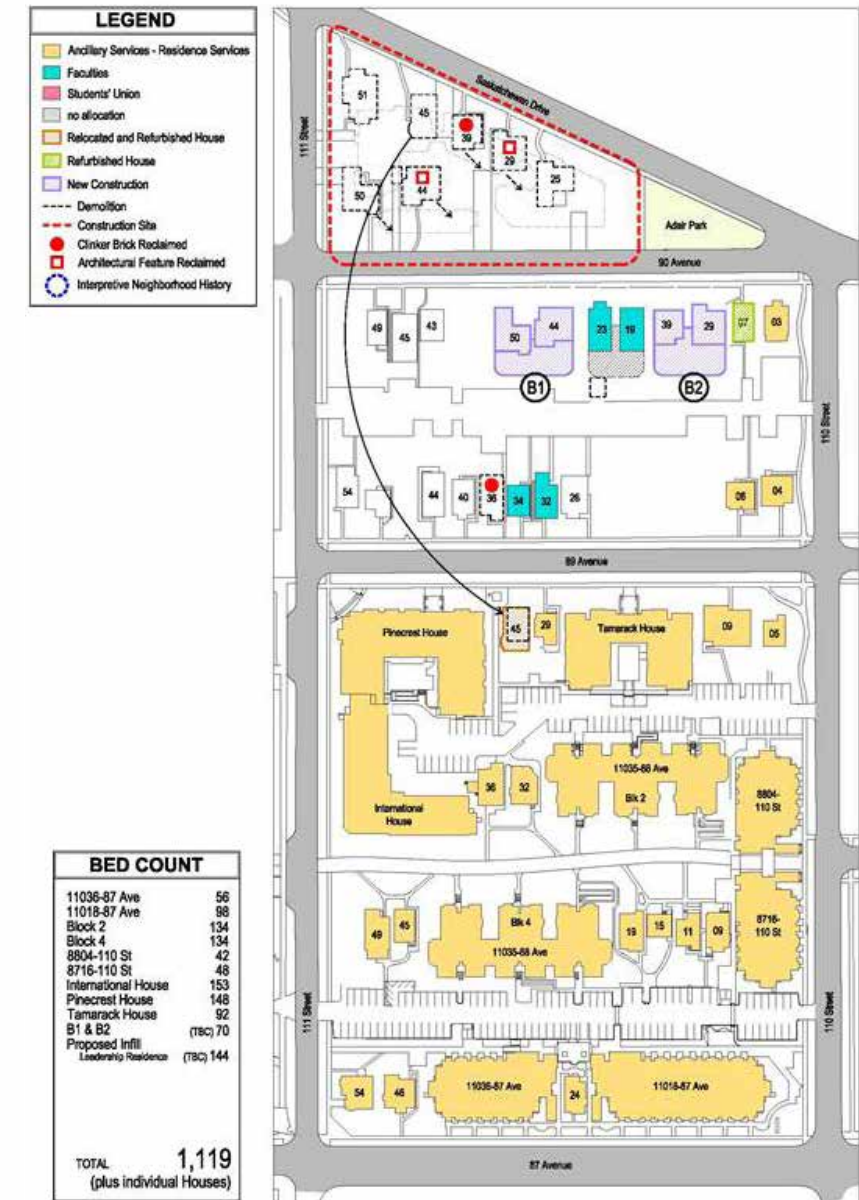
The Saskatchewan Drive Residence also supports the goals and principles outlined in the Sector 7 and 8 Plans. The project is also in alignment and accounted for in the East Campus Village Implementation Plan. Refer to the following set of planning diagrams to illustrate compliance with the Sector's overarching planning principles.

Site impacts outlined in the East Campus Village Implementation Plan include:

- 7 houses will be impacted per preservation plan and sector plan
- House #11045 Saskatchewan Drive will be relocated to 89 Avenue
- 6 houses - #11029 and #11039 Saskatchewan Drive, #11044 and #11050 - 90 Avenue, #11025 and #11051 Saskatchewan Drive will be removed
- Front facades of the former four houses will be replicated in 2 infill housing residences on 90 Avenue
- Houses to be removed are offered to interested parties to relocate off campus per house removal process and procedures

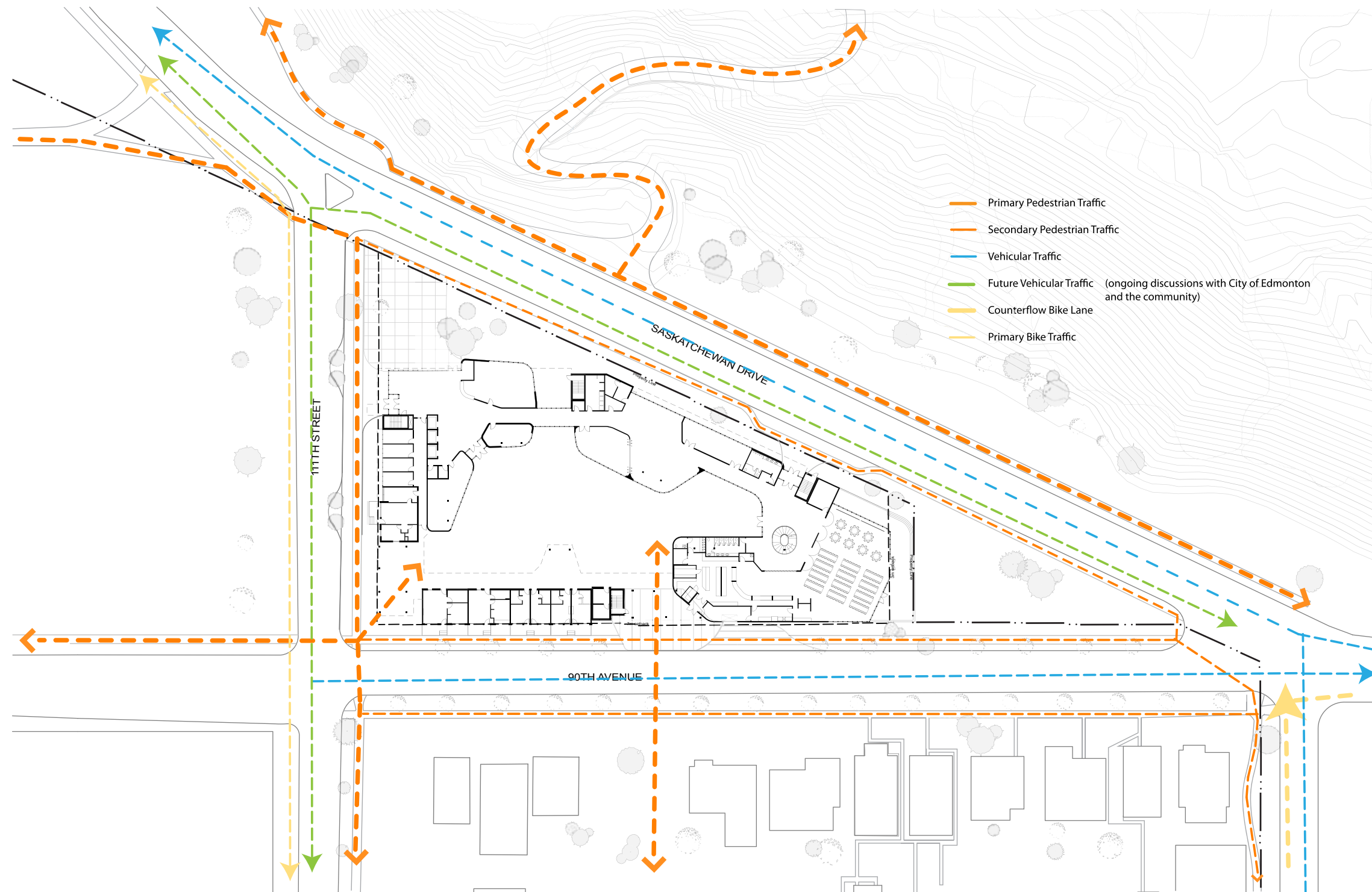


Sector 8 Plan



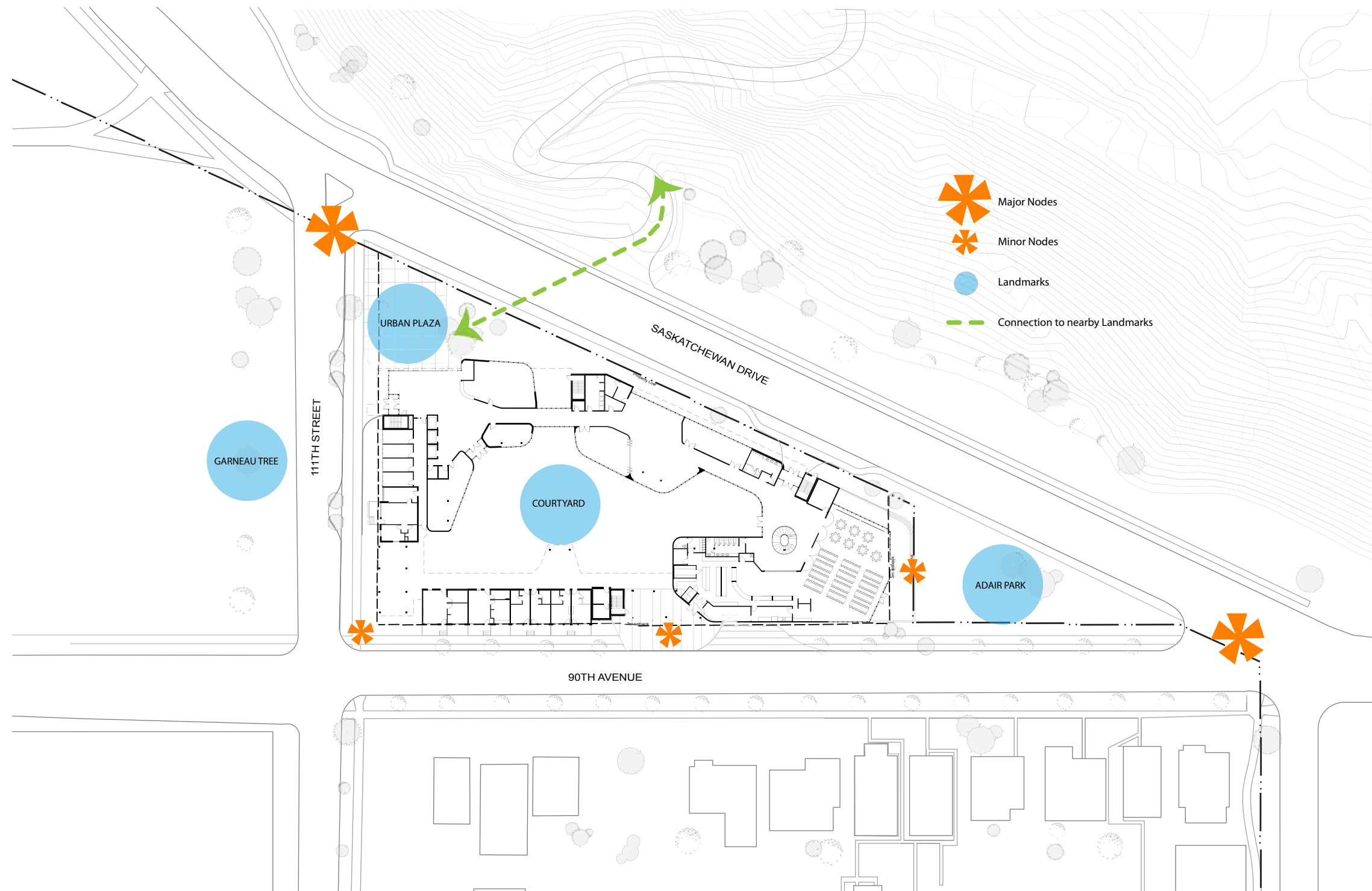
East Campus Village Implementation Plan





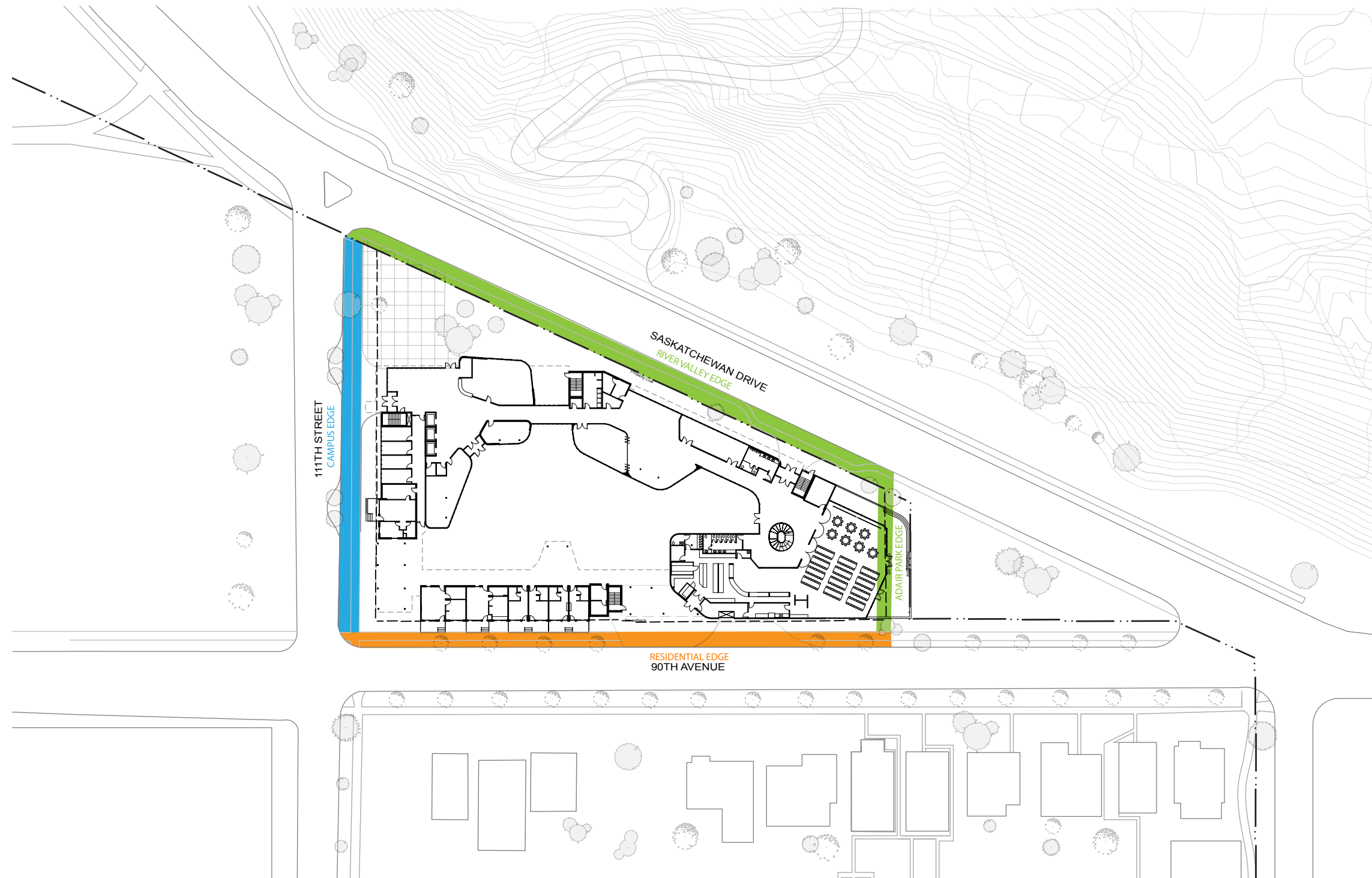
Saskatchewan Drive Residence Pathways Diagram





Saskatchewan Drive Residence Nodes and Landmarks Diagram



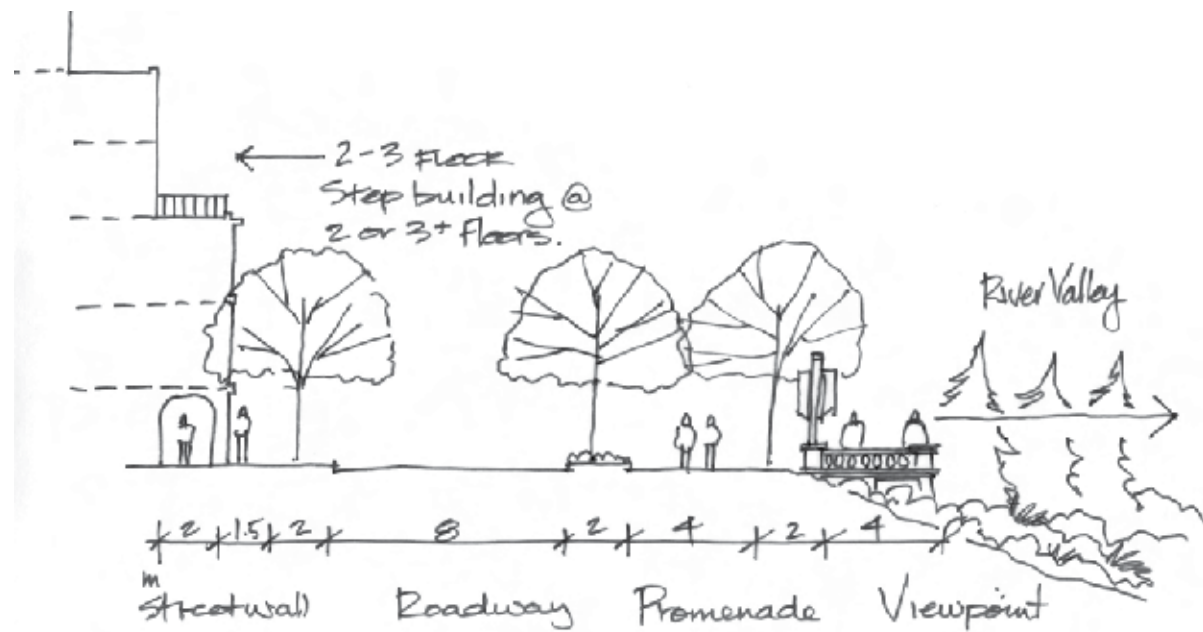


Saskatchewan Drive Residence Edges Diagram





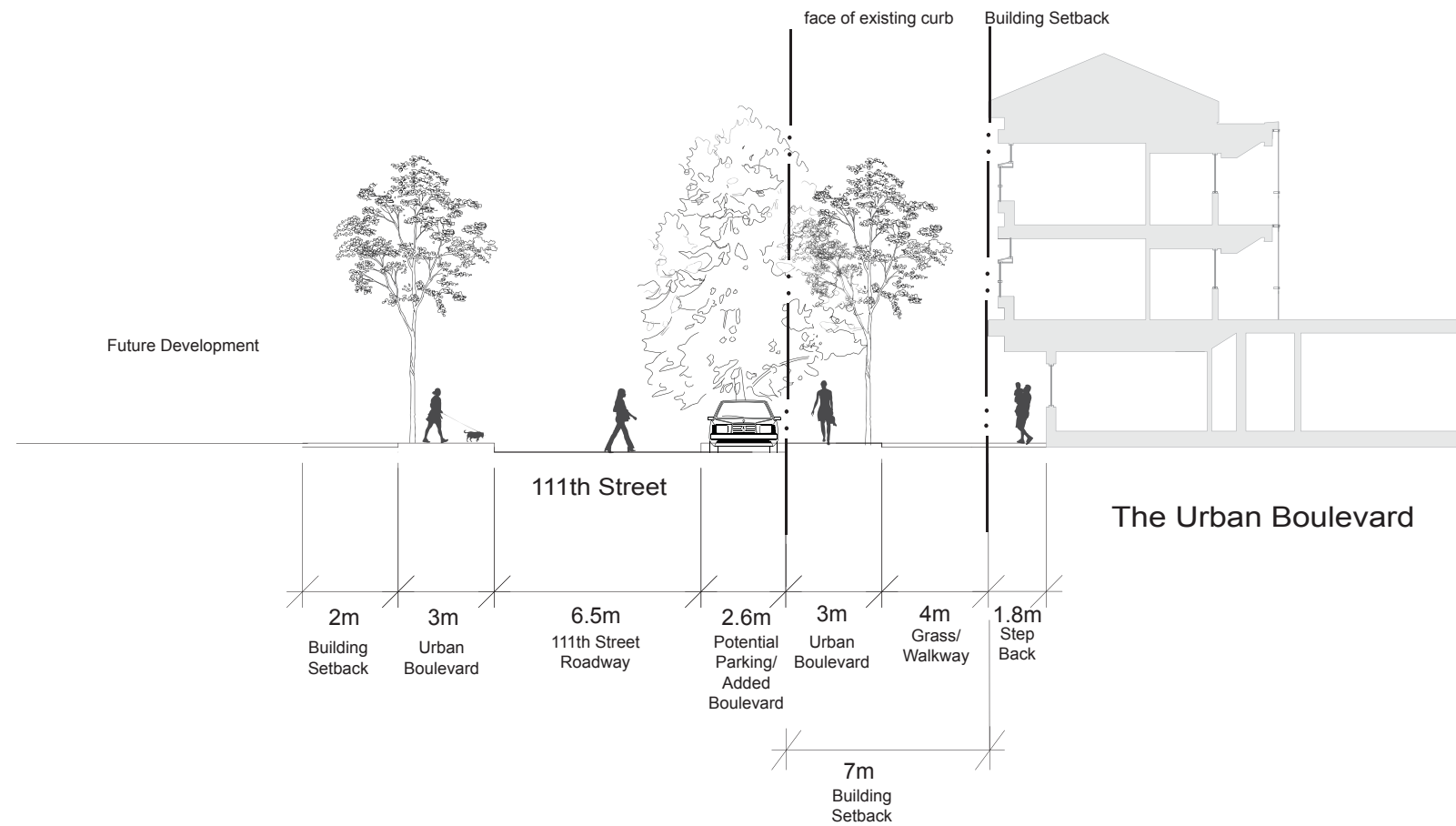
Proposed Saskatchewan Drive Residence Saskatchewan Drive Street Section



