EXECUTIVE SUMMARY

MISSION

The design mission was to refine the space program developed in pre-design and to develop the preferred pre-design option for the new 352 bed Residence Hall. This new Residence Hall will become a model for the next generation of residence halls at Eastern Washington University. This model shall appeal to students of all class levels.

The University has established a budget for the project. The design of the Residence Hall shall live within the budget constraints while creating an architectural ambiance that reflects the campus fabric and conveys a sense of engaged social and living accommodations.

This new Residence Hall will provide a memorable and identifiable community for students.

METHODOLOGY & PROCESS

Pre-Design Research:

• Through the engagement of a housing/residential life consultant (Douglas Hyde Design), the team was made aware of what has and is happening on campuses in other areas of the country. The team also became familiar with the program components of student housing projects.
• The team toured the existing EWU housing to assess existing conditions and housing standards.
• The team met with a variety of EWU groups (Administrators, Directors, Resident Directors, CA’s and Students) to discover their points of view and ideas as to what works, what doesn’t work and what needs to be added to make an EWU residence hall viable and livable.
• The team toured new housing models at Washington State University and University of Idaho.

Pre-Design Development:

Utilizing the information gained during the research phase, a program and space attributes were developed:
• A program was developed indicating the quantity of rooms, lounges and support spaces needed to meet the project mission.
• The qualifications or attributes of each of the program elements provide guidelines for the size, quality, finish, comfort and furnishings in these rooms.

The net result is a space program of approximately 101,000 square feet.

Pre-Design Implementation

Site Planning:

• Diagrams were developed to demonstrate the site attributes.
• The diagrams assist in identifying the probable building locations.
• Site infrastructure was reviewed to plan the available points of service to the building.

Pre-Design Conceptual Development:

• In addressing 352 beds in the facility, the building organization looked at 4, 5 and 6 story configurations, availability and quantification of open space and existing circulation to the site.
• Stacking of the stores created mass models that began to present images of a building and its relation to surrounding housing.
• Each of these mass models was analyzed and Pros and Cons developed.

The net result of this effort pointed to the elimination of the 4-story idea. The 5- and 6-story ideas were to be developed further with a focus on the orientation of the courtyard, the prominence of the building entry and an identifiable front porch.

Sketch renderings were provided to give a sense of architecture to the concepts.
Schematic Design:

Pre-Design culminated with the selection of the preferred concept, which has been carried forward into Schematic Design. Included in the Schematic Design Report were the following documents:

- Program
- Room Layouts
- Drawings, including Site Plan, Floor Plans, Architectural Renderings, etc.
- Architectural, Structural, Mechanical, Electrical, Civil and Landscape Narratives.
- Cost Data, including Cost Model and Project Budget

Design Development:

Schematic design defined the general characteristics, development and opinion of cost of the Southeast Courtyard Option. The Design Development Report includes:

- Revised Narratives
- Exterior/Interior Renderings
- Outline Specifications
- Civil Drawings
- Landscape Drawings
- Structural Drawings
- Architectural Drawings
- Mechanical Drawings
- Electrical Drawings
- Updated Opinion of Cost

Cost Summary

The MACC identified by the University is $16,600,000 with a project budget of $24,997,736. The current construction cost estimate is at $17,557,655. With adjustments to several line items in the budget and with the current estimated construction cost, the project is currently $243,313 over budget. Deductive alternates have been developed that result in the project being on budget.
Design Principles

Viable:
- Create a safe, secure environment.
- Honor the budget.
- Fulfill program requirements.
- Provide clear organization, circulation and zoning (interior and exterior).
- Operational and maintenance costs to be balanced with first cost.
- Provide universal accessibility.

Liveable:
- Healthy environment - daylight, views, good air quality and thermal comfort.
- Encourage formal and informal interaction between students.
- Accommodate technology.

Identifiable:
- A student centered building promoting a sense of community.
- Open and inviting with good visibility of community spaces.
- Reinforce the existing campus character while establishing a new identity for residence halls.

Flexible:
- Accommodate current programs and future changes.
- Multi-use spaces that can accommodate differing programs and community use.
- Create rooms that are flexible and allow for student adaptation.

Memorable:
- Create spaces and provide amenities that are unique and memorable.
- Build relationships - students, staff, parents and community.
- Social interaction – open and inviting.
- 2-D and 3-D display to allow students to modify and personalize their neighborhoods.

Sustainable:
- Optimize energy performance and conservation.
- Foster respect for and knowledge of natural environment.
- Meet LEED Silver.
- Create a building that is durable, maintainable and long lasting.
By analyzing the site through a series of diagrams and site visits, the team made several observations about the site. The site diagrams created during this process informed the design of the project through schematic design.

The following observations were made:

- Most of the access to the site occurs and is projected to occur along cedar street and 10th street.
- Primary access to the site occurs near the southeast corner.
- The site is central to the resident life area of campus, and 10th is a major portal for student traffic.
- The site has an opportunity to contribute to the open/green space in the area, preferably along 10th.
- In terms of connection to campus, the southeast corner is most proximate to the campus heart.
- The site has opportunity to contribute to identity (campus as well as resident life), especially along cedar and the southeast corner of the site.
EYE LEVEL PERSPECTIVE
ENTRY LOOKING WEST
GREAT ROOM EAST
KITCHEN
SOLAR STUDIES

East Social Room

June 21

September 21

December 21
**SOLAR STUDIES**

**Lounge**

**June 21**

10 am | 1 pm | 4 pm

**September 21**

10 am | 1 pm | 4 pm

**December 21**

10 am | 1 pm | 4 pm
SOLAR STUDIES

Lounge

June 21

September 21

December 21

10 am

1 pm

4 pm
SOLAR STUDIES

South Social Room

June 21

10 am

1 pm

4 pm

September 21

10 am

1 pm

4 pm

December 21

10 am

1 pm

4 pm
ROOM LAYOUTS: COMMONS

Banquet

Lounge

Presentation
Location and Context

The project site is located north of Cedar Street and flanked by North 10th Street and North 11th Street. The current parking lot on the site has a low point near the southeast corner and rises to the northeast and northwest approximately 6’. The site adjoining 10th Street rises approximately 16’ from Cedar to the north lot line. The site is adjacent to Dryden and Louise Anderson Hall to the east, Streeter and Morrison to the north and Pearce and Dressler to the southwest. The University Recreation Center (URC) is directly south between Cedar and Elm Street with a major pedestrian promenade along the east side of the URC. The central location to existing residence halls, pedestrian traffic and campus utilities makes the site and excellent choice for the new Residence Hall and Residence Life Office.

Site Plan

The New Residence Hall has been placed on the site to maximize natural sunlight into the southeast facing courtyard, to create a sense of place, provide connection to the URC promenade, and to be welcoming to both residents of the building as well as residents of neighboring residence halls and the campus community. The courtyard provides three distinct zones, a semi-circular forecourt adjacent to the entrance and lobby and a central blue grass lawn extending as a rectangle from Cedar Street culminating with the “Front Porch” to the north. The third zone is the entrance and enclosure, featuring a semi-circular park-like seating area. This area will be more organic in nature, with trees creating a sense of enclosure, while being sparse enough not to be a barrier. Walkways have been defined to be a response to major pedestrian movement across the site, with the width of each walkway being scaled to respond to the amount of pedestrian movement anticipated. The major walkway is a gentle curve that bisects the courtyard allowing for a direct, yet organic, smooth approach to the entrance of the building. The 11th Street site area is utilitarian, providing for dumpster and service-related functions as well as a secondary entrance to the building. Trash and recycle removal is inconspicuously located to the north of the building and screened. Drop-off areas have been created on both Cedar Street and on 11th Street. Street furniture, such as benches, pedestrian scale lighting, and trash receptacles are placed strategically throughout the site. The site also uses local basalt to provide for seating elements and miscellaneous site features. Landscaping has been designed for beauty, practicality, and ease of maintenance. Thin strips of green space along 10th Street and elsewhere have been designed using ground cover and drought tolerant lawn to minimize maintenance. The thin strip of land along 10th Street is terraced to provide for a grade transition and to assist in controlling site drainage. Sidewalk, forecourt, and terrace materials have been selected with snow removal in mind. ADA parking has been provided as required.

Building Organization

The proposed New Residence Hall is a five story building forming a southeast facing courtyard or green. The Ground Floor is devoted to more public functions and includes the main entrance and lobby, desk and office space, a commons or great room, seminar, residence life offices, resident director apartment, bicycle storage, servery, general storage and mechanical/electrical space. Providing a transition between interior commons and the exterior courtyard, a highlight of the Residence Hall is a continuous south facing front porch. Further enhancing this transition and residential experience is the linear wood ceiling of the “Front Porch”, which will continue into the lobby and commons; providing connectivity and warmth to these various spaces, emphasizing “community”. The creation of community and student interaction is enhanced by the design, both inside and out, at every opportunity.

