



RECREATION AND ATHLETICS COMPLEX RENOVATION

Laramie County Community College - Cheyenne WY

September 19, 2017

LEVEL I & II REPORT

TOBIN
AND ASSOCIATES
ARCHITECTURE
AND PLANNING



POTENTIAL RENOVATION DESIGN

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LCCC RAC

PROJECT DESCRIPTION

The project involves a 76,000 SF renovation of the LCCC Recreation and Athletics Complex (RAC), including upgraded HVAC & safety enhancements, expanded group and individual fitness areas and the establishment of a competition court.

PROJECT GOALS

Some of the goals established during the course of the project are as follows:

Make better use of existing space within the building, and enhance the user experience.

Upgrade an existing facility in need of significant upgrades in order to meet current building code and accessibility standards. This renovation would allow for increased ventilation, air conditioning, and electrical capacity, all allowing LCCC to provide for their current and future needs while reducing ongoing maintenance and operating costs by having more efficient and functional systems.

The transition of a portion of the existing large Multi Purpose Room (MPR) into space specifically for the college athletic programs. These spaces would include locker rooms, training, fitness, offices, tutoring, and more, contained on 3 levels

within the current MPR. The existing gymnasium isn't tall enough to host NJCAA competitions so the competition court will be moved to the MPR and allow LCCC to host NJCAA sanctioned events when complete.

Provide students, staff, and faculty with access to modern fitness and wellness spaces including locker rooms, group fitness classrooms, and adequate space for weight machines, cardio equipment, functional movement, and a climbing wall.

PROJECT NEED AND OPPORTUNITIES

Currently deficiencies and unfulfilled potential exist in the RAC. The following items are of particular concern, and present significant opportunity for improving the functionality and experience of this building.

Building Access

Several doors are currently being used to access the RAC which makes security and access difficult to control.

Creating a single main entry will allow RAC staff to more closely monitor facility access from a single point and can provide a check in point if community member access is available in the future.

Cardio

Currently in the RAC, cardio equipment shares space with a dance and exercise studio. The space is undersized, under utilized, uninspiring, and separation of the spaces would benefit both user groups. A new cardio space where all equipment and weights are collectively located would provide a more comfortable, efficient, and inviting space, more closely aligned with facilities at other collegiate institutions.

Community Use

The large multi-purpose room in the facility is currently utilized for large gatherings and functions. As modifications are made to this large space to accommodate space for athletics and a new competition gymnasium, features will be incorporated to ensure that the space can continue to be utilized by the community for various events. Features could include: upgrades and integration of audio visual equipment, a dedicated presentation wall, and chair and table storage.

Locker Rooms

Locker rooms are currently shared between public, student body, staff, and athletics. Providing dedicated student/staff and athletics locker rooms will provide a more collegiate atmosphere for users of both the recreational and athletic locker rooms.

Team and Classrooms

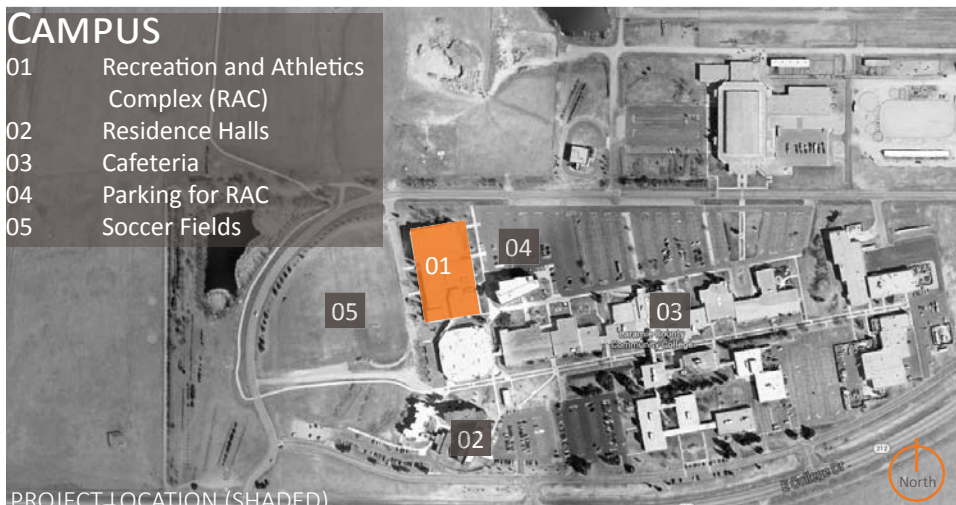
The building currently has no space dedicated as team rooms for athletics, and general classrooms are limited. Athletic team rooms could be included to provide these needed space. Additional classrooms would be added for Exercise Science classes.

Offices

The building does not currently offer adequate office space for athletics and Exercise Science faculty and staff. The third floor addition in the remodel of the MPR could provide space for athletic offices. Exercise Science offices can be created on the first level.

CAMPUS

- 01 Recreation and Athletics Complex (RAC)
- 02 Residence Halls
- 03 Cafeteria
- 04 Parking for RAC
- 05 Soccer Fields



PROJECT LOCATION (SHADED)

Studio

The current studio space is shared with exercise equipment, and is more suited for only dance classes.

Several new studio classrooms can be provided for spinning, yoga, and many other small group activities.

Pool

The existing pool is in need of extensive and expensive repairs to continue functioning and to meet current code requirements.

