SOUTH DAKOTA BOARD OF REGENTS

Budget and Finance

AGENDA ITEM: 7 – I
DATE: December 13-14, 2023

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SUBJECT

BHSU-Rapid City & SDSU West River Health Science Center Addition & Renovation Facility Design Plan (FDP)

CONTROLLING STATUTE, RULE, OR POLICY

SDCL § 5-14-1 – Classification of Capital Improvements
SDCL § 5-14-2 – Supervision by Bureau of Administration of Capital Improvement Projects – Payment of Appropriated Funds
SDCL § 5-14-3 – Preparation of Plans and Specifications for Capital Improvements – State Building Committees – Approval by Board or Commission in Charge of Institution
BOR Policy 6.4 – Capital Improvements
BOR Policy 6.6 – Maintenance and Repair

BACKGROUND / DISCUSSION

Black Hills State University (BHSU) and South Dakota State University (SDSU) jointly request approval of the Facility Design Plan for a renovation and addition to BHSU–Rapid City (BHSU-RC) for the West River Health Sciences Center (WRHSC). This project will consolidate all west river nursing education at a single site, providing efficiencies and improvement in space utilization; will replace outdated and program limiting leased facilities in four different locations in Rapid City with one fully appointed modern educational facility; and will provide the space necessary to increase the number of nursing graduates in Rapid City to address the severe nursing shortage in the region.

The Preliminary Facility Statement was approved at the May 2021 Board of Regents meeting. The Facility Program Plan was approved at the October 2021 Board of Regents meeting.

IMPACT AND RECOMMENDATIONS

All didactic nursing classes for both SDSU and USD have successfully transitioned to BHSU-RC beginning in fall 2021. SDSU's accelerated nursing program, which moved to BHSU-RC in March 2021, has one classroom permanently and exclusively assigned to it.

(Continued)

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DRAFT MOTION 20231213_7-I:

I move to approve the Facility Design Plan for BHSU-Rapid City & SDSU West River Health Science Center Addition & Renovation at a cost not to exceed $16,614,644 to be funded by the sources identified in this item.

An additional five classrooms have been dedicated to nursing curriculum (three to USD and two to SDSU) from 7:00 a.m. to 3:45 p.m. each day, which allows BHSU to continue to use the classrooms for course offerings in the evenings. This transition has brought over 200 nursing students into the facility this semester and will increase the seat utilization of BHSU-RC.

The outcome of a minor renovation project allowed for a new SDSU nursing advisor office and four new faculty offices to be dedicated to nursing faculty (two for SDSU and two for USD) beginning in the fall 2021 semester. These offices have allowed nursing faculty to move to BHSU-RC, so they are located where courses are delivered, allowing students to easily connect with faculty while saving faculty the time of having to drive across Rapid City between courses.

Renovations continued in the summer of 2022 to convert four small classrooms into two larger classrooms to accommodate the nursing section size for seventy-two students.

PROPOSED FUNDING SOURCES

The current project budget is $16,614,744. The original cost estimate of $15,114,744 in the Facility Program Plan was increased during the 2023 SD Legislative Session when an additional $1,500,000 was provided to supplement planning for the project. The Federal Capital Project Funds were approved by the Treasury in October 2023. The funding package will be completed through the issuance of Higher Education Facilities Fund (HEFF) bonds in the spring of 2024.

Federal Capital Project Funds	$8,000,000
Higher Education Facilities Funds	$5,114,644
State of South Dakota (Planning Funds)	$1,500,000
Private Donations	$2,000,000
Total Funding Sources	$16,614,644

To bring the project within budget, some of the original project features from the addition were moved into the current facility by renovating existing space, thus reducing the size of the addition.

ATTACHMENTS

Attachment I – BHSU-Rapid City & SDSU West River Health Science Center Addition & Renovation FDP
Attachment II – WRHSC Schematic Design

BHSU-Rapid City & SDSU
West River Health Science Center Addition & Renovation
Facility Design Plan

Submitted September 29, 2023

Introduction

Black Hills State University (BHSU) and South Dakota State University (SDSU) request approval of the Facility Design Plan for a renovation and addition to BHSU–Rapid City (BHSU-RC) for the West River Health Sciences Center (WRHSC). This project will consolidate all west river nursing education at a single site, providing efficiencies and improvement in space utilization; will replace outdated and program limiting leased facilities in four different locations in Rapid City with one fully appointed modern educational facility; and will provide the space necessary to increase the number of nursing graduates in Rapid City to address the severe nursing shortage in the region.

Project Approval

The following table provides a summary of the approvals received to date.

Date	Item	Approving Body
May 2020	Letter of Intent creating the WRHSC	SD Legislature
May 2021	Preliminary Facility Statement Approved	Board of Regents
June 2021	SB55 streamlined nursing programs phasing USD of Rapid City	Board of Regents
October 2021	Facility Program Plan Approved	Board of Regents
March 2022	SB43 authorized $15,115,644 for BHSU-RC WRHSC Renovation & Addition ($8 million to come from state/federal funding)	SD Legislature
March 2023	SB172 authorized $1.5 million of General Funds to supplement project planning.	SD Legislature
September 2023	$8 million of ARPA funding approved	US Treasury

What We have Already Done

Spring 2021

- SDSU's accelerated nursing program moved to BHSU-RC.
- One classroom was dedicated to this program.

Fall 2021

- All SDSU and USD didactic nursing classes were moved to BHSU-RC.
- Five classrooms were dedicated to nursing (three to USD and two to SDSU) from 7:00 a.m. to 4:00 p.m. each day, which allowed BHSU to continue to use the classrooms for course offerings in the evenings.
- Four new faculty offices were created and dedicated to nursing (two for SDSU and two for USD) allowing nursing faculty to office where their courses are delivered, to easily connect with their students outside of class time, and to eliminate faculty from having to drive across Rapid City between classes.
- An additional 200 nursing students were brought into the building, increasing the utilization of BHSU-RC significantly.

Summer 2022

- Four small classrooms were renovated into two larger classrooms to accommodate the nursing section size for seventy-two students.
- All remaining faculty offices were renovated from cubicles to walled private offices.
- An SDSU program advisor was moved into the office suite.

Requested Action

BHSU and SDSU jointly request the Building Committee's approval of the Facility Design Plan for the BHSU-RC/SDSU West River Health Science Center Addition & Renovation. Once approved by the Building Committee, the Facility Design Plan will be forwarded to the Board of Regents at the December 2023 meeting as information in accordance with Board of Regents policy 6:4 - Capital Improvements.

Facility Design Plan

The following components are identified in BOR policy 6:4 – Capital Improvements as items to be addressed in the Facility Design Plan.

A. *Architectural, mechanical, and electrical schematic design plan*

   The architectural, mechanical, and electrical schematic design plans are attached. The addition will create space for the components of SDSU's nursing program that remain in other locations in Rapid City as there is not space for them in the current facility. These include a simulation lab, skills lab, home health lab, debrief rooms, Native American Nursing Education Center, one additional large classroom and faculty offices. The renovated space in the current facility includes four large classrooms, faculty offices, SDSU nursing administrative offices, a joint testing center, WRHSC resource room, and student support and study space. The building addition and renovation are being designed to integrate all programs and occupants into an integrated circulation and programmatic space.

B. *Changes from Facility Program Plan*

   No programmatic changes have been made to this project since the Facility Program Plan was approved in October 2021. However, to bring the project into budget while still meeting the original programmatic goals, some of the project features were moved into the current facility by renovating existing space thus reducing the size of the addition.

C. *Impact to existing building or campus-wide heating/cooling/electrical systems*
The addition will have no impact on the existing building's heating and cooling system. New heating and cooling systems will be included to serve the new addition. The building electrical distribution system has capacity to support the renovation and addition. New transformers and panelboards will be installed in the addition, fed from the existing service.

D. *Total construction cost estimates*

Cost Estimate
The current project budget is $16,614,744. The original cost estimate of $15,114,744 in the Facility Program Plan was increased during the 2023 SD Legislative Session when an additional $1,500,000 was provided to supplement planning for the project. These funds were used to supplement the initial planning and design to ensure the project would be within the available resources. This was accomplished by increasing the amount of space to be renovated and decreasing the total GSF in the addition. This accomplished two major objectives: fulfilling the programmatic needs for the project within the available budget and increasing the utilization of existing space. The estimated cost of renovated space is significantly less than new space. This approach will also increase the shared space throughout the facility including classrooms, administrative offices, and student success space.

The current cost estimate as prepared by the construction manager, Gustafson Construction and verified by the architect, TSP, is within the budget. The current estimate includes new construction, renovation, site work, contingencies, and fees.

We are requesting to proceed with project bids for the currently designed building. Initial conversations have already been had with OSE, Gustafson, and TSP regarding value engineering options in the event the bids come in above budget.

E. *Changes from cost estimates for operational or M&R expenses*
There are no significant changes to the operational or M&R expenses from those provided in the facility program plan.

Tentative Schedule

Date	**Item**
October 2023	Facility Design Plan Approved by Building Committee
November 2023	Issue Bids
December 2023	Facility Design Plan on BOR Agenda as Information
December 2023	Bids open after Board of Regents meeting

Spring 2023	Construction Begins
Fall 2025	New Facility opens – All nursing education is delivered on-site.

TSP
Architecture
Engineering
Planning

MONUMENT WEST RIVER HEALTH SCIENCE CENTER

RAPID CITY, SOUTH DAKOTA

TSP PROJECT NO. 03221571

SCHEMATIC DESIGN DOCUMENTS
MAY 26, 2023

TABLES OF CONTENTS

PERFORMANCE CRITERIA

Structural

1. **Contact**
    a. Information provided by:
        i. TSP Inc., 600 Kansas City Street, Rapid City, SD, 57701
        ii. Alex R. Weiers, Structural Engineer, weiersar@teamtsp.com, 605-343-6102

2. **Loading and Design Codes**
    a. Design Code:
        i. 2018 International Building Code
        ii. ASCE/SEI 7-16
        iii. Code for the City of Rapid City, SD
    b. Risk Category III is assumed for University/College/Adult Education Facilities with an occupancy of 500 or more.
        i. Risk Category II could apply if the addition occupancy is less than 500, which would reduce some of the loading requirements to some extent.
    c. Roof Snow Load:
        i. Ground Snow Load: 42 pounds per square foot (psf) per Rapid City Code
        ii. Roof Minimum Design Snow Load: ~33 psf with increases at areas of potential sliding and drifting as required
    d. Basic Floor Loads:
        i. Typical Offices/Classrooms: 50 psf Live Load (LL) + 15 psf partitions Dead Load (DL) with appropriate increases at other areas as indicated below
        ii. Corridors/Stairs/Exits: 100 psf LL (80 psf LL for corridors above first floor)
        iii. Assembly Areas: 100 psf LL
        iv. Mechanical/Storage: 125 psf LL+ (depending on equipment loads)
        v. Dead loads will vary depending on the construction types.
    e. Wind Load:
        i. 119 mph Minimum Design (Ultimate) Wind Speed per ASCE Risk Cat. III
            1. 115 mph per Rapid City Code is superseded by the ASCE requirement
        ii. Exposure C assumed
    f. Seismic Criteria:
        i. Site Class D per original building drawings and assumed as Default until additional Geotechnical Data is provided at the footprint of the addition.
        ii. SS = 0.135, S1 = 0.041
        iii. Seismic Design Category A
    g. Other Loads:
        i. Specific mechanical rooftop units and/or other equipment loads will be coordinated with applicable disciplines to ensure the framing and foundations are designed accordingly.

3. **Primary Structure**
    a. Steel construction consisting of steel roof deck supported by steel roof joists and structural steel framing.
        i. Exterior walls consisting of infill or bypass framed cold-formed light gauge steel studs and/or storefront/curtain wall window systems.

PERFORMANCE CRITERIA

Structural

ii. Where practical or desired some hardened areas may be constructed of loading-bearing CMU walls or precast concrete panels. These locations could occur at stair wells or elevator shafts for example.

4. Footing and Foundation System

a. Shallow Foundation System
   i. A conventional shallow spread footing and foundation wall system is anticipated for the proposed addition with frost-depth, continuous footings along all the exterior foundation walls. This would be consistent with the foundation system used for the existing building.
   ii. Footings, foundations and slabs will likely require removal of existing unsatisfactory soils to a specified depth, commonly 2 to 4 feet, and replacement with structural engineered fill. This would be consistent with the geotechnical recommendations used for the existing building.
   iii. Spread footings will support all concentrated loads from steel columns.
   iv. All exterior doors will have a frost-depth stoop. Minimum frost depth for footing elevations is 42" below existing finished grade.

b. Deep Foundation or Other Foundation System
   i. If the results of geotechnical exploration at the footprint of the new building addition indicate that the existing soils are unacceptable for the use of a conventional shallow spread footing system, it may be necessary to construct foundations using a deep foundation system or another system to support the building loads which could include but is not limited to the following alternatives:
   ii. Drilled concrete piers/caissons with concrete pier caps and grade beams
   iii. Steel driven piles with concrete pile caps and grade beams
   iv. Steel helical piles with concrete pile caps and grade beams
   v. Rammed aggregate piers used in conjunction with a convention spread footing and foundation system

c. Final earthwork and foundation system recommendations will refer to the Geotechnical Exploration Report provided by the Geotechnical Engineer.

5. Interior Slabs

a. 4" to 6" cast-in-place concrete slab atop a vapor retarder atop 6" drainage course atop engineered fill is anticipated for the at-grade slabs.
   i. If a deep foundation system is required, the floor slabs may be required to be structural slabs supported by the foundation system grade beams instead of being supported by the soils. This would require generally thicker slabs with a greater quantity of steel reinforcement. Geotechnical recommendations for slabs vary depending on the soils present at the site.

b. Other areas may require thicker slabs depending on usage and loading.

c. Freezer/Cooler areas will have recessed and insulated slabs as applicable.

d. Steel rebar reinforcement will be used in slabs where appropriate or required by loadings and/or usage.

PERFORMANCE CRITERIA

Structural

6. **Floor Framing System**
   a. The structural system for any elevated floor may consist of one of the following:
      i. Composite 4”(+/-) overall concrete slab using 1.5”(+/-) metal composite deck supported by steel wide flange beams/purlins and girders(I-beams).
      ii. Non-Composite 4”(+/-) overall concrete slab using 1.5”(+/-) metal form deck supported by steel bars joists and steel wide flange girders(I-beams).
         1. This is consistent with the existing building floor construction.
   b. Steel beams/girders will be supported by square tube or wide flange columns but may otherwise be supported by other load-bearing CMU or precast walls where present.