The commons, or great room, has been designed to provide for maximum flexibility. This room can be configured as a living room/lounge, in theatre mode for presentations and large seminars, and for catered dining. The focus of the room is a gas fired basalt stone fireplace, providing visual and physical warmth to this space. An additional feature of this room is a grand piano, a provision for musical interludes and special performances. The finishes and furnishings of the room will provide for flexibility with polished concrete floor and warmth and comfort with area carpets, soft furniture, wood slated partial ceiling, pendant lighting fixtures and coffered central ceiling area.
Floors 2-5 are student living floors and provide for a total of 352 beds including predominately traditional doubles, some triples, and CA singles. A typical floor is organized with a central core that includes the elevators, a central community social lounge with kitchen, a laundry and two distinct residential neighborhoods. In addition to student rooms, each of the two residential neighborhoods provides a study lounge, central spa type bathrooms, a gaming room, recycle and trash room and a janitor’s closet. In addition, one of the neighborhoods provides an additional social lounge. These neighborhoods are configured such that they could be broken into smaller living groups if desired at some point in the future, allowing for flexibility.

The corridors are designed to be predominately 8’-0” wide to create a more open feeling, allowing opportunities for interaction and occasional seating. This corridor will enhance community and in essence be a “room” rather than just a means of circulating through the building. A wainscot provides scale and warmth in the corridors. Corridor intersections are accented by special ceiling treatment, lighting and carpeting design. Windows and window seats have been placed strategically at the ends of major corridors. To further enhance the residential feeling and to make a connection to the ground floor, linear wood soffits have been designed to identify study and social lounge spaces. Tother, these elements provide rhythm and variety to the corridor rooms.

The “Front Porch” strengthens the design approach by translating traditional porch/portico elements, columns and entablatures in a new way, making it special and progressive. The inclusion of Adirondack furniture furthers the traditional nature of this central iconic feature.

The material pallet includes brick, cast stone, metal panels, high profile asphalt roof shingles and glass.

**Interior Character**

Currently, the project is tracking with the defined program area. The Residence Hall incorporates extensive use of natural daylight that will penetrate into the corridors of the building. Windows have been placed strategically at the ends of corridors to further the feeling of openness and views to the exterior.

The interior finishes are warm and residential in nature and exude a feeling of being “residential”. Wood is being used for doors, student room furniture, and features within the building. Corridor carpeting is patterned and more hospitality-like in nature, adding color and excitement as one circulates through the building. The finishes have been selected to be durable and easily maintained, supporting an atmosphere that encourages social interaction that promotes relationships between students, staff, parents and community. Each floor showcases a related but different color scheme to enhance wayfinding and a sense of neighborhood.

Interior lighting has been selected to highlight, create rhythm and provide for safety.

The lobby provides for a variety of seating arrangements, a front desk that is both functional and welcoming and a feature wall that includes a place for circulating art and a location for the future name of the residence hall.

Acoustic needs have been addressed appropriately throughout the building and a sound transmission rating of 55 is being provided between student rooms.

**Exterior Character**

The architectural vocabulary of the building harkens back to the historic fabric of the original campus, while also incorporating modern elements respectful to the modern campus. This sensitive approach suggests a philosophy and pallet for the design of future residential buildings to be constructed on the EWU campus.

The overall massing of the building, with its pitched roof, strong pediments, punched windows with cast stone sills, cast stone copings, belt coursing, water tables, rusticated brick base, chimneys, dormers and other detailing take reference from the historic campus; while the exterior articulation of the lounges and attention to detail reflect a transparency and community in a contemporary approach.
The organization of spaces provides for a safe, secure environment that is universally accessible with clear zoning and building systems that optimizes energy performance and encourages student understanding of sustainability. The new residence hall will meet, at a minimum, LEED Silver requirements.

### Material Applications
#### 1st Floor Finishes

**Lobby:**
- Flooring: Polished concrete (2 different shades)
  - Occasional area rugs
  - Built-in entry mats at doors
- Walls: Painted Gypsum with occasional wood wainscoting.
- Ceiling: Acoustical ceiling tile, Gypsum, and Linear wood ceiling.
- Base: 6” rubber base

**Reception:**
- Flooring: Polished concrete (2 different shades)
- Walls: Painted gypsum with wood wainscoting.
- Casework: Plastic laminate base cabinetry
  - Solid Surface/Quartz transaction height counter
  - Plastic laminate workstation counter
- Base: 6” rubber base on walls, 4” rubber base on casework

**Great Room/ Commons**
- Flooring: Polished concrete (2 different shades)
  - Occasional area rugs
- Walls: Painted gypsum and linear wood on north wall
- Ceiling: Acoustical ceiling tile, Gypsum, and Linear wood ceiling.
- Base: 6” rubber base

**Seminar/MP**
- Flooring: Carpet Tile
- Walls: Painted Gypsum
- Ceiling: Acoustical ceiling tile
- Base: 4” rubber base

**Open Office and Offices**
- Flooring: Carpet Tiles
- Walls: Painted Gypsum
- Ceiling: Acoustical ceiling tile
- Base: 4” rubber base

**Storage**
- Flooring: Solid sheet vinyl
- Walls: Painted gypsum
- Ceiling: Acoustical ceiling tile
- Base: 4” rubber base

**Mail Room**
- Flooring: Solid sheet vinyl
- Walls: Painted gypsum
- Ceiling: Acoustical ceiling tile
- Base: 4” rubber base

**Elevator Mechanical**
- Flooring: Concrete
- Walls: Painted gypsum
- Ceiling: Acoustical ceiling tile
- Base: 4” rubber base

**RD Apartment**
- Flooring: Vinyl wood plank flooring
- Walls: Painted gypsum
- Ceiling: Acoustical ceiling tile
- Base: 4” rubber base

**Receiving**
- Flooring: Concrete
- Walls: Painted gypsum
- Ceiling: Exposed structure
- Base: 4” Exposed structure
Telecom
- Flooring: Concrete
- Walls: Painted gypsum
- Ceiling: Acoustical ceiling tile
- Base: 4" rubber base

Staff
- Flooring: Carpet tiles.
- Walls: Painted gypsum
- Ceiling: Acoustical ceiling tile
- Base: 4" rubber base

Toilets
- Flooring: Porcelain tile
- Walls: Ceramic tile and painted gypsum
- Base: Porcelain tile cove base to match flooring

Servery/ Break
- Flooring: Solid sheet vinyl
- Walls: Painted gypsum
- Ceiling: Acoustical ceiling tile
- Base: 4" rubber base

Floors 2-5 Finishes

Corridor
- Flooring: Carpet tiles
  - Unique pattern at nodes
- Walls: Painted Gypsum and plastic laminated wainscoting with wood trim.
  - Accent paint color defined by floor
- Doors: Wood
  - Framed by tackable surface - Wall covering defined by floor
- Ceiling: Acoustical ceiling tile, Gypsum, and linear wood ceiling
- Base: 4" Rubber base

Residence Rooms
- Flooring: Vinyl wood plank flooring
- Walls: Painted gypsum
  - Accent wall at window
- Ceiling: Gypsum
- Base: 4" rubber base

Social/Sitting Rooms
- Flooring: Carpet tiles
- Walls: Painted gypsum
- Ceiling: Linear wood ceiling and gypsum
- Base: 4" rubber base

Kitchen
- Flooring: Vinyl wood plank flooring
- Walls: Painted gypsum
- Casework: Plastic laminate base cabinetry and solid surface countertop.
- Ceiling: Gypsum
- Base: 4" rubber base

Recycling/Electrical/Custodian/Telecom/Mechanical/Fan Coil
- Flooring: Solid sheet vinyl
- Walls: Painted gypsum
- Ceiling: Acoustical Ceiling Tile
- Base: 4" rubber base

Bathrooms
- Flooring: Porcelain tile
- Walls: Ceramic tile and painted gypsum.
- Shower Partitions: Solid plastic
- Ceiling: Gypsum
- Base: Porcelain tile cove base to match flooring
- Countertops: Solid surface material with flush sinks

Laundry
- Flooring: Solid sheet vinyl
- Walls: Painted gypsum
- Ceiling: Acoustical ceiling tile
- Base: 4" rubber base
The following design narrative provides a general overview of the structural design including design loads, performance criteria, system descriptions, and material specifications.

**PROJECT OVERVIEW**

The project consists of a residence hall with related common and support spaces to house 352 students. Total size of the project is approximately 105,000 square feet. The building will be constructed as a “podium” structure. This type of structure utilizes bearing walls for the upper floors which are supported by a cast-in-place transfer slab over the bottom floor. Construction will be wood stud bearing walls, wood floor joists and wood roof trusses.

