South Dakota School for the Blind and Visually Impaired

New School Building

Facility Design Plan

South Dakota School for the Blind and Visually Impaired requests approval of the Facility Design Plan and Guaranteed Maximum Price for the new School for the Blind and Visually Impaired School Building to be constructed on the previous location of Jerde Hall on the campus of Northern State University, which will now be known as the School for the Blind and Visually Impaired campus. The Preliminary Facility Statement was approved by the Board of Regents at their October 2017 meeting. Legislative approval was received through HB1071 during the 2018 Legislative Session. The bill was signed by Governor Daugaard on February 22, 2018. The guaranteed maximum price is $11,962,182.

A. Architectural, Mechanical and Electrical Schematic Design

The two story building includes 44,956 gross-square feet and will be located on the corner of 12th Ave SE and State Street. This location will welcome families and students to the School for the Blind and Visually Impaired starting with a beautiful sensory garden in the northwest corner of the new school. The space will provide plenty of office space for administration, outreach services, instruction, and residential living. The gymnasium will promote physical activity and wellness through a range of fitness activities and sports such as goalball, biking, and archery. OT/PT are co-located in the gymnasium for ease of collaboration.

Interior materials will incorporate changes in floor material, color, ceiling height, sound reflectance, and lighting source to help students navigate using sensory cues and canes. The new 2-story building will also provide valuable learning opportunities for navigating stairs, elevators, and the more complex spatial environment.

The building's two-story entrance/lobby features full-height glass and "SDSBVI" signage in lettering and braille to the west of the doors. The exterior utilizes a blue and yellow fiber cement open-joint rainscreen panel system displaying school spirit. The gym is a white fiber cement open-joint rainscreen panel system with a large graphic silhouette of children playing.

On the south entry to the school, a children's playground will be located along with a looping bike path. There will be low fencing enclosing this area for safety but will also display the school's name and logo. Trees, shrubs, and other decorative landscaping will frame out the space to make it inviting and relaxing.

The building has been designed to meet the requirements of LEED version 4.0 Silver Rating. Fundamental and Enhanced Commissioning will be an integral part of the design

and construction process. The scope of LEED commissioning will include all heating, ventilating, and air-conditioning systems, lighting and daylight controls, domestic water systems, and building envelope.

Electrical Schematic

Power Distribution

Electrical service will consist of incoming conductors to the buildings from a utility-owned outdoor transformer located at a coordinated location. Service conductors will be run underground to the new facility. Preliminary size is to be determined with the utility company based on load study of the building. Transformer secondary voltage into the facility will be 480Y/277 volts. Aluminum conductors will be allowed for the service.

The power distribution system will provide electrical energy at 480/277 volts, 3 phase, 4 wire, (plus ground) 60 HZ for general lighting, elevators and (generally) motors larger than 3/4 HP. Dry type transformers will be 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. Power will be distributed from the main electrical equipment room and through branch circuit panelboards as required. Each circuit will be provided with a separate neutral and equipment grounding conductor.

Aluminum conductors will be allowed for feeders between main service panel and distribution panelboards.

Lighting Systems

High efficiency light sources (LED) will be utilized wherever possible and will operate at 277 volts. Lighting system to be designed within the IES recommended limits. Multiple switching will be utilized in large areas (500 sq. ft. and larger). Multiple switching and dimming will be utilized in conference rooms. Automatic on/off sensors will be utilized in offices, toilet rooms, and storage rooms, and where required by LEED. Wall dimmers or preset dimming systems will be utilized in miscellaneous rooms where applicable. Building automation system, photoelectric cells and/or time clocks will be utilized for control of exterior lighting. LEED v4 requires for all shared multi-occupant spaces to have multi-occupant spaces to have multi-zone control with at least three lighting levels [on, off, midlevel (midlevel is 30% to 70% of maximum)].