Currently the pool isn't widely used and, with the expenses to upgrade plus ongoing maintenance and service costs, eliminating the pool so that more highly used spaces such as a performance lab and endurance and strength testing may be the best and most economical option.

Existing Gymnasium

The height of the existing gymnasium isn't tall enough to host events but the space is still very functional and can be used for recreational sports or practice.

Utilities

Existing building utility services include: domestic water, fire suppression water, sanitary sewer, storm sewer, hydronic heating water (there is currently no cooling in the building), natural gas, and electricity.

Electrical

The electrical service is reportedly at maximum capacity and this project will require a service upgrade to the building or portions of the building. This will allow LCCC to have the appliances and equipment necessary for daily functions without the fear of overloading the system.

HVAC

The existing HVAC equipment will require significant upgrades throughout most of the building. Air conditioning isn't currently present in the existing building and the ventilation is very poor. This creates a very hot and humid environment that does not meet current code standards. As part of the renovation, better ventilation and air conditioning will create spaces that are more comfortable and meet current standards.

Water

Currently only one 4" water line serves the building (for domestic and fire suppression). A building renovation will require a new water line for fire suppression water, and water sizing will need to be designed for adequacy.

Fire Suppression & Detection

The building is currently supplied with an automatic fire sprinkler system in the MPR only. Riser equipment is located in the storage room adjacent to the MPR. Service sizing will need to be evaluated for the renovation. The building is equipped throughout with a fire alarm system.

SITE

The RAC is located at the northwest corner of the LCCC campus. The building is a prominent feature when entering campus from the west. Parking is provided directly to the east of the building, and various pedestrian approaches are present.

Staging during construction can use space between the existing building and road to the north and the area north of the road. This will allow minimal disruption to the adjacent parking and soccer fields.

The project is located well within LCCC property boundaries, with similar occupancy, and is located in an existing facility. Therefore, we do not foresee any legal constraints to development.

SOILS AND TESTING

A previous soils report was conducted for the adjacent Health Science building but further soils evaluations will need to take place within the existing MPR.

FINANCING

The LCCC Board of Trustees, at their August 16, 2017 board meeting, voted unanimously to call for a \$29.496 million general obligation bond issue election on November 7, 2017. If approved by the voters of Laramie County, this project will receive \$11.2 million in bond issue revenues, and the remaining \$3 million would come from student fees.

OWNERSHIP

The land on which the Recreation and Athletics Complex sits was donated by the Arp-Hammond family when the college was founded and is owned by Laramie County Community College.

ENVIRONMENTAL

The proposed project is a renovation of an existing building, and therefore poses minimal environmental impacts. The proposed changes to the building will not alter site drainage, impact the building site, or introduce hazardous materials into the building.

Asbestos

A primary concern in renovation projects is the potential presence of asbestos, lead paint, or other harmful or hazardous materials in the existing construction. A campus wide survey was performed in 1983, however the results of the survey are no longer available. Therefore it will be prudent to engage an environmental consultant to inspect the areas identified for renovation, and include any required abatement in the project, or perform the abatement separately prior to the execution of this project.

Other Regulated Materials

Any investigation efforts undertaken for asbestos should also consider other regulated materials such as lead, PCBs, and others as recommended by an environmental consultant.

PERMITTING

The following permits will be required (see appendix for copies of the forms):

Laramie County
Building Permit and Plan Review
Cost: \$37,500.00 (est.)
Contact: Karen Moon
307-633-4512

Wyoming Department of
Environmental Quality
Notification of Demolition and Renovation
Cost: No Cost
Contact: Linda Dewitt
307-777-7394

Information regarding the results of asbestos and other hazardous materials testing will be required for the Notification of Demolition and Renovation.

COMMUNITY FORUM

An open house style forum was held on July 12, 2017. Two sessions were provided, one over the lunch hour, and one from 6:00 until 8:00 in the evening.

The Community Forum provided the opportunity for community members to voice concerns and provide insight as to what types of programming LCCC could provide to meet the sports and recreational needs of the community and whether to include these functions within the Recreation and Athletics Complex renovation.

- If there was adequate interest from the community and LCCC provided spaces within the RAC to accommodate, LCCC would offer memberships or other form of access to community members to use the spaces.
- Campus parking will continue to evolve along with LCCC's Master Plan and adequate parking will be provided for future projects.
- The current MPR size will be reduced by 1/3 but it will still be open for events and alternate venues may be utilized if the renovated spaces aren't large enough.
- LCCC does not wish to compete with local fitness businesses but to provide opportunities not currently available in Cheyenne.
- The City of Cheyenne Parks and Recreation representative that attended expressed the need for more court availability and an indoor turf facility so that Cheyenne residents aren't forced to drive to Colorado for recreational activities during winter seasons.
- Comments were made that the current competition court bleachers don't get filled and questioned the need for higher seating capacity. The Director of Athletics and Campus Recreation expressed that collegiate games have to provide a desirable experience to draw community members to attend events. Additionally, LCCC would be able to host graduations and many other events that require the larger seating capacity.
- Some concerns were raised about creating the "Taj Majal" of recreational facilities and that "LCCC needs to live within their means." LCCC doesn't intend to create a lavish and decadent facility but a quality, functional facility of a collegiate level.

Note: Only 6 community members attended the lunch meeting and only 2 at the evening meeting. Due to the lack of community interest, the decision was made to move forward with students and athletics as the focus with the possibility of community access in the future.