**DESIGN CRITERIA**

- 2009 International Building Code and Referenced Code Standards Therein
- Roof (Snow) 30 PSF (1)
  
  (1) Designed for drifting snow in accordance with ASCE 7.
- Elevated Floor Live Load:
  1. Private Rooms 40 PSF
  2. Public Rooms 100 PSF
  3. Attic Mechanical Mezzanine 100 PSF
  4. Attic Catwalk 40 PSF
  5. Corridors 100 PSF
- Roof Total Load Deflection Limit L/240
- Roof Live Load Deflection Limit L/360
- Floor Total Load Deflection Limit (Residential Living Areas) L/480
- Floor Live Load Deflection Limit (Residential Living Areas) L/600
- Floor Total Load Deflection Limit (Common Areas) L/240
- Floor Live Load Deflection Limit (Common Areas) L/360
- Wind Design
  1. Basic Wind Speed (3-second gust) 85 MPH
  2. Exposure B
  3. Occupancy Category II
  4. Importance Factor 1.0
- Seismic Design
  1. Occupancy Category II
  2. Importance Factor 1.0
  3. Site Class B
  4. Seismic Design Category B

**MATERIAL SPECIFICATIONS**

- Concrete Strengths (at 28 days)
  - Foundations and Footings 3000 PSI
  - Slab on Grade 4000 PSI
  - Post Tensioned Slab and Beams 5000 PSI
  - Columns and Walls 4000 PSI
- Wood Framing
  - Floor Joists RedBuilt Douglas Fir
  - Dimensional Lumber Larch No. 2
- Structural Steel
  - WF Columns and Beams ASTM A992
  - HSS Columns and Beams ASTM A500, Grade B
  - Miscellaneous Shapes and Plates ASTM A36

**STRUCTURAL FRAMING**

- Roof Framing System:
  
  Roof framing consists of ½” APA rated plywood sheathing supported by prefabricated wood trusses at 24” on center. Wood stud bearing walls will support the trusses at the exterior and corridor walls.

  An attic mechanical space will be created in five areas of the building to allow for mechanical units. The attic mechanical space will consist of a 1” gypcrete topping on ¾” APA rated plywood sheathing supported by the bottom chord of the truss.
Floor Framing System:

The floor framing for the upper four floors consists of a 1" gypcrete topping on ¾" APA rated plywood sheathing supported by solid web wood "I" joists. Wood stud bearing walls will support the joists at the exterior and corridor walls. A 2x joist will be used over the corridors to provide space for mechanical and electrical systems. Beams will be provided as required over openings. Where possible, beams will be flush with the bottom of the solid web floor joists.

To provide more open area and future flexibility on the lower floor, the bearing walls for the upper four floors will be supported on a 12" deep cast-in-place, post-tensioned transfer slab. The slab will be supported by 14" square concrete columns spaced at a maximum of 30 feet on center. In the common areas, which require a column free space exceeding 30 feet, the post-tensioned slab will be increased to 20" deep by 5'-0" wide at each column line. Ten inch minimum thick concrete walls at the exterior and around the stairs and elevators will also provide support for the transfer slab. Concrete wall thickness will be increased as required to provide a brick ledge for the exterior veneer.

Wall Framing System:

Interior and exterior bearing walls consist of 2x6 at 16 inch on center wood studs. Exterior masonry veneer will be anchored to the stud walls to resist wind and earthquake forces perpendicular to the face of veneer. Veneer can be self supporting for its weight up to 30 feet above the transfer slab at the eaves and up to 38 feet above the transfer slab at the gable roof ends. To maximize the height of brick on the building, a partial height 6" concrete wall poured integrally with the post-tensioned concrete slab at the second floor will provide the non-combustible foundation for the veneer. Masonry veneer above 38 feet on the gable ends of the building will be supported by galvanized ledger angles supported by steel columns or steel beams.

Foundations:

Conventionally reinforced spread and continuous footings will support the building. Isolated concrete pad footings will support interior and exterior columns. A continuous concrete foundation wall and footing will link the exterior pad footings and provide a frost depth wall on which to bear the exterior studs and finishes. Due to the sloping site, a portion of the lower level will be built partially below grade similar to a daylight basement. A 10" minimum concrete wall supported on a continuous concrete basement footing will be used to retain the earth on the north and east sides of the building. Concrete wall thickness will be increased as required to provide a brick ledge for the exterior veneer.

As a result of the Value Engineering process, a portion of the second floor will be built on grade. Continuous foundation walls and footings will be provided below the wood bearing walls in this area.

A geotechnical engineering evaluation of the site has been prepared by GeoEngineers, Inc. Per the geotechnical report, existing on site soils are unsuitable for direct support of building foundations. Geopiers® will be used to improve the on site soils so that conventional footings can be used.

The floor slab will be four inches thick and reinforced to minimize shrinkage cracking. The subgrade will be prepared in accordance with the geotechnical engineer's recommendations.

Lateral Force Resisting System:

At the upper floors, wind and earthquake forces will be resisted by plywood shear walls. Shear wall sheathing will be provided on one side of most of the corridor walls and on one or both sides of partition walls between resident rooms and common spaces. Shear wall sheathing on partition walls between adjacent resident rooms will be limited to allow for future flexibility in relocating partition walls. Shear wall sheathing will also be provided on walls at the elevators and stairs and some of the exterior walls. Overturning forces will be resisted by an anchor tie system consisting of steel rods from the podium slab to the roof. Plywood sheathing at the roof and floor diaphragms will distribute the lateral loads to the shear walls.

Below the cast-in-place slab, wind and earthquake forces will be resisted by concrete shear walls at the perimeter and around the stairs and elevators. The cast-in-place slab will distribute the lateral loads from the upper levels to these shear walls.
PLUMBING SYSTEMS

Plumbing Fixtures

- Toilet room water closets and lavatories will be constructed of commercial grade vitreous china. Water closets in public restrooms will be floor mounted and community in bathing rooms water closets will be wall hung.
- Commercial grade dual flush valves will be utilized at water closets in living areas. Sensor operated, battery power operated flush valves will be used at all water closets in main floor lobby restrooms.
- Hands free sensor operated electric (battery operated) faucets with integral thermostatic mixing controls will be provided on main floor lobby restrooms but not at lavatories located within private living units or at lavatories within bathing/shower areas. Lavatory traps and supplies will be insulated per ADA requirements.
- Sinks will be stainless steel, with single lever faucets of cast brass construction.
- Custodial sinks will be provided with wall faucet and lever handles.
- Drinking fountains will have filtered water, water bottle fillers will be placed at the drinking fountains.
- Water Conservation: The following items will be reviewed by the design team and Eastern Washington University for Water Conservation and Long Term Campus Standardization/Maintenance considerations: Dual flush (1.6/1.1 GPF) water closets, ultra-low flow water closets (1.28 GPF), and 1.5 GPM showers. Lavatory faucets will deliver 0.5 GPM. Grey and black water reclamation are not being considered at this time due to budget restraints and increased maintenance.

Domestic Water Distribution

- A single water service (4" estimated size) will be provided to the building from the water main that parallels the west side of the building.
- (2) Double check valve backflow prevention assemblies will be provided in the plumbing utility room.
- Water pressures on campus are generous (80-90 psi static pressure range). As customary on EWU campus buildings, pressure reducing stations have not historically been provided on the water service.

- A domestic hot, hot water recirculation and cold water distribution system will be provided throughout the building. Hot water will be produced and stored at 140 degrees. Water will be mixed at a blending valve to 120 degrees and recirculated throughout the building.
- Campus Standard-dual control valved instantaneous steam to hot water. This approach capitalizes on the campus steam network with high quality heat exchangers. The fuel efficiency at the source for using steam from the campus natural gas fired boilers is expected to be no more than 70% efficient.
- Valves will be provided at all branch take-offs to individual fixture groups and at the base of vertical risers. Zone valves will also be provided. Balancing valves will be placed in return loops at connections of the hot water piping.
- Materials
  - Water Piping (above grade): Copper type L
  - Gas Piping (above grade): Black steel, schedule 40

Sanitary Waste System

- Sewer service will exit the west side of the building and connect to the sewer line that parallels the west side of the building. Piping will exit the building with a 6” waste line.
- A gravity sanitary drainage system will be provided to serve all plumbing fixtures and equipment. Sanitary waste lines will be routed to new connection points provided by the civil engineer within five feet of the building exterior.
- Materials
  - Drain, Waste, Vent Piping (above grade) : Cast Iron
  - Waste Piping (below grade): PVC, ABS

Rainwater Drainage System

- Gravity primary and overflow storm drainage system with interior roof drain leaders is not anticipated with the pitched roof construction. Rain harvesting will not be provided due to limited amount of rain in Eastern Washington.
Propane Gas System

- Above grade liquid propane tank with a stage one regulator will be utilized to serve a gas fireplace.
- Materials
  - Below grade gas piping from stage 1 to stage 2 regulator will be PE tubing.
  - Above grade gas piping will be schedule 40 steel piping.

HVAC SYSTEMS

Acoustics

- Recommendations for the project acoustician will be strictly adhered to. This includes allowable noise levels for mechanical equipment as well as required pipe and duct penetration isolation between living units.

Outdoor Design Conditions

- Heating Systems shall be sized for the ASHRAE median of extremes for Cheney, Washington which is -9°F.
- Cooling systems shall be sized for the ASHRAE 0.1% design condition temperature for Cheney, Washington which is 99°F dry bulb and 69°F wet bulb.