Circadian lighting will be designed as an alternated bid in the Classrooms, Halls, Public Spaces, and Student Spaces. Circadian rhythms are a basic reflection of the human biological clock, repeating on an approximately 24 hour cycle. Lighting is one of the most powerful environmental agents that provide a stimulus to reset the biological clock in humans and animals. This design will have positive effect of light on the wake/sleep cycle and a positive influence on circadian rhythms.

Emergency Egress Lighting

Emergency egress lighting will be provided in Lobbies, Corridors/Public areas, Toilets, Electrical/Mechanical Rooms, and emergency egress paths. Battery operated emergency lighting will be provided in emergency egress areas (interior and exterior). Battery operated emergency egress lighting will be accomplished through multiple inverters located in the Electrical Rooms. The inverters will have self-disgnostics to test and perform battery maintenance.

Exterior Lighting System

Exterior doors will be provided with LED 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. Driveways and drop-off areas will be illuminated with pole mounted area lights.

Lighting Control Systems

Lighting controls will be provided to conform to LEED standards. All lighting, indoors and outdoors, will be automatically controlled by a computerized, programmable lighting control system. Lighting control system will be capable of interfacing with the Energy Management Controls System. Exterior lighting controls will reside inside the building. Automatic control shall be achieved via time-of-day (via astronomical time clock), occupancy control (i.e. occupancy sensors), and photoelectric control (i.e. daylight harvesting.) A whole building control system is anticipated.

Telephone/Data Systems

A Telecommunications Room will be provided for all communication and signal systems. Painted plywood panels will be provided for 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.

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. Two 4 inch PVC, empty conduits, will be stubbed out of the building from the main telephone equipment room to location determined.

Backbone cabling will consist of 12 strands of single mode fiber to the Spafford Hall. Prefer Corning fiber as the basis of design. Anew fiber enclosure will need to be installed on an existing rack. ST connectors shall be used. Routing of the fiber will be underground and enter/exit the tunnel south of Johnson Fine Arts Buyilding. Armored cable in the tunnel is acceptable. A new rack will be installed in the new School building with all data cables terminated in patch panels.

Horizontal cabling will consist of Cat 6 (plenum) cables. Two cables will be brought to the standard workstation. Wireless access points shall be distributed throughout the facility utilizing Cat 6A cabling.

The telephone system can be mounted on plywood backboards. The phone system will be NSU's system which is VoIP.

Access Control (Card Reader) System

It is a Blackboard system. One exterior card reader at all exterior entrances, and as coordinated with Engineer. Cables shall be installed from Blackboard controller to each door (card reader, door contact, request to exit, and strike).

Video monitoring (in classrooms) is to be designed by Owner with contract documents calling out cabling, boxes, and conduit as direct by Owner.

Fire Alarm System

An addressable, multi-plexed, microprocessor based, electrically supervised fire management type system will be provided complete with central processing unit, power supplies, data gathering panels (transponders), remote annunciators, campus tie, voice evacuation 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. The main control panel will be located in the electrical room. 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. A smoke and heat detectors will be provided at elevator equipment rooms and smoke detectors will be installed in elevator lobbies as required. A smoke and/or heat detectors will be provided in electrical rooms and closets that are not sprinkled, if allowed by local and state fire codes. 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. Smoke detectors will be shown in the R Occupancy per IFC requirements.

The control panel shall have a module to interface into the existing Johnson Control building automation system located in the NSU Johnson Fine Arts Building. A2" conduit and cabling will be installed from the control panel to the Johnson Fine Arts Building. The conduit will intercept the tunnel south of the Johnson Fine Arts Building.

Site Utility Connections

Water Service
Water for domestic and fire protection will come from either the existing water main from the south (14th Ave.) or from the west (State St.)

Sanitary Sewer Service
Sanitary sewer from the building will drain to the City's sanitary sewer.