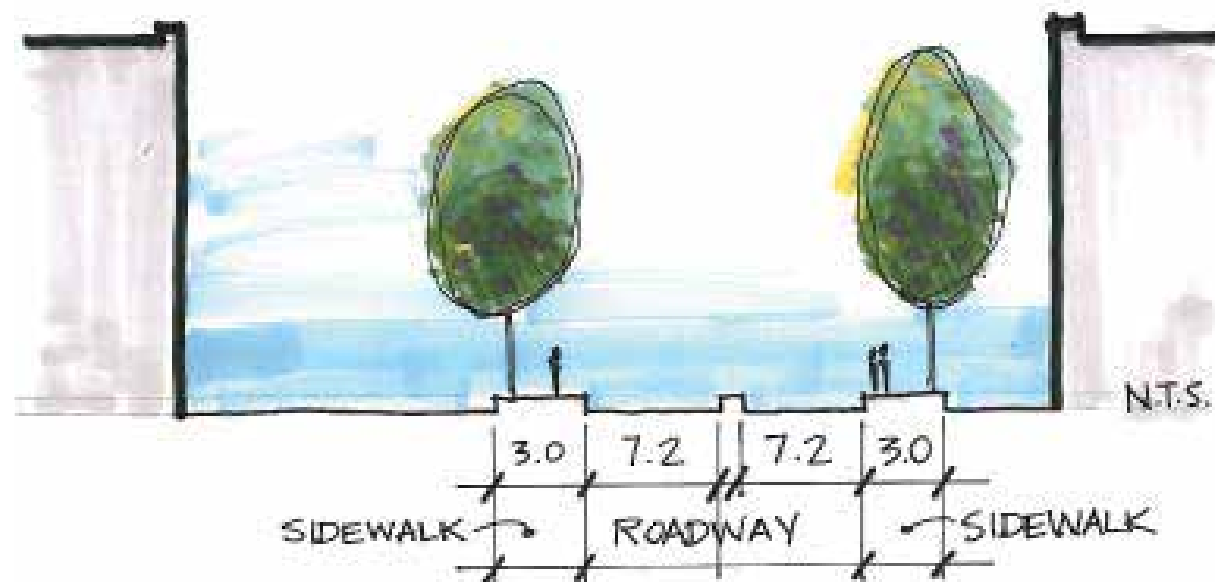
*Saskatchewan Drive to be developed in partnership with the City of Edmonton*

Proposed Sector 7 Saskatchewan Drive Street Section



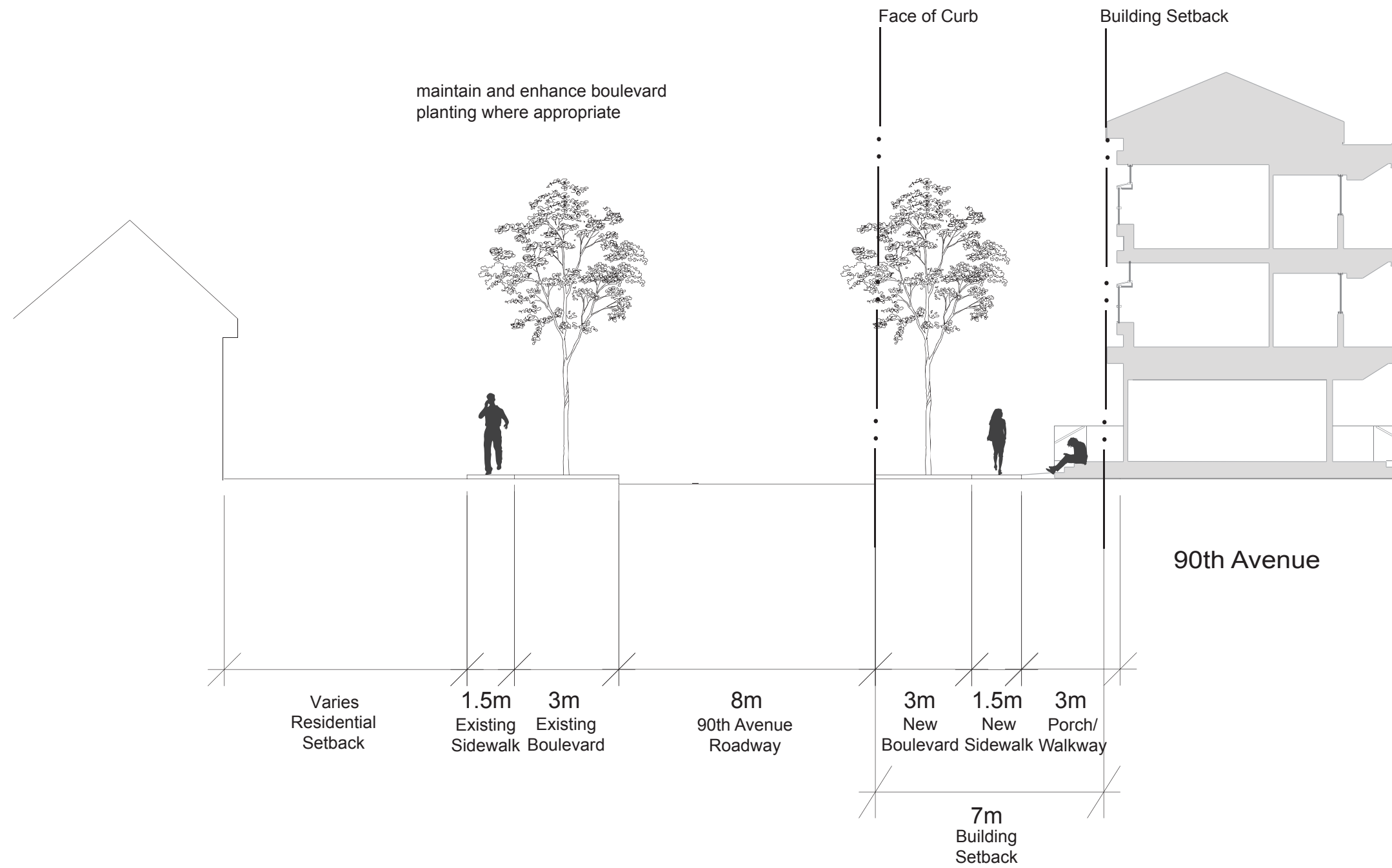


Proposed Saskatchewan Drive Residence 111<sup>th</sup> Street Street Section



Proposed Sector 7 111<sup>th</sup> Street Street Section





Proposed Saskatchewan Drive Residence 90<sup>th</sup> Avenue Street Section



## 2.3 Site Analysis

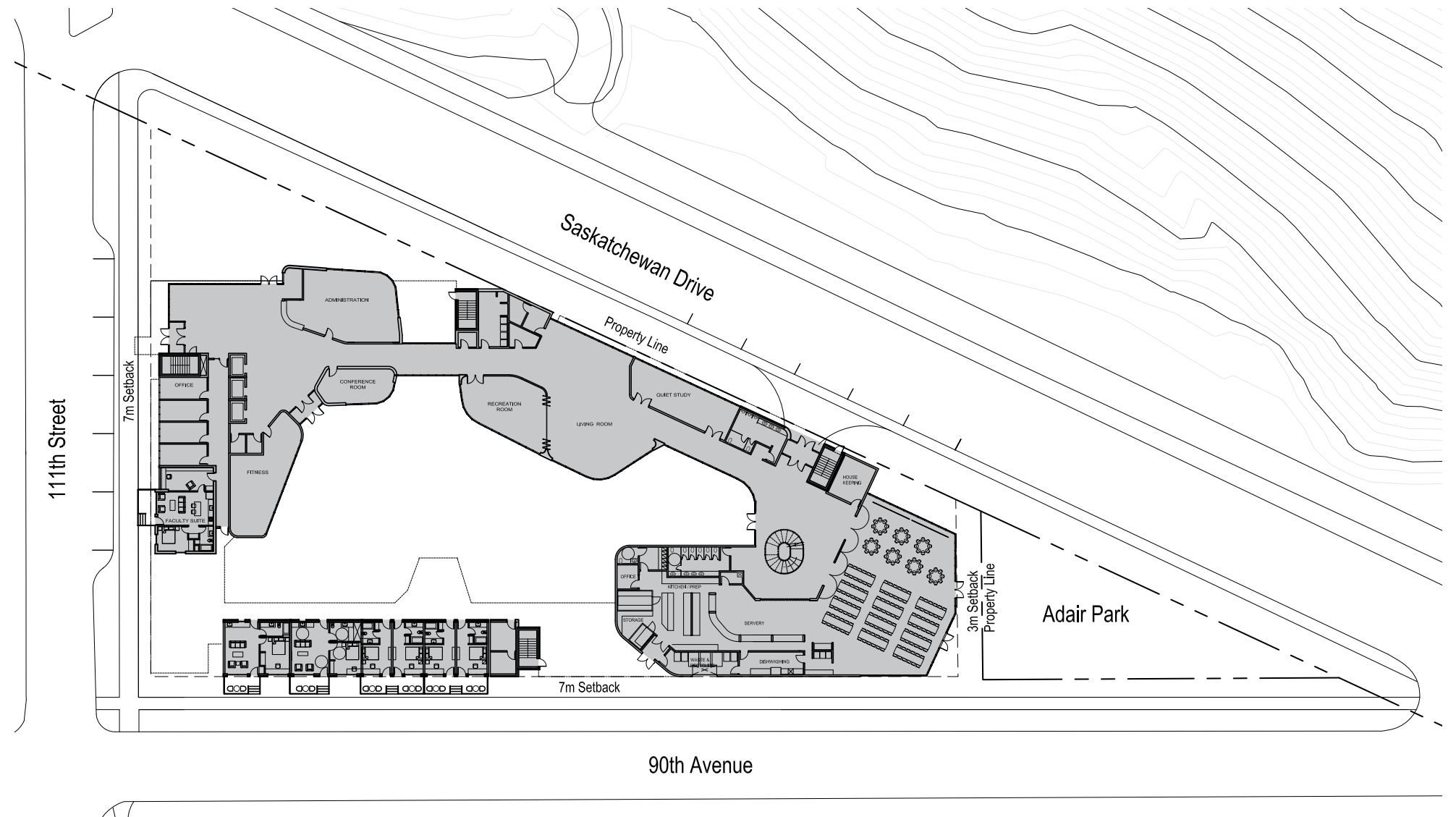
The response to environmental and site conditions are major considerations in the Schematic Design of the Saskatchewan Drive Residence. Edmonton is the most northerly major city in Canada and we are transforming ourselves into a proud winter city. The design needs to support these goals and provide opportunities to engage with the environment throughout the year.

The triangular shape of the block on which the site is located results in an eastern edge that is relatively short, a broader western edge and long edges on the south and north. This is an ideal shape and orientation to take advantage of solar access throughout the season. The mature deciduous street trees on 90th Avenue provide the ideal balance of enabling solar gain in the winter months while providing shade to southern building faces in summer.

The site is relatively flat, but does exhibit some relief, dropping approximately 2 meters from south to north at its most extreme. As one moves from east to west along Saskatchewan Drive there is a dip in the roadway and sidewalk approximately two-thirds of the way along the site. This will provide an elevated plaza and entry gateway on the corner of 111th Street and Saskatchewan Drive. As you move to the eastern end of the site the roadway and site become level allowing for an assessable event entry into the Dining Hall.

Access to daylight, and the building's ability to capture the sun's warmth and protect its occupants against our winter winds will make it accessible, safe and more enjoyable year-round. The building's orientation and configuration needs to create distinct micro-climates and sun traps that help extend the usability of outdoor environments. The courtyard building typology is ideal to create both a protected sun bathed exterior gathering space while fostering a sense of community.

Student and guest drop-offs will be provided on 111th Street and Saskatchewan Drive at the building's two primary entrances. The 111th Street drop-off needs to be integrated with the University's desire to implement an Urban Boulevard between Saskatchewan Drive and 87th Avenue. Similarly, the Saskatchewan Drive drop-off needs to be explored further with the City of Edmonton as they currently operate metered parking along Saskatchewan Drive.



Saskatchewan Drive Residence Site Plan



## 2.4 Landscape Plan

The landscape vision for the Saskatchewan Drive Residence will see the riverbank ecology wrap up from the banks of the North Saskatchewan River around and through the building, encompassing the entire site. The architecture and landscape will have a direct connection, allowing students, faculty and visitors to be immersed in the site; its beauty, seasonality, colour and texture. The landscape design will be a stylized reinterpretation of the North Saskatchewan River's morphology, mimicking its bends and undulations. Carved out depressions in the ground plane will form bioswales and rain gardens where storm water can be captured and allowed to percolate slowly into the ground. While mounded berms will offer visual interest and create intimate spaces and casual seating. An emphasis will be placed on plants and trees native to the North Saskatchewan River Valley ecology. The glazing of the architecture will mirror the surrounding river bank forest and the sky, marking the passing of time and season. A sinuous 'river' pathway will connect from the existing riverbank recreation trail to the north and weave its way around and through the site, and contributing to the River Valley Promenade described in the Sector 7 Plan. The pathway will be composed of a coloured cobble paver bordered by natural plantings. The landscape design will be barrier free; designed to accommodate people of all ages and ability.

A central courtyard has been designed to function as an extension of interior amenity space, offering spaces for contemplation, group discussions and study as well as Saskatchewan Drive Residence events. The courtyard viewed and accessed from the main floor will celebrate the seasons, providing a functional and aesthetically beautiful space 12 months of the year. The courtyard has been designed to provide microclimate amelioration, through the use of berms and trees and building orientation. Elements such as an outdoor fireplace will stretch the seasonal use of the courtyard into the shoulder seasons.

An urban pedestrian plaza at the north corner of 111th Avenue and Saskatchewan Drive will welcome people to the building and serve as a gateway to the north campus. A uniform paving strategy will extend from the plaza to the Saskatchewan Drive and 111th Street streetscape allowing the space to read as a unified ground plane. The existing street trees will be augmented with additional Ash and Elm street trees to reinforce the treed boulevards seen throughout the Garneau and East Campus Village. These tree lined boulevards form a significant part of the University's cultural landscape, and speak to the history, identity and character of the campus. A south corner plaza at 111th Avenue and 90th Avenue will flow seamlessly into the courtyard, connecting the Saskatchewan Drive Residence with the broader campus network.

Sustainable principles will guide the landscape design, inclusive of: paving SRI values; reduction of storm water run-off through the use of permeable paving and bioswales; the use of LED lighting; and the use of native and where possible drought tolerant plant material.

The landscape design will respond to and support various planning goals outlined in the Sector 7 and 8 Plans. These include:

- Providing a node at the intersection of 111th Street and Saskatchewan Drive in the form of a new Urban Plaza and campus gateway
- Provide a mid-block courtyard access that aligns with the Sector 8 mid-block pedestrian pathway
- Enhance the River Valley Promenade along Saskatchewan Drive as outlined in the Sector 7 plan
- Enhance and infill boulevard trees, where possible, along 111th Street to support the Urban Boulevard and 90th Avenue
- Provide an enhanced pedestrian corridor along 90th Avenue by providing a new sidewalk on the north side of the street





# 3.0 Architectural Considerations

## 3.1 Program Analysis

The following program summaries compare the preliminary program requirements provided during the RFP process, and the current Schematic Design program. The Saskatchewan Drive Residence contains 144 student residence rooms with a mixture of one and two bedroom units. In addition the Saskatchewan Drive Residence contains a diverse set of program elements that provide a wide range of student oriented amenity space. This diversity of program elements will help support positive social interaction, academic achievement and establish a sense of community.

The main floor primarily functions as an amenity level combining administrative functions with social and dining spaces. You enter the residence through a generous lobby space that overlooks the urban plaza space on the corner of 111th Street and Saskatchewan Drive. Directly off the lobby space students will have access to a conference room, modest fitness space as well as administrative and residence services offices. As you move further into the building along Saskatchewan Drive to start to engage with more student oriented amenity spaces, including a recreation room, living room and quiet study space. The main circulation spine of the main floor ends at the Dining Hall and event lobby. Additional main floor program elements include a faculty suite and 6 guest suites.

The upper floors of the Saskatchewan Drive Residence are dedicated to student residences which are located off of an interior corridor which wraps the courtyard space. The residence rooms are stacked for three floors on the north edge of the site and two floors and the west and south edge. Five student gathering spaces are located on the inside of the courtyard space allowing students to gathering in cohort groups while still feeling part of the broader residence community.

The top level is dedicated to the City Room; a flexible gathering space that can host a variety of different events. A small food staging area has been provided to add additional flexibility to the City Room's event offerings. An outdoor terrace area has been provided in association with the City Room to allow events to move outdoors and continue to engage with the views of the North Saskatchewan River Valley and Downtown Edmonton.

Recycling, waste handling and loading areas are located near the southeast corner of the residence on the main floor and are associated with the food preparation and storage areas for the Dining Hall. It is anticipated that major bulk food loading and storage will occur at Lister Hall with small more frequent deliveries being handled at the Saskatchewan Drive Residence. This will help reduce the size and scale of the loading area.

Overall both the net programmed area and total gross area increases as compared to the preliminary program provided during the RFP process. This is due to updates and refinement to programmed elements requirements as well as the overall nature of the courtyard and single loaded corridor design. The following is a summary of key planning updates:

- Expanded Dining Hall area to allow for increase capacity for dining and lecture style events
- Expanded Food Service and Waste management spaces to align with Dining Hall capacity and food delivery model
- Provided an additional elevator and expanded elevator lobby to help service the City Room during special events
- Provided a secure corridor to the residence service offices
- Added a servery space to the fifth floor to help support the City Room during special events
- Confirmed mechanical and electrical space allocations
- Provided a pre-function space outside of the Dining Hall to help support special events and larger gatherings of students and guests of the residence

### Preliminary Program per RFP

	Room Type	Area (SF)	# of Rooms	Capacity (Per Room)	Capacity (Total)	Revised Areas Addendum
Residence	Bedroom - Single	240	24	1	24	5760
	Bedroom - Double	395	60	2	120	23700
	Total		84		144	29460
	Guest Suites	500	4	1 or 2	up to 8	2000
Education	Forum Study/Social Rooms	400	12	12	144	4800
	Student Lounge	0	0	0	0	0
	Gathering Hall	1000	1	100	100	1000
	Conference Room	350	1	14	14	350
	Classroom					
Faculty	Resident Services	1000	1	9	9	1000
	Faculty Residences	750	1	1	2	750
	Faculty Offices	140	4	1	4	560
Food Serv.	Kitchen (Services/Storage)	900	1	9	9	900
	Dining Hall	3800	1	225	275	3800
	Café	300	1	3	3	300
	Café Storage	200	1	2	2	200
	Café Seating					0
Public	Fitness	800	1	17	17	800
	Recreation Student Lounge	725	1	36	36	725
	Quiet Study	650	1	36	36	650
	Lounge/Living Room	800	1	40	40	800
	Entry Lobby	375	1	8	8	375
	Computer Printing					
Facilities	Stairs	225	TBD			900
	Elevators	64	TBD			200
	Mail	150	1			150
	Washrooms - Men's	150	TBD			600
	Washrooms - Women's	150	TBD			600
Building Services	Mechanical	375	1			375
	Electrical	180	4	based on 4 floors		720
	Laundry (Incorporation into suite areas)	600	1			600
	Data/Telecome	180	4	based on 4 floors		720
	Building Storage/ Bike Storage	350	3			1050
	House Keeping	300	1	6	6	300
Trash/Recycling	75	4	based on 4 floors		300	
<b>TOTAL NET PROGRAMMED SPACE (SF)</b>						<b>54,985</b>
<b>ADDITIONAL CIRCULATION GROSS UP (+20%)</b>						<b>10,997</b>
<b>TOTAL BUILDING AREA (SF)</b>						<b>65,982</b>

### Schematic Design Program

	Room Type	Area (SF)	# of Rooms	Capacity (Per Room)	Capacity (Total)	Total Area (SF)
Residence	Bedroom - Single	187	21	1	21	3,927
	Bedroom - Barrier Free	258	3	1	3	774
	Bedroom - Double	357	60	2	120	21,420
	Subtotal		84		144	26,121
	Guest Suite - 1 Bedroom	612	1	1 or 2	2	612
	Guest Suite - Barrier Free	663	1	1 or 2	2	663
	Guest Suites - Hotel	330	4	1	4	1,320
Subtotal			6	8	2,595	
Education	Forum Study / Social Rooms	366	12	12	144	4,392
	Student Lounge	0	0	0	0	0
	City Room (Gathering Hall)	1,019	1	127	127	1,019
	Conference Room	350	1	14	14	350
Faculty	Resident Services	1,000	1	9	9	1,000
	Faculty Residences	793	1	1	1	793
	Faculty Offices	140	4	1	4	560
Food Serv.	Kitchen (Services/Storage)	1,984	1			1,984
	POD (Café)	87	1			87
	Café Storage	0				0
	City Room Servery	178	1			178
Dining Hall	3,334	1	200 dining 300 lecture	300	3,334	
Public	Fitness	800	1	17	17	800
	Recreation Lounge	725	1	36	36	725
	Quiet Study	650	1	25	25	650
	Lounge/Living Room	1,338	1	40	40	1,338
	Program/Social Space	5,395	1			5,395
	Pre-Function Space	1,457	1			1,457
Entry Lobby	2,220	1	20	20	2,220	
Facilities	Stairs	105	19			1,995
	Elevators	640	5			3,200
	Mail	123	1			123
	Washrooms - Men's	564	1			564
	Washrooms - Women's	546	1			546
Building Services	Mechanical	683	1			683
	Electrical	270	5			1,350
	Laundry	260	1			260
	Data/Telecome	155	5			775
	Bicycle Storage	605	1			605
	Building Storage	593	1			593
	House Keeping	300	1			300
	Trash/Recycling	75	3			225
<b>TOTAL NET PROGRAMMED SPACE (SF)</b>						<b>66,217</b>
<b>TOTAL GROSS BUILDING AREA (sf)</b>						<b>87,900</b>



### 3.3 Building Code Analysis

The Saskatchewan Drive Residence is a student dormitory for 144 students in addition to 6 guest suites and one professor in residence. The building houses dormitory rooms as well as common gathering spaces, a dining hall and a gathering space on the upper level.