LCCC STUDENT MEETING

A meeting was also held on September 1, 2017 with LCCC students and staff to further discuss their needs.

"This Renovation is gonna bring more local kids to LCCC. Makes me wish I could stay here and play again!"

Elija Oliver

"So excited for a new facility. We have the oldest facilities around, and it's time we had the best!"

Maci Bourn

"This will be amazing for our future students/athletes. They will have windows, air conditioning, modern updated locker rooms, bigger and better weight room, and an actual college gymnasium to play in."

Carlee Morrison

Note: This meeting took place after the development of the plans shown within this study since the schedule proposed by LCCC required the design team to have plans prepared prior to the return of students and teachers for the Fall 2017 semester.

The purpose of this meeting was to get student and staff input on the drawings and determine if there were any spaces or functions not currently shown that needed to be included when the project moves forward. Some of the comments were as follows:

- Cardio space is very open and there was discussion about creating screening to make the space more private.
- Better ventilation and air conditioning was requested, especially in the fitness spaces.
- The yellow element at the main entry shown in conceptual renderings was liked and students thought that it would be a very strong point to reference for way finding.
- The new entrance in the conceptual rendering looks very inviting.
- A physical barrier between the free zone and paid zone was requested to aid access control.
- Physical Education teachers requested additional space for classroom space and not to lose sight that it is also an educational building not just for recreation and athletics.
- The plans no longer show an indoor track and it was requested that an indoor track be incorporated.

Note: For complete meeting notes, see the appendix following the report.

QUALITATIVE DESIGN GOALS & STRATEGIES

The previous page outlines the quantitative spatial needs of the project. As design progresses and the functional areas are placed within the existing building shell, thought should be given to how these spaces will be rendered and the effect that will have on the function and experience of the spaces. Some of these primary qualitative goals are listed below along with possible strategies for achieving these goals.

COLLEGIATE ATMOSPHERE

Goal Description

The current facility does not possess the inviting character that many modern recreational centers on college campuses do. In order to better recruit students and athletes, this facility should feel more like a collegiate rec center.

Strategies

Upgrading finishes and instilling a focus on life long wellness along with creating a more unified and active environment can help to achieve this goal. Providing a stronger core and incorporating usable space within circulation space can help to activate the building. Where possible providing views into adjacent spaces can also unify and activate circulation spaces and thereby the building as a whole.

DAYLIGHT & VIEWS

Goal Description

Almost all spaces in the current building are dark and do not provide views to the exterior. Introducing these features into the building will make spaces more inviting and enhance the user experience. Providing day lighting and views to the outdoors significantly improve the interior environment of a building,

Strategies

Most of the building is built of pre-cast double tee units. Removing some of these units and replacing them with curtain wall glazing or cutting openings between the tee's would dramatically change the interior environment by flooding the space with daylight and providing expansive views to adjacent spaces and to the exterior of the building.

LIFELONG WELLNESS

Goal Description

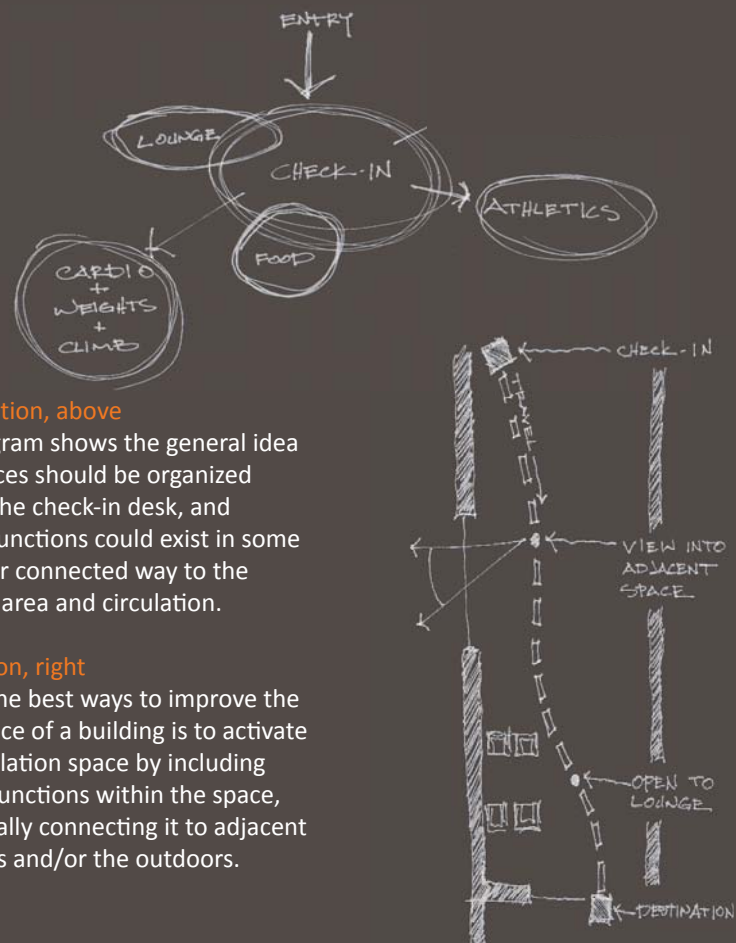
An important component of this facility is to provide students with opportunities to develop habits that support lifelong wellness. The design of the remodel should bear this in mind and consider ways that the building could reinforce this idea.