Storm Drain Service
Storm sewer is a bit of a challenge, as there is limited availability to storm sewer piping. The closest storm sewer is located about a block to the north near the intersection of 12th Ave. and State Street. There will likely be the need for limited temporary storm water retention.

Natural Gas Service
Natural gas service will be extended to the building from gas utility piping. Piping to the building will be provided as work of Division 33.

Plumbing

Domestic Water Piping
Type L hard drawn copper tubing with solder-joint fittings or Pex tubing for small sizes; mechanical grooved joints and fittings for large sizes and risers.

Recirculating hot water pumps to maintain domestic hot water temperature at fixtures and equipment.

Piping routed concealed above ceilings, within piping chases and walls to fixtures and equipment. Piping not routed underground or in unheated spaces.

Water Piping Insulation
Water 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 will be used where piping run is exposed.

Domestic Water Heaters
High-efficiency, natural gas-fired condensing storage water heater(s) located in mechanical rooms. Multiple water heater units. Water heated and stored at 140 deg F.

Water heaters provided with firm gas only (no standby fuel).

Water heaters provided with combustion air intake and discharge exhaust venting through the roof.

Master mixing valve will be provided to deliver 115 deg F. water to fixtures.

Water Softeners

Duplex or triplex water softeners for domestic hot and cold water systems. Unit(s) will be located in mechanical room at water service entrance.

Non-Potable Water Systems

Non-potable water systems with backflow preventers for the following systems:

- Makeup water for mechanical heating water systems
- Exterior wall hydrants
- Lawn irrigation systems

Sanitary Waste and Vent Piping

Cast-iron piping with no-hub fittings above and below grade. Below grade piping can be PVC.

Piping routed underground, and concealed within piping chases, above ceilings and within walls from fixtures and equipment. Piping routed by gravity to service lines.

Commercial Quality Fixtures Include

Water closets: Floor-mounted water closets (American Standard, Kohler) with electronic sensor flush valves (Sloan, Zurn). Floor-mounted tank water closets in single apartment restrooms.

Urinals: Wall-hung urinals (American Standard, Kohler) with electronic sensor flush valves (Chicago Faucets, Sloan, Zurn).

Lavatories: Counter-mounted drop-in blow china lavatories (American Standard, Kohler) and electronic sensor faucets (Chicago Faucets, Sloan, Zurn). Manual faucets in single apartment restrooms.

Sinks: Stainless steel drop-in type (Elkay) with single lever faucet (Chicago Faucets).

Janitor sinks: Molded plastic mop sinks (Fiat) with lever faucet (Chicago Faucets.)

Electric water coolers: Wall-hung double level stainless steel water coolers with bottle filler spout (Elkay).

Showers: General construction for shared dormitory showers. Fiberglass shower in single apartment restrooms (Best Bath). Thermostatic mixing valves, shower heads (Symmons, Powers, Speakman). Multiple shower heads for ADA accessible showers.

Bathtubs: Fiberglass tub (American Standard, Kohler) with shower tub trim kit (Symmons, Kohler, Sloan)

Floor Drains and Cleanouts
Cast-iron floor drains and cleanouts as needed.

Storm Drain Piping
Cast-iron piping with no-hub fittings above and below grade. Below grade piping can be PVC.

Piping routed underground, and concealed within piping chases, above ceilings and within walls from fixtures and equipment. Piping routed by gravity to service lines.

Storm Drain Piping Insulation
Above grade storm piping will be insulated with pre-molded fiberglass with all-service jackets to minimize condensation.

Roof Drains and Cleanouts
Cast-iron roof drains and cleanouts will be installed as needed.

Overflow Roof Drain Piping
Overflow roof drain piping extended to open sight drains to discharge at grade along the building exterior wall.

Storm Drain Piping Insulation
Storm and overflow drain piping insulated with pre-molded fiberglass with all service jackets. Insulate roof drain bodies with flexible elastomeric cellular insulation.