- Building Height: 5 storeys + basement
- Building Area: 2,315 square meters.
- Facing three streets
- Non-combustible Construction
- Fully-Sprinklered

#### Applicable Building Code

The applicable code document is the Alberta Building Code 2006.

#### Major Use and Occupancy

- Group A, Division 2 – Assembly Occupancy (Recreation Centre and Library)
- Group C – Residential Occupancy

#### Occupant Load

The total occupant load for the Saskatchewan Drive Residence is 1,166 people. Please refer to Appendix B Alberta Building Code Calculations for a detailed breakdown by floor.

#### Classification and Construction Requirements

The major occupancies within the building are A-2 and C. The construction requirements for Group A Division 2 are the same as that for Group C (Per 3.2.2.24); given this the building has been classified per Group C article 3.2.2.43.

The building is classified per Article 3.2.2.43, Group C, up to 6 Storeys, Sprinklered.

3.2.2.43. Group C, up to 6 Storeys, Sprinklered

- The building shall not be greater than 7,200 sq.m. if 5 storeys in building height.
- The building shall be constructed of Non-combustible construction, and
  - Floor assemblies shall be fire separations with a fire-resistance rating not less than 1 hour,
  - Mezzanines shall have a fire-resistance rating not less than 1 hour,
  - Loadbearing walls, columns and arches shall have a fire resistance rating not less than 1 hour.

#### Limiting Distance

Limiting Distance Calculations & Minimum Construction Requirements for Exposing Building Faces

Per Tables 3.2.3.1.C. and 3.2.3.7.

West Face – 11 meters to centre of 111th Street

- Building Face Greater than 150 square meters
- 100% unprotected opening s permitted.
- No fire-resistance rating required.
- Wall can be constructed of combustible or non-combustible construction with combustible or non-combustible cladding.

North Face – 11 meters to centre of Saskatchewan Drive

- Building Face Greater than 150 square meters
- 100% unprotected opening s permitted.
- No fire-resistance rating required.
- Wall can be constructed of combustible or non-combustible construction with combustible or non-combustible cladding.

East Face – 3 meters to property line of park. As no building will be built on park over 10m.

- Building Face 68 square meters.
- 100% unprotected opening s permitted.
- No fire-resistance rating required.
- Wall can be constructed of combustible or non-combustible construction with combustible or non-combustible cladding.

South Face – 10 meters to centre of 90th Avenue.

- Building Face Greater than 150 square meters
- 100% unprotected opening s permitted.
- No fire-resistance rating required.
- Wall can be constructed of combustible or non-combustible construction with combustible or non-combustible cladding.

#### Interconnected Floor Space

An interconnected floor space need not conform to the requirements of Articles 3.2.8.3. to 3.2.8.9. provided the interconnected floor space consists on the first and second storey of the building per Article 3.2.8.2. provided the space serves only Group A, Group D, Group E and Group F Division 2 or 3 occupancies.

#### Fire Separations and Fire Resistance Ratings

- Residential suites shall be separated from each other and the remainder of the building by a fire separation with a 1 hour fire resistance rating as per article 3.3.4.2.(1). Closures shall be rated 45 minutes per table 3.1.8.4.
- Separation of Major Occupancies: A-2 to C occupancies shall be separated by a fire separation with a 1 hour fire resistance rating per table 3.1.3.1. Closures shall be rated 45 minutes per table 3.1.8.4.
- Exits – as per article 3.4.4.1. exits are required to be separated by a fire separation with a fire resistance rating of 1 hours. Closures shall be rated 45 minutes as per table 3.1.8.4.
- Elevator Hoistway: - as per Table 3.5.3.1. elevator hoistways are to be separated by a fire separation with a fire resistance rating of 1 hour.
- Vertical Service Spaces – as per article 3.6.3.1. and table 3.6.3.1. vertical services spaces are required to be separated by a fire separation with a fire resistance rating of 45 minutes.
- Janitor rooms – as per article 3.3.1.21.(3) janitor rooms are required to be separated by a fire separation with no fire resistance rating.
- Common Laundry Rooms – as per article 3.3.1.22.(3) common laundry rooms are required to be separated by a fire separation with no fire resistance rating.
- Storage rooms – as per article 3.3.1.26. and 3.3.4.2. storage rooms are required to be separated by a fire separation with a 1 hour fire resistance rating. Closures shall be rated 45 minutes as per table 3.1.8.4.

- Service Rooms – as per articles 3.6.2.1.(1) & (6) service rooms and fuel fired equipment services rooms are required to be separated by a fire separation with a fire resistance rating of 1 hour. Closures shall be rated 45 minutes as per table 3.1.8.4.
- Refuse Storage – as per article 3.6.2.5. the garbage room is required to be separated by a fire separation with a fire resistance rating of 1 hour. Closures shall be rated 45 minutes as per table 3.1.8.4.
- Cooking Equipment – As per article 3.3.1.2.(2) cooking equipment producing grease laden vapours shall be designed and installed in conformance with Part 6 of the Alberta Building Code 2006.

#### Exiting and Means of Egress

Means of Egress – As per article 3.3.1.5 – 2 means of egress are required where:

- Occupant load is over 60 people
- When the area of the room exceeds 200m<sup>2</sup>, or
- Where travel distance to an egress door exceeds 25m.

Distance between Exits – as per article 3.4.2.3. the least distance between two exits shall be one half the maximum diagonal dimension of the floor area, but not less than 9 meters.

Location of Exits – as per article 3.4.2.5 (1)(c) exits shall be located so that the travel distance to one exit is not more than 45m from any point within the floor area.

Exit Width – as per article 3.4.3.2.(1)

- Required exit width for doorways, corridors and passageways @ 6.1mm per person
- Required exit with for stairs @ 8mm per person.
- As per article 3.4.3.2.(8) the width of an exit shall not be less than 1,100mm for corridors and 800mm for doorways.

Please refer to Appendix B: Alberta Building Code Calculations for a detailed breakdown of Egress Capacities.

#### Washroom Calculations

Dining Hall & City Room Water Closet Calculations

- Water Closet Calculations per Table 7.2.2.6.B
- Occupant Load = Dining Hall (300) + Kitchen & Servery (21) + Fifth Floor (265) = 586 people = 293 of each sex.
- Required = 5 male; 7 female

#### Residential Common Space Water Closet Calculations

- Water Closet Calculations per Table 7.2.2.9
- Occupant Load = Entry (38) + Quiet Study (32) + Living Room (43) + Recreation Room (37) = 150 people = 75 of each sex.
- Required = 4 male; 4 female

Water closets for dormitory rooms and adjacent social spaces are provided in student residence rooms. 7 water closets are provided for every 12 occupants.

Total Required Water Closets in Common areas = 9 male; 11 female.

Total Provided Water Closets in Common areas = 8 male; 9 female; 3 unisex.



### Provisions for Fire Fighting

- Access route is required to the principal entrance & must be not less than 3m and not more than 15m from the closest portion of route to face of building, as per 3.2.5.5
- Access route must have clear width of 6m, centerline radius not less than 12m, overhead clearance of 5m, change of gradient not more than 1:12.5 over 15m, as per 3.2.5.6
- A fire hydrant is to be located to be not less than 45m from fire department connection, as per 3.2.5.16(1)
- The fire department connection shall be not less than 3m and not more than 15m from the principal entrance, as per 3.2.5.16(3)

### Barrier Free Requirements

The building design shall meet the requirements of Section 3.8 – Barrier Free Design.

- Not less than 50% of the pedestrian entrances shall be designed for barrier free access as per article 3.8.1.2 as outlined in 3.8.3.3.
- Barrier-free paths of travel shall be designed per article 3.8.1.3.
  - Unobstructed width not less than 920mm,
  - Walking surfaces shall be firm and slip resistant with no opening greater than 13mm in diameter, and be provided with sloped floors or ramps at changes in level more than 13mm.
  - The width of a barrier free path of travel that is more than 30m long shall be increased to not less than 1500mm for a length of 1500mm at intervals not exceeding 30m.
- Building controls including switches, intercoms, thermostats, and elevator controls that are intended to be operated by occupants and are located within the barrier free path of travel shall be mounted between 400 and 1200mm above finished floor as per 3.8.1.5.
- A barrier-free path of travel is not required to service rooms, service spaces, janitor rooms or roof spaces per 3.8.2.1.(2).
- A barrier-free path of travel shall be provided from the entrance to the exterior parking area per 3.8.2.2.(1)
- The parking area shall contain 6 designated parking stalls for use by persons with physical disabilities per Table 3.8.2.2. 6 designated parking spaces are provided.
- All doorways in barrier-free path of travel shall have clear width not less than 800mm, as per 3.8.3.3
- All washrooms in a barrier-free path of travel shall be barrier free, as per 3.8.2.3, 3.8.3.8 to 3.8.3.12
- Applicable to passenger-elevating devices, as per 3.8.3.5
- At least one shower stall in each group of showers shall be barrier free (not less than 1500mm wide & 900mm deep), as per 3.8.3.13
- Public counters shall have at least one barrier-free section not less than 760mm long, not more than 865mm above the floor, as per 3.8.3.14
- At least one barrier-free drinking fountain, as per 3.8.3.16

### Flame Spread Ratings of Interior Finishes

As per article 3.1.5.10

- Combustible interior wall finishes can't be more than 25mm thick and have a flame spread rating not more than 150 on any exposed surface
- Combustible interior ceiling finishes can't be more than 25mm thick and have a flame spread rating not more than 25 on any exposed surface
- Fire retardant treated wood in not more than 10% of the ceiling area is permitted to have a flame spread rating not more than 150

As per article 3.3.1.27.

- Drapes, curtains and other decorative materials, including textiles and films, used in a building shall meet the requirements of the Alberta Fire Code 2006.

### Fire Stopping

As per article 3.1.9.1 – Electrical and mechanical service penetrations through fire separations shall be sealed by a fire separation system that has an F rating when tested with CAN/ULC-A115 “Fire Tests of Firestop Systems”



### 3.4 Design Option

The massing and formal resolution of the Saskatchewan Drive Residence has been developed to address the East Campus Village Design Guidelines for Infill Development, the Sector 8 Plan, and the overarching Guiding Principles and aspirational goals of this project. The result is a unique architectural expression for the Saskatchewan Drive Residence that provides an intentional and enriching student residential experience.

#### Main Floor/Courtyard

The courtyard has been designed to create a sense of place and community for the students who will live at the Saskatchewan Drive Residence as well as a neighbourhood amenity for students in the East Campus Village. The courtyard will contain gathering spaces for small group gathering and for larger events. A warming element will be integrated into the courtyard to help extend its seasonal use and support group gatherings. In addition, the courtyard will be designed for ease of maintenance and operational simplicity. The programmatically rich main floor will engage both visually and physically with the courtyard and animate it throughout the day.

The main floor contains the majority of the student amenity spaces including; a recreation room, living room, quiet study space, modest fitness area and dining hall. Additionally, the main floor contains the administrative functions for the residence including; offices for residence services, a conference room and student office. Finally, the main floor also contains a faculty residence as well as guest suites for visitor to the University. This mixture of administrative, amenity and residence functions creates a vibrant main floor that provides opportunities for interaction and enrichment of student life.

Main floor program elements are clad in a rusticated brick with clear transparent glazed sections to ensure visual connected to the exterior. Brick was chose for its durability and ease of maintenance as well as its connection to the early residential architecture of the neighbourhood.

#### Residence Floors

The upper residence floors are ringed by a perimeter corridor and integrated student spaces. The glazed corridor will help reveal and connect the life within the building. Students will be able to see each other move around the building and they will see when various groups or individuals gather together in the integrated student spaces. The corridor itself will provide impromptu social gathering and student interaction opportunities with their abundant natural light and places to sit.

The organization of the residence floors are based on 12 cohort groupings of 12 students. These 12 groupings are distributed over three floors with five groups on the second and third floor with two on a fourth floor. The lower residence blocks are arranged on the south side of the building to allow sun to penetrate the courtyard while also placing the lower building scale adjacent to the residential scale of East Campus Village. Each residence room is articulated with an individual window seat which is expressed on the exterior as a series of bay windows. Each residential block is topped by a shallow pitched roof; the pitched roof references the surrounding single family residences but also provide enclosed roof space for mechanical services.

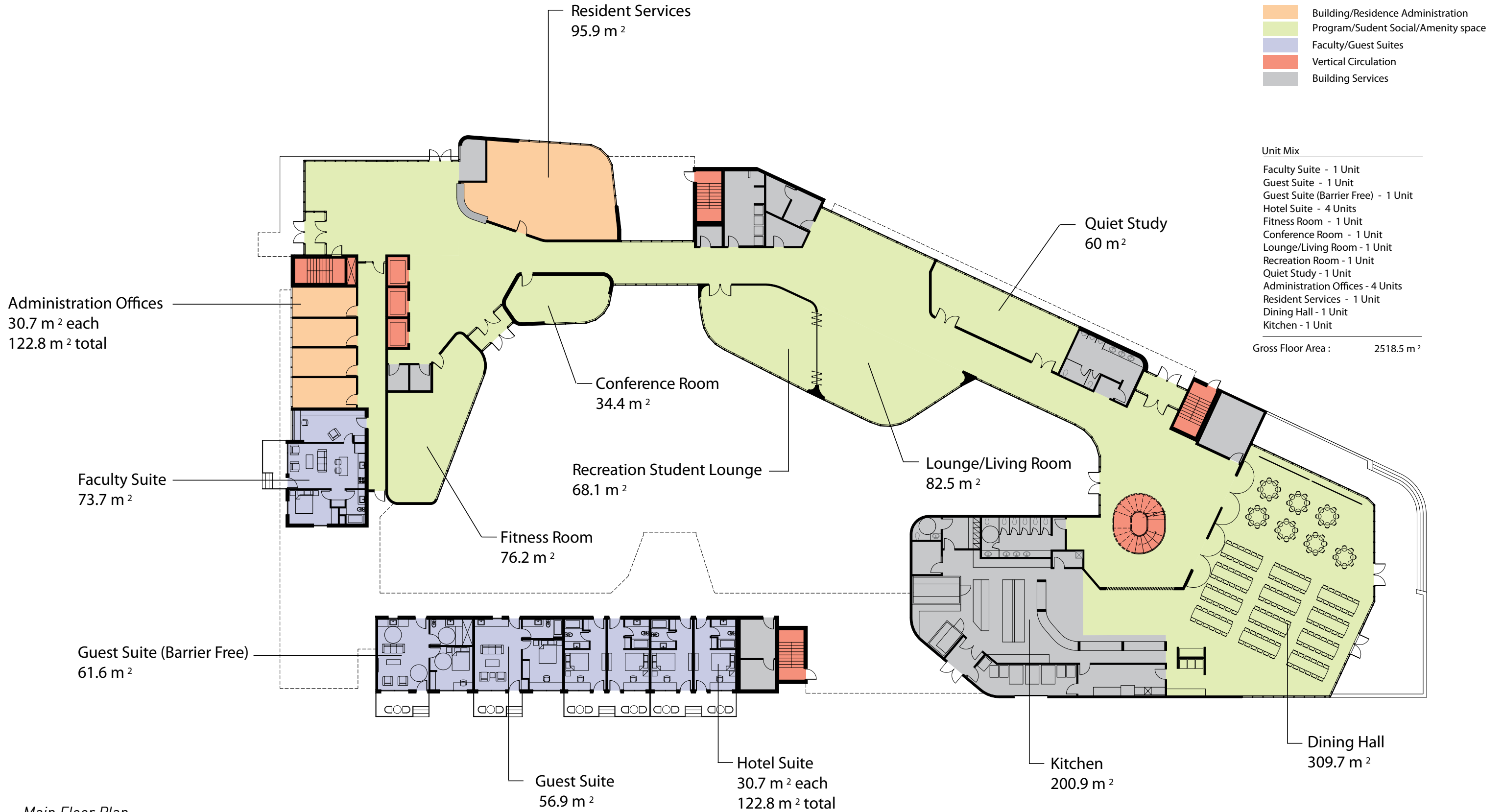
The residential blocks are clad in a zinc flat lock shingle. Zinc is a natural and durable material that will provide long term low maintenance for the facility. The shingle pattern will complement the running bond pattern of the brick main floor below. The insets within each residence block will be a bevelled fibre cement panel. The inlay of a plank siding gives expression to the individual blocks, while reinforcing the residential nature of these building components.

#### City Room

The City Room is a gathering hall and provides inspirational space for social gatherings, lectures and seminars. Located on the fifth floor in the northwest corner of the Saskatchewan Drive Residence, its location will enjoy panoramic views of the North Saskatchewan River Valley. Its long roof overhangs will emphasise the horizon and relate to our prairie landscape. Adjacent to the City Room is an exterior terrace. The terrace will provide overflow space for social gatherings or an informal social space during regular operations. The terrace will have direct access from the City Room as well as the adjoining public corridor. To support the City Room's function as an event and gathering space a small servery will be located on the fifth floor. This will allow hors d'oeuvre and drink service in the City Room. The servery will not be designed to allow for plated food service in the City Room.