7. **Roof Framing System**
   a. The structural system for the roof framing will be steel bar joists with 1-1/2”(+/-) wide-ribbed, metal, roof deck supported by steel wide flange girders.
      i. Where rooftop mechanical units occur at the roof other framing consisting of steel beams and potentially concrete slabs may be required depending on loading and mechanical requirements.

8. **Lateral Force Resisting System**
   a. The lateral force (wind & seismic) resisting system will consist of braced frames using diagonal steel tubes between columns at particular exterior or interior wall locations.
      i. Any CMU or precast concrete load bearing walls that may be present in the project would be used as shear wall lateral elements within the building as well. These concrete elements provide significant lateral resistance which reduces the overall quantity and/or size of other steel braced frames.
   b. Alternatively, moment frames and/or a combination of lateral systems may be used as needed based on the final layout and building design.
   c. Where lateral force resisting elements occur, the foundation design generally requires larger footing sizes to resist increased forces at these locations.

9. **Other Considerations**
   a. Demolition/Existing Conditions
      i. The addition will be constructed directly adjacent to the existing structure.
         1. Exterior doors at one or more locations, which have existing concrete frost stoops, may need to be demolished in order to construct the new footings and foundations that connect to the existing foundation.
         2. Steel structure directly adjacent to the existing building may be independent of the existing structure so an expansion joint would be constructed where the buildings adjoin.
   b. Geotechnical Investigation/Report
      i. The original building geotechnical recommendations were provided by American Engineering Testing (AET) in February of 2009. It is recommended that AET conduct additional field exploration borings and testing to verify the foundation system recommendations for the new addition.

PERFORMANCE CRITERIA

Mechanical

1. **Contact**
    a. Information provided by:
        i. TSP Inc., 600 Kansas City St., Rapid City, SD 57701
        ii. Lance Rikala, Mechanical Engineer, Rikalalm@teamtsp.com, 605-343-6102
        iii. Alex Kalmbach, Mechanical EIT, Kalmbachad@teamtsp.com, 605-343-6102

2. **Mechanical Design Criteria**
    a. Site / Elevation: Rapid City, South Dakota / 3,200 Feet
    b. 2021 International Building Code (IBC)
    c. 2021 International Mechanical Code
    d. 2021 International Fire Code
    e. 2015 South Dakota Plumbing Code
    f. Handbooks of American Society of Heating, Refrigerating and Air Conditioning Engineers (ASHRAE)
    g. Ventilation for Acceptable Indoor Air Quality, ASHRAE Standard 62.1-2019
    h. NFPA-13 Installation of Fire Sprinkler Systems

3. **Outdoor Design Conditions**
    a. Source: ASHRAE 2021 Fundamentals Handbook.
    b. Summer Outdoor 0.4% Design Temperature: 96.6°F DB, 66.1°F mean coincident WB
    c. Winter Outdoor Design Temperature: -20°F DB

4. **Indoor Design Conditions**
    a. Classroom, Conference Room, Lounge, and Office Spaces: 70°F heating, 75°F / 50% RH cooling. No mechanical humidification.
    b. Labs: 70°F heating, 75°F / 50% RH cooling. No mechanical humidification.
    c. Exam and Hospital Rooms: 70°F heating, 75°F / 50% RH cooling. No mechanical humidification.
    d. Bathrooms: 70°F heating. No cooling or mechanical humidification.
    e. All other corridor and storage areas: 70°F heating, 75°F / 50% RH cooling. No mechanical humidification.

2. **Load Analysis**
    a. Trane Trace 700 Analysis Program for heating / cooling load calculations.
    b. Occupancy will be based on ASHRAE 62.1 – 2019 recommendations where actual occupancy levels are unknown.
    c. Lighting loads will be based on 2015 IECC, Energy Standard for Buildings Except Low-Rise Residential Building and per Electrical Engineers selected lighting power densities.
    d. Equipment loads will be based on recommendations in ASHRAE 2021 Handbook Fundamentals, Owner provided IT equipment information and on manufacturer's data where available.
    e. Wall, roof, and glass thermal characteristics as developed by the project architects.

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Mechanical

3. **Site Utility Connections**
   a. Sanitary Sewer Service:
      i. A new 6" sanitary sewer line will extend from the new addition to city utility piping. Extensions from building connections are work of Division 33.
   b. Storm Drain Service:
      i. Multiple new primary storm sewer services shall route underground and extend from the new building to city utility piping. Extensions from building connections are work of Division 33.
   c. Domestic Water Service:
      i. An existing 3" water service enters the existing building. The existing water service will be extended to serve the new addition.
   d. Fire Protection Water Service:
      i. An existing 6" fire service enters the existing building. No work is anticipated for the fire service.
   e. Gas Service:
      i. The existing gas meter has an approx. load of 4,210 MBH. An existing 1-1/2" gas service line (5 PSI) serves the building and generator. The existing gas service will be extended to serve the new addition. The sizes of the existing gas meter and regulator will be verified if they are sufficient to handle the loads of the new addition, as design progresses. No work is anticipated with the gas meter and regulator at this time.

4. **Plumbing Systems**
   a. Domestic hot, cold, and hot water recirculating services shall be Type L hard drawn copper tubing with solder-joint fittings for small sizes (below 2") and mechanical grooved joints fittings for large sizes (2 ½" and above).
      i. Recirculating hot water pumps to maintain domestic hot water temperature at fixtures and equipment.
      ii. Piping routed concealed above ceilings, within piping chases and walls to fixtures and equipment. Piping not routed underground or in unheated spaces.
   b. Water Piping Insulation:
      i. Water piping insulated with pre-molded fiberglass with all-service jackets.
      ii. Insulation thicknesses as required by the Energy Code to reduce thermal losses and to minimize condensation.
      iii. PVC jackets where piping is run exposed.
   c. Domestic Water Heater(s):
      i. Remove existing gas water heater. Provide new high-efficiency gas-fired condensing storage water heater(s) located in the mechanical room of the new addition. Water heated and stored at 140°F.
         1. Water heaters provided with firm gas only (no stand by fuel)
         2. Water heaters provided with combustion air intake and discharge exhaust venting through roof.
      ii. A domestic hot water recirculating system will be provided to maintain hot water main loop within ~5°F of hot water setpoint.

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iii. Master mixing valve will be provided to deliver 115°F water to fixtures.
iv. Thermostatic mixing valves to be provided at each fixture that requires hot and cold domestic water service.

d. Domestic Water Softener(s):
   i. At a minimum, a water softener sized for the makeup water load to the new condensing boilers will be provided to increase hydronic system and equipment longevity.

5. Plumbing – Sanitary Waste and Vent Systems

a. Sanitary Waste and Vent Piping:
   i. Cast iron piping with no-hub fittings above and below grade. Below grade piping can be PVC.
   ii. Piping routed underground, and concealed within piping chases, above ceilings and within walls from fixtures and equipment. Piping routed by gravity to service lines.

b. Plumbing Fixtures: Commercial quality fixtures include:
   i. Water closets: Wall mounted water closets with battery powered sensor flush valve.
   ii. Urinals: Wall-hung urinals with battery powered sensor flush valve.
   iii. Lavatories: Wall-mounted porcelain lavatories and manual single lever handled faucets.
   iv. Sinks: Stainless steel - drop in type
   v. Electric water cooler, wall hung double level stainless steel water coolers.

c. Floor Drains and Cleanouts:
   i. Cast-iron floor drains

6. Plumbing – Storm Drainage Systems

a. Storm Drain Piping – Primary and Overflow:
   i. Cast iron piping with no-hub fittings above and below grade. Below grade piping can be PVC.
   ii. Schedule 40 PVC piping with socket fittings and solvent cemented joints, above and below ground.
   iii. Above grade storm drainage piping to be insulated with pre-molded fiberglass with all service jacketing. Provide PVC jacket where pipe is run exposed.
   iv. Piping routed underground, and concealed within piping chases, above ceilings and within walls from fixtures and equipment. Piping routed by gravity to service lines.

b. Cleanouts:
   i. Cleanouts located in risers or above ceiling to match piping material type, Cast-Iron or PVC.
   ii. Floor Cleanout to be Cast-Iron.

7. Plumbing – Medical Gas System

a. Medical gas
   i. Simulated medical gas system will be provided for training.

PERFORMANCE CRITERIA

Mechanical

8. Fire Protection Systems

a. Fire Protection System
   i. Provide new wet sprinkler zone to serve the new addition. New zone shall be for 100 percent coverage of the new building addition in accordance with the requirements of NFPA. System shall be designed to provide a level of fire protection consistent with the fire hazard.

b. Fire Protection Piping
   i. Threadable, lightwall, steel piping with threaded or mechanical grooved-end fittings. Piping extended above grade within ceiling and wall cavities to fire sprinklers located throughout the building. Exposed piping, such as in mechanical rooms, will be Schedule 40 black steel piping.

c. Fire Sprinklers
   i. Pendent and sidewall sprinklers.

9. Mechanical HVAC – Ventilation and Air Conditioning Systems

a. HVAC Airside Systems:
   i. The building ventilation will be achieved with indoor air-handling systems. Air handling units will utilize hot water coils and chilled water coils, supplied from a boiler and chiller plant respectively. Downstream of the AHU's will be variable air volume (VAV) terminals with hydronic reheat coils.

b. Air Handling Units:
   i. The air handling units are planned to be in an enclosed mechanical penthouse. Air handling unit AHU-1 shall serve the first floor and AHU-2 shall serve the second floor.
   ii. The penthouse should be accessed by an enclosed stairwell which would be ideal to facilitate transportation of replacement equipment such as motors and filters as well as necessary tools up to the penthouse area.
   iii. All indoor AHU's will have the following unit specifications:
      1. 2" Double Wall Construction.
      2. Direct drive plenum return fan with variable speed motor drive.
      3. Outside air/return air plenum. Mixing dampers with top outside air opening. Provide provision and 100 percent air economizer capability. Provide an air flow measuring station with capability to measure minimum outside air.
      4. Chilled water cooling coils with modulating control valves.
      5. Heating water heating coils with modulating control valves.
      6. Hinged access doors.
      7. Centrifugal direct drive airfoil plenum supply fan with variable speed motor drive.
      8. Field provided multi-zone VAV controls with BACnet interface to building automation system.

c. Preliminary Unit Service and Capacities:
   i. <u>AHU-1</u>: First Floor: 20,000 CFM
      1. 25% Outdoor Air
      2. 689 MBH Cooling

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Mechanical

        3. 323 MBH Heating
    ii. AHU-2: Second Floor: 16,000 CFM
        1. 25% Outdoor Air
        2. 538 MBH Cooling
        3. 254 MBH Heating

d. Exhaust
    i. Toilet rooms, janitor closets, and other miscellaneous areas requiring exhaust will be exhausted through indoor mounted Energy Recovery Ventilator's (ERV's). The supply side of the ERV will be connected to the return duct of the AHU's.

e. Air Distribution Ductwork
    i. Supply air, return air, outside air, relief air, and exhaust air ductwork fabricated of galvanized steel sheet metal in rectangular and round shapes according to space requirements. SMACNA 2-inch and 4-inch duct pressure classifications, with Class A duct sealing.

f. External Duct Insulation
    i. Concealed supply and return air duct shall be insulated with 1-1/2" 1.0 density fiberglass blanket with a foil-scrim-kraft vapor barrier.
    ii. Exposed supply and return air duct shall be insulated with 2-inch thick, 3.0 pound density fiberglass board insulation with all-service jacket.
    iii. Outside air and relief air ducts shall be insulated continuously and exhaust air ducts shall be insulated within 5 feet of a wall or roof opening with 2-thick, 3.0 pound density fiberglass board insulation with all-service jacket.

g. Variable Air Volume Air Terminal Units
    i. Pressure-independent, single duct, variable air volume units with digital controls and hydronic heating water reheat coils.

h. Registers, Grilles, and Diffusers
    i. Square plaque supply diffusers with round necks, lay-in and surface-mounted.
    ii. Linear slot diffusers in areas with specialty ceilings.
    iii. Lay-in and surface mounted eggcrate return air grilles.
    iv. Sidewall and ceiling return and exhaust registers.

i. HVAC Hydronic Systems:
    i. The building cooling will be achieved by a water-cooled chiller and associated pumps located in the penthouse. The chilled water system shall contain 35% propylene glycol.
        1. It is proposed to tie the new chiller into the existing cooling tower (CT-1). The existing cooling tower appears to have enough heat rejection capacity for the new chiller, based on discussions with the facilities team and preliminary sizing calculations.
    ii. The building heating will be achieved by an indoor, modulating condensing boiler plant. Boiler plant, expansion tank, and associated circulation pumps will be located in the penthouse. The hot water system shall contain 35% propylene glycol.

j. Water Cooled Chiller:

PERFORMANCE CRITERIA

Mechanical

i. The chiller shall be the water-cooled type, with compressors, evaporator tube bundle, condensing fans and coil sections, and factory provided refrigeration system controls with interface to Automatic Temperature Control system

ii. Chiller will have the following unit specifications:

1. Variable speed operation with lead compressor operating with variable speed drive and remaining compressors staged for full capacity modulation.
2. Elastomeric isolators or internally isolated components
3. Minimum 5-year compressor warranty
4. Factory provided controls

k. Preliminary Unit Service and Capacities:

i. <u>CH-1:</u> Serves AHU-1 and AHU-2

1. 110 tons of cooling capacity.
2. Heat recovery mode option.
3. Single point power connection.

l. Modulating Condensing Boiler Plant:

i. The new boiler plant shall consist of two (2) water boilers. Boilers shall be modulating, condensing, fire-tube type boilers with sealed combustion air and independent flue venting.

ii. The heating water system will be designed as a primary-secondary system for energy efficiency and increased system reliability. The system will be provided with a supply temperature optimization sequence based on outside air temperature i.e. heating water reset algorithm. Each boiler will have its own boiler circulation pump, sized, and selected by the boiler manufacturer to ensure proper operation of each primary boiler loop.

iii. Two (2) heating water circulating pumps will be provided to circulate hot water throughout the building to all heating coils, reheat coils, and terminal units. Circulating pumps will be close-coupled, vertical inline style pumps complete with suction diffusers, discharge triple duty valves, and motors with variable frequency-drives. The pumps will be nominally sized to match the full system flow each, with one pump stand-by for N+1 redundancy.

iv. Boilers will have the following unit specifications:

1. Full boiler modulation, minimum 15:1 turndown heat exchanger
2. Condensate neutralization kit
3. Motorized isolation valves
4. Factory provided controls with BACnet interface
5. AL29-4C venting

m. Preliminary Unit Service and Capacities:

i. <u>B-1, B-2</u> Serve AHU heating coils, and air terminal reheats.