Mechanical HVAC Piping – Heating Water Systems

Hot Water Boilers
High efficiency gas-fired condensing hot water boilers. Two boilers with natural gas burners. Self-contained microprocessor controllers to cascade and to modulate firing rate to generate heating water for air-handling unit preheating coils, perimeter space heating, vestibule and equipment room heating and air terminal unit heating coils for space temperature control.

Heating water supply temperature will be designed for 180 deg F but will be controlled to reset to 120 deg F as outside air temperatures moderate.

Boilers provided with combustion air intake and discharge exhaust venting through the roof.

Heating Water Pumps and Equipment
Duplex base-mounted centrifugal pumps with full standby capability selected for a full range of GPM loads. Variable frequency drives provided for pump motors.

Provide in-line boiler pumps with variable frequency drives to assure water circulation through hot water boilers.

Heating water system equipment will include air separators, diaphragm-type compression tanks, and auxiliaries.

An automatic glycol feeder unit will be provided for makeup water. Heating water will be a 30 percent propylene-glycol solution.

Heating Water Piping

Schedule 40 black steel piping with threaded, flanged, or mechanical grooved-end fittings. Type L copper tubing with lead-free solder joints could be used for smaller pipe sizes. Heating water piping extended to air-handling coils and to hydronic terminal units throughout the building.

Hydronic terminal units will include air terminal unit heating coils, unit heaters, radiant ceiling panels, and finned tube radiation. Perimeter heating will be primarily with continuous radiant panels, but also with finned tube radiation under full height curtain wall glass. Provide cabinet unit heaters at entrance vestibules.

Piping routed concealed above ceilings, within piping chases and walls to fixtures and equipment. Piping will not be routed underground or in unheated spaces.

Provide water flow meters on heating water mains to measure total flow.

Heating Water Piping Insulation

Heating water 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.

Mechanical HVAC Piping

Air-Cooled Water Chiller(s)

Air conditioning provided with a centralized chilled water system from a packaged, rotary screw compressor, air-cooled chiller(s) located on grade. Provide variable speed compressor and sound package. Preliminary estimated cooling load is 160 tons.

Chilled Water Pumps and Equipment

Duplex base-mounted centrifugal pumps selected for a full range of GPM loads. Variable frequency drives provided for pump motors.

Chilled water system equipment will include air separators, diaphragm-type compression tanks, and auxiliaries.

An automatic glycol feeder unit will be provided for makeup water. Chilled water will be a 25 percent propylene-glycol solution.

Chilled Water Piping

Schedule 40 black steel piping with threaded, flanged, or mechanical grooved-end fittings. Chilled water piping extended to air-handling unit chilled water coils.

Piping routed concealed above ceilings, within piping chases and walls to fixtures and equipment. Piping not routed underground or in unheated spaces.

Chilled Water Piping Insulation

Chilled water 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.

Mechanical HVAC – Ventilation and Air Conditioning Systems

HVAC Systems

The building heating, ventilation and air conditioning will be achieved with packaged outdoor air-handling systems and separate energy recovery units supplemented with perimeter heating equipment for the Class room areas. Dorm area will be served by 4 pipe fan coil system with a Dedicated Outdoor Air System to provide required ventilation. Gymnasium and Fitness will be packaged rooftop units with energy recover.

Fire Protection Systems

Fire Protection Piping

Threadable light wall steel piping with threaded or mechanical grooved-end fittings will be utilized. Piping extended above grade will be within ceiling and wall cavities to fire sprinklers located throughout the building.

Fire Sprinklers

Conventional coverage, quick-response wet-pipe fire sprinkler types consistent with fire protection required and with the architectural design. Sprinklers will be flush pendants with white-painted covers, semi-recessed pendants with white-painted or chrome-plated escutcheons, or brass upright or pendent sprinklers where exposed and in service areas.

Dry-type pendent and sidewall sprinklers will be used in any areas subject to freezing.