Indoor Design Conditions

- Cooling is not provided in the bedrooms of the housing unit. Cooling is provided in the social areas, corridors, restrooms, the lower level apartments, and the lower level regularly occupied spaces (office, meeting rooms, etc).
- In cooling mode, the occupied spaces with air conditioning shall be designed to control to 74 to 76°F during occupied mode. Telecommunication rooms will control to 68-75°F 24 hours per day, 7 days per week. Mechanical and electrical spaces will control to 85-90°F
- The corridors on floors 2 through 5 would be considered tempered—they have generous air conditioning but when students open the doors from their rooms, they will rob cooling from the hall system.
- In the heating mode, the occupied spaces shall be designed to control to 68-70°F during occupied mode. Telecommunication rooms will control to 68-75°F 24 hours per day, 7 days per week. Mechanical and electrical spaces will control to 55°F.
- If the thermal comfort LEED credit is pursued for this project, the heating mode conditions may need to be increased to 71 to 72°F to meet published comfort standards established in ASHRAE Standard 55 for low humidity regions.

Exterior Envelope Requirements

- General: Components of the building envelope will be insulated to meet or exceed the Washington State Energy Code (2009) for Spokane County located in Washington State Climate Zone 2.
- Glazing U value is an overall assembly value that combines mullions and glazing and is rated by NFRC.
- Minimum Values (residential):
  - Roofs: R-38 continuous rigid insulation
  - Wall-above grade-wood framed: R-19 wood stud plus R-11 continuous rigid insulation (U=0.044)
  - Wall-below grade: Same as above grade
  - Slab on Grade: R-10 rigid for 24 inch minimum (with thermal break), (F=0.54)
  - Opaque Doors: U-0.40
  - Glazing: U-0.36 for non-metal framing
  - U-0.42 for metal framing, operable windows

Heat Generation

- Steam to Hot Water Converter: The campus central steam plant distributes 100 psig steam to the campus buildings via underground utility.
tunnels. Very preliminary loads estimate the steam peak load at 5000-6000 lbs/hr for heating and domestic hot water. EWU has indicated that the system is sufficiently sized to allow for future campus growth. The main utility tunnel is located under the sidewalk on the south of the building within close proximity to the building footprint. A shallow utility trench with steam (servicing Streeter and Morrison Halls) is located along the east side of the site. A branch from the main utility tunnel from Cedar Street will be extended to the building and would enter the lower level steam service room in the southwest corner of the building. A condensate pump located in the steam room would return condensate to the pumped condensate pipe in the tunnel that returns the condensate back to the central steam plant. High pressure campus steam would be reduced to low pressure steam within the mechanical room. Low pressure steam is piped to the domestic water heaters, lower level air handling unit and convertors that convert steam to hot water to be used for terminal unit heating. It is assumed the steam system is no more than 70% efficient when central plant boiler efficiencies, steam condensate loss and pipe losses between the central plant and the building are considered. The high pressure steam service size for the building is 3” and the pumped condensate is 1 ½”

- **Water Treatment:** The hydronic heating system will be freeze protected with a propylene glycol solution due to freeze potential of heating coils located in the 100% outside air heat recovery units.
- **Materials**
  - Low pressure steam: Black steel, schedule 40
  - High pressure steam: Black steel, schedule 80
  - Steam Condensate: Black steel, schedule 80
  - Hydronic Heating Water Piping: Copper or steel pipe, schedule 40

### Refrigeration

- **Campus Chilled Water Plant:** Chilled water to the building would be provided from the campus central chilled water plant. The campus water plant distributes chilled water to the buildings on campus via underground utility tunnels. Preliminary estimates of peak chilled water demand for partial building cooling are 120-135 tons and 240 to 270 GPM.
- **Water Treatment:** Consistent with campus standards, the chilled water system will not be glycol and the main air handling unit will require winter drain down for freeze protection. The majority of the fan coil units will be recirculating type (not subject to freezing) and will not require winter drain down.
- **Materials**
  - Hydronic Chilled Water Piping: Copper or steel, schedule 40

### Ventilation

- **Ventilation** will be provided in accordance with ASHRAE Standard 62 (Ventilation for Acceptable Indoor Air Quality). Each programmed space will be designed to accommodate the appropriate occupancy requirements based on ASHRAE Standards and other applicable codes and standards as listed below in terms of minimum outdoor air volumes, as well as make up and exhaust air requirements.
- The ventilation system make-up air and exhaust will operate 24 hours per day. Heat recovered from the building exhaust air will be used to temper the fresh air with a heat recovery unit that contains air to air heat exchangers. The fans and heat exchanger units will be located in the attic space. Fresh air and exhaust ductwork will be ducted horizontally in the attic where it will be distributed vertically through the building.
- Fresh air for the living units and make up air for the exhaust systems will be conditioned at terminal units on each level and introduced into the hall way system. This supply air will be transferred from the hall way to the living units, toilet rooms, shower areas and custodial rooms where it will be exhausted.

### Air Handling Units

- **Air handling units serving the lower level shall be central station type variable volume air handling units.** Units will be modular type, pre-packaged by the manufacturer, and shall include fans, steam face and bypass heating coil, chilled water coil, filter, and mixing box sections. Outside air for the units will vary between a minimum setting and 100% based upon minimum outside requirements and economizer cooling demand.
• Heat recovery units will be provided for the dedicated outside air system serving floors two through five. Heat recovery units will be packed with supply fan, heating coil, pre-heat coil, energy recovery wheel, filters, exhaust fan. Units will deliver a fixed ventilation airflow and heat recovery controls will include a defrost cycle.

Terminal Units

• Perimeter Hydronic Heat: The two and three bedroom student living units will be heated with hot water radiant heat (fin tube or radiator).
• Fan Coil Units: The fan coils units serving the social areas on floors 2 through 5 will be heated and cooled with hydronic fan coil units with heating and chilled water coils.
• Variable Air Volume Terminal Units: The variable volume terminal units located on the first floor will be either single duct terminal units for small zones or parallel fan powered boxes with air flow volume damper, air flow measurement and a hot water reheat coil.
• Materials
  o Supply/Return and exhaust ductwork: Galvanized steel
  o Shower exhaust: aluminum

Terminal and Packaged Units

• Packaged terminal cooling units will be utilized for isolated areas that have 24 hour process cooling loads such as the telecommunication rooms. Stacked telecommunication rooms will be serviced from a single outdoor heat pump condensing unit with variable refrigerant volume supply controls to provide cooling to the indoor duct split fan coil units. Egress stairwells will also be served by packaged terminal units. The outdoor heat pump will have energy recovery capabilities that will provide energy trading between telecommunication rooms and the stairwells in the heating season.

HVAC Instrumentation and Controls

• The project will utilize a Direct Digital Control (DDC) for the control of the HVAC systems. Damper and valve actuators shall be electronic.

Each two and 3 bedroom dorm room and apartment will have their own thermostat.

• The energy management control system will be compatible with the existing BACnet (Alerton or Delta) system on the Eastern Washington University campus. This building shall interface and communicate with the existing campus network and front end operator’s terminal for the purpose of remote operation and maintenance.

Testing, Adjusting and Balancing

• Air systems (supply, return, and exhaust), hydronic and domestic hot water recirculation systems shall be completely balanced in accordance with Associated Air Balance Council or National Environmental Balancing Bureau. The Contractor shall secure the services of an independent Testing, Adjusting and Balancing (TAB) agency for the TAB of the mechanical systems.

Fire Protection Systems

• Fire Service: The supply main to the building will be 6-inch. The static water pressure in the area of the building is 80 to 90 psi with good flow. This water supply will support the sprinkler system without a booster pump.
• All interior spaces in the building will be sprinklered in accordance with NFPA 13 with a wet-pipe system. Combustible concealed spaces will be sprinklered as required by NFPA 13. The attic will be insulated, and therefore will be sprinklered with a wet pipe system.
• Standpipes will be provided in each stairwell.
• The fire system will be divided into multiple zones by floor for identification and annunciation at the central fire alarm panel. Fire department connections, post indicator valve and backflow prevention shall be in accordance with the City of Cheney requirements.
• Consistent with EWU standards, the fire department pump connection will be mounted on the exterior of the building.
• The fire system will be provided with its own double check backflow prevention assembly.
• At this time, it is anticipated that steel pipe will be used throughout. If construction conditions allow, CPVC piping may be used in some areas.
Electrical Service

- The EWU Campus currently receives electrical utility power via two separate 13.2KV electrical service feeders from the City of Cheney. These two 13.2KV electrical service feeders are terminated within the EWU Rozell Substation at Campus Switchgear Bus #1 and Campus Switchgear Bus #2. Four separate 13.2KV campus feeders are routed from the Campus Switchgear to a system of 13.2KV switches located throughout the EWU campus in order to provide increased redundancy and flexibility to the campus electrical distribution system.

Telecommunications Service

- Data/Communication service is typically provided to each building on the EWU Campus from the EWU owned data/com distribution system. Fiber optic cabling is typically routed throughout the EWU Campus via a system of cable tray that is located within the existing campus utility tunnel system. New telecommunications building service pathways will be provided and installed by the contractor. New building service pathways will be routed from the existing campus utility tunnel system into the main telecom room. Outside plant cabling and associated pathway will be installed from Patterson Hall and URC to the New Residence Hall to provide telecommunications service to the New Residence Hall. Telecommunications building service cabling will be provided and installed by EWU through a separate vendor.

Service and Distribution

- Site Electrical: The New Residence Hall will receive power from the existing campus 13.2KV primary electrical distribution system. The existing 13.2KV primary distribution system feeders will be intercepted and extended to a new 13.2KV vacuum switch which will be installed within existing tunnel Terminal #2. A new 13.2KV feeder will be installed from the new 13.2KV switch in Terminal #2 to the New Residence Hall pad mount transformer location.