Main Floor Plan





Second Floor Plan





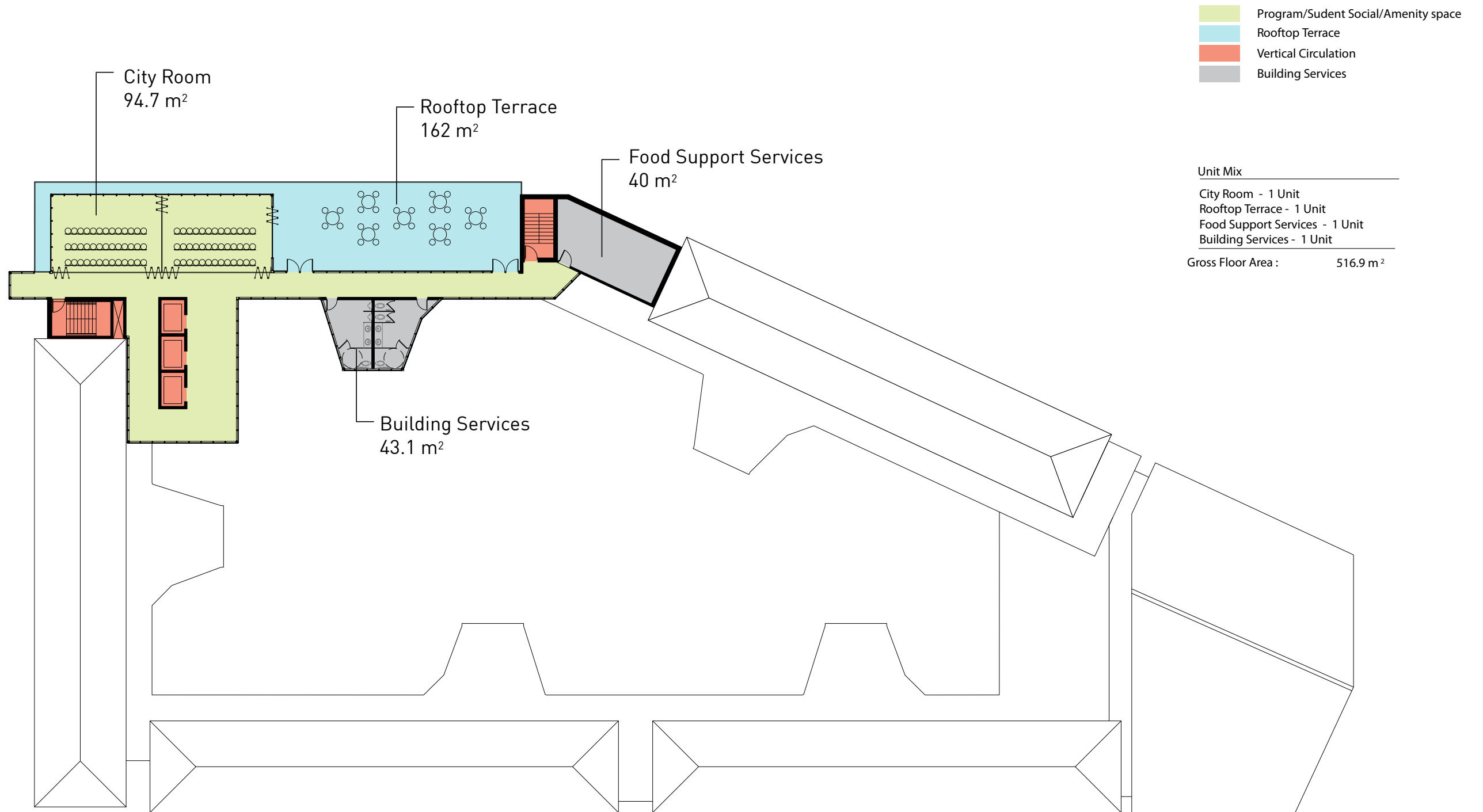
Third Floor Plan





Fourth Floor Plan

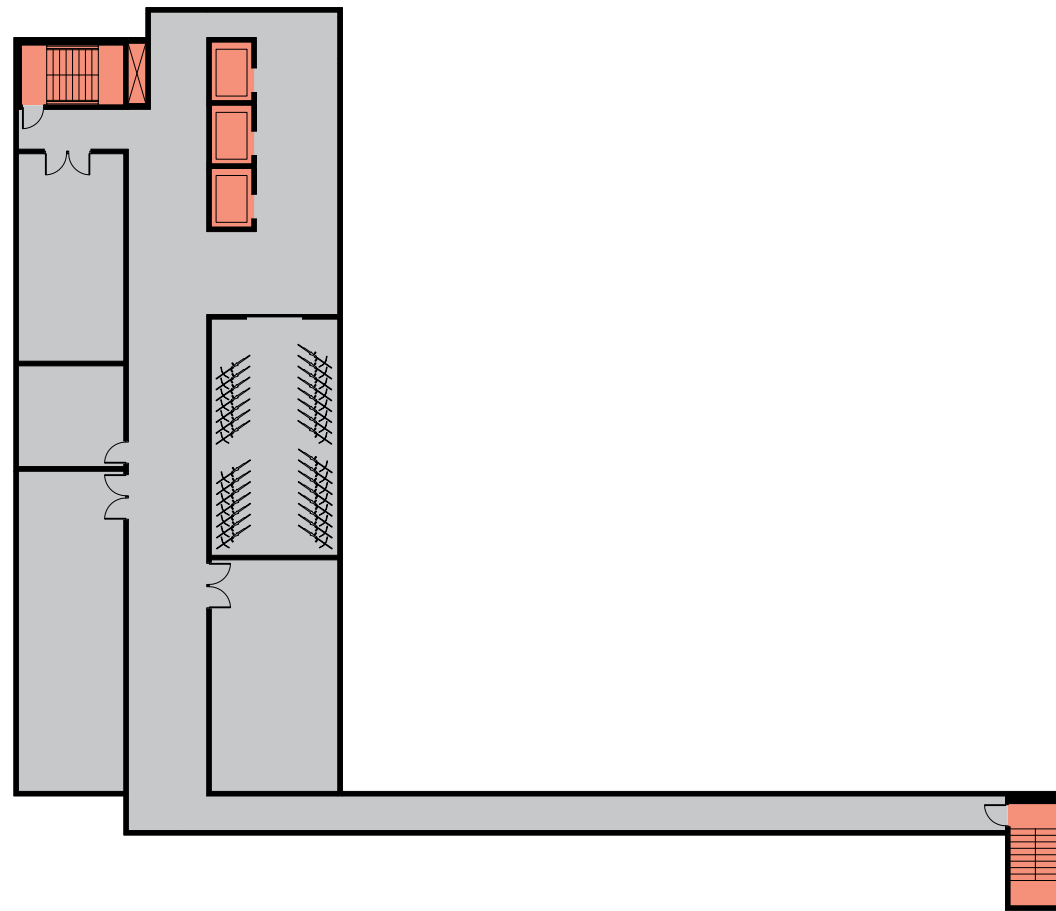




Fifth Floor Plan

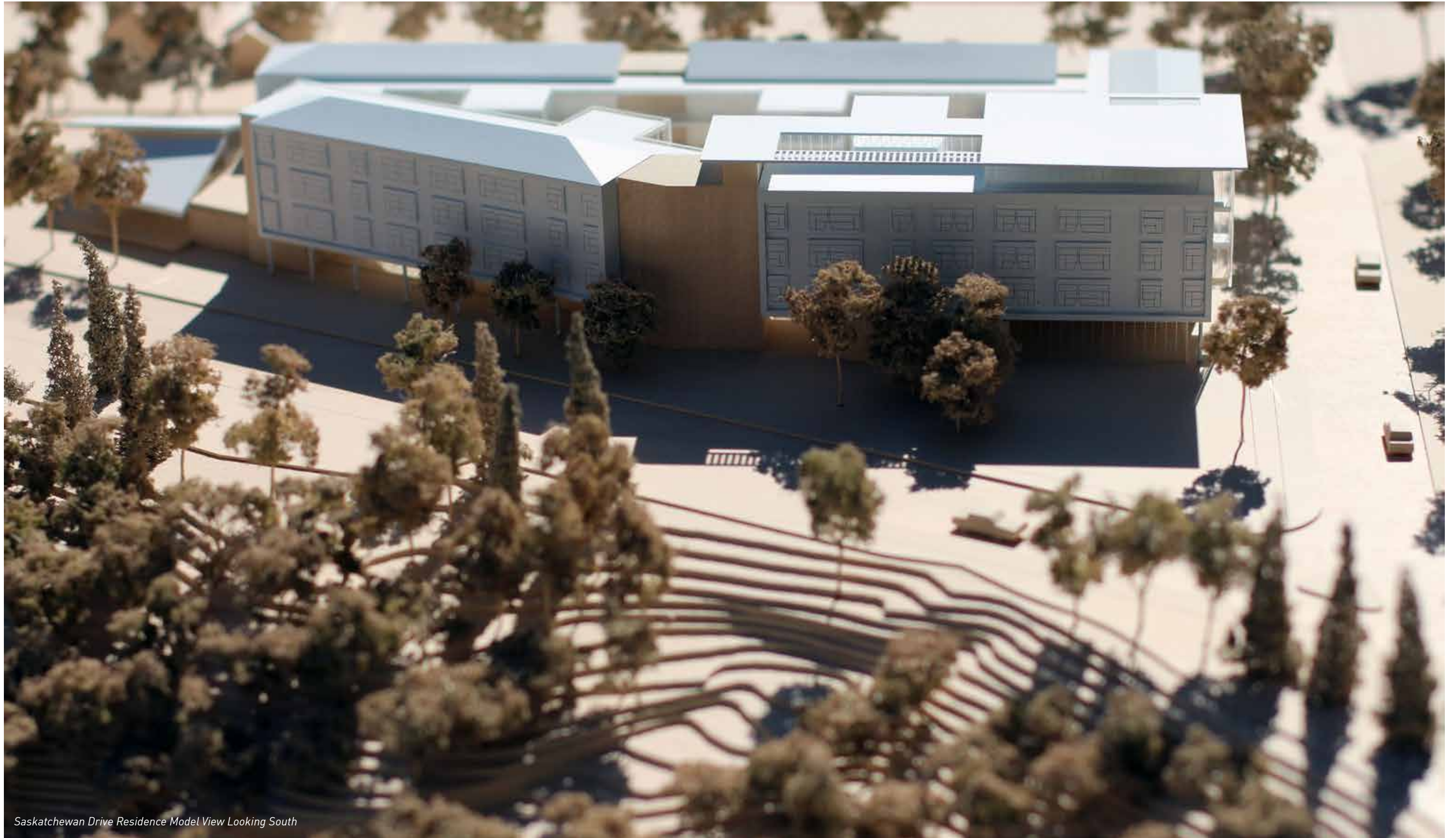


Vertical Circulation  
Building Services



*Basement Plan*





*Saskatchewan Drive Residence Model View Looking South*





*Saskatchewan Drive Residence Model View Looking East*





*View of Urban Plaza from Saskatchewan Drive*



*View from the Corner of 111<sup>th</sup> Street and 90<sup>th</sup> Avenue Intersection*





*View of the Courtyard from the 90<sup>th</sup> Avenue Entry*



*View of the Courtyard from a Student Amenity Space*



## Dining Hall

The Dining Hall anchors the eastern end of the site and addresses Adair Park. The Dining Hall will play an important day-to-day role as the primary food service for the Saskatchewan Drive Residence as well as a special ceremonial role that would include students from all over campus. Additional pre-function crush space has been provided outside of the Dining Hall to handle the influx of students and visitors. An event entry has been included to allow for guest drop-off adjacent to the Dining Hall. The pre-function space will also have a direct connection to the courtyard.

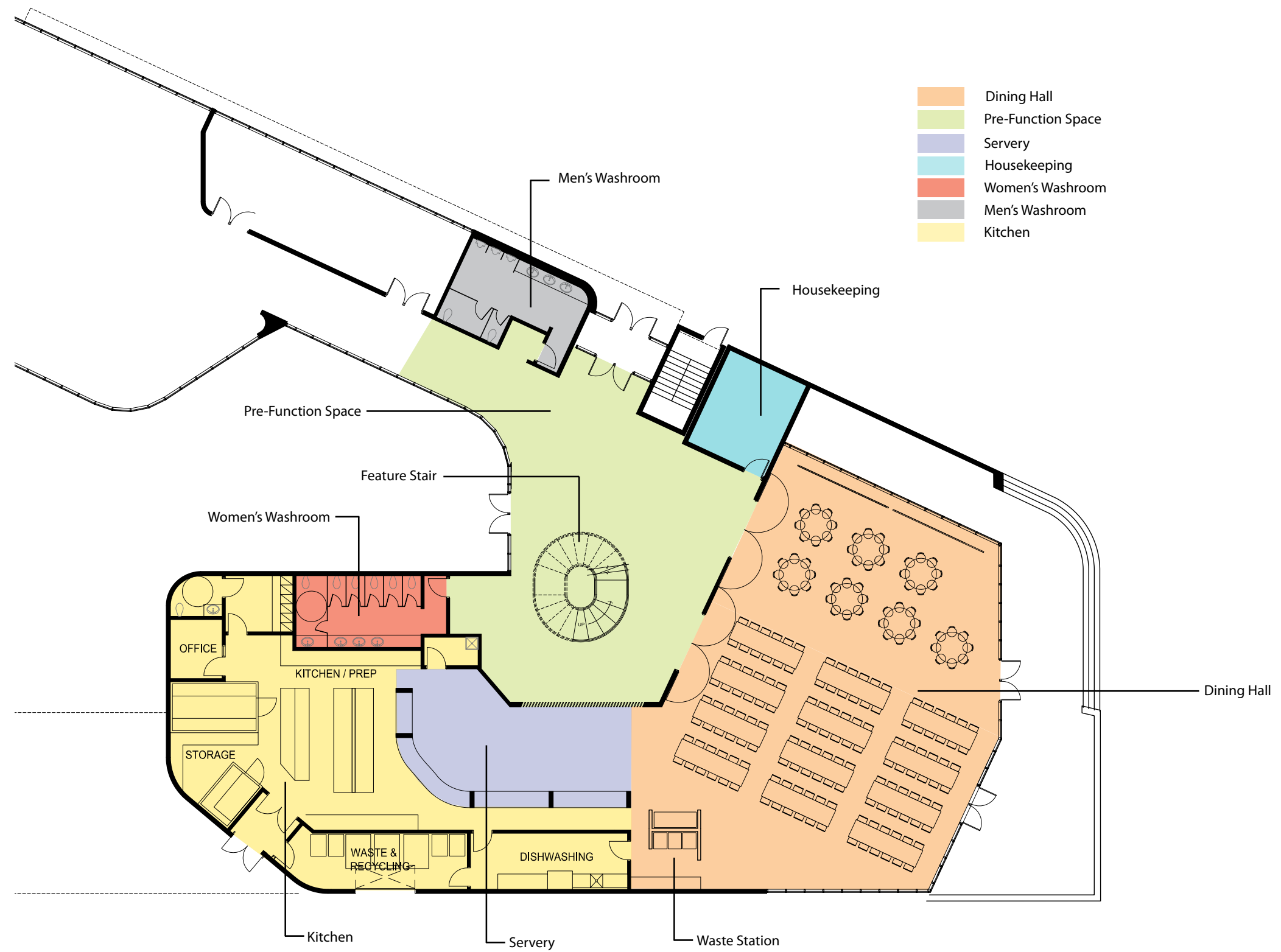
Consisting of two large roof planes, the Dining Hall's exposed wood structure will create a warm and welcoming environment. Its lower massing and residential roofline will integrate with the adjacent neighbourhood while providing a buffer to the taller building massing along Saskatchewan Drive. Roof overhangs will extend out into the landscape and provide cover for an exterior patio space.

It is assumed that Lister Hall will be the commissary and staging area for food deliveries and some food preparation. Food will be brought to the Saskatchewan Drive Residence via smaller cargo vans. This will reduce the storage and loading requirements at the Saskatchewan Drive Residence allowing them to better integrate into the 90th Avenue streetscape. Product arriving to the Saskatchewan Drive Residence will have been unboxed at Lister Hall. Vegetables can be washed and placed in plastic containers with the containers being returned to Lister Hall daily. This would reduce the cardboard storage and recycling requirements within the Saskatchewan Drive Residence, stream lining food preparation.

Waste and recycling areas will be equipped with pulped food bins, recycling bins for bottles and cans, and barrels for oil. Pulped food bins will be transported to the composting location every other day and oil bins will be removed as needed.









### Unit Design

The Saskatchewan Drive Residence's suite design needs to support social interaction, academic achievement and foster a sense of community. The residence includes 144 one and two bedroom suites which are aggregated into 12 cohort groupings of 12 students. Additionally, one faculty suite, and six guest suites are provided on the main floor. The six guest suites are divided into two one bedroom long stay suites and four hotel style suites for shorter stays. Each guest suite and the one faculty suite have direct street access to help provide activity and reflect the infill nature of the East Campus Village. One barrier-free suite is provide on each floor that compiles with both the Alberta Building Code requirements as well as residence services recommendations.



Typical Two Bedroom Unit

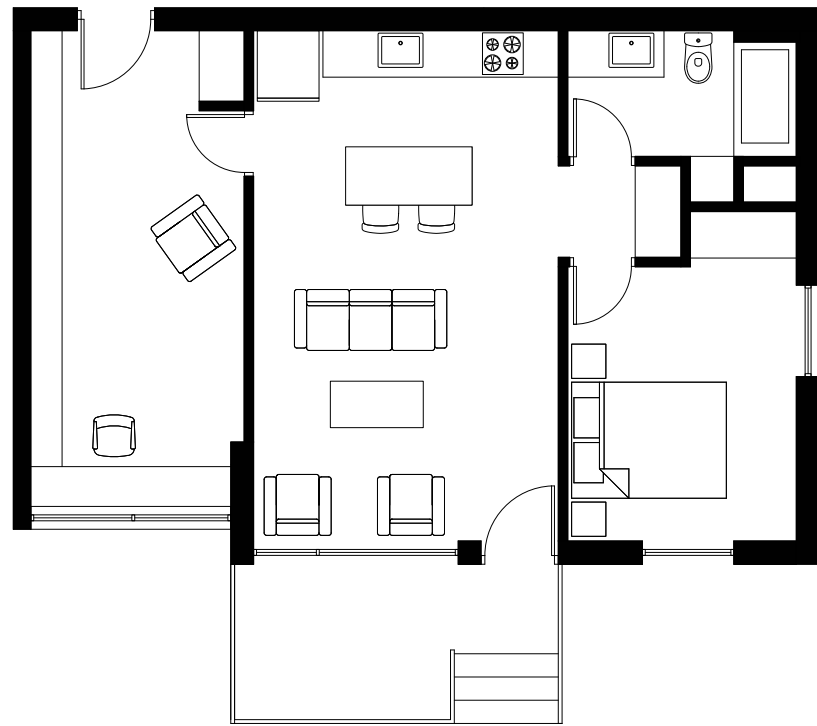


Typical One Bedroom Unit

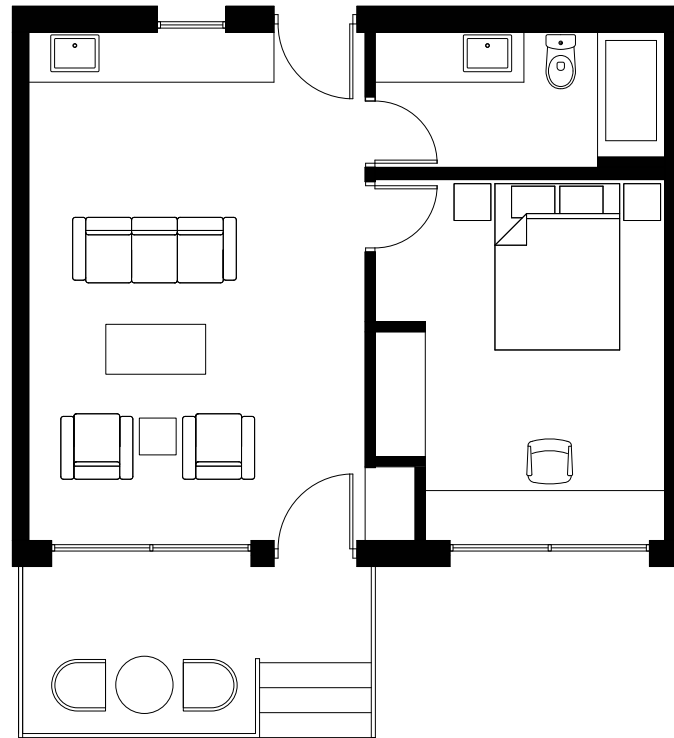


Typical One Bedroom Barrier Free Unit

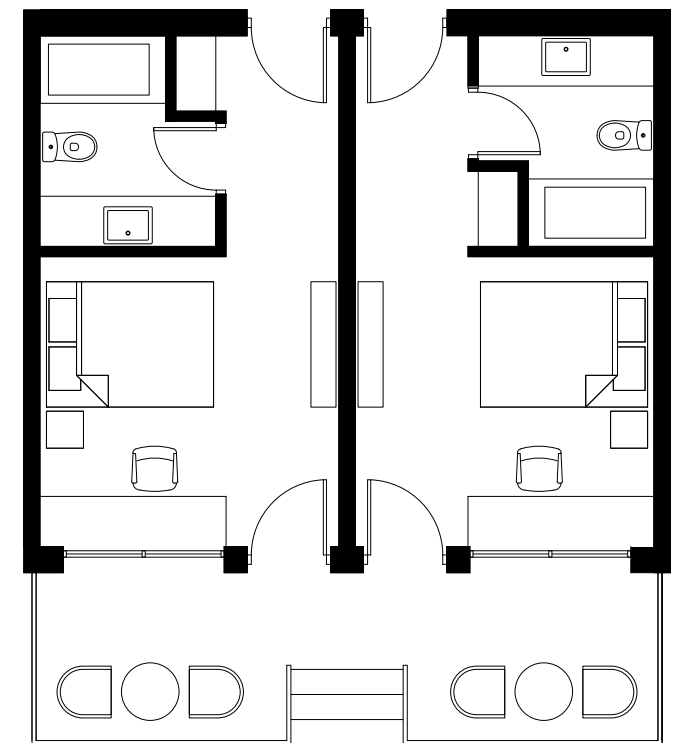




Faculty Suite



1 Bedroom Guest Suite



Hotel Guest Suite



## 3.5 Sustainable Design Concepts

The Saskatchewan Drive Residence is targeting Green Globes certification for new construction in Canada. The University has prescribed a target of 4 Green Globes which requires achieving 70 to 84% of the possible points, and indicates leadership in terms of energy and environmental design practices and commitment to continuous improvement and industry leadership.

Sustainable priorities for the Saskatchewan Drive Residence include:

- Creating a benchmark for sustainable design for University residences
- Showcase and make apparent sustainable strategies to students and guests of the Saskatchewan Drive Residence
- Explore the incorporation of renewable energies with support from the University's Energy Management Program group
- Employ durable, and reliable sustainable technologies
- Employ appropriate technologies that allow cost effective maintenance
- Reduce resource use and operating costs
- Explore sustainable strategies that can be supported by the University's Energy Management Program including, triple glazing, increased R-value, ventilation heat recover, drain water heat recover, metering and integrated photovoltaic panels

Please refer to Appendix A for a preliminary Green Globes checklist outlining points which the design team have identified as achievable, possible and not achievable.

## 3.6 Architectural Standards

Specific building materials and finishes have been selected which build on the Guiding Principles and design intent outlined in the Project Charter. The materials and building assemblies have been specified for their durability, low maintenance and overall energy performance. The exterior materials have also been selected to support the design aspirations of East Campus Village. The final building assemblies will be determined in conjunction with energy model testing to ensure they meet the projects energy targets in regard to Green Globe certification.