1. Each of the two (2) boilers (B-1, B-2) is sized at approximately 2/3 of the preliminary building heating estimate for added redundancy if one were to fail.
   a. 1,443 MBH of heating output each.
2. Basis of Design – Lochinvar Crest.

n. Hydronic Piping

PERFORMANCE CRITERIA

Mechanical

i. Hydronic piping shall be Schedule 40 black steel with grooved mechanical joints. Piping 2” and smaller may be Type L copper with wrought copper fittings and soldered joints.
ii. Hydronic piping insulated with pre-molded fiberglass with all-service jackets. Insulation thicknesses as required by the Energy Code to reduce thermal losses and to minimize condensation. PVC jackets where piping is run exposed.
iii. Piping routed concealed above ceilings, with in piping chases and walls to fixtures and equipment. Piping not routed underground or in unheated spaces.

o. Automatic Control System:
   i. All new temperature control systems will be DDC. Equipment shall operate according to a documented sequence of operations.
   ii. All new spaces as a part of this Nursing Lab addition shall receive Demand Controlled Ventilation (CO2 Outdoor Air Reset) to reduce the amount of energy required to condition outdoor air when the building is not at full occupancy.

10. Green Globes

a. New construction will be designed to meet the requirements of Green Globes in order to obtain a two globes certification rating.
b. Renovation of existing spaces within the existing building will reuse and modify existing systems as needed.

PERFORMANCE CRITERIA

Electrical

1. **Contact**
    a. Information provided by:
        i. TSP Inc., 600 Kansas City St., Rapid City, SD 57701
        ii. Kelli Osterloo, Electrical Engineer, osterlooka@teamtsp.com, 605-343-6102

2. **Electrical Service**
    a. The existing electrical service consists of conductors incoming to the building from a utility-owned outdoor transformer (West River Electric). The existing utility transformer is a 750 KVA transformer with 480Y/277V, 3-phase secondary to the building.
    b. The peak demand provided by West River Electric for the past 24 months was 208.8 KW. A power factor was not able to be obtained. Assuming a 0.8 power factor, this peak demand equates to 261 KVA, or approximately 314 Amps. With a 125% demand factor applied, per the NEC, the existing peak demand is 393 Amps.
    c. The existing electrical service switchgear consists of a 1600A main circuit breaker switch board located near the transformer, which serves a 1600 A main distribution panel located in MECH 218.
    d. New construction is estimated at approximately 31,000 square feet. At an estimated 15 W/ft^2, the estimated added load to the system is 465 KW, or approximately 560 Amps.
    e. The peak demand plus the estimated added load is approximately 953 Amps, which can be supported by the existing 1600 A service. No changes to the service entrance are anticipated.

3. **Emergency Power**
    a. A 200 KW, 480V, 3-phase, 4W natural gas generator is located outside. The generator contains a 300A load bank circuit breaker, a 200A circuit breaker, and a 100A circuit breaker. The generator serves two transfer switches: a 100A ATS that serves emergency lighting, and a 400A ATS that serves select mechanical systems. The 400A ATS is fed by a 400A feeder and circuit breaker on the normal side, and a 200A feeder and circuit breaker on the generator side.
    b. The existing load on the generator is not currently known, however the as-built drawings indicate a connected load of 141 KVA in the original design.
    c. Egress lighting and exit lights will be powered from the existing 100A ATS.
    d. New mechanical equipment will be reviewed with the owner to determine what should be powered by the generator, and what remaining capacity the generator has for these loads.

4. **Power Distribution System**
    a. The power distribution system provides electrical energy at 480/277 volts, 3 phase, 4 wire, (plus ground) 60 HZ for general LED lighting, elevators and (generally), motors larger than 3/4 HP. Dry type transformers are used to provide 208/120 volt, 3 phase, 4 wire, (plus ground) service for convenience receptacles, motors smaller than 3/4 HP, selected communication equipment and other miscellaneous equipment.

PERFORMANCE CRITERIA

Electrical

b. New 480/277 V panelboards will be provided in the addition, fed from the existing main distribution panel. Step down transformers and 208/120V panelboards will be provided in the addition and fed from the new 480V panelboards.
c. Each circuit will be provided with a separate neutral and equipment grounding conductor.
d. Aluminum conductors will be allowed for feeders between main service panel and distribution panelboards.
e. Circuits will be installed in conduit/raceways.
f. Metal-Clad cable (MC) will be allowed, with homeruns in conduit.

5. Electrical Motor and Power Equipment

a. Individual motor starters will be provided. All starters will be combination type with fused disconnect or circuit breaker capable of being padlocked in the off position. Variable Frequency Drives (VFDs) will be installed as specified by Mechanical Engineer. All automatically controlled starters will have a local hand off-auto switch to allow for individual testing of the motor. All starters will contain pilot lights to visually indicate operation. A disconnecting means to be installed within sight of motors and other equipment where specifically indicated. Motors 25 HP and larger will be equipped with reduced voltage starters. The Energy Management Controls System, specified in another division, will be utilized wherever possible to reduce the amount of electrical energy consumption.

6. Miscellaneous Equipment Connections

a. Power will be provided for mechanical equipment and water heaters furnished and installed by Division 22/23, automatic door operators, water coolers, and all miscellaneous equipment furnished by Owner that is coordinated with engineer.
b. Tamper-resistant receptacles shall be installed throughout the education facility per the NEC.
c. Duplex receptacles with be gray in color and have stainless steel cover plates.

7. Grounding

a. Grounding will be provided in accordance with the National Electric Code. All feeders and individual branch circuits will be provided with a separate grounding conductor. Ground busses will be provided in all electrical distribution equipment. All communication rooms will be provided with a ground bar and connected to building grounding electrode system.

8. Lightning Protection

a. An existing lightning protection system is not present. A lightning protection system is not planned.

9. Lighting Systems

a. Lighting in the existing building has already been upgraded to LED.
b. LED lighting will be utilized and will operate at 277 volts. The color temperature of new lights will match the existing lighting in the building.

PERFORMANCE CRITERIA

Electrical

c. Lighting system to be designed within the IES recommended limits.

10. Emergency Egress Lighting

a. Emergency egress lighting will be provided in lobbies, corridors/public areas, toilets, and electrical/mechanical rooms. Emergency lighting in the public areas, that is not on continuous, will be programmed by the lighting control system to come on automatically if the emergency generator is started due to a normal power loss.

11. Exterior Lighting System

a. Exterior doors will be provided with egress/security lighting. Exterior lighting including soffit lighting, parking lot lighting, sidewalk lighting, etc. will be as coordinated with the Design Team. LED lighting will be used for exterior lighting. Lighting control will include a time clock, photoelectric cell, or building automation type functions if applicable. Parking lots, driveways, and drop-off areas will be illuminated with pole mounted area lights.

12. Lighting Control Systems

a. Fixtures in the public areas will be switched by lighting contactors or by a computerized, programmable lighting control system. Lighting control system will be capable of interfacing with the Energy Management Controls System. A main lighting control panel will be located in a control room. This control panel will control lighting in public areas and corridors, lobbies, public toilets (if applicable), exterior building, surface parking lot and driveways, exterior walkways, and other selected locations. Public toilets will be controlled from a local switch in each toilet for individual control. Motion detectors will provide automatic on-off switching of lights in offices, toilet rooms, storage rooms, and other selected rooms or areas that would be appropriate for conserving energy when the room is not used continuously.

13. Telephone/Data Systems

a. There is one main MDF room in the existing building and all cabling goes back to this room (Telecommunication 363). The goal is to run all new cabling back to the existing room.
b. If cable length is an issue, a remote comm room will be required. In this case, new backbone cabling will be provided from the MDF to the new room in the addition, using single mode fiber.
c. Painted plywood panels will be provided for new terminal equipment and mounting system boxes and panels. A ground wire will be brought to a ground bar in all telecommunication rooms/closets from the building service ground.
d. A conduit system is to be installed as required with distribution conduits, sleeves, and outlet boxes. Pull strings to be provided in all telephone/data conduits for long run conduits.
e. If a new room is required, a two-post rack will be installed in new telecommunications rooms with horizontal and backbone cabling terminated to patch panels.
f. Horizontal cabling will consist of Cat 6 (plenum) cables and patch panels. Two cables will be brought to the standard workstation.

PERFORMANCE CRITERIA

Electrical

g. Wireless Access Points (WAP) will have Cat 6A cables and patch panels. One cable to each.
h. Data outlet jack color will be coordinated with the owner. Wall plates at workstations shall be angled and stainless steel. Data patch cords quantity shall be coordinated with Engineer.
i. Analog lines will be provided as requested by owner, for fax, security system(s), and/or fire alarm system. It is understood that a VOIP telephone system is used throughout the facility.

14. Distributed Antenna System (DAS)

a. A conduit to the roof with a weatherhead and stubbed into an accessible ceiling on the upper level will be provided. The system electronics and cabling are not included.

15. Cellular DAS System

a. A cellular DAS system is not planned.

16. Video (TV) Distribution System

a. A conduit system is to be installed as required with distribution conduits, sleeves, and outlet boxes. All required power equipment/connections and raceway system to be provided as determined by the Owner. A coax will be installed from outlet to Telecom room wall. Amplification is by Owner.

17. Audio/Visual Systems

a. Rough-in (conduit and boxes) for Owner installed devices (and wiring) shall be coordinated with Engineer.

18. Sound System

a. A sound reinforcement system is not planned.

19. Sound Masking System

a. A sound masking system is not planned.

20. Paging System

a. Paging system is not planned.

21. Clock System

a. An existing Primex clock system is present. The transmitter is located in the penthouse server room and wireless clocks are located throughout the building.
b. It is anticipated that new clocks in the addition will be owner provided.

22. Class Bell System

a. A bell system is not planned.

23. Access Control (Card Reader) System

PERFORMANCE CRITERIA

Electrical

a. The existing access control system is by Transact (previously Blackboard). BHSU will furnish controllers, proximity card readers, REX, and door contacts. All devices will be installed and wired by the electrical contractor. Door hardware will be provided by the door hardware supplier.

24. Intrusion Detection System

a. An intrusion detection system is not planned.

25. Video Surveillance System

a. Rough-in (conduit and boxes) for Owner installed devices (and wiring) shall be coordinated with Engineer.

26. Cable Tray

a. Cable tray will be provided for main routing of low-voltage cabling.

27. Fire and Smoke Alarm Systems

a. The existing fire alarm control panel is a Siemens FC922. The existing control panel is capable of supporting up to 252 points and can network with other Siemens panels. The existing panel is currently using 94 points.
b. The existing system is a voice evacuation system, with speakers located in the corridors.
c. The existing fire alarm system will be expanded into the addition and be provided with audible (speaker) and visual signal devices, manual stations, automatic devices including ionization smoke detectors, combination fixed temperature/rate of rise detectors, OS&Y switches, etc. as required. All devices shall be connected together to provide a complete system designed to NFPA standards. The system will be designed in accordance with ADA standards. Manual stations will be provided at all exits (with the exception of lobby doors unless otherwise required by Local Codes) and within 200 feet of horizontal travel. System will be provided in accordance with local and state requirements. A smoke detector will be provided above the fire alarm panel in the electrical room as required. Smoke and heat detectors will be provided at elevator equipment rooms and smoke detectors will be installed in elevator lobbies as required. Smoke duct detectors will be provided in air moving systems where required by code. The system will be addressable by device to allow easy identification of the activated area and type of device. Smoke detectors will be provided in conjunction with magnetic door holders, when applicable.

28. Green Globes

a. New construction will be designed to meet the requirements of Green Globes in order to obtain a two globes certification rating.
b. Renovation of existing spaces within the existing building will reuse and modify existing systems as needed.

DRAWINGS

CODE SUMMARY

PROJECT SUMMARY
THIS PROJECT INVOLVES THE PARTIAL RENOVATION OF AN EXISTING BUILDING, AND THE ADDITION OF NURSING TRAINING FACILITIES TO THE SAME BUILDING.
INFORMATION BELOW DELINEATES INTENT.

PROJECT:	WEST RIVER NURSING
OWNER:	BLACK HILLS STATE UNIVERSITY
ARCHITECT / ENGINEER:	TSP, INC. 600 KANSAS CITY STREET RAPID CITY, SOUTH DAKOTA 57701
BUILDING CODE:	INTERNATIONAL BUILDING CODE (IBC) 2018
ELECTRICAL CODE:	NATIONAL ELECTRICAL CODE 2020
PLUMBING CODE:	UNIFORM PLUMBING CODE 2015
MECHANICAL CODE:	INTERNATIONAL MECHANICAL CODE 2015
FIRE SAFETY CODE:	UNIFORM FIRE CODE 2015 NFPA 101 LIFE SAFETY CODE 2012
ACCESSIBILITY CODE:	2010 ADA STANDARDS FOR ACCESSIBLE DESIGN ANSI A117.1-2009 (BY REFERENCE FROM IBC)

A. Use and Occupancy:

1. HIGHER ED: BUSINESS (B)
   - a. This fire area is fully sprinkled.
   - b. Existing: 51,960 SF
   - c. Addition: 31,055 SF

B. Allowable Areas and Number of Stories:

1. Based upon BUSINESS (B)
   - a. IBC Table 504.3
     - i. Allowable height (B) 75 FT (II-B)
     - ii. Actual 52 FT
   - b. IBC Table 504.4
     - i. Allowable stories (B) 4 (II-B)
     - ii. Actual 3
   - c. IBC Table 506.2
     - i. Allowable area (B) 69,000 sf (II-B) Does Not Include Frontage Increase
     - ii. Actual 83,015 sf total

C. Building Elements:

1. IBC Table 601 — Fire-resistance rating for II-B

a.	Structural frame	0
b.	Bearing walls – Exterior	0
c.	Bearing walls – Interior	0
d.	Non-bearing walls – Exterior	0
e.	Non-bearing walls – Interior	0
f.	Floor	0
g.	Roof	0