- Building Normal Electrical Service: A new three-phase four-wire electrical service will be provided for the new building. This new electrical services will be derived from a new 480/277V outdoor pad mount transformer which will be connected to the EWU campus 13.2KV primary electrical distribution system. A new 480/277V main switchboard will be located in a dedicated main electrical room located on the first level. The dedicated main electrical room will be located as closely as possible to the new outdoor pad mount transformer.

- NEC Article 700 Emergency Electrical Distribution System: A new emergency electrical distribution system will consist of a 480/277V engine driven propane fueled generator system. The emergency generator will be pad mounted outdoors, and will be provided with a weather proof sound attenuating enclosure. The emergency electrical distribution system will also be provided with an automatic transfer switch in order to automatically switch loads between normal EWU campus power and generator backed power. The new automatic transfer switch will also allow the generator to start automatically upon loss of normal EWU campus power. The emergency electrical distribution system will supply power to all life safety systems within the building such as egress lighting, exit lighting and the fire alarm system.

- NEC Article 701 Legally Required Standby Electrical Distribution System: A new NEC 701 Legally Required Standby electrical distribution system shall be provided for the building. This legally required standby electrical distribution system will consist of a propane fueled engine driven generator system. The NEC Article 700, 701 & 702 systems will be connected to the same generator system by using separate automatic transfer switches. The NEC 701 legally required standby electrical distribution system will utilize the dedicated automatic transfer switch in order to automatically switch loads between normal EWU campus power and generator backed power. The new automatic transfer switch will also allow the generator to start automatically upon loss of normal EWU campus power. The primary intent of the legally required standby power system is to provide generator backed power to legally required loads within the New Residence Hall such as the building passenger Elevators and the Elevator machine room cooling system.

- NEC Article 702 Optional Standby Electrical Distribution System: A new NEC 702 Optional Standby electrical distribution system shall be provided for the building. This optional standby electrical distribution system will consist of a propane fueled engine driven generator system.
The NEC Article 700, 701 & 702 systems will be connected to the same generator system by using separate automatic transfer switches. The NEC 702 optional standby electrical distribution system will utilize the dedicated automatic standby switch in order to automatically switch loads between normal EWU campus power and generator backed power. The new automatic transfer switch will also allow the generator to start automatically upon loss of normal EWU campus power. The primary intent of the optional standby power system is to provide generator backed power to non-life safety loads within the New Residence Hall such as the building telecommunications system, associated telecom room cooling, access control system and other low voltage systems.

- Building Distribution: The building electrical distribution will originate from a main electrical room on the lower level and smaller stacked electrical rooms located on each floor. The building electrical distribution will be designed to provide separation of lighting, mechanical and general receptacle loads. Dry type transformers will be utilized to step down from 480V to 208/120V to feed multiple 208/120V distribution switchboards. Multi-stage surge suppression shall be provided by installing transient voltage surge suppressors at the main switchboard, distribution switchboards and appropriate panelboard locations. All horizontal distribution of large electrical feeders will occur on the first floor level. Large electrical feeders will route vertically through the building and between floors via stacked electrical distribution rooms. Two sets of stacked electrical rooms will be provided on opposite ends of the building for electrical distribution.

- Mechanical Equipment: Refer to mechanical narrative for proposed mechanical systems and possible equipment. Motor loads ½ HP and larger will be 480V three phase. Motor starters and disconnects will typically be located in close proximity to each associated piece of mechanical equipment. Motor control centers will be utilized when several pieces of mechanical equipment which require motor starters are located in close proximity to one another. Variable frequency drives will be provided by the mechanical contractor and installed by the electrical contractor for various pieces of mechanical equipment.

- Engine/Generator: Emergency and standby power generation shall be provided by means of an engine driven propane fueled generator set. Generator set shall be sized to supply emergency and standby loads. Generator set shall include a weather proof sound attenuating enclosure for outdoor installation. Operation of the generator will be monitored on a multi function system designed to report most normal failures such as low cooling fluid temperature, low starting batteries, overcrank, overload, high water temperature, etc.

**Lighting and Branch Wiring**

- General Interior Lighting: Lighting throughout the interior building spaces will respond to the primary use of each space while maintaining a level of flexibility to react to future use of each space. Uniform ambient lighting will establish a basic minimum lighting level throughout each individual space with task. Display and accent lighting will be considered where appropriate. Lighting within the building will be primarily fluorescent. Fluorescent lamps shall be primarily T8, T5 and compact fluorescent. LED lighting will also utilized within the building where deemed appropriate. Lighting system design foot candle levels will be in accordance with IES standards and EWU standards. In general, areas within the building will be illuminated to the following light levels:

<table>
<thead>
<tr>
<th>Building Area</th>
<th>Foot-Candles</th>
</tr>
</thead>
<tbody>
<tr>
<td>Resident Rooms</td>
<td>30</td>
</tr>
<tr>
<td>Classrooms/Learning Space</td>
<td>50</td>
</tr>
<tr>
<td>Offices</td>
<td>40-50</td>
</tr>
<tr>
<td>Restrooms</td>
<td>30</td>
</tr>
<tr>
<td>Corridors</td>
<td>10-20</td>
</tr>
<tr>
<td>Janitor Rooms</td>
<td>30</td>
</tr>
<tr>
<td>Storage Rooms</td>
<td>20</td>
</tr>
</tbody>
</table>

- Egress & Exit Lighting: Exit lighting will be LED type with integral battery backup. Emergency egress lighting will be provided throughout the path of egress, and will be supplied with power from the emergency generator system in the event of a failure on the normal power system.

- General Lighting Controls: Within normally occupied common spaces, multi-level switching will be provided in conjunction with occupancy sensors, and will utilize two or more manual wall switches. Manually dimmable lighting controls shall only be utilized within appropriate areas where specifically requested, such as conference rooms or social spaces. Automatic dimmable or step-dimmed lighting controls shall be considered for the purpose of daylight harvesting where required by the
energy code. A programmable low voltage lighting control system shall be provided for automatic control of lighting in corridors / common areas and exterior site lighting. The low voltage lighting control system shall also be interfaced to the campus energy management system (EMS) to allow EMS control of the exterior lighting.

- Programmable Low Voltage Lighting Control System: Provide programmable, low voltage relay based lighting control system with building management system interface. The programmable low voltage lighting control system shall be used to control lighting within interior corridors and large common areas. This will allow the building lighting to be automatically turned on and off at pre-programmed times. The low voltage lighting control system shall be manufactured by Nexlight in accordance with EWU campus standards.

- Occupancy Sensors: Occupancy sensors will be utilized to automatically shut off the lighting within offices, common restrooms and social spaces when these spaces are unoccupied. Occupancy sensors shall be dual technology type. Either ceiling mounted or wall mounted occupancy sensors will be utilized depending on the physical size and specific geometry of the room being controlled.

- Sustainable Design Considerations: All sustainable design measures considered will be evaluated completely with regards to their associated sustainable and economic aspects. Many opportunities are currently available to construct a building that is a model of sustainable design. The following is a brief list of items related to the building lighting and lighting control systems which are being considered for this project:
  - Energy efficient fluorescent lighting will be utilized as the primary light source within the building in order to reduce the energy consumption associated with the lighting system to the fullest extent possible.
  - Occupancy sensors will be utilized to automatically shut off the lighting when spaces are unoccupied. This will allow the interior lighting within these spaces to be automatically turned off during unoccupied times, thereby increasing the available energy savings associated with the interior lighting system.
  - Within normally occupied spaces, multi-level switching will be provided in conjunction with occupancy sensors, and will utilize two or more manual wall switches. The utilization of multi-level switching within these spaces will allow the user to manually reduce the light levels within their spaces if desired, further increasing the available energy savings associated with the interior lighting system.
  - Automatic dimmable or step-dimmed lighting controls shall be considered for the purpose of daylight harvesting within areas where required by the energy code. The utilization of automatic dimming or step-dimming and daylight harvesting will allow EWU to take advantage of the natural available daylight to the fullest extent possible. This will result in additional available energy savings associated with the interior lighting system.
  - A programmable low voltage lighting control system shall be used to control both the exterior lighting system and portions of the interior lighting system. This will allow both the interior and exterior lighting systems to be automatically turned on and off at pre-programmed times, thereby increasing the available energy savings associated with the interior and exterior lighting systems.

- General Exterior Lighting: Exterior lighting will be selected to match the architectural building exterior and EWU campus standards. Exterior entry lighting which illuminates the path of egress will be supplied with power from the emergency generator system in the event of a failure on the normal power system. Exterior lighting will utilize full cut off light fixtures in order to avoid light trespass and meet associated dark sky lighting requirements. In general, exterior areas will be illuminated to the following light levels:

<table>
<thead>
<tr>
<th>Exterior Area</th>
<th>Foot-Candles</th>
</tr>
</thead>
<tbody>
<tr>
<td>Exterior Entry</td>
<td>5</td>
</tr>
<tr>
<td>Exterior Walkways</td>
<td>2</td>
</tr>
<tr>
<td>Parking Areas</td>
<td>1</td>
</tr>
</tbody>
</table>

- Exterior Lighting Controls: A programmable low voltage lighting control system shall be used to control the exterior lighting. This will allow the exterior lighting to be automatically turned on and off at pre-programmed times, automatically controlled via outdoor photocell and automatically controlled by the campus EMS system.