Various building materials and assemblies are proposed for the basis of design for the Saskatchewan Drive Residence; including but not limited to the following assemblies:

### Glazing Assemblies

(G1) Curtain Wall Glazing System

- Double glazed sealed units, c/w low-E costing on low-iron glass, in aluminum thermally broken framing system
- Horizontal sunshades are proposed for south facing curtain wall.
- A triple glazed sealed units are being explored based on the project's ability to secure EMP funding
- Operable windows visually frameless (Kawneer GLASSvent or equal)

### Exterior Wall Assemblies

(W1) Zinc Shingle Walls

- Flat lock zinc shingle
- 100mm semi-rigid mineral fibre insulation
- 100mm horizontal z-girts spaced to suit
- Self-adhering flexible membrane air/vapour barrier
- 13mm fibreglass mat gypsum sheathing
- 152mm steel studs
- 16mm abuse-resistant gypsum board

(W2) Residence Block Infill

- Horizontal fibre cement cladding
- 100mm semi-rigid mineral fibre insulation
- 100mm horizontal z-girts spaced to suit
- Self-adhering flexible membrane air/vapour barrier
- 13mm fibreglass mat gypsum sheathing
- 152mm steel studs
- 16mm abuse-resistant gypsum board

(W3) Brick Walls

- 92mm Face Brick Norman, (Iron sport or hand formed clay brick)
- 25mm air space
- 100mm semi-rigid mineral fibre insulation
- 100mm horizontal z-girts spaced to suit
- Self-adhering flexible membrane air/vapour barrier
- 13mm fibreglass mat gypsum sheathing
- 152mm steel studs
- 16mm abuse-resistant gypsum board

(W4) Walls Below-grade

- Geotextile drainage layer
- 75mm polystyrene rigid insulation
- Hot rubberized asphalt waterproof membrane
- Cast-in-place concrete foundation wall
- 25mm air space
- 152mm steel studs
- 16mm abuse-resistant gypsum board

### Roof Assemblies

(R1) Zinc Shingle Roof (sloped)

- Flat lock zinc roof shingles, on thermal clips
- 200mm low density mineral fibre batt insulation
- Self-adhering flexible membrane air/vapour barrier
- 13mm fibreglass mat gypsum roof board
- 38mm structural steel roof deck on steel structure

(R2) Flat Roof

- 1ply SBS thermofusible cap sheet on
- Factory applied base sheet
- 13mm fibreglass mat gypsum roof board
- 170mm polyisocyanurate rigid insulation

(R3) w/ soffit

- 1ply SBS thermofusible cap sheet on
- Factory applied base sheet
- 13mm exterior fibreglass mat gypsum roof board
- 170mm polyisocyanurate rigid insulation
- Aluminum sub-framing to suit
- Composite metal panel soffit c/w venting and insect screen

### Interior Partitions

(P1) Interior Partition

- 16mm abuse-resistant gypsum board
- 92mm steel stud framing
- 16mm abuse-resistant gypsum board

(P2) Interior Partition w/ acoustic rating

- 16mm abuse-resistant gypsum board
- 152mm steel stud framing to underside of structure
- 150mm sound absorbing fibre-glass insulation
- 2 layers – 16mm abuse-resistant gypsum board

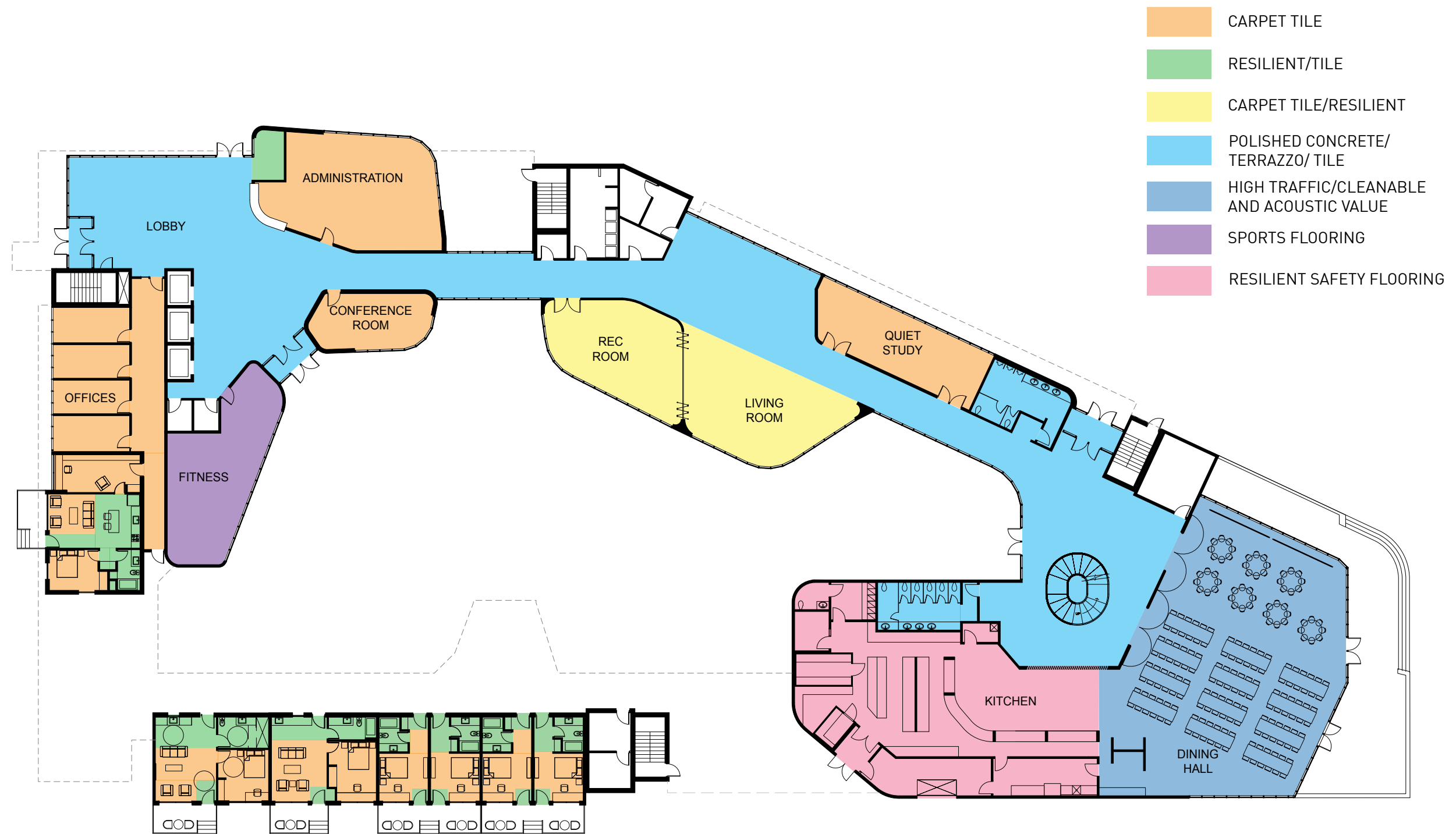
### Ceilings

- Gypsum board finished ceiling are proposed in all public spaces
- Suspended acoustic ceiling tiles in food preparation and back-of-house spaces
- Exposed ceiling in all service and storage rooms

### Flooring

Refer to the following floor plans for type and extents of proposed flooring.





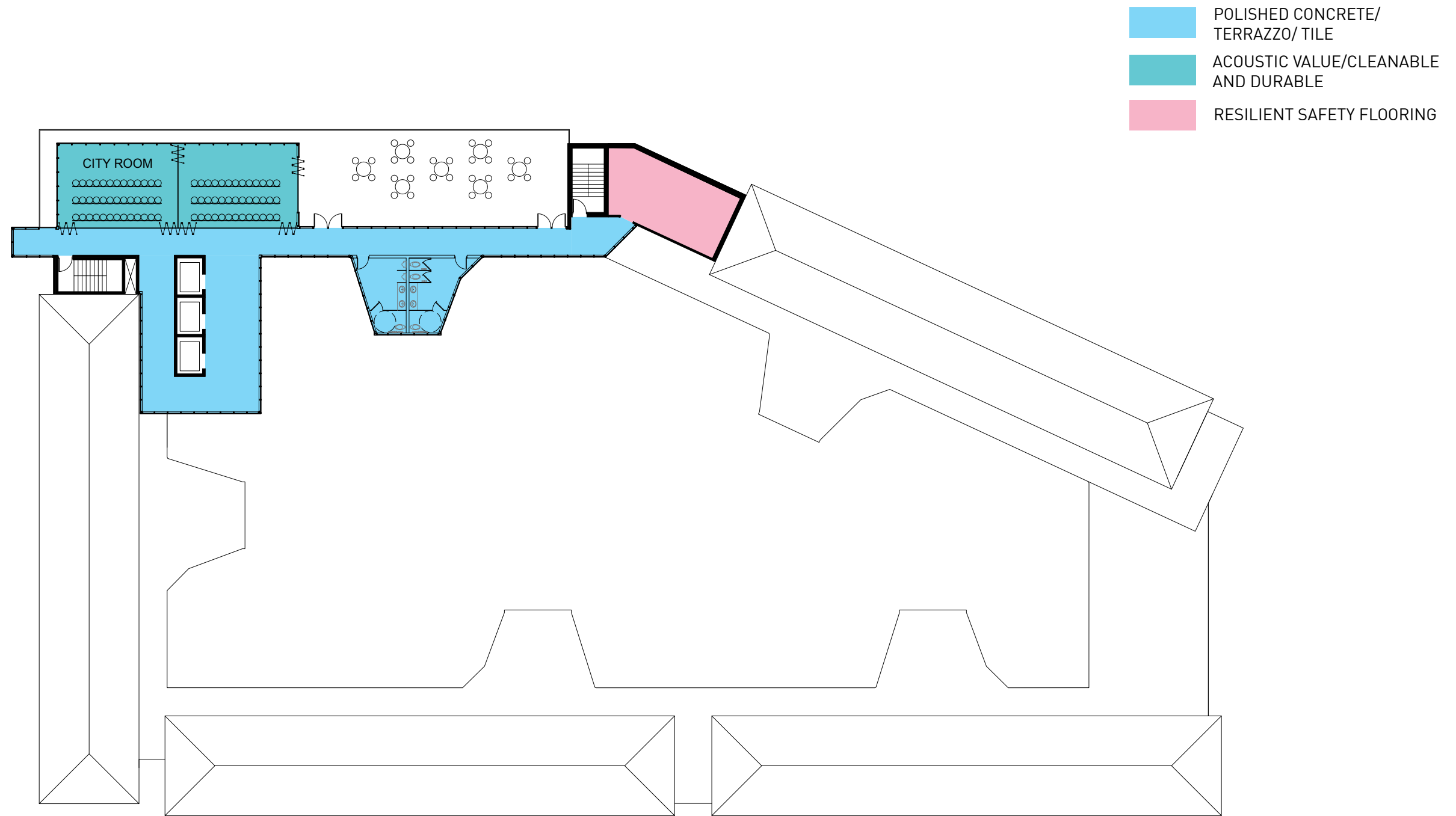
Main Floor Finish Plan





Typical Residence Floor Finish Plan





*Fifth Floor Finish Plan*



# 4.0 Structural Considerations

The proposed new residential building for the University of Alberta will primarily be a four story steel structure with partial basement and partial fifth floor. Careful detail will be paid to structural members when exposed, with timber framing used as feature structural accents at key locations within the building. In general, the goal is to develop economical structural solutions with opportunities for sustainable design.

## 4.1 Design Criteria

The building will be designed to meet the Alberta Building Code 2006 for the following loading:

### Ground Snow:

S<sub>s</sub> = 1.7 kPa

S<sub>r</sub> = 0.1 kPa

### Occupancy Loads:

Corridors exits and assembly areas 4.8 kPa

Residences 1.9 kPa

### Seismic Loads:

Sa[0.2]	Sa[0.5]	Sa[1.0]	Sa[2.0]	PGA
0.12	0.056	0.023	0.008	0.059

### Wind Loads:

q<sub>10</sub> = .36 kPa

q<sub>50</sub> = .48 kPa

Normal Importance (I=1.0)

## 4.2 Foundations

The current foundation assumes piled foundation in keeping with similar buildings in the vicinity of similar weight. A geotechnical investigation will be required in order to verify this assumption and to give approximate sizes.

The foundation is assumed to be comprised of conventional deep reinforced concrete piles with grade beams and possible suspended slab at grade level. The piles will be optimally placed below support columns, with grade beams supporting the main level interior and perimeter slab. Void form will be used under grade beams to mitigate the effects of frost heave. The slab will be designed to sit on compacted grade or engineered fill between grade beams.

All concrete foundation elements will incorporate a high content of fly ash into the concrete mix design. The resulting longer curing time of the concrete should not significantly affect the construction schedule as the concrete work is primarily limited to the main level.

## 4.3 Floor Structure

The floors are primarily supported with steel framing and concrete composite decking. Floor construction will consist of 300mm deep Comslab composite steel and concrete deck system, designed to span approximately 4.8m between inset structural steel support lines. Steel beams will be 410mm deep at the corridor and 200mm deep within the residence. Supporting columns (HSS 152x152), located within walls where possible, will be made to align throughout the entire height of the building, in order to mitigate the use of heavy transfer beams. The composite floor system will cantilever at each end to maximize daylighting and to optimize the deck capacity. This also eliminates the need for perimeter columns along the glazed courtyard edge. (Refer to the schematic section)

The following structural systems were also explored during preliminary design phase, but were found to be insufficient for reasons given:

- Steel superstructure with transfer beams at the second level – An option was explored of offsetting the columns at the exterior perimeter, above the main floor. This helped to maximize ceiling height within the upper living quarters however this required heavy 760mm deep cantilevered transfer beams at the main level. This scheme was rejected due to economic concerns and conflict issues with M&E at the main level ceiling.
- Steel upper structure with transfer concrete slab at the second level - A suspended slab and slab band system at the second level was explored in order to reduce the number of columns at the main level to provide more flexibility. This was found to be more expensive than the recommended option. In addition, the architects were able to adjust the upper columns to suit the required spans and flexibility at the main level.
- Steel stud upper structure with transfer concrete slab at the second level -To offset the cost of the suspended slab at the second level, the option of a structural steel stud system for the upper 4 levels was explored. This system was rejected as it added too many limitations on the locations of the walls. It also required a row of support columns along the courtyard edge of the hallway at each floor which was not desired by the architect.
- Two-way flat slab superstructure – This option was explored to maximize the ceiling heights and reduce the overall structural depth. Increased column sizes, costs, and weight led to eliminating this option.

## 4.4 Roof Structure

### Residences Roof

The roof above the residences will be of similar construction as the floors, comprised of ComSlab composite steel deck with steel framing. The thickness and reinforcing of the composite system will be reduced in order to reflect the lighter roof loading and higher deflection tolerances allowed on this system, where snow drifting is not anticipated.

### Dining Room Roof

Above the main floor dining room, located at the East end of the building, the roof will consist of feature heavy timber framing and exposed timber decking. Columns within the space will be minimized through the use of a main line of structure, a heavy timber truss or similar along the ridge line, with secondary heavy timber structure framing between the walls and this line.

### Fifth Floor City Room Roof

This roof will feature exposed heavy timber decking. Glue Laminated Timber (GLT) or staggered Nail Laminated Timber (NLT) panels (approx. 130mm deep) will be supported by 200mm deep perimeter steel beams. The wood panels will create the finished ceiling surface for added visual aesthetic and warmth. Slender HSS columns will be used to support the roof. These columns may be integrated with the window mullions to reduce the overall mullion width.

## 4.5 Lateral Support System

The primary means of lateral support will consist of braced steel frames at stair cores and other key locations. The lateral loads will be transferred to these frames with the concrete filled steel deck floor and roof diaphragms.

As the main floor dining room is somewhat disconnected from the main stair cores, it will use portions of wall to house steel braces to provide the lateral support. The lateral loads will be transferred using plywood diaphragm located above the timber plank decking.

## 4.6 Sustainability

There are multiple ways in which the structural approach will positively impact the sustainable design of the structure:

- Through the inclusion of flyash in the concrete mix design. The production of cement is a known contributor to carbon dioxide in the environment. By adding flyash to the mix it is possible to reduce the amount of cement needed and therefore reduce the amount of carbon dioxide produced.
- Specifying recycled steel. A minimum percentage of recycled steel can be specified in the steel members, reinforcing, and in the ComSlab steel deck. Using recycled material saves the need to mine iron ore and also eliminates the amount of energy needed to produce new steel.
- Reduce construction waste by specifying standard size material and lengths (of rebar for example). This eliminates waste produced from having to modify a standard size.
- Through efficient design. By designing the structure precisely to the limits of the code, it eliminates added material that “cushions” the design.
- Where wood is used, specifying an FSC certified product. This ensures that the timber has been sustainably harvested and milled.



# 5.0 Mechanical Considerations

The following report, schematics and outline specification have been provided for consideration in satisfying the facility design intent. The report conveys the mechanical systems design strategies, and will allow for budget projections for the proposed systems and equipment.

This report offers what is considered the optimal long term solution for the facility, balancing for the greatest potential flexibility, operating efficiency, comfort and ease of maintenance. Sustainable design initiatives and energy saving attributes associated with potential Green Globe building certification are also noted in Section of this report.

## 5.1 Building Code Requirements

Following is an overview of 2010 Alberta Building Code articles that will have impact on the mechanical work:

### Use and Occupancy: Group A Division 2/Group D

- We interpret this project will be categorized as a combination of "Residence Space" and "Assembly" space.

### Building Size and Construction Relative to Occupancy:

- Article 3.2.2.54 - Building must be sprinklered.

### Provisions for Fire Fighting:

- Article 3.2.5.8 – A standpipe and hose system will be required as the buildings are greater than 3 stories and greater than 14 m high and is sprinklered throughout.
- Article 3.2.5.16 - Fire Department connections for sprinkler system must be located within 45 m (unobstructed) from a fire hydrant and must be located between 3 m and 15 m from the principle entrance to the building.
- Article 3.2.5.17 - Portable fire extinguishers must be provided in cabinets, not more than 23 m apart.

### Exhaust Duct Negative Pressure:

- Article 3.6.4.1 - Defines that fire compartments must not have individual exhaust fans that discharge into an exhaust riser.

### Horizontal Service Spaces and Service Facilities:

- Article 3.6.4.3 - Defines requirements where ceiling plenum can be used for return air.
- Heating, Ventilation and Air Conditioning
- Article 6.2.1.1 - Defines ASHRAE, SMACNA and NFPA as reference standards for good engineering practice.
- Article 6.2.1.14 - Defines that an exit stairway serving more than one storey must be heated/ventilated by an independent system.
- Article 6.2.2.1 - Defines that ventilation (mechanical and normal) shall be provided within the facility in compliance with ASHRAE 62 2010.

### Plumbing Services

- Article 7.1.2.1 – Defines that plumbing systems must be consistent with Municipal or Provincial Regulations.

## 5.2 Fire Protection and Life Safety

Sprinklers are planned for the building in its entirety. An assessment of facility requirements will be made, and fire protection attributes employed to satisfy building functions and code requirements. Areas of the sprinkler zone exposed to cold environments would be dry type to withstand potential freezing conditions and sprinkler heads caged to prevent damage. The remainder of the facility would be equipped with conventional wet sprinklers, zoned in an appropriate fashion to meet code.

The domestic water supply to the building will need to be confirmed to be adequate for the conventional sprinkler service given the proximity of the adjacent water supplies. A utilities site plan identifies the closest available service connection for the minimum required water supply to be at \_\_\_\_\_. The utility service that comes off of \_\_\_\_\_ will need to be tested at the closest adjacent site hydrant to determine available residual flow rates and pressures. Given the site size and building layouts, additional site hydrants will be required. Ventilation fan shutdowns will be installed for code compliance, and will be interlocked with the fire alarm system.

## 5.3 Plumbing Systems

All new plumbing fixtures are to be of the latest design and of the highest degree of water consumption efficiency. The washroom layout and fixture count should be reviewed for code compliance and adequate to satisfy future space planning. The use of low flow urinals is considered, along with low flush toilets as a water conservation measure. BFA layout and fixture placement may be necessary to accommodate new building functions. New lavatories, trim and sinks are proposed along with water conserving faucet sets.

Plumbing fixtures will be selected consistent with program requirements and in close communication with Client and the Architect. A brochure showing all fixture cuts will be distributed for review.

Domestic water piping as well as sanitary water piping will be networked throughout the buildings back to the building service connections. Sanitary vent piping will be vertically stacked and terminated at the roof line. Each tenant space will be provided with plumbing rough-ins adequate for the tenant service connections.

Domestic hot water for the buildings service in facility is to be provided by a high efficiency hot water heaters installed in each mechanical space.

All domestic hot and cold piping should be thermally insulated for energy conservation. Domestic hot, cold piping will be extended to all fixtures. Domestic hot water will be generated for distribution at 54°C.

Reduced pressure backflow preventer assemblies should be provided consistent with the National Plumbing Code Requirements.

A system of sanitary drainage within the building will collect sanitary waste for transfer of effluent to the City sewer system.

Storm water is collected by a system of roof drains, and effluent will be piped to the storm drainage systems in the buildings. The storm water piping systems are currently planned to discharge directly to the site storm drainage mains, however a provision for regulated discharge is required as part of the city of Edmonton Storm Water Management Plan.

Any subsurface drainage will be managed by an array of weeping tile and catch basins with sump pumps to control subsurface water levels. Each pit and pump location will be provided with a local and BMS alarm point for high water condition. Any required trench drains in loading areas will also be networked to sump pits and pump systems to manage surface runoff as well as snowmelt.

## 5.4 Heating Systems

The heating systems design proposed for the building is a high efficiency condensing boiler plant and associated hydronic heating equipment. This heating plant will serve all common areas and residence wings.

In addition, a glycol heating circuit will preheat of outdoor air in ventilation units.

As well, supplemental in slab heating for dining area and exist and entrance ramps will be is being considered. This is achieved by supplemental hydronic circuit heat exchangers employed at each area and with temperatures scheduled to suit the respective spaces.

Heating systems proposed for the residence areas consist of overhead heating panels or perhaps custom wall panels in the residences. Perimeter heating fin cabinets may be used in areas of high glazing such as the kitchen and common areas.

New entrance unit heaters are ceiling or wall mounted in vestibules and entryways will allow for offsetting of infiltration and heat loss at door entrances.

The new hot water heating system servicing building as currently proposed will be as follows:

- Condensing hot water boilers with one redundant boiler (N+1)
- Pumped primary loop with N+1 pumps
- Cascading secondary variable flow loops with three way control to optimise condensing performance.
- Insulated reverse return mains located over corridors.
- Control valves for suites will be located in common areas for access and service.
- Every room will have BMS heating control for optimal comfort in winter.

## 5.5 Cooling Systems

- The building will be cooled in two ways:
- Make-up ventilation air distributed to all areas: common areas, suites and kitchen, etcetera will be tempered. Control will be for on a pod basis therefore air will be delivered at a moderate temperature (approximately 16C) with an outdoor air temperature reset. This is will provide partial cooling to "non-air conditioned" suites.
- Packaged VFR fan coil units using common outdoor condensing units is intended to provide space conditioning to common spaces, the cafeteria, the meeting rooms and selected suites on the main level.