D. Fire Resistance Rated Construction:

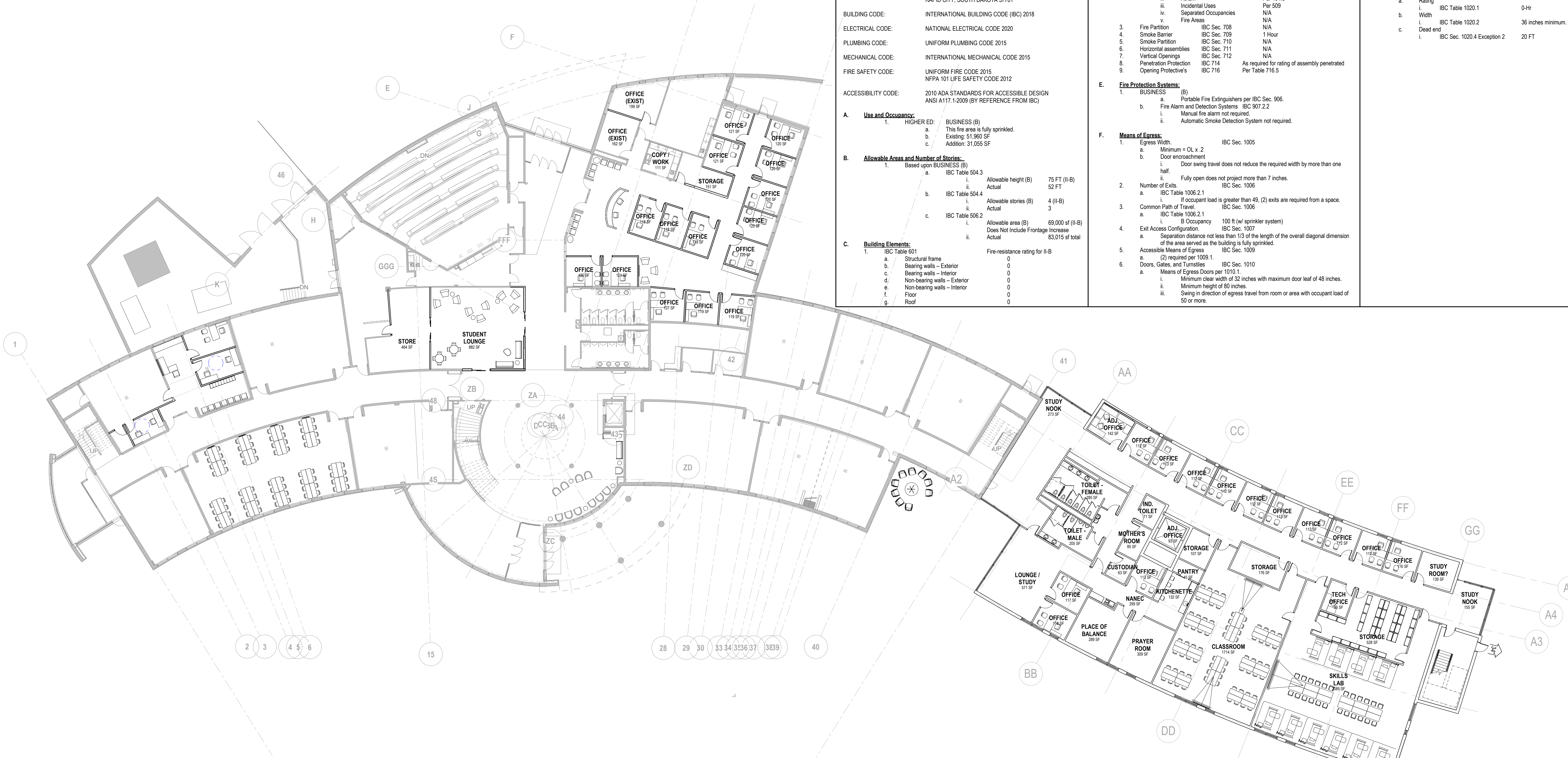
1. Fire Walls. IBC Sec. 706 N/A
2. Fire Barriers. IBC Sec. 707
   - a. Fire Resistance Rating
     - i. Exit access stair 1 Hour
     - ii. Atrium Per 404.6
     - iii. Incidental Uses Per 509
     - iv. Separated Occupancies N/A
     - v. Fire Areas N/A
3. Fire Partition IBC Sec. 708 N/A
4. Smoke Barrier IBC Sec. 709 1 Hour
5. Smoke Partition IBC Sec. 710 N/A
6. Horizontal assemblies IBC Sec. 711 N/A
7. Vertical Openings IBC Sec. 712 N/A
8. Penetration Protection IBC 714 As required for rating of assembly penetrated
9. Opening Protective's IBC 716 Per Table 716.5

E. Fire Protection Systems:

1. BUSINESS (B)
   - a. Portable Fire Extinguishers per IBC Sec. 906.
   - b. Fire Alarm and Detection Systems IBC 907.2.2
     - i. Manual fire alarm not required.
     - ii. Automatic Smoke Detection System not required.

F. Means of Egress:

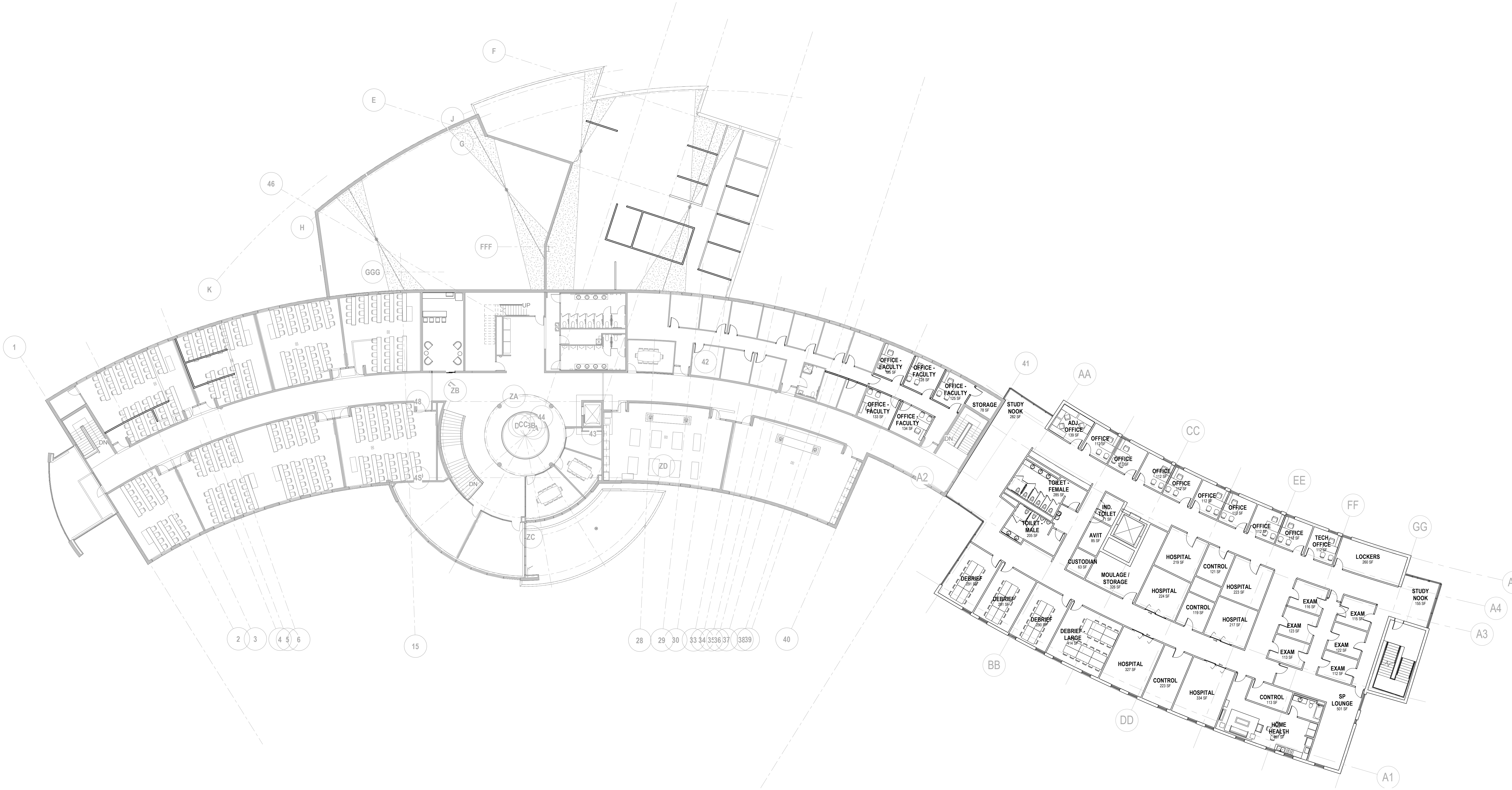
1. Egress Width. IBC Sec. 1005
   - a. Minimum = OL x .2
   - b. Door encroachment
     - i. Door swing travel does not reduce the required width by more than one half.
     - ii. Fully open does not project more than 7 inches.
2. Number of Exits. IBC Sec. 1006
   - a. IBC Table 1006.2.1
     - i. If occupant load is greater than 49, (2) exits are required from a space.
3. Common Path of Travel. IBC Sec. 1006
   - a. IBC Table 1006.2.1
     - i. B Occupancy 100 ft (w/ sprinkler system)
4. Exit Access Configuration. IBC Sec. 1007
   - a. Separation distance not less than 1/3 of the length of the overall diagonal dimension of the area served as the building is fully sprinkled.
5. Accessible Means of Egress IBC Sec. 1009
   - a. (2) required per 1009.1.
6. Doors, Gates, and Turnstiles IBC Sec. 1010
   - a. Means of Egress Doors per 1010.1.
     - i. Minimum clear width of 32 inches with maximum door leaf of 48 inches.
     - ii. Minimum height of 80 inches.
     - iii. Swing in direction of egress travel from room or area with occupant load of 50 or more.
7. Exit access. IBC Sec. 1016
   - a. Intervening spaces allowed if accessory to area served.
8. Exit access travel distance. IBC Sec. 1017
   - a. Table 1017.2
     - i. Occupancy B 200 FT with fire sprinkler system
9. Corridors. IBC Sec. 1020
   - a. Rating
     - i. IBC Table 1020.1 0-Hr
   - b. Width
     - i. IBC Table 1020.2 36 inches minimum.
   - c. Dead end
     - i. IBC Sec. 1020.4 Exception 2 20 FT



MONUMENT WEST RIVER HEALTH SCIENCE CENTER
CODE PLAN - FIRST FLOOR

Kahler Slater

TSP Architecture Engineering Planning



MONUMENT WEST RIVER HEALTH SCIENCE CENTER
CODE PLAN - SECOND FLOOR

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ADDITION:

FIRST FLOOR - 12,934 SF
SECOND FLOOR - 13,344 SF
PENTHOUSE - 4,777 SF

TOTAL: 31,055 SF
(- 3,773 SF)

1 FLOOR PLAN - LEVEL 1 - OPTION 2A
1/16" = 1'-0"

MONUMENT WEST RIVER HEALTH SCIENCE CENTER
FIRST FLOOR

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DRAWINGS

1 FLOOR PLAN - LEVEL 2 - OPTION 2A
1/16" = 1'-0"

ADDITION:

FIRST FLOOR - 12,934 SF
SECOND FLOOR - 13,344 SF
PENTHOUSE - 4,777 SF

TOTAL: 31,055 SF
(- 3,773 SF)

MONUMENT WEST RIVER HEALTH SCIENCE CENTER
SECOND FLOOR

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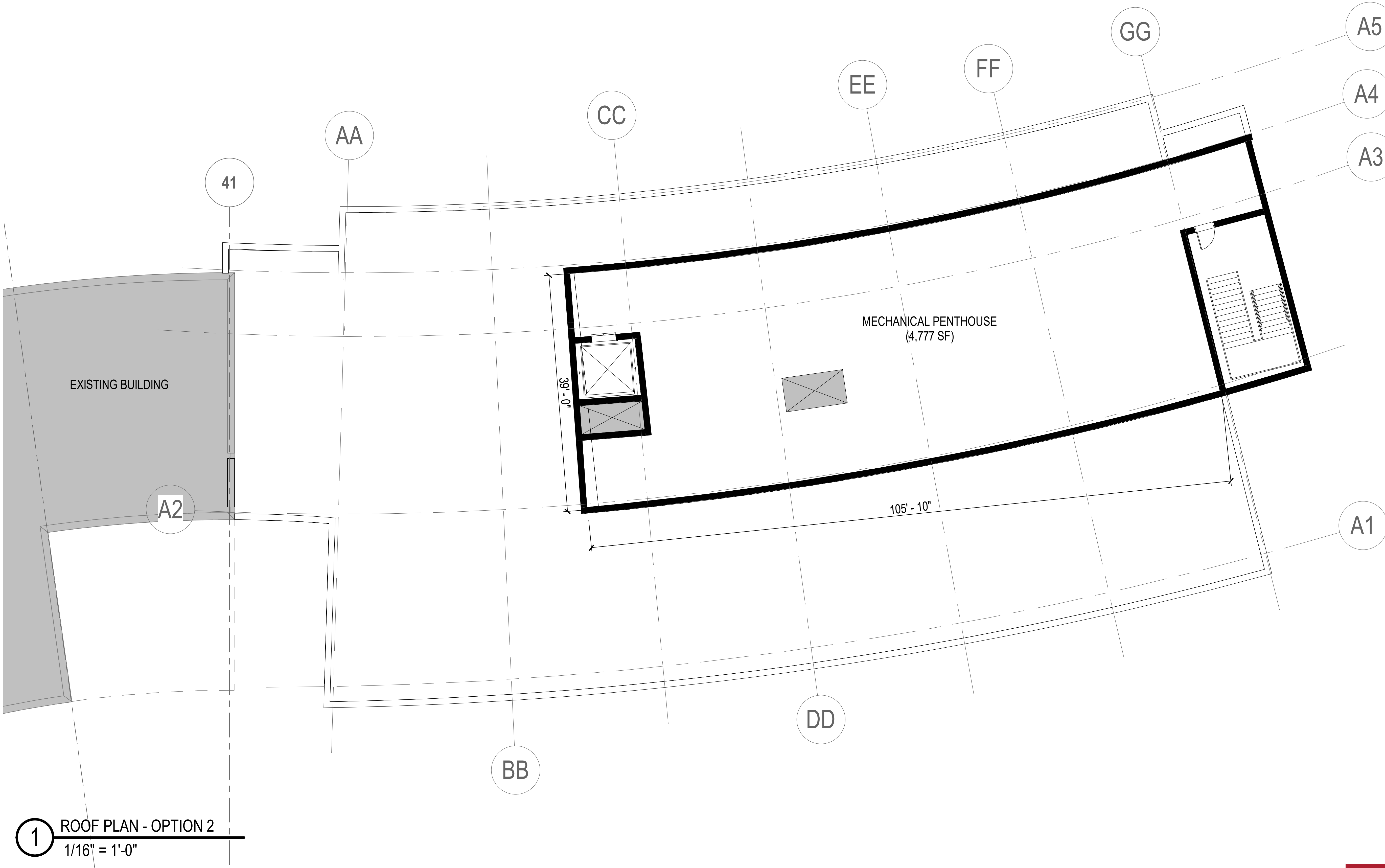