B. Changes from Facility Program Plan

There have been no major changes to the design included in the Facility Program Plan approved in October, 2017.

Total estimated project cost

The Guaranteed Maximum Price is $11,962,182 and the total project cost is estimated at $14,347,916. The funding for the project will be provided through private dollars.

Project costs include construction, site work, fees, furnishings and equipment as follows:

Project Costs		
Construction Costs	$	11,962,182
Guaranteed Maxiumum Price	**$**	**11,962,182**
Soft Costs		
Architect/Engineer Fees	$	1,003,590
Office of the State Engineer Fee	$	68,000
Furniture, Fixtures & equipment	$	400,344
Survey	$	6,000
Geotechnical Report and Environmental Impact Assessment	$	9,500
Commissioning	$	104,000
AV/Telecom/IT/Security	$	75,000
Special Inspections & Testing Agency	$	100,000
LEED Registration Expenses	$	4,300
Asbestos/Hazardous Material Abatement	$	80,000
Signage	$	25,000
Pre-Bid Expenses/Bid Advertisements	$	10,000
CM Pre-Construction Services Fee	$	50,000
Owner Contingency	$	450,000
Total Soft Costs	**$**	**2,385,734**
Total Estimated Project Cost	**$**	**14,347,916**

C. Changes from the cost estimates for operational or M&R expenses

There have been no changes to estimate operating or M&R costs from those provided in the facility program plan.

D. Timeline

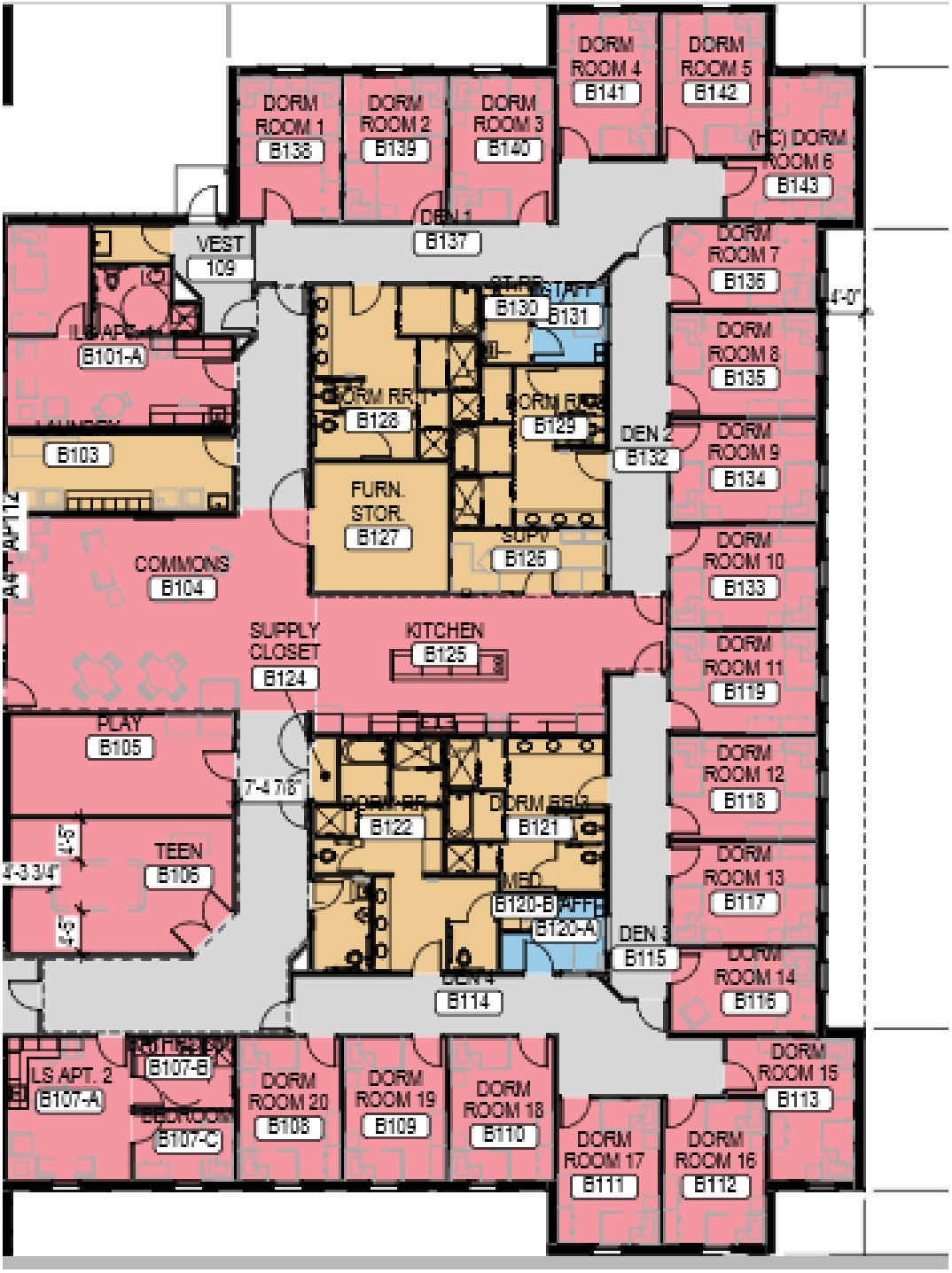
Construction will begin in the fall of 2018. The building will be completed and open for classes in the fall of 2019.