- General Branch Wiring: Provide complete raceway and wiring systems in conformance with code requirements and campus standards.
Telecommunications

- Telecommunications Building Distribution: Telecommunications building distribution cabling and devices will be provided and installed by EWU through a separate vendor. A complete telecommunications distribution pathway system will be provided by the contractor in accordance with the EWU construction standards. Telecommunications rooms will be located throughout the facility in accordance with EIA/TIA 568 and 569. The main telecom room will be located on the first level of the building. Secondary telecommunication rooms will be located on each floor and stacked vertically from floor to floor. Horizontal station cable pathways will be provided and routed to the telecommunications rooms located on each floor. Each telecommunications room shall be provided with a dedicated 120/208V standby power panelboard and an equipment ground bar. The building will be equipped with cabling pathway provisions for wireless local area networking. Telecommunications riser cabling pathways will be provided from the entrance location to the telecommunications room on each floor. Cable trays will be installed at each floor within hallway ceiling space. Telecommunications outlets located above the first floor shall be installed in conduit from the device location to the nearest cable tray or telecom room. All horizontal distribution of telecommunications risers will occur on the first floor level. Vertical distribution of telecommunications risers will route vertically through the building and between floors via stacked secondary telecommunications rooms. A single stacked telecommunications rooms will be provided on each floor for telecommunications distribution.

- Telecommunication Outlet Distribution: Telecommunications devices will typically be located at ceiling mounted projector locations, common/social areas, gaming rooms, lounges, conference rooms, apartment spaces and office spaces. Resident rooms will be provided with a single hard wired telecom outlet per room occupant. A wireless telecommunications distribution system will be installed to provide students with WIFI coverage throughout the building. Emergency/courtesy phones will typically be mounted in the hallway on each floor within 25 feet of the Elevator.

Low Voltage Systems

- Closed Circuit Television (CCTV) System: New CCTV System pathways will be provided by the contractor. Required locations for CCTV devices will be closely coordinated with EWU. Typical spaces which will include CCTV devices are all building entrances, main lobby/circulation area waiting/circulation area and commons/great room. All CCTV cameras, power supplies, cabling and active electronic equipment will be provided and installed by EWU through a separate vendor.

- Access Control System: A new access control system will be provided for the new building. Required locations for miscellaneous access control devices will be closely coordinated with EWU. Typical spaces which will include access controls are building entrances, office suites and utility rooms. Hard key locks will be provided for all other rooms. The access control system shall be furnished and installed by Engineered Control Systems (ECS).

- Audio / Video Systems: New AV system pathways and cabling will be provided by the contractor. Required locations for AV devices and equipment will be closely coordinated with EWU, but will typically include commons/great room and conference rooms. Video projectors, sound reinforcement systems and all active electronic AV equipment will be furnished and installed by EWU through a separate vendor.

- Fire Alarm: A complete battery backed addressable fire alarm system with manual pull stations, automatic detection and ADA compliant speaker/strobes will be provided throughout the facility. Smoke detector and heat detectors will be installed as required by the governing codes, and in accordance with EWU campus standards. Resident room smoke detectors will be installed with sounder bases for local resident room annunciation. A 30 second delay will be programmed in to the resident room smoke detectors prior to activation of speaker strobes which will be located throughout the building. Each resident room will also be provided with a speaker/strobe. The building fire sprinkler system will be monitored by the fire alarm system for system flow and shutoff valve tampering. Central reporting capabilities will be provided with the fire alarm system, and shall be compatible with the existing Edwards FireWoks EWU campus fire alarm monitoring system. The new fire alarm system shall be manufactured by Edwards System Technology.
(EST) Model EST-3 in accordance with EWU campus standards, and shall be furnished and installed by Engineered Control Systems (ECS).

- **Clock System:** New Clock System pathways will be provided by the contractor. Required locations for clocks will be closely coordinated with EWU. Clocks will typically be provided within the commons/great room, social areas, gaming rooms, lounges, lobby and conference rooms. All clocks, cabling and clock equipment will be provided and installed by EWU through a separate vendor.

- **Community Antenna Television (CATV) System:** CATV system pathways are not currently planned for the building. Entertainment television will be provided through the use of Network Information Outlets located throughout the building.

**Site Lighting**

- **Site lighting** will be selected in conformance with EWU campus standards, and will utilize full cut off light fixtures in order to avoid light trespass and meet associated dark sky lighting requirements. Site lighting which illuminates the path of egress will be supplied with power from the emergency generator system in the event of a failure on the normal power system. Site lighting will be controlled via a programmable low voltage lighting control system which will allow the site lighting to be automatically turned on and off at pre-programmed times, automatically controlled via outdoor photocell and automatically controlled by the campus EMS system.
Site Work, Utilities, and Demolition

- Existing Site Conditions: A site topographic survey was provided by LandTek in March 2011. Existing grade along 10th Street drops from a high point at the northern boundary from elevation 2470 to an elevation of 2453 at the intersection of Cedar Street and 10th Street. The roadway slopes at about a 6.7% along this distance. Cedar Street is relatively flat at about a 2% drop from the intersection of Cedar Street and 11th Street to Cedar Street and 10th Street to the east. The high point of 11th Street occurs at the intersection with Cedar Street. It then slopes downward at less than 1% to an elevation of 2457 at the northwest boundary of the site. Within the boundaries of the streets, the existing site generally slopes to the southeast corner. The lowest contour line on the existing site is 2452 and is located just inside the east parking lot entrance off Cedar Street. The existing parking lot has been cut out of the side of a hill between 10th and 11th Streets. Generally speaking, the site drops about 17 feet from north to south and about 13 feet from northwest to southeast.

- Existing Streets: As stated above the project is surrounded by 10th Street, Cedar Street and 11th Street and to the north/upslope is Streeter Hall. All streets are fully improved with curb and gutter. Also, there are existing sidewalks on the project side of 10th Street and Cedar Street. This project will construct new sidewalk on the east side of 11th Street. It is not anticipated that any other work will be required for the streets other than connecting and extending utilities to the site and cutting/ installing access points and drop-off/loading areas on 11th Street and Cedar Street.

- Access Control and Circulation Plan: The project civil engineer is using Auto-Turn software to help design vehicular routes of travel, fire lanes, and truck routes. Vehicular (including emergency vehicle) access is available from all three bordering streets. The exterior circulation to and around the site is well established with these adjacent and nearby streets. ADA parking has been identified near the northwest corner of the site, as head-in, perpendicular parking along 11th Street.

- Demolition: The largest item of demolition on the project is the existing parking lot. A curb surrounding the perimeter of the parking lot will require demolition. At the north end of the parking lot there are a retaining wall and a stairway leading to Streeter Hall that will also be demolished as part of this project. Light poles in the parking lot will be demolished. Some sections of the perimeter street sidewalk and curbing will be demolished in preparation for the new residence hall construction. Minor street demolition will be required to remove existing driveway access points as well preparing for the construction of new drop-off/loading areas on 11th Street and Cedar Street. Miscellaneous site appurtenances such as chain link fencing, directional signs, parking meters, drainage structures, trees, and so on will also need to be demolished.

- Site Preparation: A temporary erosion and sediment control (TESC) plan will be developed to control erosion and offsite migration of sediment-laden water. The TESC plan will address practices, methodologies, and requirements for erosion control. The TESC plan will be developed during the design process and be followed during construction. This plan is intended to result in the establishment of Best Management Practices (BMPs) to be implemented and followed during construction to prevent erosion of exposed soils, as well as prevent sediment from leaving the project site. Adjacent properties and pipe storm drain systems must be protected from sediment deposition, as well as increases in volume, velocity, and peak flow rates of stormwater runoff from the project site. Erosion control measures will include the use of temporary sediment basins, filter fabric fences, catch basin inserts, straw bales, gravel check dams, and so on. Inspections of the erosion control BMP’s will be required at intervals of not less than once a week and within 24 hours of every significant storm. Erosion control measures will be inspected by a Certified Erosion and Sedimentation Control Lead (CESCL). The project will require a Stormwater Pollution Prevention Plan (SWPPP) prior to the start of construction outlining specific control measures to prevent accumulation of sediment in stormwater runoff during construction. A Notice of Intent (NOI) will be filed and approved prior to any construction or demolition. Upon completion of the project and after site stabilization, a Notice of Termination (NOT) must be completed and filed through the Washington State Department of Ecology; temporary protection of adjacent property, structures, benchmarks, and monuments; temporary relocation of site improvements scheduled for reuse; temporary utility connections to
existing buildings as required by phased construction; removal and legal disposal of cleared materials.

- Earthwork: Site earthwork will include excavation to footing/bottom floor depths, backfilling and compaction behind walls and structures, and grading for the building, site improvements, and utilities. Imported materials will likely be required for structural fill for foundations, sub-base materials for drainage infiltration and pavements, and backfill material for slabs and other improvements. The contractor will remove and legally dispose of excavated materials. All recommendation of the Geotechnical Engineering Evaluation prepared by GeoEngineers, dated may 5, 2011 should be implemented and followed for this project.