Strategies

Including nutritional food options, a variety of exercise, social, and educational opportunities in a bright, active, and organized environment will provide students with a place on campus dedicated to the maintenance of their holistic physical wellness.

The interior design of this facility will be important in that the space must be inviting, and must attract students and be a place they want to spend time. The use of materials such as glass and wood where practical as opposed to solid masonry and wall board could make strides in achieving this goal.

DESIGN DIAGRAMS



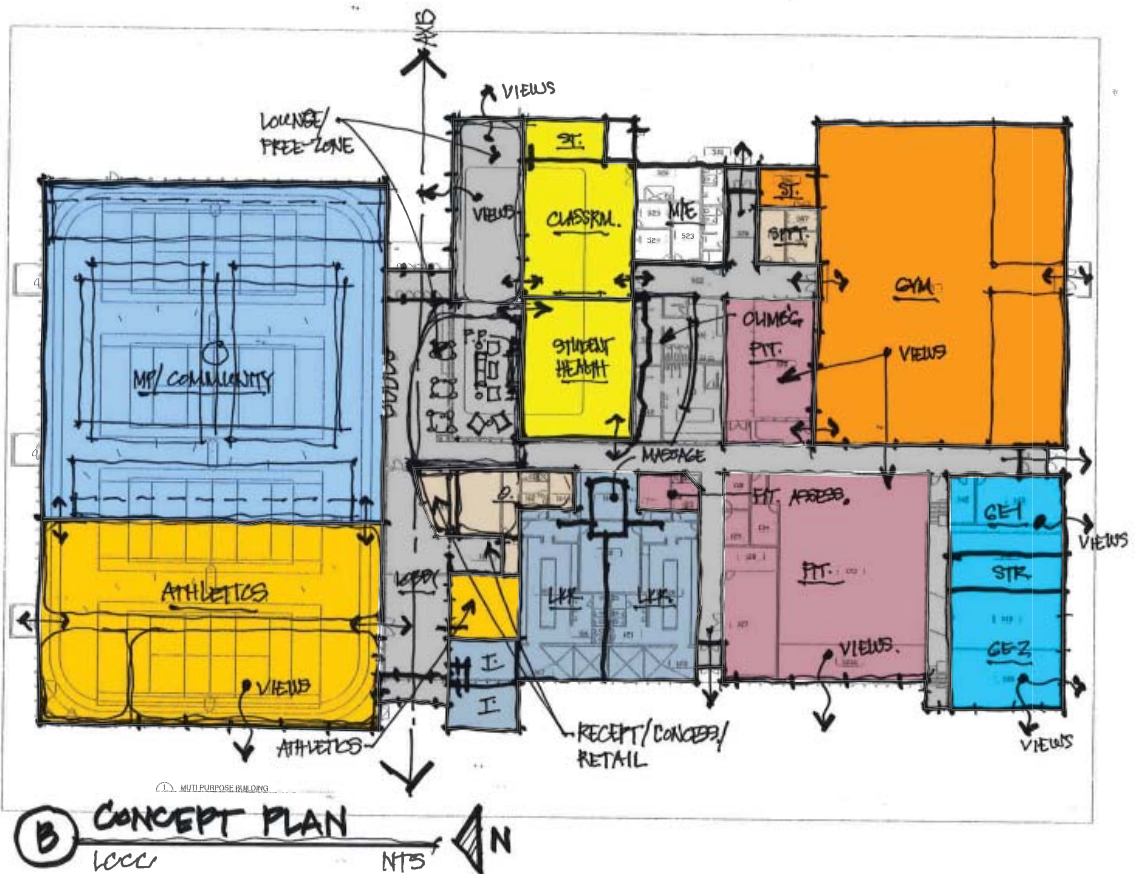
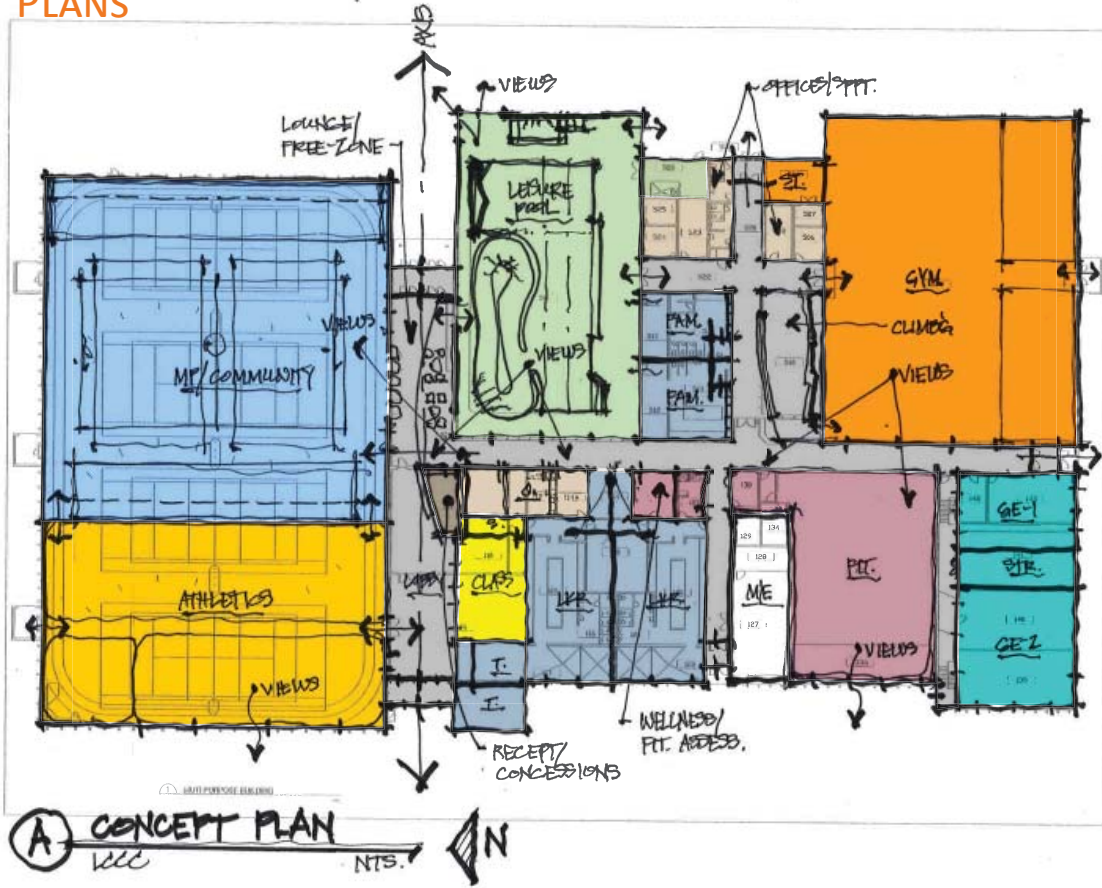
Organization, above