## 5.6 Ventilation & Exhaust Systems

### Design Criteria

Outdoor air deliver will be as a minimum to ASHRAE 62-2010 and that required to make up exhaust in.

Paired make-up air units / exhaust units with heat recovery are proposed dedicated to particular pods. Specifics include:

- Direct drive fans with redundancy (2 fan fanwalls)
- Heating coils (glycol)
- DX cooling coils served by remote condensing units.
- Heat recovery glycol run around coils.
- Washroom / general exhaust fans with heat recovery coils.
- Small mechanical penthouse for adequate service access.



## 5.7 Humidification Systems

No humidification systems are proposed for the facility at this time.

The relative humidity in the common and tenant spaces will be variable, dependent on outside air conditions.

## 5.8 Thermal Insulation

### General

Piping, equipment and sheet metal work with surface temperatures greater or less than surrounding air temperature will be insulated to control heat transfer and condensation, and to meet NMEBC requirements.

### Piping

Insulation on piping systems will include:

- Heating water
- Glycol systems
- Domestic hot, cold and recirculation
- Roof drains and a portion of pipe near roof
- Plumbing vents near roof
- Refrigerant piping.

### Ductwork

Insulation on duct systems will include:

- Outside air ducts/plenums
- Supply ducts carrying conditioned air
- Exhaust/relief ducts near louvers
- Acoustic treatment where required

## 5.9 Controls

The proposed system for control of the facility consists of a combination of unitary control for tenant spaces and a central BMS systems for control and monitoring of base building systems. These systems will be electronic based, and flexible to functions.

### Central Plant Control

The BMS electronic control systems for base building equipment will operate fan systems, boilers, and other major equipment. All monitoring and alarm functions will be networked. Generally the networked and unitary control features will include:

- Optimization of system operation and start/stop scheduling for unoccupied temperature setback.
- Programmable capability to optimize energy efficient operation including:
- Unoccupied fan system shutdown and temperature setback on the base building zones
- Precise control operation through PID (proportional/integral/derivation) logic
- Schedule water temperature with outdoor air temperature to limit heat losses from piping distribution.
- Space temperature and outdoor air condition profile feedback to anticipate supply air temperature settings on air system.

### Space Temperature Control

Room thermostats, one in each control zone will control space temperature by cycling the zone roof top units, and manage occupancy demands and time of day scheduling.

## 5.10 Site Services

A review of the site services has been undertaken, and the water, storm and sanitary service connections all enter the facilities at various locations from \_\_\_\_\_. The drainage systems are dedicated storm and sanitary systems which connect to the facility within the property line, and leave as parallel services respectively. It is anticipated that this configuration will be acceptable from a capacity perspective; however approval with the City should be reviewed by the site consultant.

A separate evaluation of the site drainage of the adjacent parking areas will be required and discussions with the drainage department needed by the project civil consultant.

The new gas service to the site will consist of shallow service distribution terminating at exterior meter sets at the complex to serve the residence and base building requirements. The gas service will be piped to the mechanical room and peripheral equipment to accommodate equipment housed within the facility.

The domestic water service for distribution to the building will be terminated inside the lower level meter room, and distributed accordingly within the building to serve for fire protection and domestic water requirements.

## 5.11 Design Options and Green Globe Considerations

For the project, the following design options considerations have been made:

- Use of new low flow plumbing fixtures and trim to achieve maximum water use efficiency. Maintenance and functionality are a consideration over conventional commercial flush valve products. Included measures are 4.8 lpf Water Closets and 0.6 lpf urinals with automatic flush valves for common spaces, and 4.8 lpf Water Closets for residences. Hands free .5 GPM lavatory faucets for public washrooms, and low flow shower fixtures for residences. All residence fixtures and trim will be equipped with low flow aerators.
- Provision for fully insulated domestic hot water storage tanks with insulated supply and recirculation lines.
- Provision for high efficiency heat pumps/fan coil units at 2.5 to 3 tons capacity for the Variable Flow Refrigerate systems each to achieve optimal energy performance. All refrigerant equipment and selected condensing units will have 410A Refrigerant, and high EERs of 15 to 17.
- Heating plant has been designed with high efficiency natural gas fired boilers which is scheduled to suit the building loads, which circulation pumps are equipped with variable speed drives for further reduction in electrical energy consumption for pumping requirements.
- Building automation will allow for enhanced control and scheduling capability for systems operation to accommodate setback or shutdown of systems when the facility or spaces are unoccupied. Individual zones of temperature control can be enabled to operate on a demand for heating and cooling during off peak hours, depending upon tenant requirements.
- Primary ventilation systems will incorporate air side heat recovery and controlled ventilation rates to minimize excess air heating requirements, and to optimize on waste heat from the building exhaust air streams. These units will also be scheduled to accommodate building occupancy further reducing overall energy consumption for the facility.
- Provision has been made to provide for permanent and safe access to mechanical equipment on the roof for regular maintenance routines.



# 6.0 Electrical Considerations

The outline of the electrical systems and facilities contained in this report are to describe the Schematic Design concepts.

This report outlines specific strategies for the electrical systems of the proposed facility and will form the basis for the development of the Design Development phase of the project. A basic outline of the perceived strategies for power distribution, low-tension systems, communication systems and life safety systems for the proposed Saskatchewan Drive Residence have been included to summarize discussions and concepts developed to date.

The electrical services proposed for the Saskatchewan Drive Residence are based upon an anticipated gross building area of approximately 65,000 ft<sup>2</sup>.

The electrical design will be based on the following applicable University of Alberta and other applicable standards including:

- University of Alberta, Facilities Management Commissioning Manual.
- University of Alberta, Electrical Design Guidelines.
- University of Alberta, Guidelines for Design and Installation of Street, Sidewalk and Area Lighting – Revised October 2000.
- University of Alberta, Fire Alarm Design Standards, draft copy issued January 2005.
- University of Alberta, Electric Utility Standards, draft issued December 2004.
- ANSI, IEEE, EEMAC Standard for High and Low Voltage Switchgear.
- Latest adopted Canadian Electrical Code – Part I.
- Regulations of the Alberta Electrical Protection Branch – Safety Codes Act.
- Latest Alberta Building Code.
- Latest Alberta Fire Code.
- CSA Standard C282-05 Emergency Electrical Power Supply for Buildings.
- CSA Standard B651-95 Barrier Free Design.
- Latest CSA Fire Alarm Standards and ULC Standards.
- Latest Illuminating Engineering Society of North America (IESNA) Standards.
- AICT Telecommunications Design Guidelines, University of Alberta Cabling Standards (Version 2.2, May 23, 2008).
- University of Alberta, Lighting Design Guidelines and Standards (January 2009, Revision 0.2).

Each system presented in this report will be open to further in-depth review with the user groups and University of Alberta Facility Management group.

## 6.1 Sustainable Design Considerations

The Saskatchewan Drive Residence design will be based upon achieving a Green Globes 4 certification. The rationale for engaging in sustainable design is to create a facility that will contribute to reduced demands on the earth resources. There are four areas that are impacted by engaging Green Globe practices into electrical systems including:

- energy conservation,
- light pollution reduction,
- measurement and verification, and
- indoor environmental quality.

Sustainability design for the Saskatchewan Drive Residence will be considered based on how Operations can maintain these systems and have the budgets to sustain the systems for operations and replacement of systems.

It is understood that the Saskatchewan Drive Residence needs to be 'cutting edge' with the possibility of showcasing various systems such as:

- Dashboard' in the suites so that students are aware of consumption and usage
- Key access into suites integrated w lighting and mechanical systems.
- Smart' switches to be considered in suites where all devices connected into the system are deactivated.
- Photovoltaic display for showcasing the amount of power going back into the grid system.

Further review of these systems will be required during the next phase of design.

Other sustainable design options to be considered for review are:

- Energy management within suites - Integrated lighting and HVAC control via motion sensor and programmable thermostat.
- Photovoltaics and two way metering. Further review is required to determine the feasibility of using PV arrays.
- People counters to be used in certain rooms - City room and dining hall integrated with BMS system.

### 6.1.1 Energy Conservation

Electrical energy comprises a small portion of the total energy consumed by a facility but when expressed in actual utility costs, the electrical system consumes approximately 20 - 40% of the total building's energy budget. The following initiatives will be adopted in the design to reduce the building's energy consumption:

- Use the latest illumination technology including LED lighting, T8 and T5HO fluorescent lamps and very high efficiency luminaires wherever possible and justified by application.
- The Minimum Energy Performance prerequisite in Green Globes is intended to comply with the minimum level of energy efficiency as specified in ASHRAE / IESNA 90.1. The basic requirement to improve energy performance is to include some means of efficient controls technologies. It is proposed to provide this means of control by providing direct user control of the space by local switching via lighting-control panels to turn lights off during hours of non-use.
- Other measures that can further improve the baseline energy performance is the use of occupancy sensors, dimming controls complete with dimming ballasts, daylight harvesting sensors, photocells, and improved local controls including those employing a digital addressable lighting system. An interface to the University's building automation system will optimize the use of lighting and ventilation systems when a space is occupied and reduced usage when spaces are not occupied.
- Engineered lighting systems to provide appropriate lighting levels that are safe and effective. Lighting will comply with prescribed guidelines rather than using light levels that are on the high end of the IESNA (Illuminating Engineering Society of North America) standard. It is proposed that lower ambient lighting levels be employed in offices, suites, circulation spaces, and corridors.

The following non-Green Globes energy efficient design parameters will be considered:

- Use of time delay relays for larger motor loads to help reduce peak power demand
- Power distribution centres will be located as close as possible to their connected loads, thereby minimizing the length of branch circuit wiring which in turn will improve the voltage regulation.
- Designated equipment to have "manual-off-automatic" controls such that they can be run in manual mode or automatically through the building management system.

- Use of copper-wound versus aluminum-wound transformers. Copper-wound transformers are more efficient than aluminum-wound transformers and consume less energy.
- The design will favor the use of environmentally friendly components such as LED lamps and fluorescent lamps with low mercury content.

### 6.1.2 Measurement and Verification

A lighting control system can also be utilized to verify energy savings. The requirements to achieve this go above and beyond just measuring lighting energy and include: motor loads, variable-frequency drives, chillers, cooling loads, air and water economizers, air distribution, boilers, building processes, indoor water risers and outdoor irrigation systems.

Lighting control system lighting-energy verification would have to be integrated into the complete Building Automation System. Mechanical loads will also be measured based on consumption utilizing various digital metering or current transformers.

Flexibility will be incorporated into the design to ensure that lighting loads can be metered separately from plug loads. A few options to consider and to be further reviewed during the Design Development stage would include:

- Quad logic metering for various panels
- Using a Lighting control system to segregate lighting loads
- Using CTs to measure branch circuit loads

### 6.1.3 Indoor Environmental Quality - Controllability of Perimeter and Non-Perimeter Spaces

An option is to utilize advanced lighting control system technology. One such system would be the use of a digital addressable lighting interface system. This technology can offer significant energy savings and excellent control. Luminaires can be controlled separately or in large groups. Dimming ballasts would be utilized to allow finite lighting control of different areas in the building. The digital addressable lighting interface system would also offer the convenience of reprogramming existing luminaires to adapt existing spaces for new program requirements. Dimming can be achieved locally or from a central location. A central station can monitor energy-use profiles and identify lamp or ballast failure.

## 6.2 Power Distribution

### 6.2.1 Power Distribution – Approach

The design approach for this facility is to provide a single ended substation with 13.8 kV on the primary side with a 600 V secondary distribution.

### 6.2.2 Power Distribution System Design

The total connected load for Saskatchewan Drive Residence is estimated at approx. 750kW based on a building size of 65,000 ft<sup>2</sup>. A 1200A, 347/600V service is estimated but demand loads will need to be further reviewed with UofA Electrical Utilities. To transport power efficiently over a large area and to numerous loads, one (1) 13.8 kV single-ended substation will be provided. Power transformer is rated at 750 kVA. The design provides for a minimum of 25% reserve capacity. The single ended substation will be fed from the Utility tunnel. Service to the building will be provided by UofA Electrical Utilities group.



Main Electrical Room: will be located in the bsmt - to house single ended substation to meet arc flash requirements and 600V distribution. A review will be required to determine access to electrical equipment replacement in the future.

#### Sub Electrical Rooms:

South Wing - to house 600V and 120/208V distribution

North Wing - to house 600V and 120/208V distribution

120/208V Panelboards will be provided and designated for suites and specialty areas.

The Saskatchewan Drive Residence service entrance switchgear will be metal enclosed 15 kV rated indoor style load break fused switching devices and vacuum circuit breakers. All low voltage switchgear (600 V) will be metal-enclosed indoor rated, with withdrawable type power-air circuit breakers complete with programmable protective relays.

The standard operating, distribution and utilization voltages for Saskatchewan Drive Residence will be 600 V, 3-phase, 3-wire and 120/208 V, 3-phase, 4-wire. In general, feeders that supply 208 V distribution transformers, large mechanical motor loads, and with high amperage electrical loads will be supplied at 600 V. All site lighting (lighting not affixed to building will be fed at 120 or 208 V.

All other loads will be supplied from 120/208 V, 3-phase, 4-wire electrical distribution systems. A sufficient number of 120/208 V panelboards will be located in the suite areas to maintain required voltage levels. The panelboards will have a minimum of 25% spare for future use.

### 6.2.3 Emergency Power Distribution

Emergency power for the Saskatchewan Drive Residence facility will need to be reviewed further to determine the feasibility of providing a natural gas generator to provide emergency power to the life safety systems vs. providing battery units for these systems. Emergency power system will be designed to accommodate base building life safety systems including fire alarm and lighting systems.

### 6.2.4 Mechanical Systems

All motors 0.25 kW and smaller will be single-phase 120 V and all motors at 0.37 kW and larger should be 600 V, 3-phase. The supply and installation of all motor protection switches, starters, and disconnect switches for mechanical equipment will be provided by the electrical contractor. Time delay relays will be provided for all motors 18.65 kW (25 hp) and larger. A disconnect switch will be provided for and at each motor. Motor control centres of the grouped design should be utilized where large quantities of mechanical equipment are located such as at wet mechanical rooms, penthouses, etc. In order to reduce capital costs of equipment and allow more effective use of mechanical room space, VFD controlled motor loads will be fed from Distribution Centres (CDP) rather than Motor Control Centres. Energy consumption of all HVAC loads is required to be measured for the Green Globes measurement and verification credit.

The variable speed drive starters (VFDs) and electrical equipment to be grouped away from wet, dusty, or hot areas.

### 6.2.5 Grounding and Bonding

Grounding system has been designed to provide a low impedance path for ground fault currents to flow.

Each of the electrical rooms will have a grounding bus connected to the nearest substation, which in turn will be connected to the ground grid. All non-current-carrying metal parts of equipment in the electrical rooms will be bonded to ground per Canadian Electrical Code. This will include all metal raceways, equipment enclosures, metal structures, low tension systems, and miscellaneous metal systems. A bonding conductor will be provided in each conduit.

### 6.2.6 General Wiring

All wiring will be installed in conduit. Copper wiring is recommended to be used in the facility except for feeders/conductors 150 A and larger where aluminum wiring will be used. It is recommended that conduits not be installed in the concrete slabs. This will provide greater flexibility for future renovations and additions. The use of cable tray systems and other wiring methods increasing the future expansion and modification options for the various systems will be further investigated during the Design Development process.

Cabling for life safety systems such as elevators, fire alarm systems, etc. will be minimum one-hour fire rated. Inverter grade cables will be used from VFD's to the motors when they are separated by more than 10 m of cable length from the VFD's.

## 6.3 Lighting

The lighting system will be designed to provide for the functional requirements of the installation. Established standards and parameters for an educational facility will be used for the design. The Illuminating Engineering Society of North America (IESNA) standards and the University of Alberta lighting design guide will be the key references. The objective to achieve Green Globes certification will at times result in variances being made to these key references. Energy consumption considerations and lighting levels will be carefully weighed with the benefits of achieving a Green Globes certification.

The lighting system for the Saskatchewan Drive Residence will be designed to provide integration of numerous lighting techniques to provide vibrant and attractive atmosphere that is both inviting and engaging for the people within the space. It is the intent to provide layered lighting within public circulation and gathering areas that will enhance the building's profile on campus. It will both augment and add to the architectural elements of the space in providing a visually stimulating environment that is comfortable and welcoming. It is the intention that the design will integrate the various aspects of the lighting system with the building's space functions, mechanical systems, and architectural elements. Integration of natural light captured by the building will take on a key role in achieving desired illumination.

City Room: Further discussions are required with the design team and users to determine the lighting scheme and options.

Site and courtyard lighting will use LED lighting.

Suites: LED lighting will be provided within all suites.

No compact fluorescent or incandescent lighting will be used.

### 6.3.1 Lighting Control System

All building lighting will be controlled to decrease energy use, allow flexibility and to meet the requirements of the University of Alberta and applicable standards. The lighting control system will be a stand-alone system that will allow interface with the Building Automation System. Controls will include:

- Daylight sensors for perimeter spaces, with dimming control for luminaires in these areas.
- Occupancy sensors will be provided in all suites, private offices, storage rooms, washrooms and similar spaces.
- Manual switches (digital) will be provided in all rooms for local control.
- Central time clock control. All building lighting will be controlled using a central time clock control.

The control system is being provided to meet the requirements of the Green Globes program and intended to only increase user comfort and ease of maintenance but to reduce the energy usage in the building.

The general lighting source to be used in the facility will be a combination of LED and fluorescent lighting. A mixture of LED, and T5HO linear lamps will be used extensively in the building. Reasonable attempts will be made to limit the number of different fixture types and lamp types, while providing good quality lighting. The rationale for using LED and fluorescent lamps is their high lumen efficacy and color rendering properties. LED lighting will be incorporated into the suites, exterior fixtures, high lighting architectural features, etc.

Fluorescent luminaires will utilize high efficient electronic ballasts.

Certain luminaires in public spaces and paths of egress will be connected to the emergency power system to provide the code required egress lighting. This lighting will also operate as the 24/7 night lighting for the space.

## 6.4 Fire Alarm System

The fire alarm system will be a single-stage, annunciated, class A-wired and electrically supervised system. Zoning of the fire alarm system will be based on smoke zone subdivision. System devices will be of the addressable type and will consist of manual pull station, products-of-combustion detectors, thermal detectors, and sprinkler flow valves.

Fire alarm sounding devices will be of the audible and visual (strobe) type in compliance with the latest Alberta Barrier-Free Code requirements. The building is to be equipped with fire fighters telephone handsets.

The fire alarm system will also be interconnected into the campus wide FM Net system and Mass Notification System.

## 6.5 Low Tension Systems

This section of the report discusses the various low tension and security systems that are envisioned to be installed in the Saskatchewan Drive Residence. Each system has been identified in an effort to capture the perceived requirement for the Saskatchewan Drive Residence.

### 6.5.1 Access Control System

The team will be engaged in detailed discussions with the University of Alberta user groups and facility management staff to define which doors require card access.

At the present, the project will allow for the installation of conduit and cabling system complete with all necessary power supplies, end devices and architectural electrified hardware devices. The following levels of access control have been discussed:

- Card access at the elevators and entry doors
- Keyed access into the suites will be provided



## 6.5.2 Security Television System

Security television design requires further discussion with the users and architect; however, it is envisioned that the courtyard will contain security television pan tilt zoom cameras with head end equipment located within the communication rooms.

## 6.5.3 Emergency Blue Phone system

Blue phones will be provided as required to meet the overall campus requirements. Discussions to date involved providing blue phones within the courtyard area but further review is required.

## 6.5.4 Clock System

GPS wireless clock system will be provided throughout the facility but requires further review.

## 6.5.5 Public Address system

A building wide public address system will NOT be provided but further review with the UofA will be required.

## 6.5.6 Mass Notification System

A Mass Notification system will be deployed throughout the facility and will be fully integrated with the Campus wide system connected through the fire alarm system interface. The system will incorporate text to speech functionality through the fire alarm system speakers. Marque messaging boards and Alertus panels will be provided throughout and will require further coordination with the University for locations.

## 6.6. Communication Infrastructure

### 6.6.1 Main Communication Room – Service Entrance

Main Communication room – will be located in the basement to house tel/data, demark point, fire alarm and security head end systems.

### 6.6.2 Communication Rooms

Sub Communication Rooms - located in the north and south wings - main floor.

Communication closets – will be located in the south wing.

Communication service will be extended from the south with fiber via a new ductbank. Further review is required with UofA AICT group.

Communication Rooms on each floor will also house all the switches for data/voice and wireless infrastructure. In addition (where required) the Communication Rooms will house IP based lighting controls, building access and controls, fire alarm and security systems.

Each of these rooms will support the University of Alberta needs for equipment, cabling and access control.

### 6.6.3 Structured Cabling Pathways

Communications cabling will be installed in conduits, stubbed up to the closest cable tray and run to the designated Communications Room. Cable trays in the corridors will be 105 mm by 600 mm. All conduits for communication systems shall be EMT (electrical metallic tubing). Flex conduit is not permitted. Minimum conduit size for voice/data outlets will be 27 mm. Maximum fill ratio is 40% per the Telecommunication Industry

Association standards. Office areas will have an additional set of two (2) conduits to be located on an opposite wall complete with pull strings to allow growth and/or support office rearrangements. Design will provide for one power receptacle (2 per duplex outlet) per data port.

Routing of horizontal structured cabling will be accomplished by utilizing the main cable trays within the corridors, and providing conduit stubs into the ceiling space from voice/data outlets.

### 6.6.4 Data and Voice Cabling – Structured Cabling

A power duplex outlet will be placed in close proximity to all voice and data drop outlets including future data/voice drop locations.