View from the south, approaching campus on State Street

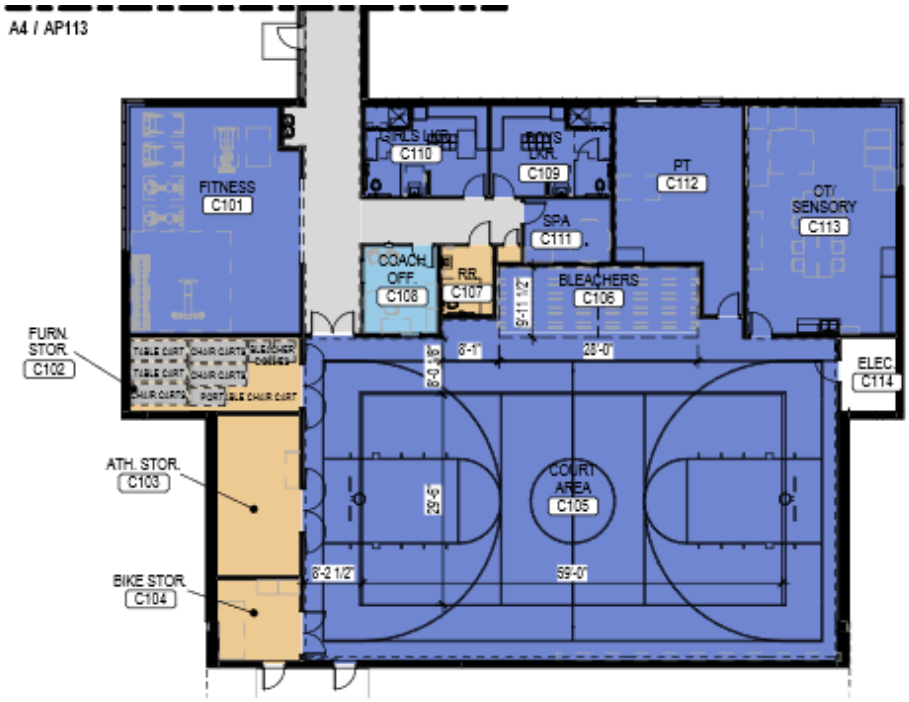
Closer view of entrance

First floor Offices/Class Rooms

First floor Residential



Gym/OT/PT



Second floor Class Rooms/Library