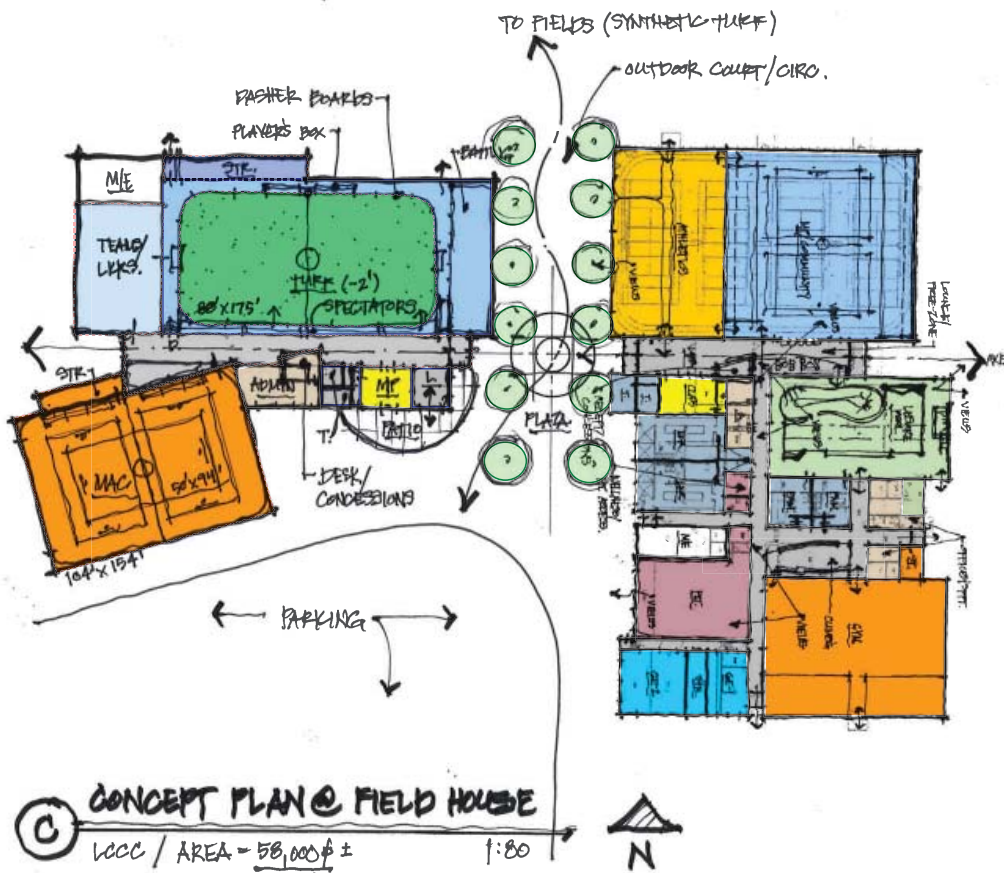
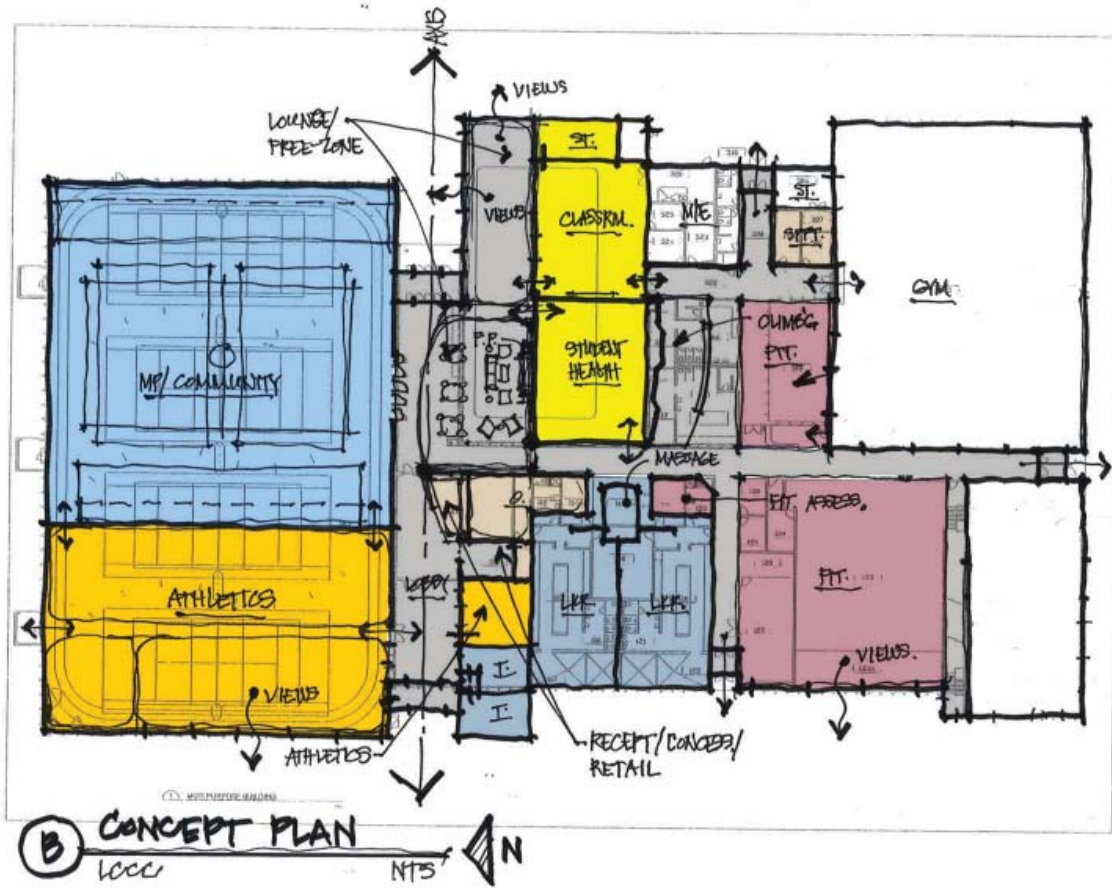
This diagram shows the general idea that spaces should be organized around the check-in desk, and certain functions could exist in some shared or connected way to the check-in area and circulation.