- Hot-Mixed Asphalt Paving: The majority of paving to occur on the project will consist of patching the existing streets. Two pullout areas along Cedar Street and 11th Street will also provide short term parking and loading/unloading. Pavement sections will match the existing pavement sections in the street, according to the City of Cheney standard specifications.

- Portland Cement Concrete Paving: In the area of the two new pullouts a revised sidewalk will be constructed and extended to tie into other sidewalks along those sections. On the 11th Street side of the project a new sidewalk will be built along the length of the project site. Within the courtyard a network of sidewalks connect the residence hall to the promenade at 10th Street and Cedar Street intersection. Sidewalks will likely 6 inches thick and of varying width dependent on the location. Cast-in-place concrete curbs will be used at the pullout areas and at locations where existing approaches were removed. Decorative paver blocks may be used in some areas of the courtyard in lieu of concrete sidewalks.

- Water Service: Domestic (potable) water lines currently serve the facilities around the site. An 8 inch water main exists in both 10th and 11th Streets. The size needs for fire and irrigation water services have not been finalized however domestic water needs require a 4 inch line be extended to the building. Once facility fire demands are known, an automatic fire protection system will be designed. Initial review of the area has existing hydrants near all four corners of this block. However, one additional hydrant will likely be required due to distance limitations. The Cheney Fire Department will determine future hydrant needs. The project civil engineer will design water service in compliance with applicable codes and requirements of the authority having jurisdiction requirements, including backflow prevention, metering, and so on. Currently the water service to the building is proposed to come from 11th Street, near the southwest corner of the building.

- Storm Sewerage: On-site stormwater collection and disposal will be handled by storm piping, catch basins, clean-outs, manholes, and grassed swales. An on-site stormwater drainage design will be developed using the Rational Method to calculate the post-developed storm water runoff for the 10-year, 24-hour design storm. The project civil engineer will design the storm water system to handle the stormwater runoff (peak rate and volume). Existing storm drain manholes and piping are located in Cedar Street. Poor soil conditions may require that metered disposal to the existing system in Cedar Street to be included in the design however the City of Cheney has noted that all disposal be onsite in accordance with the Spokane Regional Stormwater Manual.

- Sanitary Sewerage: Public sanitary sewer system piping and manholes are available in both 11th and Cedar Streets. Invert elevation of the manhole located in the Cedar Street/11th Street intersection is noted to be at 2446.63 on the survey, which is about 11 feet lower than the (first floor) Finished Floor Elevation of 2458. We have coordinated one 6-inch sanitary sewer line exiting the building near the northwest corner of the building, draining to 11th Street.

- Signage: All on-street signage shall be protected and/or replaced with like signage. On-street traffic signage must me maintained or replaces with similar signage.
The Eastern Washington University Residence Hall is a new construction project located at the corner of 10th Street and Cedar Street on the northwestern section of the campus. The placement of the structure provides the residents with easy access to the existing mall and the student recreation center. Students will primarily move through the site via the long, sweeping brick paver walkway. This walk is flanked by basalt columns at its beginning, which includes mounted building signage, creating a gateway into the site. Secondary and tertiary paths have been developed to pick up the cross circulation in the site. These paths are of varying widths and materials, signifying their level of importance. Gathering and activity spaces are strategically placed in the inner courtyard to encourage lounging, socializing, studying and passive recreation. Two brick paver spaces are integrated along the main path—a larger one closer to and protected by the building and another just after the gateway into the site. These spaces will integrate basalt columns as seating and to define the edges of the space. A large quad of bluegrass provides areas for pick-up games of football and Frisbee.

The landscaping on the site is residential in nature but with a larger campus feel. Plantings in and around the courtyards shall be massing of like species that respond to the intimate hardscape layout. The perimeter foundation plantings will consist of native/adaptive species, selected for their year round interest and hardiness. Three types of grass are used in the landscape. Bluegrass, as previously mentioned, is located in the main quad area. A drought tolerant fescue blend is seen around most of the building perimeter and a meadow grass wildflower mix is applied behind the basalt gateway, to enhance its presence, and at the north side of the building. The meadow grass creates a defined edge between the existing bluegrass to the north and rolls down to the building edge. The existing large street trees on the southwest corner of the site are to remain and be protected during construction. Cedar Street shall be lined with appropriate sized street trees located at back of walk. North 10th Street shall be open to provide early morning light.

Irrigation for the project is a mix of different types, which are all currently used on campus. Bluegrass areas are irrigated with traditional spray system while the drought tolerant lawn has a subsurface irrigation. The shrub beds are irrigated with drip emitters. With this unique combination of irrigation products, the building will qualify for the LEED Water Efficient Landscaping credit.
ARCHITECTURAL ACOUSTICS

Wall Systems

The International Building Code states a minimum STC 50 rating should be maintained between residential units and from residential units to corridors. We have found historically that an STC 50 acoustical separation between residential units, however, may be insufficient for apartment type housing of normal to mid level quality.

The project direction is to go with wood stud walls in an effort to minimize cost. In order to meet a more appropriate acoustical separation between dorm rooms and occupied adjacencies, we have recommended using a wood stud wall with a resilient isolation clips such as a Pac Int’l RSIC-1 clip or a Kinetics IsoMax type system with insulation batts in the walls and a single layer of 5/8” GWB on each side. Such a wall should provide STC 55 acoustical separation between units which is consistent with normal quality separation for apartment type buildings.

Using an STC 50 wall between dorm rooms and corridors meets the minimum code requirement for acoustical separation. Although this STC 50 performance is not typically realized in the field given the presence of door openings, using STC 50 partitions as a general rule provides adequate acoustical separation. Given the decision to use wood studs on the project, meeting an STC 50 rating is a challenge without either 2-3 layers of GWB on each side of a wood stud wall or using a resilient clip system. From a cost standpoint, using the same STC 55 type of wall as used between dorm rooms - makes the most sense.

Use of door seals is recommended on dorms as these can improve the acoustical separation between units and corridors by 10 dB or more. In the past we have had good success with DHSI perimeter seals (#105 Cush’N’Seal) and door bottom sweeps (#AMDB3) and would recommend these for this project. Another option that can be considered if door bottoms are used to return some air are bottom seals that allow for air to pass through (#AMDB3-3xAMU). The acoustical performance with these door bottoms is slightly reduced by about 3 dB from the AMDB3, but still adds a significant improvement to a door without a bottom seal. Using a transfer duct or eliminating return air to rooms are other alternatives that may be considered.

In certain areas, acoustical separation is greater than STC 50 or 55 for housing units and adjacencies. For example we recommend using double stud walls in several areas. An example of this is where Double 214 abuts to Laundry 301 and Lounge 197 - areas which are likely to see significant use while Double 214 occupants may be sleeping. Other instances are where units are immediately adjacent to Toilet/Shower areas.

Table 1 - Recommendations for Acoustical Separation (see Table A1 in Appendix)

<table>
<thead>
<tr>
<th>Source Room</th>
<th>Receiving Room</th>
<th>Recommended STC</th>
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<tbody>
<tr>
<td>Double/Triple</td>
<td>Corridor</td>
<td>STC 50 (STC 55)</td>
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<td>Double/Triple</td>
<td>Double/Triple</td>
<td>STC 55</td>
</tr>
<tr>
<td>Double/Triple</td>
<td>Sitting/Social/Lounge Areas</td>
<td>STC 60+</td>
</tr>
<tr>
<td>Double/Triple</td>
<td>Toilet/Shower Areas</td>
<td>STC 60+</td>
</tr>
<tr>
<td>Office</td>
<td>Office</td>
<td>STC 45</td>
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</table>

Floor To Floor Separation

The flooring system between Level 1 and Level 2 will be a concrete PT slab of approximately 12” thick at this point. Separation between upper floors will be wood system flooring; consisting of 1” gypcrete + ¾” wood sheathing + 12” deep I-joists. For this system we recommend adding 2 layers of 5/8” GWB isolated on resilient clips (IsoMax or RSIC-1 type system) + R19 batts in floor cavity. Where we have sprinklers in dorm rooms, we recommend oversizing ceiling penetrations by approx. ¼” to avoid direct contact between piping and GWB and then sealing this gap with resilient acoustical sealant (see Appendix for list of recommended products).

Hard flooring (wood look-alike vinyl or linoleum) is planned over dorm rooms. Carpeting is planned in the corridors. With respect to impacts from footfalls, when carpeting is used, the impact separation is not generally problematic and easily meets code. Based on the current design however, dorm rooms will have hard surface flooring, and in order to meet code minimum impact separation (IIC 50), an acoustical underlayment will be needed. We have recently had good success using thin (1/8” thick) recycled fiber underlayments manufactured by MP Global Products under wood (QuietWalk) or tile (Fiber-Backer) flooring which is relatively inexpensive. For vinyl flooring, a recycled
rubber underlayment, such as Ecore QTscu, can be used to meet impact requirements - this material being about 1/4" thick. A resilient underlayment is not anticipated over the toilet rooms as these are stacked one above another. Independent of flooring finishes or the use of underlayments, if beam spans are too long for light weight flooring systems, boominess can occur on floors below. The rule of thumb is that this problem can begin to occur for spans of 16’ or greater. Since our floor spans are right at 16’ in dorm rooms, we will look into this potential issue in more depth in the very near future and discuss this with the design team.