1 ROOF PLAN - OPTION 2
1/16" = 1'-0"

ADDITION:

FIRST FLOOR - 12,934 SF
SECOND FLOOR - 13,344 SF
PENTHOUSE - 4,777 SF

TOTAL: 31,055 SF
(- 3,773 SF)

MONUMENT WEST RIVER HEALTH SCIENCE CENTER
ROOF PLAN

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TSP Architecture Engineering Planning

05/26/23

1 *FIRST LEVEL - RENOVATION -STUDENT SUPPORT

SCALE: 1/16" = 1'-0"

NO. OFFICES: 17
OVERALL SF: 4,326 SF

MONUMENT WEST RIVER HEALTH SCIENCE CENTER
STUDENT SERVICES

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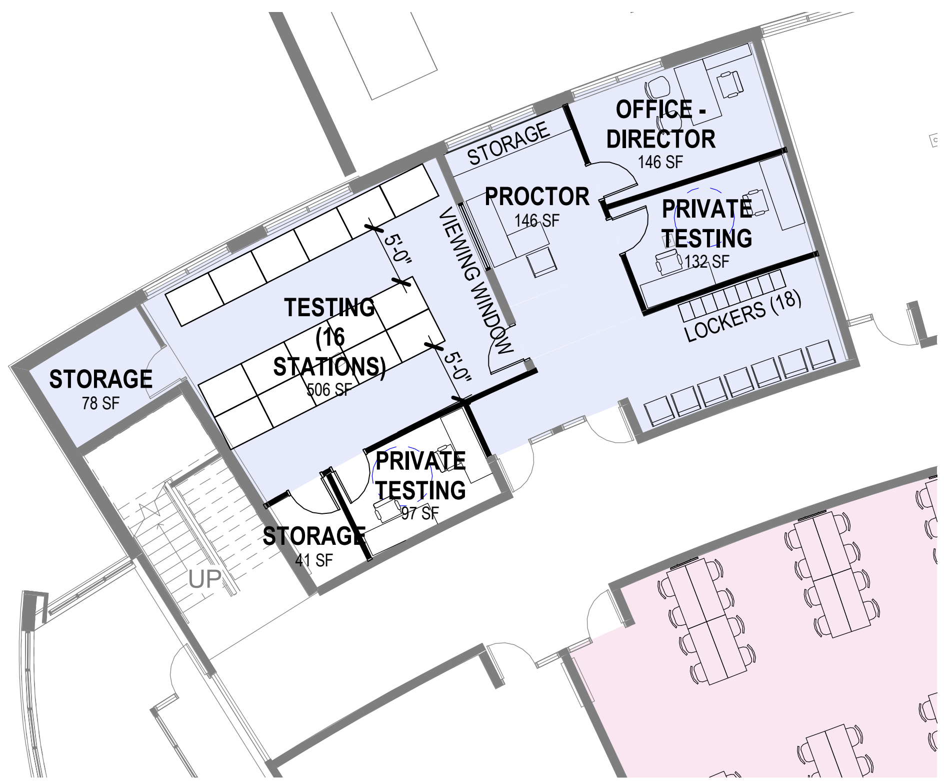
TSP Architecture Engineering Planning

05/22/23

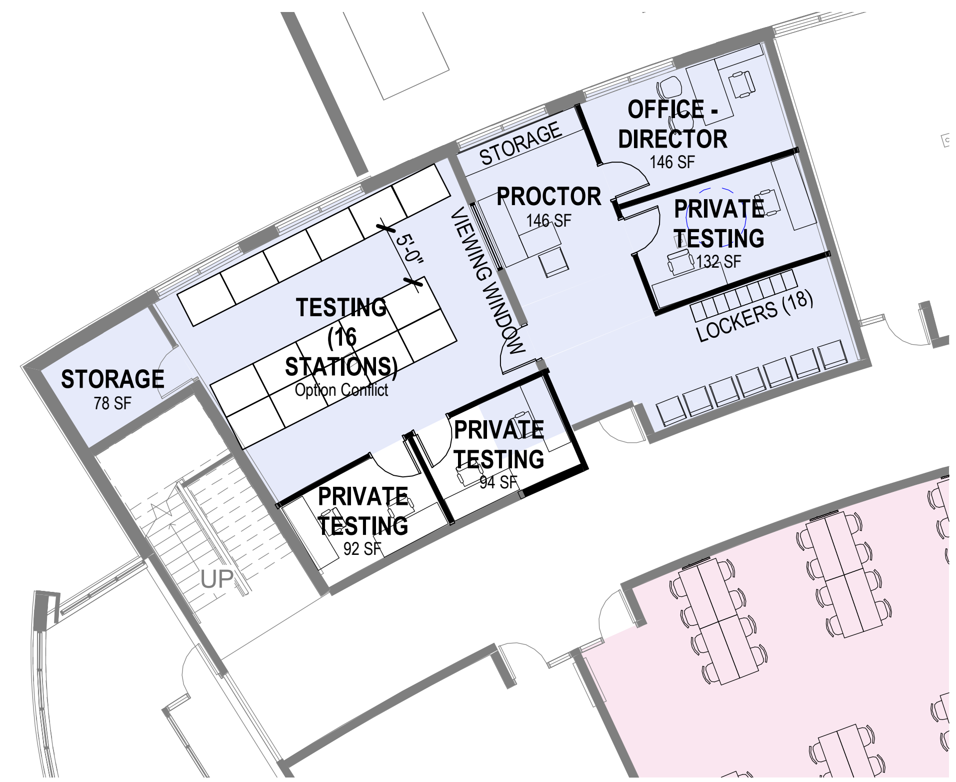
1 *SECOND LEVEL - RENOVATION - OFFICE
SCALE: 1/16" = 1'-0"

2 *SECOND LEVEL - RENOVATION - OFFICE OPTION 2
SCALE: 1/16" = 1'-0"

NO. OFFICES: 5
OVERALL SF: 969 SF



1 *FIRST LEVEL - RENOVATION - TESTING CENTER
SCALE: 1/16" = 1'-0"



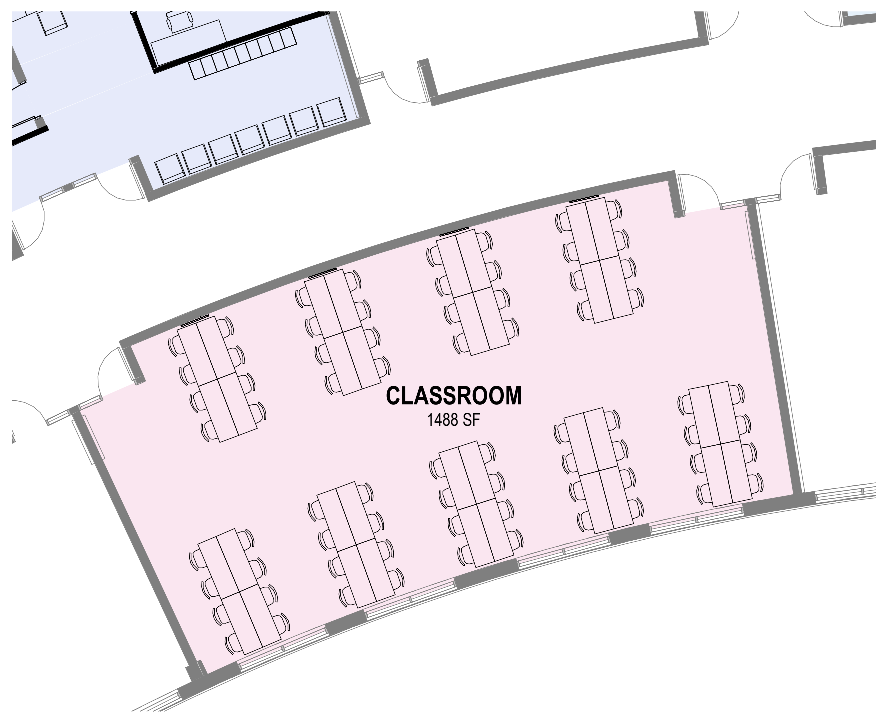
2 *FIRST LEVEL - RENOVATION - TESTING CENTER 2
SCALE: 1/16" = 1'-0"

OVERALL SF: 1,501 SF

MONUMENT WEST RIVER HEALTH SCIENCE CENTER
TESTING CENTER

Kahler Slater

TSP Architecture Engineering Planning



1 *FIRST LEVEL - RENOVATION - CLASSROOM
SCALE: 1/16" = 1'-0"

EXISTING ROOMS: 104 & 106
OVERALL SF: 1,488 SF

MONUMENT WEST RIVER HEALTH SCIENCE CENTER
CLASSROOM

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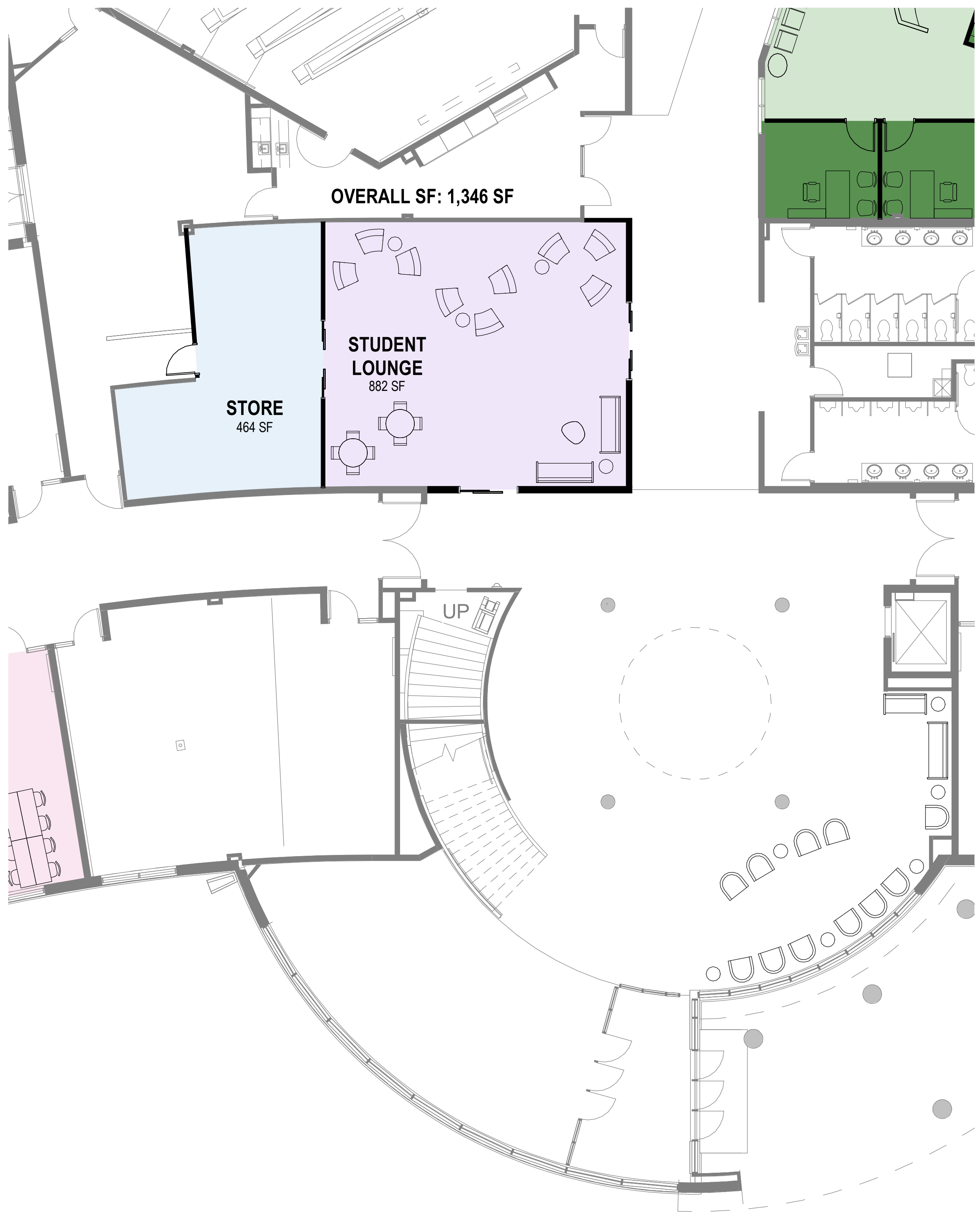
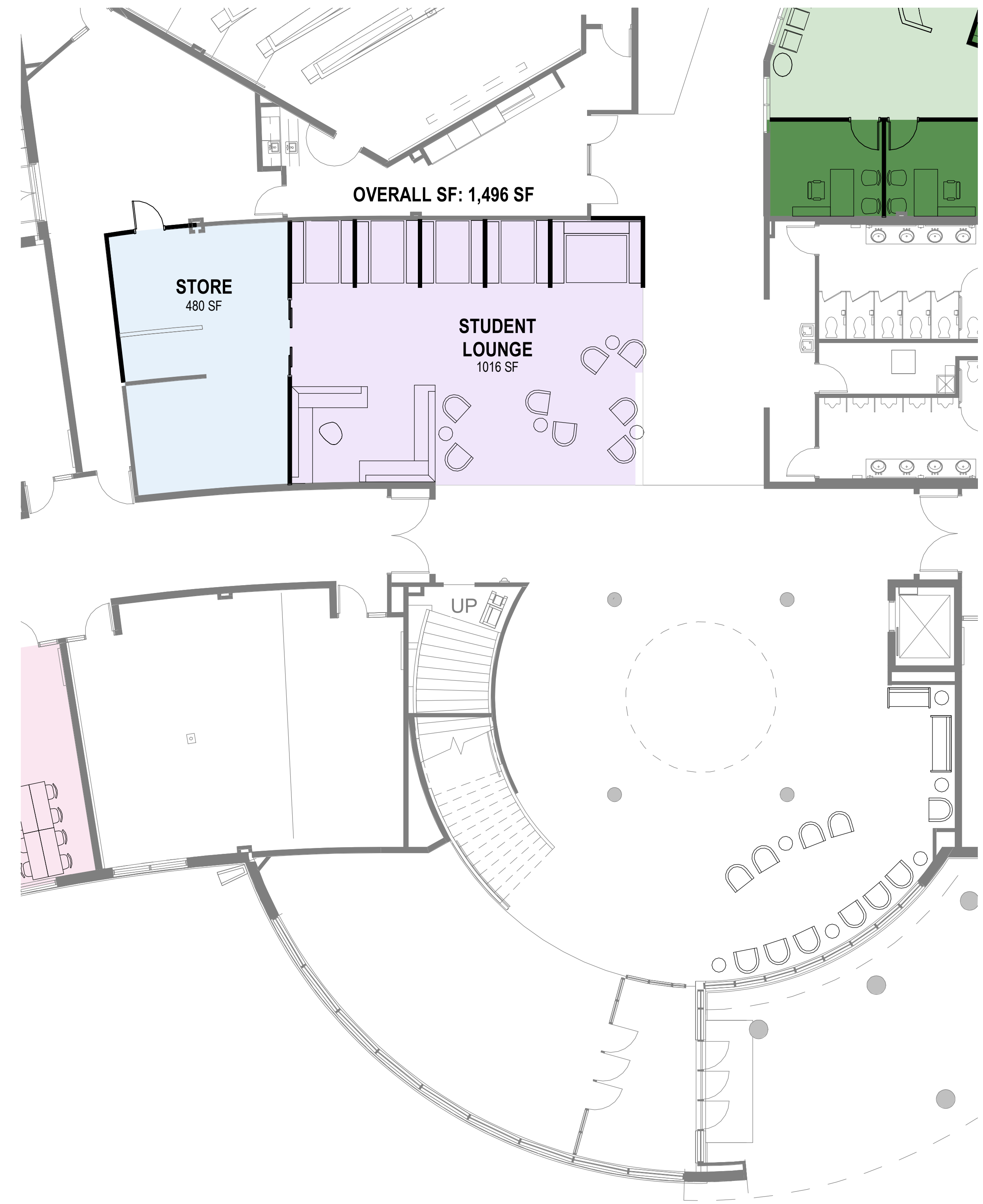
TSP Architecture Engineering Planning