Circulation, right

One of the best ways to improve the experience of a building is to activate the circulation space by including related functions within the space, and visually connecting it to adjacent functions and/or the outdoors.

CONCEPT PLANS





SPACE PROGRAM

The space program includes outlines the spaces required for this project the program and will continue to evolve when the project moves forward and more user groups are able to provide more specific feedback. Many spaces are simply being relocated to function better. The removal of the existing pool, and adding floors within the MPR, spaces such as the Outdoor Program have been added and some of the existing spaces have been dramatically increased to meet the needs of the students, staff, and athletes.

	Room #	Room Name/ Description	Notes	Occ. Load	Area (sqft)
LEVEL 1	HW	Misc. Circulation, Stairs & Other		n/a	7,254
	C101	Janitor		n/a	50
	101	Vestibule	New Construction	n/a	289
	102	Ticket Office		3	243
	103	Multi Purpose Gymnasium		3,076	15,477
	103A	Storage	New Construction	2	351
	104	Lounge		44	650
	105	Reception		4	379
	106	Office, Fitness Admin		2	150
	107	Office		2	148
	108	Office		2	160
	109	Wellness		14	656
	110	Classroom		43	857
	111	Open Fitness		166	7,862
	112	Mechanical Room		3	670
	113	Gymnasium	No work being done	592	9,470
	114	Storage		3	689
	115	Racquetball	No work being done	7	724
	116	Racquetball	No work being done	7	797
	117	Racquetball	No work being done	7	798
	118	Small Group/Cycling		16	762
	118A	Storage		1	134
	119	Dance and Large Group		31	1,518
	119A	Storage		1	262
	120	Mechanical		4	300
	121	Family RR		2	80
	122	Family RR		2	84
	123	Massage		2	200
	124	Men's Lockers		22	1,053
	125	Men's Lockers		13	647
	126	Women's Lockers		22	1,080
	127	Women's Lockers		13	645
	128	Café/Concessions		36	530
	129	Prep Kitchen		3	512
	130	Women's RR		n/a	523
	131	Men's RR		n/a	307
	132	Athletics Locker Room Entry		n/a	1,292
	133	Officials		2	74
134	Lockers, Basketball		19	993	
135	Lockers, Soccer		23	1,123	
136	Lockers, Soccer		21	1,050	
137	Lockers, Basketball		19	988	
138	Training		7	621	
				4,236	62,452
		Grossing Factor, Includes wall thickness, mechanical/plumbing chases.		13%	7,986
		Level 1 Total		4236	69,692

LEVEL 2	HW	Misc. Circulation, Stairs & Other		n/a	922
	201	Lockers, Volleyball		22	1,063
	202	Toilet		n/a	80
	203	Toilet		n/a	87
	204	Athletic Fitness		79	3,905
	205	Film Room		34	505
	206	Storage		1	147
				136	6,709
		Grossing Factor, Includes wall thickness, mechanical/plumbing chases.		6%	391
		Level 2 Total		136	7,100