Network Architecture: Using standard ethernet design concepts and protocols, this system will be built on a logical bus and centralized physical star topology using vertical and horizontal cabling and localized switching. The horizontal segments will be built using structured cabling solutions with home runs from the outlet jack back to rack mounted patch panels inside the closest Communications Room. Vertical segments will provide connections between the Communications Rooms and a centralized location such as the Main Communication room. Fiber connections will be made to the campus wide area network(s).

### 6.6.5 Desktop/Suites

Copper: Certified Category 6 unshielded twisted pair structured data/voice cable will be utilized for horizontal distribution. The maximum cable run distance is 90 m between terminating devices (additional 10 m allowance for interconnecting patch cabling).

Fibre: Full duplex 50/125 micron optimized multimode fiber optic cable is to be provided at user designated locations for high speed / bandwidth applications. Cable runs will be dependent upon type of cable selected but typical multimode is 300 m and single-mode 1000 m; however, the maximum horizontal run shall remain 90 m per the Telecommunication Industry Association standard.

Specific requests for an unbroken fiber connection between two (2) points longer than 90 m that also require spanning floors will be considered on a case-by-case basis. It is likely that this fiber will be physically separated or uniquely marked to avoid confusion with other riser fibers.

### 6.6.6 Voice

Voice communication will consist of both Voice over Internet Protocol (VoIP) for standard voice communication and traditional hard wired Private Automatic Branch Exchange (PABX) telephone switch connections for emergency phones and phones as designated by the University of Alberta (i.e. payphones). The expectation is that the limitations of VoIP such as e911 and reliability will be addressed.

VoIP Network Architecture: The design will consist of a certified category 6 UTP cable between each outlet jack to a rack inside the Communication Rooms. At the rack, the cabling will be translated into a fiber connection back to the Main Communication Room where it will connect to a VoIP Call Manager.

The telephone handsets and the telephone switch will be supplied, installed and programmed by the University of Alberta as required.

## 6.6.7 AV and data requirements - to be further reviewed during DD phase

The following areas have been highlighted to provide adequate AV and data requirements. Further review is required with the UofA and users to determine the exact requirements:

- Suites – Provision for two Cat 6 cables and coax to be provided
- Dining Hall
- Fitness room
- Recreation room
- 4th floor City room and Terrace
- Social Spaces
- Courtyard
- Lobby areas
- Social spaces – Adequate AV, power and data outlets will be provided
- Quiet Study – Adequate power outlets and data/USB ports will be provided

## 6.7.8 Wireless Local Area Network

With the exception of mechanical rooms and areas sensitive to radio frequency interference (RFI), this facility will contain a complete 802.11abg enterprise designed wireless infrastructure consisting of access points, network switches, servers, wireless local area network (WLAN) controllers and the necessary cabling infrastructure as required. It is our understanding that the University of Alberta has conducted a review of existing WLAN technologies for capable enterprise wide wireless wide area network (WWAN) solutions and has decided on a Cisco system provider. The Saskatchewan Drive Residence wireless solution will be an extension of the campus wireless system. It is also anticipated that there will be wireless hot-spots offered for the general public.

Although not requested at this time, the wireless network will be designed to incorporate the use of Voice over IP Wireless phones. This will require an access point distribution that supports e911 triangulation. Unlike data that can be resent if lost or damaged, voice communication is highly susceptible to drop out. Data communication success over a WLAN depends mostly on WLAN localized bandwidth and security. Combining the needs of voice and data will require an access point distribution with 20% overlap with minimum cell edge signal strength shall of -70 dBm and a minimum Signal to Noise Ratio of 25 dB and numbers sufficient to maintain high speed communication.

The density of access points in most areas will be spaced a maximum of 10 to 20m based on the level of usage required. Further review will be required.

To reduce installation costs, 'Power Over Ethernet' will power access points.

## 6.8 Commissioning and Testing

In a project of this nature it is imperative that the commissioning and testing of major electrical equipment and systems be undertaken by a commissioning and testing agency. This work will include necessary verification and start-up procedures. Operation and Maintenance manuals incorporating copies of shop drawings, complete schematic diagrams, recommended maintenance schedules, and logs, system operation write-ups, test results, and safety procedures will form part of the electrical contractor's scope of work.







## APPENDIX A: GREEN GLOBES CHECKLIST



Saskatchewan Drive Residence 11th Feb 2014: Preliminary Green Globes Canada Checklist		25%:1GG, 40%:2GGs, 55%:3GGs, 70%:4GGs, 85%:5GGs					MISSION GREEN BUILDINGS
		100%	52.9%	32.1%	15.0%	9.3%	
This is an interim Green Globes checklist whilst we wait for the registration process to be completed to allow access to the online tool.		Available Points	Yes	Maybe	No	N/A	Commentary
<b>1. Project Management</b>		-					
<b>1.1 Integrated Design Process (IDP)</b>		-					
1.1.1 Pre-Design IDP Meetings: Key Participants	2.5	2.5					The project is and will continue to follow an Integrated Design Team process with key disciplines involved. This requires documentation.
1.1.1 Pre-Design IDP Meetings: Additional Participants	0.7	0.7					The project is and will continue to follow an Integrated Design Team process with key disciplines involved. This requires documentation.
1.1.2 IDP Performance Goals Level 1	2		2				Green performance goals to be discussed but not thought to have been established during pre-design other than GG rating.
1.1.2 IDP Performance Goals Level 2	3		3				Green performance goals to be discussed but not thought to have been established during pre-design other than GG rating.
1.1.3 IDP Progress Meetings for Design Level 1	1.3		1.3				To be confirmed whether meetings were held and are required for further stages.
1.1.3 IDP Progress Meetings for Design Level 2	1.2		1.2				To be confirmed whether meetings were held and are required for further stages.
<b>1.2 Environmental Management During Construction</b>		-					
1.2.1 Environmental Management System	4		4				This could be included in the tender documents if desirable.
1.2.2 Clean Diesel Practices	2		2				This could be included in the tender documents if desirable.
1.2.3 Mould Mitigation During Construction	2		2				This could be included in the tender documents if desirable.
1.2.4 IAQ During Construction: Best Practices	2	2					One of these options will be included in the tender documents.
1.2.4 IAQ During Construction: SMACNA	2.5	2.5					These measures will be included in the specification.
<b>1.3 Commissioning</b>		-					
1.3.1.1 Pre-Commissioning: OPR	1	1					Confirmation of the role of the Commissioning Agent is required.
1.3.1.3 Pre-Commissioning: BoD	1	1					Confirmation of the role of the Commissioning Agent is required.
1.3.1.5 ASHRAE Commissioning Authority reporting to Owner	1	1					Confirmation of the role of the Commissioning Agent is required.
1.3.2.1 Whole Building Commissioning: ASHRAE/NIBS Guideline 0-05	16.5	16.5					The scope of the commissioning process should be discussed and confirmed.

Saskatchewan Drive Residence 11th Feb 2014: Preliminary Green Globes Canada Checklist		25%:1GG, 40%:2GGs, 55%:3GGs, 70%:4GGs, 85%:5GGs					MISSION GREEN BUILDINGS
		100%	52.9%	32.1%	15.0%	9.3%	
This is an interim Green Globes checklist whilst we wait for the registration process to be completed to allow access to the online tool.		Available Points	Yes	Maybe	No	N/A	Commentary
1.3.2.2 Whole Building Commissioning: Other Guidelines	1		1				The scope of the commissioning process should be discussed and confirmed.
1.3.3 Systems Training for Building Operators	1	1					The scope of the commissioning process should be discussed and confirmed.
1.3.4 Operations and Maintenance Manual	12	12					Who will be responsible for these should be confirmed.
<b>Total Section Points - Project Management</b>	<b>50</b>	<b>40.2</b>	<b>16.5</b>	<b>0</b>	<b>0</b>		
<b>2. Site</b>		-					
<b>2.1 Development Area</b>		-					
2.1.1.1 Walkability	3		3				The walkscore website does not offer a score for the project site. To be investigated with GG.
2.1.1.3 Proximity to Commercial Zone	3		3				To be confirmed following further investigation.
2.1.1.5 Previously Developed Site	4		4				To be confirmed following further investigation.
2.1.2.1 Brownfield Redevelopment	10			10	10		This is not a brownfield site. It may be possible to mark this point as N/A.
2.1.2.3 Sensitive Site Avoidance	6	6					The site does not include any of the uses listed as sensitive.
2.1.2 Floodplain Avoidance	4	4					The site is not within a floodplain.
<b>2.2 Ecological Impacts</b>		-					
2.2.1 ESC Plan	5	5					A stamped ESC Plan will be included.
2.2.1 Limit Construction Disturbance	2	2					It is understood that the site layout will comply.
2.2.2 Tree Integration	5		5				Second and third items might be N/A.
2.2.3 Tree Preservation Plan or Best Practices	4			4			Trees to be removed from the site.
2.2.4.1 Heat Island Effect: Roof	5		5				To be confirmed as design progresses.
2.2.4 Heat Island Effect: Hardscaping	2		2				Credit can be N/A for ASHRAE climate zones 6,7 and 8.
2.2.4 Heat Island Effect: Shade from Trees	3		3				Building might shade courtyard. To be analyzed further.
2.2.4 Heat Island Effect: East and West Walls	2		2				To be confirmed as material choices are made.
2.2.5 Bird Collision Prevention	2		2				To be confirmed as the design develops.
2.3.1 Storm Water Management Plan	15	15					A Stormwater Management Plan will be written at the appropriate time.
2.3.3 Natural water body protection	3	3					The site is more than 100 ft from a natural water body.
2.4.1 Landscape and Irrigation Plan	5		5				Landscape plan to be finalized in due course.



Saskatchewan Drive Residence 11th Feb 2014: Preliminary Green Globes Canada Checklist		25%:1GG, 40%:2GGs, 55%:3GGs, 70%:4GGs, 85%:5GGs					MISSION GREEN BUILDINGS
		100%	52.9%	32.1%	15.0%	9.3%	
This is an interim Green Globes checklist whilst we wait for the registration process to be completed to allow access to the online tool.		Available Points	Yes	Maybe	No	N/A	Commentary
2.4.3 Landscaping and Irrigation Plan: Contents	3		3				Landscape plan to be finalized in due course.
2.4.4 Landscaping: Plant Selection	9		9				Landscape plan to be finalized in due course.
2.4.6 Landscaping: Soil and/or Organic Mulch	2		2				Landscape plan to be finalized in due course.
2.4 Landscaping: Plant Grouping	3		3				Landscape plan to be finalized in due course.
2.4 Landscaping: Pervious Paving	4		4				Landscape plan to be finalized in due course.
2.5 Exterior Light Pollution Choose Path A Lighting Design Performance OR Path B Prescriptive Lighting Requirements	7		7				Path A is seen as more flexible by the design team. The site boundary to be confirmed. Note that the site will border City land on two sides.
2.6.1 Habitat Exchange	4			4			No based on cost compared to benefit.
2.6.3 Urban Agriculture	5		5				Students will have access to community gardens in east campus village, which may meet the criteria.
<b>Total Section Points - Site</b>	<b>120</b>	<b>35</b>	<b>67</b>	<b>18</b>	<b>10</b>		
<b>3. Energy</b>		-					
<b>3.1 Energy Performance</b>		-					
3.1.1 - 3.1.6 Modeled Energy Performance	150	120		30			Energy model underway by the mechanical engineering team. The design will include efficient systems, including a high performance envelope such as R20 walls, R40 roof and possibly triple glazing. 120 out of 150 points are targeted subject to energy modeling results.
<b>3.2 Energy Demand</b>		-					
3.2.1 Power Demand Reduction: Monthly Power Demand Factor	8		8				To be investigated and modeled.
3.2.3 Power Demand Reduction: Energy Management System	8		8				To be investigated and modeled.
<b>3.3 Metering, Measurement and Verification</b>		-					
3.3.1.1 Energy Metering at Building Level	4	2			2		No steam or other fuels so N/A.
3.3.1.2 Energy Sub-metering	4		3.5		0.5		Sub-metering maybe included at a later date. There are no renewable energy systems at present so this is N/A.
3.3.2 M&V: Energy Metering Reporting Plan Protocols	4		3.5		0.5		Sub-metering maybe included at a later date. There are no renewable energy systems at present so this is N/A.
<b>3.4 Building Opaque Envelope</b>		-					
3.4.1 Thermal Resistance of Roof	1.5	1.5					R40 roof will be better than MNECB requirements.
3.4.1 Thermal Resistance of Above Grade Walls	1.5	1.5					Detailing and specification will ensure that these criteria are met.
3.4.1 Thermal Resistance of Below Grade Walls	1	1					Detailing and specification will ensure that these criteria are met.

Saskatchewan Drive Residence 11th Feb 2014: Preliminary Green Globes Canada Checklist		25%:1GG, 40%:2GGs, 55%:3GGs, 70%:4GGs, 85%:5GGs					MISSION GREEN BUILDINGS
		100%	52.9%	32.1%	15.0%	9.3%	
This is an interim Green Globes checklist whilst we wait for the registration process to be completed to allow access to the online tool.		Available Points	Yes	Maybe	No	N/A	Commentary
3.4.1 Thermal Resistance of Floors	1.5	1.5					Detailing and specification will ensure that these criteria are met.
3.4.1 Thermal Resistance and Transmittance of Slab on Grade	1	1					Detailing and specification will ensure that these criteria are met.
3.4.1 U-Value of Opaque Doors Are Equal or Less Than MNECB Requirements	0.5	0.5					Detailing and specification will ensure that these criteria are met.
3.4.2 Orientation of Building	5		5				To be measured and confirmed by MGB.
3.4.3 U-factor of Fenestration System Is Equal or Less Than MNECB Values	8	8					Detailing and specification will ensure that these criteria are met.
3.4.3 Solar Heat Gain Coefficient (SHGC)	8	8					Detailing and specification will ensure that these criteria are met.
<b>3.5 Lighting</b>		-					
3.5.1 Total Lighting Power Density (LPD)	8	8					The lighting design will comply if compared to the dormitory category (0.9 Wsf).
3.5.2 Interior Automatic Shutoff Controls	3	3					One of these options will be included.
3.5.3 Light Reduction Controls	4	4					Light reduction controls will be included.
3.5.4 Daylighting: Area	3	3					The architectural design will ensure that adequate daylighting will be included.
3.5.4 Daylighting: EAVF	3		3				To be calculated.
3.5.4 Daylighting: Skylight Roof Area (%)	2			2			No skylights are included in the current design.
3.5.5 Controls for Daylighted Zones: All Small Areas	3	3					Appropriate lighting controls will be included.
3.5.5 Controls for Daylighted Zones: All Large Areas	3	3					Appropriate lighting controls will be included.
3.5.6 Exterior Luminaires: Initial System Efficacy	1	1					The electrical engineer indicated that this was a reasonable target.
3.5.6 Exterior Luminaires: Only LEDs Used	1		1				There is flexibility over what is used in courtyard but not necessarily other external areas, therefore this item may not be possible.
3.5.6 Exterior Luminaires: Low or No Mercury Content	1	1					The electrical engineer indicated that this was a reasonable target.
3.5.6 Exterior Luminaires: Controls	2	2					The electrical engineer indicated that one of these options would be included.
<b>3.6 HVAC Systems and Controls</b>		-					
3.6.1 Building Automation System (BAS)	10	10					It is understood that a BAS will be included.
3.6.2 Cooling Equipment Base Efficiency	5	3	2				A target of 3 points was deemed to be reasonable by the mechanical engineering team.
3.6.2 Incremental Cooling Equipment Efficiency Improvement	8		8				To be confirmed as design develops.
3.6.3 Cooling Tower: Fan Energy Consumption	4				4		N/A as no cooling towers in this design.



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		100%	52.9%	32.1%	15.0%	9.3%	
This is an interim Green Globes checklist whilst we wait for the registration process to be completed to allow access to the online tool.		Available Points	Yes	Maybe	No	N/A	Commentary
3.6.3 Cooling Tower: Waterside Economizer System able to use outdoor air for cooling water	4					4	N/A as no cooling towers in this design.
3.6.4 Heat Pump Efficiency	6					6	N/A as there are no heat pumps in the design.
3.6.5 Heating Equipment Efficiency	8	8					The specification of a condensing boiler was thought to achieve all 8 points (15% improvement).
3.6.6 Condensate Recovery	3					3	N/A as there are no steam systems present.
3.6.7 Steam Traps: Designs Stamped by PE	1					1	N/A as there are no steam systems present.
3.6.7 Steam Traps: Isolation Valves	1					1	N/A as there are no steam systems present.
3.6.8 Domestic Hot Water Heater: Efficiency	2	2					The condensing dhw system is believed to comply with this requirement.
3.6.8 Domestic Hot Water Heater: Intermittent Electrical Igniters and low NOX burners	1	1					The mechanical engineer confirmed that this was included.
3.6.9 Variable Speed Control of Pumps	6	6					The mechanical engineer confirmed that this was included.
3.7 Other HVAC Systems and Controls		-					
3.7.1 Minimizing or Eliminate Reheat and Re-Cool	6	6					The mechanical engineering team confirmed that re-heat and re-cool will be eliminated.
3.7.2 Air Economizers: Free cooling	1		1				100% OA design. To be evaluated further against the GG criteria.
3.7.2 Air Economizers: Outdoor Air and Exhaust Air Dampers	1		1				The mechanical engineering team confirmed that this was included.
3.7.2 Air Economizers: Low leakage dampers	1		1				The mechanical engineering team confirmed that this was included.
3.7.3 Fans and Ductwork: Duct Distribution System	1.5	1.5					The mechanical engineering team confirmed that this was included.
3.7.3 Fans and Ductwork: Flexible Duct Work	1.5	1.5					The mechanical engineering team confirmed that this was included.
3.7.3 Fans and Ductwork: Duct Joints and Seams	1	1					The mechanical engineering team confirmed that this was included.
3.7.3 Fans and Ductwork: Fan Motors Efficiency	1	1					The mechanical engineering team confirmed that this would be specified.
3.7.3 Fans and Ductwork: Variable Speed Fans with Energy Management Controls	2	2					Included, but maybe only in the kitchen.
3.7.4 Demand Controlled Ventilation: CO2 Sensors	4				4		This level of DCV is not included in the design at present. Can be "not applicable" if spaces meeting this criterion represent less than 40% of the total design ventilation
3.7.4 Demand Controlled Ventilation: CO2 Sensor Calibration Maintenance	1				1		This level of DCV is not included in the design at present. Can be "not applicable" if spaces meeting this criterion represent less than 40% of the total design ventilation
3.7.4 Demand Controlled Ventilation: Ventilation Heat Recovery System Features	5	5					The mechanical engineering team confirmed that these would be included.
3.8 Other Energy Efficient Equipment and Measures							
3.8.1 Elevators and Escalators: Regenerative Braking Elevators	3		3				To be determined.

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		100%	52.9%	32.1%	15.0%	9.3%	
This is an interim Green Globes checklist whilst we wait for the registration process to be completed to allow access to the online tool.		Available Points	Yes	Maybe	No	N/A	Commentary
3.8.1 Elevators and Escalators: Escalators Able to Stop or Slow Down if No Traffic	2				2	2	N/A as no escalators included.
3.8.2 Other Fixed Energy Efficient Equipment	5		5				To be determined.
3.9 Renewable Sources of Energy		-					
3.9.1 On-site Renewable Energy: % of Thermal and/or Electrical Consumption	15		15				Model using RETScreen or similar to determine the size of the required systems. Can be N/A if a study shows that this is not feasible.
3.9.2 Green Power: % Electrical Consumption	12		12				Purchasing of green power to be discussed with the owner.
3.10 Energy Efficient Transportation							
3.10.1 Site Is within 400 m of Public Transit Facility or Site Transit Score > 75%	10		10				To be confirmed.
3.10.2 Preferred Parking for Carpooling and Shelter for Waiting Persons	2				2		Only a small amount of parking is included in the site plan, therefore this is not thought to be feasible.
3.10.3 Alternative Fuel Re-fueling or EV Charging Station	5				5		There are none included at present.
3.10.4 Access to Bike Paths	3	3					It is understood that the site has excellent access to bike paths. To be confirmed.
3.10.5 Sheltered Bike Parking	3	3					Architectural team estimated bike parking would be for about 66% of units.
3.11.1 Net Zero Energy Building	10				10		Net Zero Energy is not a project objective.
<b>Total Section Points - Energy</b>		<b>395</b>	<b>227</b>	<b>90</b>	<b>56</b>	<b>24</b>	
4. Water		-					
4.1 Water Consumption		-					
4.1.1 Water Consumption - Reduction in Water Use	20	12	8				The project will include dual flush WCs and low flow fixtures but no waterless urinals. Point allocation shown is an estimate based on previous projects. To be confirmed.
4.1.1 Water Consumption - Plumbing Fixture Efficiencies	6	6					The mechanical engineering team confirmed that these or better fixtures will be included.
4.1.1 Water Consumption - Appliances	4	2	2				Clothes washers will comply but dish washers might not have appropriate qualifying models.
4.2 Cooling Towers		-					
4.2.1 Cooling Towers - Minimization of Make-up Water	2					2	N/A. The design includes no cooling towers.
4.2.2 Cooling Towers - Make-Up Water Monitoring and Control Features	4					4	N/A. The design includes no cooling towers.
4.2.3 Cooling Towers - % of Cooling Consisting of Dry Cooling	3					3	N/A. The design includes no cooling towers.
4.3 Boilers and Water Heaters		-					



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		100%	52.9%	32.1%	15.0%	9.3%	
This is an interim Green Globes checklist whilst we wait for the registration process to be completed to allow access to the online tool.		Available Points	Yes	Maybe	No	N/A	Commentary
4.3.1 Boilers and Water Heaters - Features	4	1	1			2	2 measures (not shown are N/A) as they apply to steam boilers.
4.4 Water Intensive Applications		-					
4.4.1 Commercial Food Service Equipment - Avoidance of Water Intensive Equipment	2		2				To be confirmed. Might be N/A.
4.4.1 Commercial Food Service Equipment - Water Usage of Appliances	4		4				To be confirmed. Might be N/A.
4.4.2 Laboratory and Medical Equipment - Sterilizer Features	1					1	N/A for this project.
4.4.2 Laboratory and Medical Equipment - Once-through Cooling Devices	1					1	N/A for this project.
4.4.2 Laboratory and Medical Equipment - Dry Vacuum Systems	1					1	N/A for this project.
4.4.2 Laboratory and Medical Equipment - Digital X-rays, MRIs, CT scans, etc	1					1	N/A for this project.
4.4.2 Laboratory and Medical Equipment - Fume Hoods	2					2	N/A for this project.
4.4.2 Laboratory and Medical Equipment - Refrigerator Space	1					1	N/A for this project.
4.4.2 Laboratory and Medical Equipment - Sub-metering of Water Used for Lab	1					1	N/A for this project.
4.4.3 Laundry Equipment - Water Factor of Coin or Card-operated Laundromat Machines	2		2				Review cut sheets from Uof A for compliance.
4.4.3 Laundry Equipment - Washing Machine Types if an Institutional/Industrial Laundry	2					2	N/A for this project.
4.4.4 Special Water Features - Water-Efficiency Measures	3					3	N/A for this project.
4.5 Water Treatment		-					
4.5.1 Filtration System Pressure Drop Gauge Feature	1				1		Not included in the current design.
4.5.2 Reverse Osmosis- Feature	1				1		Not included in the current design.
4.5.3 Water Softener Recharge Control - Feature	1				1		Not included in the current design. Can be marked N/A if no water softeners included.
4.6 Alternate Sources of Water		-					
4.6.1 Water harvesting on-site and reclamation	5				5		U of A prefers not to include water harvesting because of maintenance issues.
4.7 Metering		-					
4.7.1 Sub-metering for all water-intensive indoor applications	3		3				To be confirmed.
4.7.2 Sub-metering of potable water used for irrigation	3	3					The project team confirmed that a sub-meter will be included.
4.7.3 Water Meter Data Management System	3	3					The project team confirmed that this measure will be implemented.
4.7.4 Chilled and hot water loop makeup meters	2	2					The project team confirmed that this measure will be implemented.