**Lighting**

With the two lighting systems under consideration for dorms (canned lights or a ceiling mounted type systems) we would prefer a non recessed option. If we do go with the canned lights however, we may need to create a GWB soffit to address airborne noise transfer, and come up with a good isolation scheme so the lights don’t short-circuit the isolated clip ceiling by being mounted to the I-joists or structure above.

**Room Treatments**

Dorm rooms are planned to have GWB ceilings. Corridors are planned to have ACT ceilings. Social areas should include ACT type ceilings as well, or if a GWB ceiling is planned, should include absorptive panels within these spaces.

**MECHANICAL NOISE & VIBRATION CONTROL**

**Plumbing Systems**

In normal multi-family residential projects, we isolate plumbing including risers and domestic heating and cooling as each room has toilet, shower, sinks, etc. Given the limited plumbing to individual dorms (fin tube radiators), in general, plumbing isolation throughout the building should not be necessary. Where Level 2 plumbing for Bathrooms passes over the Office area, piping should consist of cast iron and should be wrapped with an insulated and mass loaded wrapping (Kinetics Model KNM-100ALQ or equivalent). Similar treatments should be used for piping located over the Level 1 Commons/Great Room.

**Level 1 Mechanical Room**

We recommend isolating all piping supported from the ceiling in the Level 1 Mechanical Room with spring hangers given dorms are located directly above this area. For piping mounted on a common unistrut support, the entire support system can be isolated in lieu of isolating each pipe individually. We should also be aware of the potential for sound between dorm rooms flanking through radiator piping. We can help develop a detail that will reduce the risk of this transfer, by oversizing the penetrations at walls to avoid direct contact with GWB (and wood studs) and seal the opening with a resilient acoustical sealant.

Plan on isolating pumps in the Level 1 mechanical room on spring inertia bases if greater than 15 HP. The AHU in this room should have internally spring isolated fans, and the unit itself should be supported from the floor on neoprene pads for now. Ductwork in this mechanical room should receive the same spring isolation treatment as piping. Plan on isolating other mechanical equipment and floor supported piping in this room on 3/4” neoprene pads with neoprene washer grommets at mounting points.

Steam PRV Stations can also be a source of noise. If possible, we would like to wrap these with insulation to help reduce the high frequency noise associated with these calces.

**HVAC Systems**

Heat recovery systems are currently planned for the rooftop mechanical mezzanine. Under the current scheme each individual unit will be sized to no more than 5000 cfm. The static pressures on fans would be expected to be in the neighborhood of 5.5”TSP on the supply side. With this being the case, we should plan on the following treatments:
• Internally isolate fans on 1” deflection springs
• Externally isolate HRUs on 2” deflection springs (maximizing the height of these springs, rather than using height saving brackets is preferred acoustically)

At this point, it is unknown if airborne noise to the corridor and dorms below will be problematic. As a placeholder for now, using a resilient clip isolated ceiling on the Level 5 corridor ceiling may be a good placeholder. If possible directly exposing the rooftop insulation in the Mechanical Mezzanine may help reduce some of the airborne energy from HRUs.

For the current scheme, return air from dorms and other Level 2-5 areas will be provided by HRUs. As ductwork serving each area develops we will help develop a scheme that eliminates the concern for ductwork cross-talk between spaces.

Fan coil units will be using to serve heating/cooling in Bathrooms and Social Areas and some Level 1 areas. To our knowledge lined ductwork is not restricted on this project; we therefore recommend as a placeholder, that 5’ of 1” internal ductlining be used after each fan coil unit. We will refine recommendations as the design progresses.
## LEED Checklist:

**LEED 2009 for New Construction and Major Renovations**

**EWU Residence Hall**

**Project Checklist 6.30.11**

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<td>Site Selection</td>
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<td>5. Credit 3</td>
<td>Development Density and Community Connectivity</td>
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<td>Alternative Transportation—Public Transportation Access</td>
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<td>Alternative Transportation—Bicycle Storage and Changing Rooms</td>
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<td>Construction IAQ Management Plan—Before Occupancy</td>
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<td>Low-Emitting Materials—Flooring Systems</td>
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<td>1. Credit 4.4</td>
<td>Low-Emitting Materials—Composite Wood and Agrifiber Products</td>
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<td>Indoor Chemical and Pollutant Source Control</td>
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<td>Controllability of Systems—Lighting</td>
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<td>Controllability of Systems—Thermal Comfort</td>
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<td>Daylight and Views—Daylight</td>
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<td>Daylight and Views—Views</td>
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<td>1. Credit 1</td>
<td>Innovation in Design: Public Education</td>
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<td>1. Credit 1</td>
<td>Innovation in Design: Green Cleaning</td>
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<td>Innovation in Design: Specific Title</td>
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<tr>
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<td>Regional Priority: WEc1: Water Efficient Landscaping</td>
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<td>1. Credit 1.3</td>
<td>Regional Priority: WEc3: Water Use Reduction</td>
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<td>1. Credit 1.4</td>
<td>Regional Priority: EA: Optimize Energy Performance</td>
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**Certified** 40 to 49 points  
**Silver** 50 to 59 points  
**Gold** 60 to 79 points  
**Platinum** 80 to 110
### DESIGN DEVELOPMENT ESTIMATE

#### Cost Estimate

**Project SF**

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<th>Division</th>
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<th>Labor</th>
<th>Material/Sub</th>
<th>Percent</th>
<th>$/SF</th>
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<td>1</td>
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<td>Thermal and Moisture / Roofing</td>
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**Subtotal**

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<tr>
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<th>Material/Sub</th>
<th>Subtotal</th>
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<tbody>
<tr>
<td>$1,155,773</td>
<td>$13,846,870</td>
<td>$146.04</td>
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#### Summary

- **Labor Subtotal**: $1,155,773
- **Labor Mark-up**: 50% ($577,886)
- **Material/Sub Subtotal**: $13,846,870

**Subtotal**

<table>
<thead>
<tr>
<th>Escalation</th>
<th>Overhead &amp; Profit</th>
<th>Bonds &amp; Insurance</th>
<th>Contingency</th>
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<tr>
<td>0%</td>
<td>7%</td>
<td>2.25%</td>
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<td>$0</td>
<td>$1,090,637</td>
<td>$375,101</td>
<td>$511,388</td>
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**Grand Total**: $17,557,655

**Cost**: $170.91
### EWU New Residence Hall Project Budget

#### Design Development

**EWU Facilities & Planning Services**
- C&P/Facilities Services $530,000

**Consultant Services**
- Predesign Services $113,675
- Basic Services $1,206,895
- Consultant Additional Services $322,000
- Reimbursables $65,200
- Other Consultant Services $300,000

**V/E Study**
- Constructability review
- L & I Review
- Special Inspection & Testing
- Commissioning

**Design Contingency** $100,000

**Subtotal** $2,107,770

#### Construction Costs with Telcom & Data

**Construction Costs** (from detailed estimate) $17,558,000

**Total Construction Cost** $17,558,000
- Change Order Contingency $1,328,000
- Sales tax $1,643,082

**Telcom/Data**
- Telcom/Data EWU estimate $292,929
- EWU provided Active IT Equipment $131,268

**Subtotal** $424,197

**Total Construction Costs with Telcom/Data** $20,953,279

**Furnishing & Equipment**
- Furnishing & Equipment $1,370,000
- Sales Tax $130,000

**Subtotal** $1,500,000

**Other Costs**
- Permits/Fees/Utilities $150,000

**Subtotal** $150,000

**Total Project Budget** $25,241,049

**EWU Project Budget** $24,997,736

**Difference** $243,313
### SCHEDULE OF ALTERNATES

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<th>Description</th>
<th>Cost</th>
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<tbody>
<tr>
<td>A</td>
<td>Alternate No. 1: Resident Life Office TI.</td>
<td>($240,000)</td>
</tr>
<tr>
<td>B</td>
<td>Alternate No. 2: Provide MC cable in lieu of EMT for branch circuits in all resident rooms.</td>
<td>($120,000)</td>
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<tr>
<td>C</td>
<td>Alternate No. 3: Provide vinyl operable windows in lieu of specified aluminum operable windows.</td>
<td>($148,000)</td>
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<tr>
<td>D</td>
<td>Alternate No. 4: Provide “PEX” piping for all potable domestic water in lieu of specified copper pipe.</td>
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<td>E</td>
<td>Alternate No. 5: Delete snow melt system.</td>
<td>($95,000)</td>
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<tr>
<td>F</td>
<td>Alternate No. 6: Change the plastic laminate with wood trim to impact resistant gypsum board.</td>
<td>($50,000)</td>
</tr>
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### VALUE ENGINEERING ITEMS

- Change end of corridor windows to storefront. ($33,000)
Design Development Report
NEW STUDENT RESIDENCE HALL
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