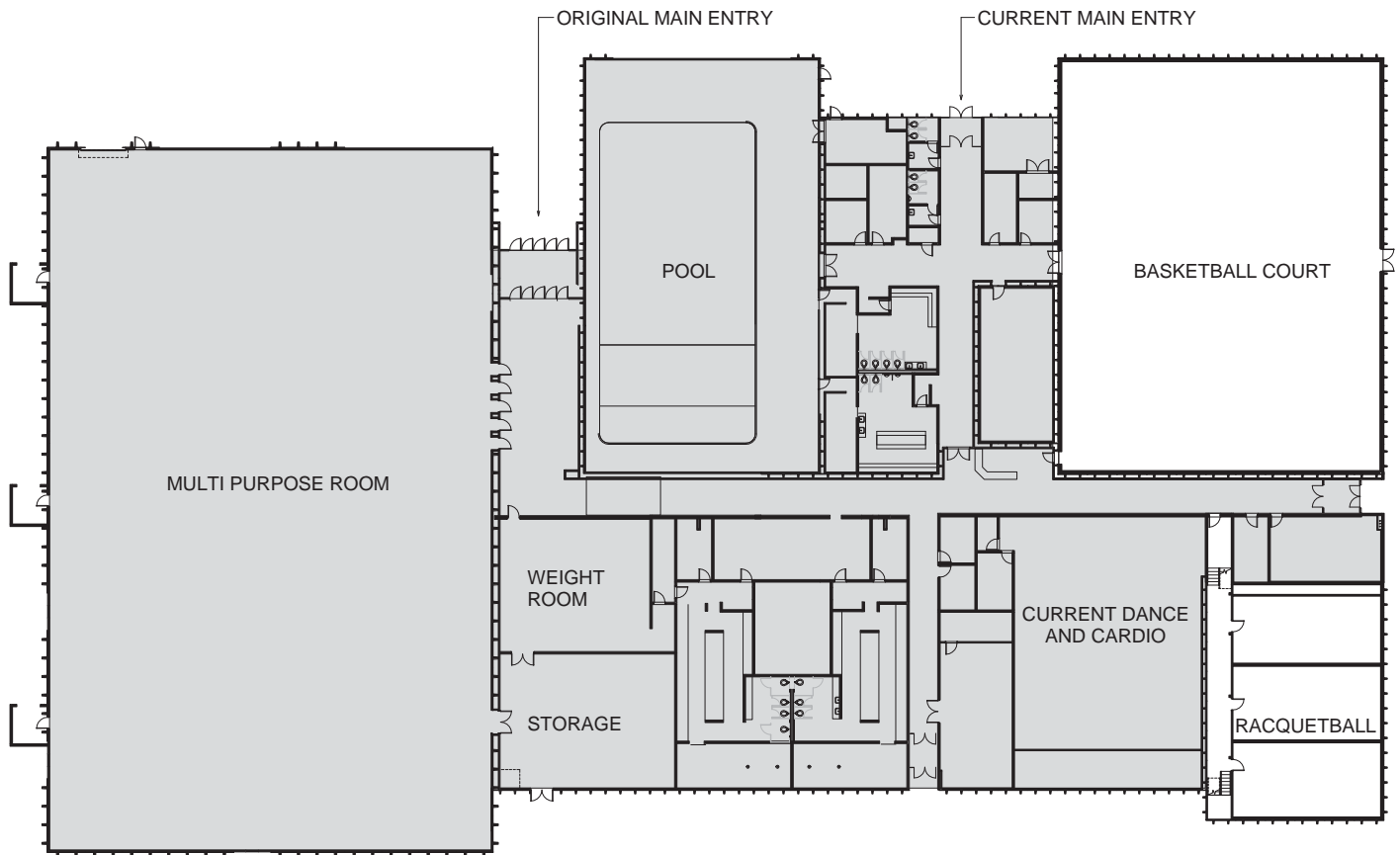
LEVEL 3	HW	Misc. Circulation, Stairs & Other		n/a	1,427
	301	Achievement Center		68	1,018
	302	Conference		14	209
	303	AD Assistant Office		2	176
	303A	Athletic Director		3	261
	304	Champions Club Lounge		59	883
	304A	Storage		1	169
	305	Office	Includes Assistant Coach	3	235
	306	Office	Includes Assistant Coach	3	235
	307	Office	Includes Assistant Coach	3	235
	308	Office	Includes Assistant Coach	3	240
	309	Office	Includes Assistant Coach	3	235
	310	Office	Includes Assistant Coach	3	235
	311	Office	Includes Assistant Coach	3	212
	312	Men's RR		n/a	204
	313	Women's RR		n/a	229
				168	6,203
	Grossing Factor, Includes wall thickness, mechanical/plumbing chases.		14%	897	
	Level 3 Total		168	7,100	

Building Total	4,540	83,892
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EXISTING 1ST FLOOR PLAN

The plan below on this page indicated in gray, is the portion of the existing building which is proposed for remodeling. This is over 80% of the entire building. The current function of those spaces include:

- The current weight room.
- Storage
- One of four indoor tennis courts.
- Original building entry, which is currently seldom used.
- The existing pool which is to be removed and the space re purposed
- The existing locker rooms



REMODELED 1ST FLOOR PLAN

The first floor will undergo a significant renovation with over 80% of the level being remodeled entire or enhanced. The new athletics locker rooms will be located within the existing MPR with the additional 2 levels above. Organizationally, a main corridor extends east/west completely through the building and acts as the separation between athletics and the student/community recreation areas. This corridor is also part of the “free zone” and contains spaces for lounges, a cafe, and the reception desk. Many interior walls have been removed to create a much more open feel, especially for the student/staff fitness spaces, reducing the perceived length of the long north/south corridor which now opens up to large fitness spaces.