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		100%	52.9%	32.1%	15.0%	9.3%	
This is an interim Green Globes checklist whilst we wait for the registration process to be completed to allow access to the online tool.		Available Points	Yes	Maybe	No	N/A	Commentary
4.8 Irrigation		-					
4.8.1 Xeriscaping	14				14		There will be no parts of the exterior vegetation that do not require irrigation.
4.8.1 Irrigation System - Use of non-potable water	3		3				There are no applicable features in the current design.
4.9 Water Innovation		-					
4.9.1 Net Zero Water	5				5		There are no plans for extensive water capture.
4.9.2 Use of all stormwater and/or grey water.	5				5		There are no plans for on site water treatment.
<b>Total Section Points - Water</b>		<b>110</b>	<b>29</b>	<b>25</b>	<b>32</b>	<b>24</b>	
5. Materials and Resources		-					
5.1 Building Assembly (C&S including Envelope)		-					
5.1.1 Life Cycle Assessment of design.	32		32				To be discussed in more detail. Has not been carried out to date.
5.2 Interior Fit-Out		-					
5.2.1 Environmental Product Declarations	10	6	4				Current point allocation is a place holder subject to further analysis.
5.3 Reuse of Existing Structures		-					
5.3.1 Facades - % of facade from an existing building on site retained in new design	6					6	This is a new build construction and it should be possible to show reuse of pre-existing buildings was not feasible.
5.3.2 Structural Systems - % of structural systems from an existing building on site retained in new design	5					6	This is a new build construction and it should be possible to show reuse of pre-existing buildings was not feasible.
5.3.3 Non-Structural Elements - % of interior ceilings, partitions, and/or demountable walls reused	5					5	N/A
5.3.3 Non-Structural Elements - % of existing furnishings reused	4					4	N/A
5.3.3 Non-Structural Elements - Incorporation of reused and off-site salvaged materials	4					4	N/A
5.4 Waste		-					
5.4.1 Construction Waste Management Plan	5	5					To be included in the specification and tender documents.
5.4.1 Construction Waste - Reuse of existing on-site materials for site development or landscaping	1		1				Existing houses on site might be usable. To be investigated.
5.4.2 Operational Waste - Features of operational recycling program	2	2					The project team confirmed that these items would all be included.
5.5 Building Service Life Plan		-					
5.5.1 Building Service Life Plan - Inclusion of expected service life estimates for building elements	6	6					The project team confirmed that these items would all be included.
5.5.2 Building Service Life Plan - Schedule for maintenance, repair, and replacement for each building element for duration of design life	10	10					The project team confirmed that this would be produced.
5.6 Resource Conservation		-					



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		100%	52.9%	32.1%	15.0%	9.3%	
This is an interim Green Globes checklist whilst we wait for the registration process to be completed to allow access to the online tool.		Available Points	Yes	Maybe	No	N/A	Commentary
5.6.1 Minimized Use of Raw Materials - Use of prefabricated, preassembled, and/or modular products in design	2		2				To be investigated further.
5.6.1 Minimized Use of Raw Materials - Design uses materials efficiently compared with typical construction	1		1				To be investigated further.
5.6.2 Multi-functional Assemblies - incorporated in design	1		1				To be investigated further.
5.6.3 Deconstruction and Disassembly - facilitated by design	20				20		This is not addressed by the current design.
<b>5.7 Building Envelope - Roofing/Opening</b>		-					
5.7.1 Roofing Membrane - Installation and Inspection	3	3					The project team confirmed that these requirements would be included in the specifications.
5.7.2 Flashings - Installation and Inspection requirements	3	3					The project team confirmed that these requirements would be included in the specifications.
5.7.3 Roof and Wall Openings - Feature, Installation and Inspection requirements	4	4					The project team confirmed that these requirements would be included in the specifications.
<b>5.8 Envelope - Foundation, Waterproofing</b>		-					
5.8.1 Foundation Systems - Requirements	2	2					The project team confirmed that these requirements would be included in the specifications.
5.8.1 Foundation Systems - Damp-proofing measures on foundation walls in contact with grade	2	2					The project team confirmed that these requirements would be included in the specifications.
5.8.2 Below Grade Wall Slabs and Above Grade Horizontal Assemblies - Waterproofing Membrane Assembly Requirements	2	2					The project team confirmed that these requirements would be included in the specifications.
<b>5.9 Envelope - Cladding</b>		-					
5.9.1 Exterior Wall Cladding Systems - Installation Requirement	1	1					The project team confirmed that these requirements would be included in the specifications.
5.9.1 Exterior Wall Cladding Systems - Inspection Requirement	1	1					The project team confirmed that these requirements would be included in the specifications.
5.9.1 Exterior Wall Cladding Systems - Joint Sealers	1	1					The project team confirmed that these requirements would be included in the specifications.
5.9.2 Rain Screen Wall Cladding - Installation requirements	1.5	1.5					The project team confirmed that these requirements would be included in the specifications.
5.9.2 Rain Screen Wall Cladding - AAMA 508-07 Lab-testing requirements	0.5				0.5		Testing will not be included.
<b>5.10 Envelope - Barriers</b>		-					
5.10.1 Air Barriers - Design and Installation Requirements	2		2				The GG requirements will be reviewed and analyzed further before a recommendation is made.
5.10.1 Air Barriers - Compliance Requirements	2		2				The GG requirements will be reviewed and analyzed further before a recommendation is made.
5.10.2 Vapor Retarders - Requirements 1	1		1				The GG requirements will be reviewed and analyzed further before a recommendation is made.
5.10.2 Vapor Retarders - Requirements 2	1		1				The GG requirements will be reviewed and analyzed further before a recommendation is made.
5.10.2 Vapor Retarders - Requirements 3	1		1				The GG requirements will be reviewed and analyzed further before a recommendation is made.
<b>5.11 Resource Innovation</b>		-					
5.11.1 One-time carbon offset accounting for total footprint of embodied carbon per project LCA assessment	10		10				These points will be held in reserve until just before the GG application, should they be needed.

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		100%	52.9%	32.1%	15.0%	9.3%	
This is an interim Green Globes checklist whilst we wait for the registration process to be completed to allow access to the online tool.		Available Points	Yes	Maybe	No	N/A	Commentary
<b>Total Section Points - Materials and Resources</b>		125	49.5	58	20.5	25	
<b>6. Emissions and Other Impacts</b>		-					
<b>6.1 Heating (Choose Path A OR Path B)</b>		-					
6.1.1 District heating or low emission heating	18	9	9				Ultra Low Nox boilers will be specified. CO emissions to be investigated.
<b>6.2 Cooling</b>		-					
6.2.2 Ozone-Depleting Potential - cooling equipment uses zero or near zero ODP refrigerants	10	10					The project team confirmed that ODP less than or equal to 0.005 would be specified.
6.2.3 Global Warming Potential - cooling equipment uses low GWP refrigerants	10	10					The project team confirmed that GWP of less than or equal to 100 would be specified.
6.2.4 Leak Detection - Testing requirement	3				3		Leak detection is not seen as appropriate for smaller equipment. Might be N/A
6.2.4 Leak Detection - Refrigerant leak detectors	3				3		Leak detection is not seen as appropriate for smaller equipment. Might be N/A
6.2.4 Leak Detection - Alarm system	3				3		Leak detection is not seen as appropriate for smaller equipment. Might be N/A
<b>6.3 Janitorial Equipment</b>		-					
6.3.1 Designated storage areas for hazardous materials with ventilation and floor-to-floor walls	3	3					Smoke separation needed in any event (floor to floor walls). The project will comply.
<b>Total Section Points - Emissions and Other Impacts</b>		50	32	9	9	0	
<b>7. Indoor Environment</b>		-					
<b>7.1 Ventilation</b>		-					
7.1.1 Ventilation Air Quality - ANSI/ASHRAE 62.1-2007	7	7					The project will comply with ASHRAE 62.1 - 2010
7.1.2 Air Exchange (Choose Path A, B, or C)	-						
<b>Path C: Combination of Mech &amp; Natural Ventilation</b>		-					The most appropriate route appears to be as a mixed mode building.
7.1.2c Mechanical Ventilation - Zone air distribution effectiveness EZ value ≥ 0.9	4	4					Zone air distribution effectiveness EZ value will be designed to be greater than or equal to 0.9 in all regularly occupied spaces.
7.1.2c Natural Ventilation - Conditions met as per ANSI/ASHRAE 62.1-2010: Section 5.1	4	4					Will include operable windows throughout.
<b>7.1.3 Ventilation Intakes and Exhausts</b>		-					
7.1.3 Ventilation Intakes and Exhausts - Pollutant control features	8	8					The project team confirmed that all criteria would be met by the design.
7.1.4 CO2 Sensing & Ventilation Control Equipment	5				5		Not included in the current design.
7.1.5 Air Handling Equipment - Equipped with MERV 13	5	5					MERV 13 filters are included.
<b>7.2 Source Control and Measurement of Indoor Pollutants</b>		-					
7.2.1 VOCs - Adhesives and sealants	2.5	2.5					The project specification will ensure that VOC limits are made clear.
7.2.1 VOCs - Carpet complies with CRI Green Label Plus	2	2					The project specification will ensure that VOC limits are made clear.
7.2.1 VOCs - Paint VOC limits	3	3					The project specification will ensure that VOC limits are made clear.



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		100%	52.9%	32.1%	15.0%	9.3%	
This is an interim Green Globes checklist whilst we wait for the registration process to be completed to allow access to the online tool.		Available Points	Yes	Maybe	No	N/A	Commentary
7.2.1 VOCs - Floor and floor coverings	2.5	2.5					The project specification will ensure that VOC limits are made clear.
7.2.2 Leakage, Condensation and Humidity - Measures to avoid fungus, mould, bacteria	8	8					The project team reviewed the criteria and confirmed that they will all be met by the project.
7.2.3 Access for HVAC Maintenance - Measures to facilitate maintenance of HVAC equipment	4	4					To be discussed with U of A
7.2.4 CO Monitoring - Devices and alarms in areas with sources of combustion	4		4				This is not typically done but easy and cheap to incorporate if desirable..
7.2.5 Wet Cooling Towers - Drift eliminators and inlet air louvers (or no wet cooling towers)	4					4	N/A as no cooling towers included.
7.2.6 Domestic Hot Water Systems - Tankless or storage at or above 55 C	2	2					The project team reviewed the criteria and confirmed that the design will comply.
7.2.7 Humidification and Dehumidification Systems - Drain pan design	3	3					The project team reviewed the criteria and confirmed that the design will comply.
7.2.8 Pest and Contamination Control - Integrated pest management strategies	2	1.5			0.5		The project team reviewed all of the criteria and confirmed that all will be included apart from the item on from mullion spacing.
7.2.8 Pest and Contamination Control - Sealed storage area for food/kitchen solid waste/recycling	1	1					The project team reviewed the criteria and confirmed that the design will comply.
7.2.9 Other Indoor Pollutants - Prohibition of smoking	1	1					The project team reviewed the criteria and confirmed that the design will comply.
7.2.9 Other Indoor Pollutants - "No Smoking" signage	1	1					The project team reviewed the criteria and confirmed that the design will comply.
7.2.9 Other Indoor Pollutants - Radon	5		5				Project site to be reviewed against radon map
7.2.10 Ventilation and Physical Isolation for Specialized Activities	1	1					Cooking and laundry will comply.
7.2.10 Ventilation and Physical Isolation for Specialized Activities - Negative pressure	1				1		Negatively pressurized areas were not seen as appropriate.
<b>7.3 Lighting Design And Systems</b>		-					
7.3.1 Daylighting - Minimum daylight factor of 2 (% of floor area)	7	7					Daylight factor to be calculated.
7.3.1 Daylighting - Exterior views (% of floor area)	5	5					The design is thought likely to comply but calculations will be required.
7.3.1 Daylighting - Shading devices	1		1				Shading devices are only being considered on courtyard areas.
7.3.1 Daylighting - Photo-sensors	3	1	2				Included throughout but not in student rooms.
7.3.2 Lighting Design - Prescribed lighting levels	7	7					The project team reviewed the criteria and confirmed that the design will comply.
7.3.2 Lighting Design - Luminance ratios	4		4				SMP to calculate luminance ratios.
7.3.2 Lighting Design - Average luminance	2	2					The design will target this measure and calculations will be carried out to confirm compliance.
7.3.2 Lighting Design - Ceiling uniformity	1	1					The design will target this measure and calculations will be carried out to confirm compliance.
<b>7.4 Thermal Comfort</b>		-					
7.4.1 Thermal Comfort Strategies - Thermal control zones 1	2	2					The project team reviewed the criteria and confirmed that the design will comply.

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		100%	52.9%	32.1%	15.0%	9.3%	
This is an interim Green Globes checklist whilst we wait for the registration process to be completed to allow access to the online tool.		Available Points	Yes	Maybe	No	N/A	Commentary
7.4.1 Thermal Comfort Strategies - Thermal control zones 2	2	2					The project team reviewed the criteria and confirmed that the design will comply.
7.4.1 Thermal Comfort Strategies - Thermal control zones 3	2					2	There are no applicable areas.
7.4.1 Thermal Comfort Strategies - Thermal control zones 4	3	2	1				The project team reviewed the criteria and confirmed that the design should achieve 2 out of 3 points.
7.4.1 Thermal Comfort Strategies - ANSI/ASHRAE 55-2010 or 55-2004	3		3				To be evaluated further.
<b>7.5 Acoustic Comfort</b>		-					
7.5.1 Acoustic Comfort Design - Strategies	6	4			2		The project team reviewed the criteria and confirmed that the design should achieve 4 out of 6 points.
7.5.1 Acoustic Comfort Design - Sound Transmission Class (STC) ratings	5		5				To be reviewed in more detail.
7.5.1 Acoustic Comfort Design - Impact Insulation Class (IIC) rating of floor-ceiling assemblies	2		2				To be reviewed in more detail.
7.5.1 Acoustic Comfort Design - Reverberation Time (RT)	5		5				Would require a study to review compliance. To be discussed with U of A.
7.5.2 Mechanical, Plumbing, and Electrical - Background sound levels of mechanical systems	2		2				To be researched further against GG criteria
7.5.2 Mechanical, Plumbing, and Electrical - Airborne noise from HVAC system	2.5		2.5				To be researched further against GG criteria
7.5.2 Mechanical, Plumbing, and Electrical - Structure-borne noise from HVAC system	2		2				To be researched further against GG criteria
7.5.2 Mechanical, Plumbing, and Electrical - Noise from plumbing system	1.5		1.5				To be researched further against GG criteria
7.5.2 Mechanical, Plumbing, and Electrical - Electrical system noise minimization best practices	2		2				To be researched further against GG criteria
<b>Total Section Points - Indoor Environment</b>		<b>150</b>	<b>93.5</b>	<b>42</b>	<b>8.5</b>	<b>6</b>	







## APPENDIX B: ALBERTA BUILDING CODE CALCULATIONS



### Occupant Load Calculations

FACULTY COMPONENTS	UNITS	G.F.A. (S.M.)	AREA PER PERSON (S.M.)	OCCUPANT LOAD	COMMENTS
<b>BASEMENT</b>					
Service Area		127	46.00	3	
Storage Area		133	46.00	3	
<b>TOTAL BASEMENT OCCUPANT LOAD</b>				<b>6</b>	
<b>MAIN FLOOR</b>					
Assembly					
Entry	1	70	1.85	38	
Pre-Function Space	1	115	-	-	included in dining hall as these are the same occupants
Dining Hall	1	288	-	300	
Kitchen/Servery	1	194	9.30	21	
Quiet Study	1	60	1.85	32	
Living Room	1	80	1.85	43	
Recreation Room	1	68	1.85	37	
Fitness	1	76	4.60	17	
Service & Administration					
Administration	1	98	9.30	11	
Conference Room	1	35	1.85	19	
Offices	4	60	9.30	6	
Residence					
Faculty Suite	1	66	-	2	
Guest Suites	6	197	-	12	
<b>TOTAL MAIN FLOOR OCCUPANT LOAD</b>				<b>538</b>	
<b>SECOND FLOOR</b>					
Residences					
Shared	25	-	-	50	
Single	10	-	-	10	
Social Spaces	5	165	1.85	89	
<b>TOTAL SECOND FLOOR OCCUPANT LOAD</b>				<b>149</b>	
<b>THIRD FLOOR</b>					
Residences					
Shared	25	-	-	50	
Single	10	-	-	10	
Social Spaces	5	165	1.85	89	
<b>TOTAL SECOND FLOOR OCCUPANT LOAD</b>				<b>149</b>	
<b>FOURTH FLOOR</b>					
Residences					
Shared	10	-	-	20	
Single	4	-	-	4	
Social Spaces	2	66	1.85	36	
<b>TOTAL SECOND FLOOR OCCUPANT LOAD</b>				<b>60</b>	
<b>Fifth Floor</b>					
City Room	1	100	0.75	133	
Roof Terrace	1	124	0.95	131	
Servery	1	30	46.00	1	
<b>TOTAL SECOND FLOOR OCCUPANT LOAD</b>				<b>265</b>	
<b>TOTAL OCCUPANT LOAD</b>				<b>1,166</b>	



### Egress Capacity Calculations

FACULTY COMPONENTS	OCCUPANT LOAD	EXIT	TYPE	WIDTH	EXIT CAPACITY	COMMENTS
BASEMENT	6					
		ST2	Stair	1,100	138	North-West Exit Stair
		ST5	Stair	1,100	138	South Exit Stair
<b>TOTAL EXIT CAPACITY</b>					<b>276</b>	
MAIN FLOOR	621					
		West	Door	1,800	282	North West Entrance
		North	Door	1,800	282	North West Entrance
		Courtyard	Door	1,800	282	North West Courtyard Access
		South	Door	900	141	South West Exit
		North	Door	1,800	282	East Prefunction
		Courtyard	Door	1,800	282	East Prefunction
		East	Door	1,800	282	Dining Hall
		East	Door	1,800	282	Dining Hall
		South	Door	1,800	282	Kitchen
<b>TOTAL EXIT CAPACITY</b>					<b>2,397</b>	
SECOND FLOOR	149					
		ST2	Stair	1,100	138	North-West Exit Stair
		ST3	Stair	1,100	138	North Exit Stair
		ST4	Stair	1,100	138	North-East Exit Stair
		ST5	Stair	1,100	138	South Exit Stair
<b>TOTAL EXIT CAPACITY</b>					<b>552</b>	
THIRD FLOOR	149					
		ST2	Stair	1,100	138	North-West Exit Stair
		ST3	Stair	1,100	138	North Exit Stair
		ST4	Stair	1,100	138	North-East Exit Stair
		ST5	Stair	1,100	138	South Exit Stair
<b>TOTAL EXIT CAPACITY</b>					<b>552</b>	
FOURTH FLOOR	60					
		ST2	Stair	1,100	138	North-West Exit Stair
		ST3	Stair	1,100	138	North Exit Stair
		ST4	Stair	1,100	138	North-East Exit Stair
<b>TOTAL EXIT CAPACITY</b>					<b>414</b>	
Fifth Floor	265					
		ST2	Stair	1,100	138	North-West Exit Stair
		ST3	Stair	1,100	138	North Exit Stair
<b>TOTAL EXIT CAPACITY</b>					<b>276</b>	
<b>TOTAL EXIT CAPACITY</b>					<b>4,467</b>	





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