1 *FIRST LEVEL - RENOVATION - STUDENT LOUNGE

SCALE: 1/16" = 1'-0"



2 *FIRST LEVEL - RENOVATION - STUDENT LOUNGE 2

SCALE: 1/16" = 1'-0"

MONUMENT WEST RIVER HEALTH SCIENCE CENTER
STUDENT LOUNGE - 1ST FLOOR

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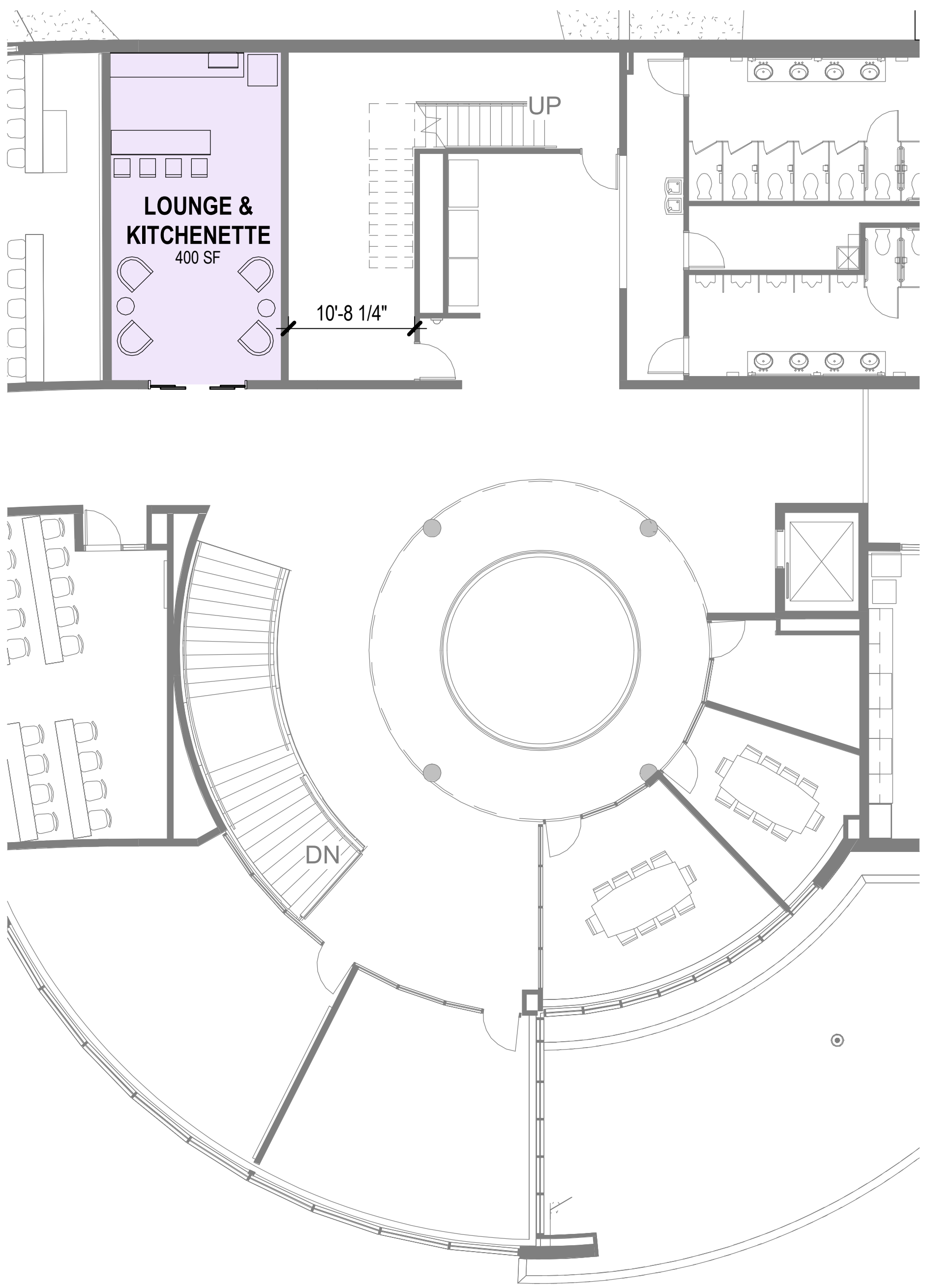
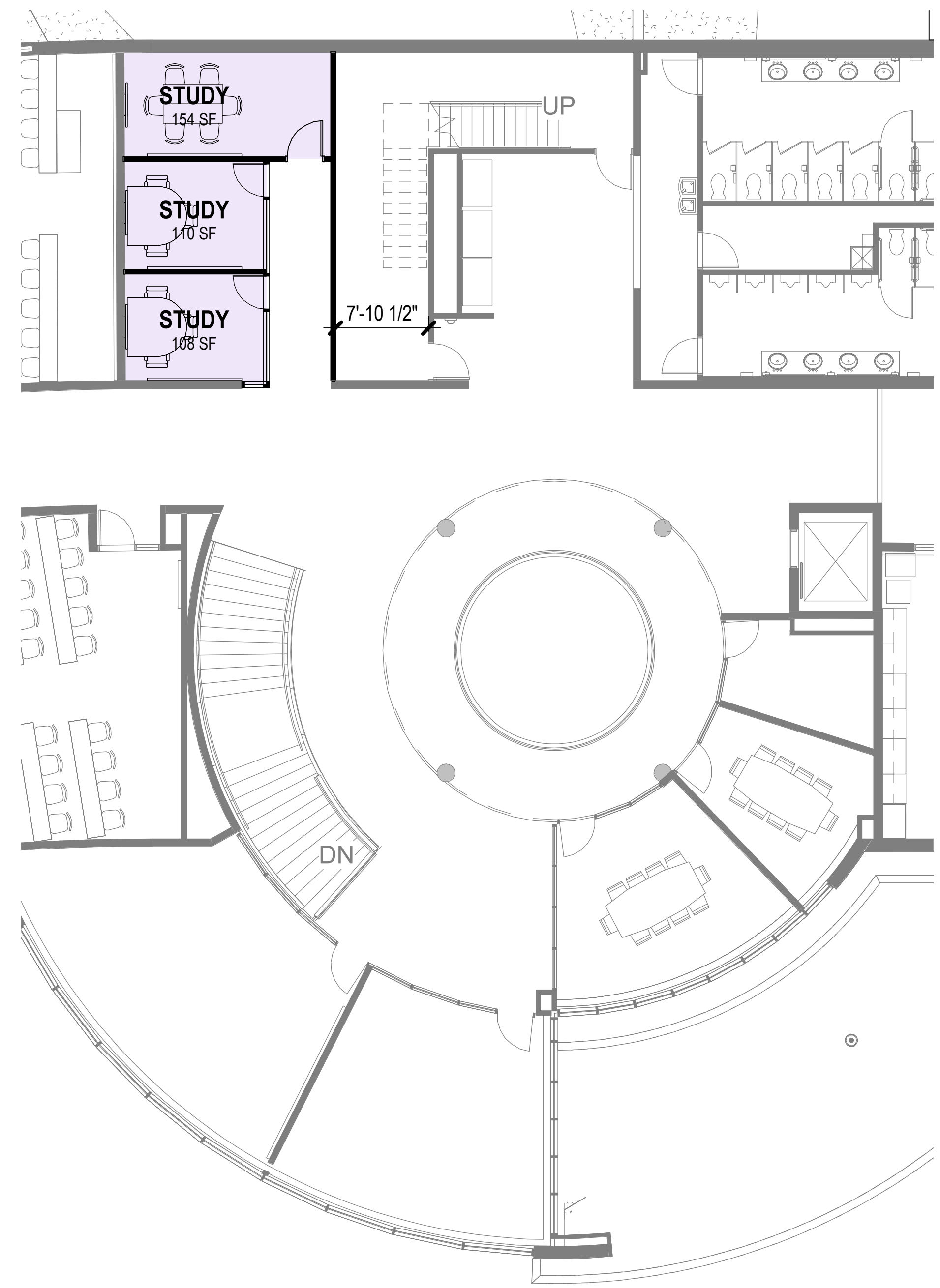
TSP Architecture Engineering Planning

05/22/23



1 *SECOND LEVEL - RENOVATION - STUDENT LOUNGE
SCALE: 1/16" = 1'-0"



2 *SECOND LEVEL - RENOVATION - STUDENT LOUNGE 2
SCALE: 1/16" = 1'-0"

MONUMENT WEST RIVER HEALTH SCIENCE CENTER
STUDENT LOUNGE - 2ND FLOOR

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MONUMENT WEST RIVER HEALTH SCIENCE CENTER
NORTHEAST PERSPECTIVE

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MONUMENT WEST RIVER HEALTH SCIENCE CENTER
NORTHWEST PERSPECTIVE

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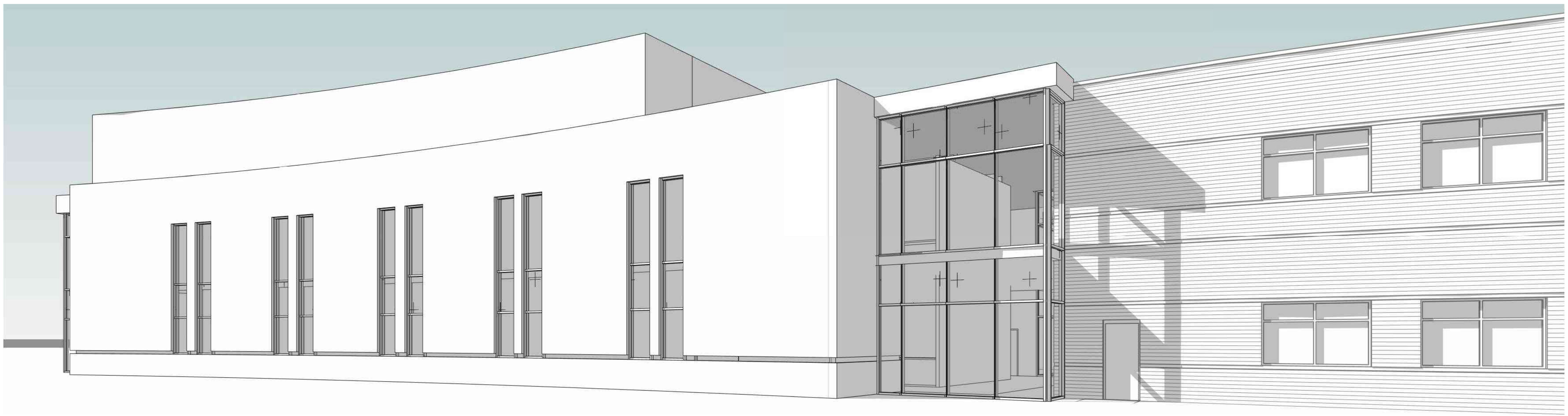
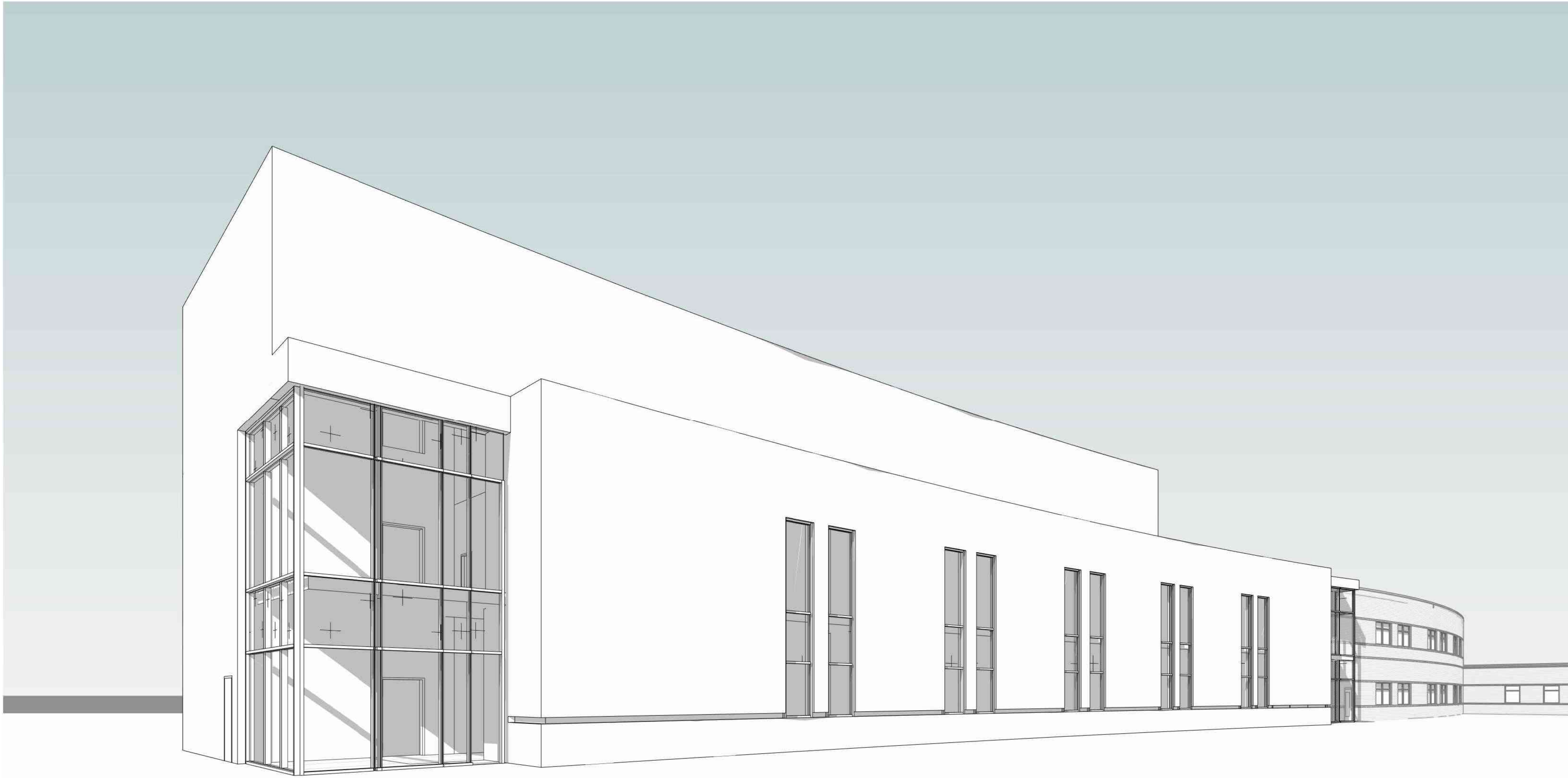


MONUMENT WEST RIVER HEALTH SCIENCE CENTER
SOUTHEAST PERSPECTIVE

Kahler Slater

TSP Architecture Engineering Planning

05/26/23



MONUMENT WEST RIVER HEALTH SCIENCE CENTER
SOUTHWEST PERSPECTIVE

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TSP Architecture Engineering Planning

05/26/23

foresight
MANAGEMENT

GREEN GLOBES OVERVIEW

Values Summary

The Monument West River Health Scient Center project located among the Black Hills of South Dakota aims to be a **culturally aware**, **environmentally responsible**, **occupant-focused** build. Green Globes is structured around six Assessment Areas: Project Management, Site, Energy, Water Efficiency, Materials, and Indoor Environment. This initial strategy for two Green Globes (550 points or more) is value-aligned with the purpose, and goals of the project team and surrounding community.

Project Management (65 points anticipated)

1.1.1 Performance & Green Design Goals (15 points anticipated)

1.1.1.1(8 points): Some performance and green design goals have already been established in collaboration with the owner and will be regularly assessed through occupancy, including:

- Site design;
- Environmentally responsible construction activities;
- Water conservation, efficiency, alternate water sources, and reuse;
- Building envelope and moisture control;
- Energy efficiency;
- Materials including:
  - Efficiency;
  - Environmentally preferable products; and
  - Storage of hazardous materials;
- Indoor environment including:
  - Acoustic comfort;
  - Thermal comfort;
  - Lighting;
  - Air quality; and
- Building resilience

1.1.1.2 (3 points): Review and assess goals throughout the design of the project:

1.1.1.3 (4 points): Review and assess goals throughout the construction of the project:

1.1.2 Integrated Design Process (7 points anticipated)

The project held a pre-design Integrated Design Process meeting.

1.2 Environmental Management During Construction (6 points anticipated)

1.2.1.1.1 (2 points): Create a GC/CM Environmental Policy Including policies and procedures that support the health of humans and site-environment during construction.

1.2.1.1.3 (2 points): Conduct a project ecological health risk assessment prior to the start of construction to identify major risks that could impact the general welfare and health of humans (i.e., residents, workers, visitors, and construction trades people) and the ecological environment surrounding the immediate area of construction for the specific project and local agency requirements.

1.2.1.1.4 (2 points): prohibit smoking within 25 ft. (7.62 m) of the building during construction.

1.3 Life Cycle Cost Analysis or Building Service Life (12 points anticipated)

1.3.1A: Life Cycle Cost Analysis

Include cost analysis (first and operation cost) of green features of the project and compare the life time benefits of ownership to the subsequent costs.

1.5 Commissioning or Systems Manual & Training (25 points anticipated)

Commission HVAC&R systems and controls, building envelope, lighting systems and controls, plumbing, irrigation systems, electrical systems, and elevating and conveying systems.

foresight
MANAGEMENT

Site (53 points anticipated)

The Black Hills have a rich environmental and cultural history that spans thousands of years. Archaeological evidence suggests that the region has been inhabited by humans for at least 11,000 years, and the Native American tribes, such as the Lakota, that still call the region home have a deep connection to the land and its history. Site is perhaps the most applicable assessment area to protecting, admiring, and respecting the land that the project is being built upon.

2.1.1 Urban Fill and Urban Sprawl (10 points anticipated)
The building is awarded points for being constructed on a previously developed site.

2.2 Transportation:
Points awarded for bicycle facilities and access to public transit.

2.3.1 Site Erosion (5 points anticipated)

2.3.1A: Erosion and Sedimentation Control Plan
The civil engineer will create an erosion and sedimentation control plan (SESC).

2.3.3 Tree and Shrub Preservation (4 points anticipated)
For indigenous people in the Black Hills region, trees are seen as important symbols of strength, wisdom, and longevity. Many view trees as sacred beings and believe that they have spiritual energy that can be harnessed for healing and well-being.

Earn points from preserving as much existing canopy and trees on the site as possible (50% or more).

2.3.4 Mitigating Heat Island Effect (6 points anticipated)

Design a vegetated roof or specify a high Solar Reflectance Index (SRI).

2.4 Stormwater Management (14 points anticipated)
Water is considered a sacred element and is viewed as a symbol of life. Many use water in traditional ceremonies and believe that it has healing properties. The conservation and protection of water resources are also a significant concern for indigenous people in the region, particularly in light of the ongoing challenges related to the management and protection of water rights.

foresight MANAGEMENT

2.4.1.1(10 points): Create a stormwater management report including:

- Storm water discharge plan
- Soil boring reports
- Site plans, including all areas of hardscape
- Percolation test results
- Civil AND/OR landscaping drawings indicating drainage
- Area rainfall charts

2.4.1.2 (4 points): Verify location of project s within 100ft of natural body of water or natural waterway

2.5 Landscaping (9-13 points anticipated):

Plants are viewed as important sources of food, medicine, and spiritual guidance. Many Native American cultures have a deep understanding of the healing properties of plants and use them in traditional medicine practices. Plants are also used in many cultural ceremonies, such as the sweat lodge, where they are believed to have spiritual and healing properties.

2.5.1.1.1 (3 points): Evaluate the natural light conditions of the site and structural limitations that would impact the location and growth of plants.
2.5.1.1.2 (3 points): Identify existing soil types and prepare soil and drainage to support root development for vegetation planned for the site.
2.5.1.2 (3 points): Use non-invasive and drought tolerant plants.
2.5.1.3 (3-4 points): Use native plants (new, retained, or salvaged).

2.6 Exterior Light Pollution (5 points anticipated)

Light pollution can have a significant impact on Native Americans in the Black Hills region of South Dakota, as it can negatively affect their cultural practices and spiritual beliefs. Many Native American tribes, including the Lakota, have a strong tradition of astronomy and stargazing. The night sky is considered an important aspect of their spiritual and cultural heritage. Light pollution can make it difficult to see stars and constellations, which can interfere with traditional practices such as star-gazing and celestial navigation. Additionally, Many Native American ceremonies, such as the Sun Dance, take place outdoors and are often conducted at night. Light pollution can interfere with these ceremonies by creating excessive light and distracting from the intended atmosphere and meaning of the ritual.

2.6.1: Meet performance or prescriptive requirements of IDA-IES Model Lighting Ordinance

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MANAGEMENT

Energy (171 points anticipated)

Indigenous people to the Black Hills area of North Dakota have a historic relationship to the natural geothermal resources cand hot springs. Article: Historical Impacts of Geothermal Resources on the People of North America.

As for solar power, the sun holds great significance in the cultural and spiritual practices of Native Americans in the Black Hills region of South Dakota. Many Native American tribes in the region, including the Lakota, Dakota, and Nakota, consider the sun to be a powerful and sacred entity that represents life, energy, and renewal. These values have been aligned throughout the Energy Section.

3.1.1 Assessing Energy Performance

Demonstrate ~30% energy improvement over ASHRAE 90.1-2010 baseline with an energy model.

3.3.1 Metering (10 points anticipated)

3.3.1.1: Meter 100% of building's total site energy.

3.3.1.3: Sub-meter heating, cooling, and electricity sources.

3.3.2 Monitoring and Reporting (5 points anticipated)

3.3.2.1 (2 points): Create a Resource Management Plan addressing all energy consuming areas, the listed monitoring protocols (i.e., hourly, daily, monthly, seasonal, by floor, etc.), and that also includes one or more of the following:

- Electricity;
- Heating fuels;
- Steam; and
- Other (e.g., chilled or hot water for campus/district systems

3.3.2.2.1 (1 points): Create improvement goals based on automated data collection from monitored meter usage.

3.3.2.2.2 (2 points): Define a process for implementing improvements in energy usage to reach stated goals.

3.3.3 Verification (10 points anticipated)

3.3.3.1 (9 points): Verify energy data gathered, analysis performed, and computation of energy efficiency is consistent with design objectives and intent.

3.3.3.2 (1 point): Installed a fault detection and diagnostic system HVAC and lighting systems with the ability to detect 1) economizer operation, 2) simultaneous heating and cooling, 3) photocell malfunction 4) additional HVAC and lighting setpoints.

3.4.2 Off-Site Renewable Energy Credits (10 points anticipated)

Points awarded for percentages of energy from renewable sources with a 3-year commitment.

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Water Efficiency (57 points anticipated)

Water is a vital element in the culture, spirituality, and daily life of Native Americans in the Black Hills region of South Dakota. For many indigenous people in the area, water is not just a physical substance, but a sacred and life-giving force that sustains all living things. It is an important part of many Native American ceremonies and rituals.

4.1.1 Plumbing Fixture and Fitting Standards (35 points anticipated)

Provide WaterSense labeled plumbing fixtures and fittings.

4.3.2 Domestic Hot Water Systems (6 points anticipated)

4.3.2.1 (3 points):

Energy and water is conserved by designing efficient hot water delivery piping systems by a maximum of 48oz. from a water heater and a maximum of 24oz from a recirculation or similar hot water line.

4.3.2.2 (3 points):

>90% of a reduction of hot water waste to lavatory sinks, kitchen sinks, and showers by use of hot water recirculating systems that use occupant sensors, occupant controls, and thermocouples to reduce waiting times and water purged down the drain.

4.4.2 Laboratory and Medical Equipment (2 points anticipated)

4.4.2.1(1 point): When installed, steam sterilizers must be equipped with mechanical vacuum systems and water tempering devices that only allow water to flow when the discharged condensate of hot water exceeds 140 degrees.

4.4.2.2 (1 point): Steam sterilizers must be equipped with specify dry vacuum systems for all laboratory/medical/dental purposes.

4.5 Water Treatment (4 points anticipated)

4.5.1.1 (1 point): Filtration systems must be equipped with pressure drop gauges that allow backwash to be based on pressure drop and not on timers.

4.5.1.2 (2 points): Reverse osmosis must reject less than 60% of feed-water volume for a system producing more than 100 gallons per day.

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4.7 Metering (10 points anticipated)

4.7.1.1 (2 points): Sub-metering all water-intensive applications such as commercial kitchens/laundries/labs/pools/spas.

4.7.1.2 (4 points): Sub-meter irrigation.

4.7.1.3 (2 points): Link water meters and sub-meters to a meter data management system.

4.7.1.4 (2 points): Meter chilled or hot water loops or cooling towers.

4.9 Irrigation (27 points anticipated)

4.9.1: Earn points for no irrigation *or* **water demand reduction of 75-100%** compared to Landscape Water Allowance.

4.9.1.4: Inspect sprinkler system to assure no runoff or overspray.

Materials (103 points anticipated)

Indigenous cultures value intentional material use through deeply rooted values and beliefs that emphasize the interconnectedness of all living things and the need to preserve natural resources for future generations. They prioritize sustainable harvesting practices, often taking only what is needed and leaving the rest for future use or for others. Using every part of the resources is also prioritized, thus minimizing waste and maximizing the value of what is taken. These values have been aligned throughout the Materials Section.

Foresight will track products and progress throughout construction.

5.2 Product Life Cycle (35 points anticipated)
Specify products with EPDs.

5.3 Product Risk Assessment (5 points anticipated)
Use at least 5 products formulated products with an Occupant Exposure Screening Report (OESR)

5.4 Sustainable Materials Attributes (15 points anticipated)
Specify materials with sustainable materials attributes (recycled content, biobased content, 3rd party sustainable forestry certification content, Eco-Certified Composite/TMV).

5.5.1 Structural Systems and Non-Structural/Interior (22 points anticipated)
Retain as much structural, non-structural, interior systems and finishes as possible from existing building.

5.6.1 Construction Waste (20 points anticipated)

5.6.1.1 (2 points): FSMGMT and contractor to develop a preconstruction waste management plan prior to any construction or demolition activities.

5.6.1.2 (1 point): Provide final waste management summary report after construction.

5.6.1.3 (10 points): Generate less than 1.2lbs/ft^2 of construction waste.

5.6.1.4 (6 points): Divert greater than 75% percentage of construction waste including building demolition waste and packaging through recycling, reuse, repurposing, or composting.

5.6.1.5 (1 point): Verify annual average recycling rate from a 3rd-party organization.

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5.6.2.1 Post Occupancy Solid Waste Recycling (2 points anticipated)
The building design must address one or more of the following:

5.6.2.1.1 Recycling for Solid Waste based on capacity
Provide minimum of 0.010 CY per student recycling collection capacity.

AND/OR

5.6.2.1.2 Recycling for Solid Waste based on interior storage requirements
Include at least one of the following types of dedicated recycling storage:
- In-cabinet or under-counter/work station collection bins;
- A minimum of one collection bin centrally located on each floor;
- A separate and secure collection area for a single material stream;

AND/OR

5.6.2.1.3 Recycling for Solid Waste based on exterior storage requirements
Provide adequate, accessible enclosures for recycling collection containers:
- Permanent, durable enclosures to accommodate collection bins required.
- Enclosures are screened on three sides; and
- Enclosures are designed to accommodate minimum clearances for collection equipment.

5.6.3.1 Supply Chain Waste Minimization (4 points anticipated)
Greater than 50% by cost, of building products used come from facilities that divert over 80% of their waste.

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Indoor Environment (107 points anticipated)

In many Native American cultures, the wind is considered a powerful force that connects humans to the natural world and to the spiritual realm. For example, in Lakota culture, the wind is associated with the breath of life and is believed to carry prayers and messages to the Creator. The direction of the wind is also significant, with each direction having its own associated qualities and spiritual meanings. The east wind is often associated with new beginnings, while the south wind is associated with growth and abundance. The west wind is associated with introspection and reflection, while the north wind is associated with wisdom and guidance. These values have been aligned throughout the Indoor Environment Section.

6.1.1.1 Ventilation Air Quality (9 points anticipated)
Design ventilation to ASHRAE 62.1 standard.

6.1.2.1 Air Change Effectiveness (9 points anticipated)
Provide an Ez value greater than or equal to 0.9 in all regularly occupied spaces.

6.1.3 Air Handling Equipment (11 points anticipated)

6.1.3.1 (6 points): Provide MERV 13 filters for ventilation air and MERV 8 for terminal equipment that circulates room or zone air.

6.1.3.2 (5 points): Avoid interior liners that could harbor microbial growth AND/OR erode in the air in any outdoor air, return air, and supply air ductwork, or any fan, coil, terminal, or other devices exposed to the airstream.

6.1.4.1 CO2 Sensing and Ventilation Control Equipment (6 points anticipated)
Provide CO2 sensing and ventilation control equipment for densely occupied (25(+) people per 1,000ft2) rooms.

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6.2.1 Volatile Organic Compounds (17 points anticipated)

6.2.1.1.1 (2 points): 70% (+) of adhesives and sealants by volume comply with VOC emissions criteria

6.2.1.1.2 (1 point): 90% (+) of adhesives and sealants by volume comply with VOC content limits

6.2.1.2.1 (2 points): 70% (+) of paints and coatings by volume comply with VOC emissions criteria

6.2.1.2.2 (1 point): 90% (+) of paints and coatings by volume comply with VOC content limits

6.2.1.3.1 (3 points): 90% of floors and floor coverings by area comply with prescribed limits of product VOC emissions

6.2.1.3.2 (3 points): 90% of ceiling systems by area comply with prescribed limits of product VOC emissions

6.2.1.3.3 (1 point): 90% of acoustical and thermal insulation by area comply with prescribed limits of product VOC emissions

6.2.1.3.4 (1 point): 90% of Wall Systems by area comply with prescribed limits of product VOC emissions

6.2.1.4.1 (1 point): 100% by cost of Installed furniture products comply with ANSI/BIFMA LEM Prerequisite AND/OR Certified

6.2.1.4.2 (1 point): 90% by cost of Installed furniture products comply with ANSI/BIFMA LEM Intermediate AND/OR Certified

6.2.1.4.3 (1 point): 70% by cost of Installed furniture products comply with ANSI/BIFMA LEM Advanced AND/OR Certified

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<u>6.2.3.1 Carbon Monoxide Monitoring (1 expected point)</u>
Install Carbon monoxide monitoring devices and alarms in enclosed areas with combustion.

<u>6.2.5 Pest and Contamination Control (2 points anticipated)</u>

<u>6.2.5.1 (1 point):</u> Need to use the following Integrated pest management strategies:

- Outdoor air inlets have insect screens of 18x14 mesh for plenum systems feeding multiple air handlers
- Structural and mechanical openings are fitted with permanent protection (e.g. screens, sealants, etc.)
- Advertising signs and other assemblies affixed to the building façade are designed and constructed in a way that reduces bird habitation, and penetrations in the façade are sealed to prevent entry
- Mullions and ledges are less than 1 in. (2.5cm) deep to discourage bird roosting

<u>6.2.5.2 (1 point):</u> Provide a sealed storage area for food/kitchen solid waste and recycling.

<u>6.3.1 Daylighting and Views (12 points anticipated)</u>

<u>6.3.1.1 (5 points):</u> Achieve a minimum daylight factor (DF) of 3 or more for greater than 75% of regularly occupied floor area.

<u>6.3.1.2 (3 points):</u> Design clear views to the exterior for 90% of regularly occupied task areas.

<u>6.3.1.3 (2 points):</u> Install automated shading devices.

<u>6.3.1.4 (2 points):</u> Install sensors to maintain consistent lighting levels throughout the day using both daylighting and electric lighting.

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6.3.2 Lighting Design Quantity (9 points anticipated)

6.3.2.1 (5 points): 90% percentage of regularly occupied spaces meet the Recommended Illuminance for the Locations/Tasks in Table 11.3.2.1-A and Table 11.3.2.1-B

6.3.2.2 (2 points): Meet maximum luminance ratios per IESNA for tasks:
• 3:1 between the task and adjacent surroundings
• 10:1 between the task and remote (nonadjacent) surfaces
• 20:1 between the brightest and darkest surface in the field of view
• 8:1 between rows of luminaires where there is indirect lighting and where ceiling luminance exceeds 124.1 fL (425 cd/m2)

6.3.2.3 (2 points): Select lighting fixtures for direct lighting with less than:

- 248.1 FL (850 cd/m2) at 65° from the vertical
- 102.2 FL (350 cd/m2) at 75° from the vertical
- 51.1 FL (175 cd/m2) at 85° from the vertical

6.3.3 Lighting Design Quality (3 points anticipated)

6.3.3.1 (1 point): Use light fixtures with a CRI of 80 or higher in all spaces.

6.3.3.2 (1 point): Specify Correlated Color Temperature (CCT) between 2700°K and 4500°K.

6.3.3.4 (1 point): Provide individual control of primary workspace lighting using stepped dimming or switching with at least three steps (100%, 50%, 0%).
Foresight to provide list of spaces once further project information is received.

6.3.4 Lighting Sustainability (5 points anticipated)

6.3.4.1 (2 points): Specify a Lumen Maintenance factor of 35,000 hours to L70 or greater.

6.3.4.2 (2 points): All luminaires must be RoHS compliant with EU Directive 2011/65/EU of the European Parliament that specifies maximum levels for the following six restricted materials:

- Lead (Pb): < 1000 ppm;
- Mercury (Hg): < 100 ppm;
- Cadmium (Cd): < 100 ppm;
- Hexavalent Chromium: (Cr VI) < 1000 ppm;
- Polybrominated Biphenyls (PBB): < 1000 ppm; and
- Polybrominated Diphenyl Ethers (PBDE): < 1000 ppm

6.3.4.3 (1 point): Develop a maintenance and operations plan.

6.4.1 Thermal Comfort Zones (14 points anticipated)

Design appropriately sized thermal zones.

6.4.2.1 Thermal Comfort Design (9 points anticipated)

Design HVAC systems and building in conformance with ASHRAE Standard 55-2017.

GBI Project Checklist for Green Globes for New Construction

GREEN BUILDING INITIATIVE®

Date: 5/26/2022

Project Name: MWR HEALTH SCIENCE CENTER

Important Note: This document is intended to provide information regarding the areas assessed and associated **maximum** points available under the Green Globes for New Construction (NC) 2021 program for each assessment area (e.g. Project Management), section (e.g. Team & Owner Planning), and subsection (e.g. Performance & Green Design Goals). Each of the areas presented here contain more specific criteria which are scored within the online Green Globes questionnaire. **Please purchase and complete the Green Globes questionnaire for the most accurate self-evaluation of a project. Final Green Globes certification is based upon third-party assessor verified points at the conclusion of an assessment.**

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PROJECT MANAGEMENT		Maximum Points: 100	Expected Points	Applicable Points
1.1	**Team & Owner Planning**	**45**		
1.1.1	Performance & Green Design Goals	20	**15**	
1.1.2	Integrated Design Process	14	7	
1.1.3	Site and Building Resilience	11		
1.2	**Environmental Management During Construction**	**8**	6	
1.3	**Life Cycle Cost Analysis or Building Service Life**	**12**	12	
1.4	**Moisture Control Analysis**	**6**	0	
1.5	**Commissioning or Systems Manual & Training**	**29**	25	
			65	0

SITE		Maximum Points: 150	Expected Points	Applicable Points
2.1	**Development Area**	**35**		
2.1.1	Urban Infill and Urban Sprawl	10	**10**	
2.1.2	Greenfields, Brownfields and Floodplains	25		
2.2	**Transportation**	**31**		
2.3	**Construction Impacts**	**34**		
2.3.1	Site Erosion	5	**5**	
2.3.2	Site Disturbance	5		
2.3.3	Tree and Shrub Preservation	6	**4**	
2.3.4	Mitigating Heat Island Effect	14	**6**	
2.3.5	Bird Strikes	4		
2.4	**Stormwater Management**	**21**	14	
2.5	**Landscaping**	**21**	9	
2.6	**Exterior Light Pollution**	**5**	5	
2.7	**Wildland- Urban Interface Site Design**	**3**		
			53	0

ENERGY		Maximum Points: 260	Expected Points	Applicable Points
3.1	**Energy Performance**	**180**	136	
3.2	**Non-Modeled Energy Efficiency Impacts**	**15**		
3.2.1	Vertical, Horizontal, and Inclined Transport Systems - Efficiency Measures	5		
3.2.2	Load Shedding	5		
3.2.3	Plug Load and Process Energy Management	5		
3.3	**Metering, Monitoring, and Measurement**	**25**		
3.3.1	Metering	10	**10**	
3.3.2	Monitoring and Reporting	5	5	
3.3.3	Verification	10	10	

GBI Project Checklist for Green Globes for New Construction

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3.4	**Renewable Sources of Energy**	**40**		
3.4.1	On-Site Renewable Energy	30		
3.4.2	Off-Site Renewable Energy Credits	10	10	
			171	0

WATER EFFICIENCY		Maximum Points: 190	Expected Points	Applicable Points
4.1	**Indoor Domestic Plumbing**	**54**		
4.1.1	Plumbing Fixture and Fitting Standards	52	**35**	
4.1.2	Residential Indoor Appliances	2		
4.2	**Cooling Towers**	**22**		
4.3	**Boilers and Hot Water Systems**	**9**		
4.3.1	Boilers and Water Heaters	3		
4.3.2	Domestic Hot Water Systems	6	6	
4.4	**Water Intensive Applications**	**19**		
4.4.1	Commercial Food Service Equipment	5		
4.4.2	Laboratory and Medical Equipment	2	2	
4.4.3	Laundry Equipment	6		
4.4.4	Water Features and Pools	6		
4.5	**Water Treatment**	**4**	4	
4.6	**Alternate Sources of Water**	**25**		
4.6.1	Alternate Water Sources for Indoor Uses	12		
4.6.2	Alternate Water Sources for Non-Domestic for Non-	12		
4.6.3	Graywater Treatment	1		
4.7	**Metering**	**20**	**10**	
4.8	**Leak Detection**	**10**		
4.9	**Irrigation**	**27**	27	
			57	0

MATERIALS		Maximum Points: 150	Expected Points	Applicable Points
5.1	**Whole Building Life Cycle Assessment**	**20**		
5.2	**Product Life Cycle**	**39**	35	
5.3	**Product Risk Assessment**	**10**	5	
5.4	**Sustainable Materials Attributes**	**15**	15	
5.5	**Reuse of Existing Structures and Materials**	**30**		
5.5.1	Structural Systems and Non-Structural/Interior	22	**22**	
5.5.2	Material Reuse from Off-Site	8		
5.6	**Waste**	**26**		
5.6.1	Construction Waste	20	**20**	
5.6.2	Post Occupancy Solid Waste Recycling	2	**2**	
5.6.3	Supply Chain Waste Minimization	4	**4**	
5.7	**Resource Conservation**	**10**		
5.7.1	Off-Site Fabrication for Construction Optimization	4		
5.7.2	Design for Deconstruction (DfD)	6		
			103	0

GBI Project Checklist for Green Globes for New Construction

GREEN BUILDING INITIATIVE

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INDOOR ENVIRONMENT		Maximum Points: 150	Expected Points	Applicable Points
6.1	**Air Ventilation and Quality**	**35**		
6.1.1	Ventilation Air Quantity	9	**9**	
6.1.2	Air Change Effectiveness	9	9	
6.1.3	Air Handling Equipment	11	11	
6.1.4	CO2 Sensing and Ventilation Control Equipment	6	6	
6.2	**Source Control and Measurement of Indoor Pollutants**	**34**		
6.2.1	Volatile Organic Compounds	17	**17**	
6.2.2	Pre-Occupancy Indoor Air Quality Testing	6		
6.2.3	Carbon Monoxide Monitoring	1	1	
6.2.4	Legionellosis Mitigation in the Building Water Systems	3		
6.2.5	Pest and Contamination Control	2	2	
6.2.6	Other Indoor Pollutants (Tobacco, Radon)	5		
6.3	**Lighting Design and Systems**	**32**		
6.3.1	Daylighting and Views	12	**12**	
6.3.2	Lighting Design Quantity	9	9	
6.3.3	Lighting Design Quality	6	3	
6.3.4	Lighting Sustainability	5	5	
6.4	**Thermal Comfort**	**23**		
6.4.1	Thermal Control Zones	14	**14**	
6.4.2	Thermal Comfort Design	9	9	
6.5	**Acoustic Comfort**	**26**		
6.5.1	Noise Limits and Masking Sound Level	12		
6.5.2	Acoustic Insulation and Vibration Isolation	10		
6.5.3	Reverberation Time or Ceiling Noise Reduction Coefficient (NRC)	4		
			107	0

	Expected Points	Applicable Points
TOTAL:	556	0

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