The climbing area will be relocated adjacent the fitness space adjacent the existing gymnasium and will offer bouldering as well as top rope climbing.

A Reception area will be the division between the free, non-paid, and the paid zone. The free zone consists of lounge space, cafe, rest rooms, and access to the Outdoor Program. The paid zone consists of locker rooms, fitness space, group class areas, climbing and more.

The existing gymnasium and raquet ball courts will remain.

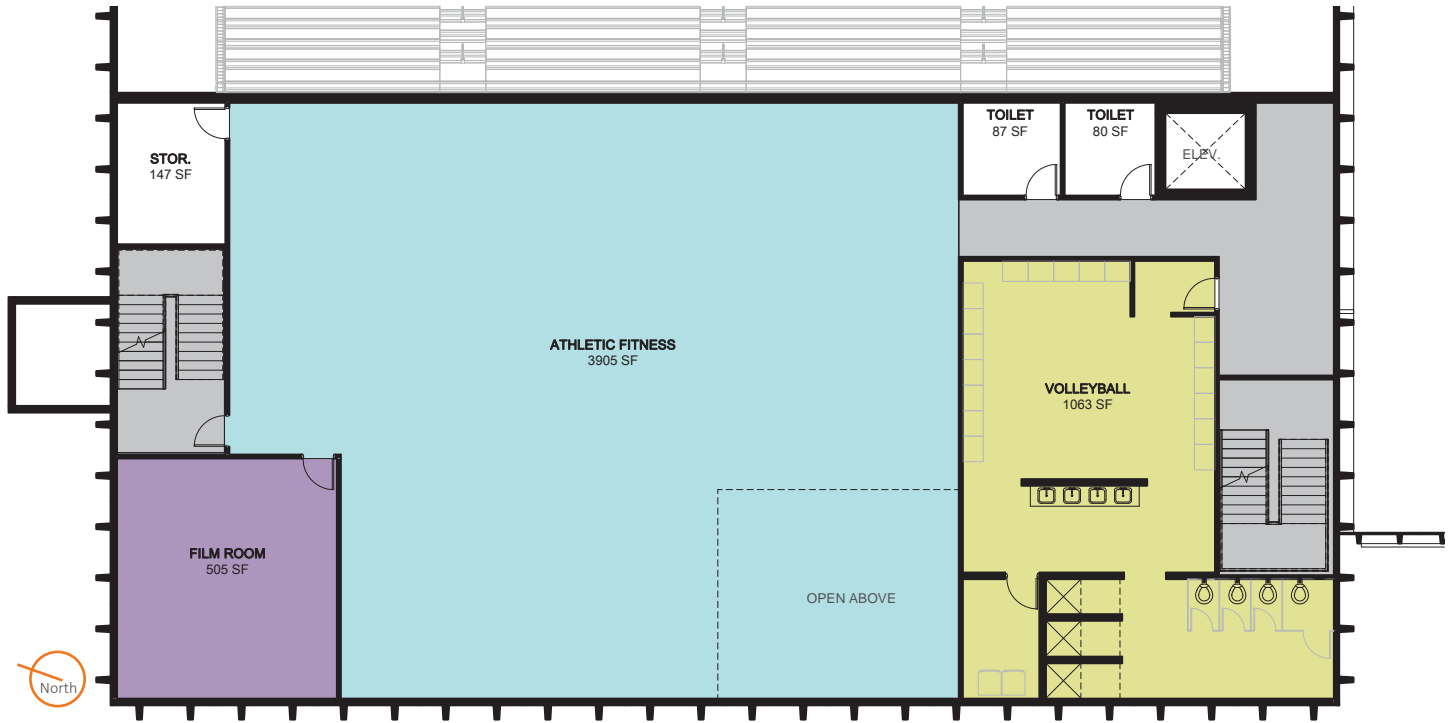


See levels 2 & 3 above 1st level.
Area indicated by dashed line.



2ND FLOOR PLAN

The second floor of the proposed interior addition within the MPR has dedicated rooms for a locker room, film room, and other support spaces, and is primarily utilized as Athletics Fitness space. This large, mostly open space, will provide adequate space for athlete training and includes an area noted as “open above” to place lifting stations that require additional height. The western wall of this space will have portions of the existing precast concrete removed to allow views and natural day lighting into the space.



3RD FLOOR PLAN

The third floor of the proposed interior addition includes all of the athletics offices, conference room, student athlete studying and tutoring, and a Champion’s Club Lounge overlooking the competition court. Natural day lighting will be allowed into this level by removing a portion of the existing precast concrete exterior walls panels.



INTERIOR DESIGN

This image shows a possible interior renovation option. In this view large portions of the existing exterior wall have been removed and replaced with glazing, allowing ample day lighting and views to the east.

Light colors and the use of natural materials such as wood, bring a warmth into the building that is currently absent.



EXTERIOR DESIGN

This image shows a possible exterior renovation option. The LCCC campus is lacking consistent exterior materials, other than the precast concrete, and this rendering shows the use of metal panels and stone that would match the newly constructed buildings on campus such as the Clay Pathfinder Building. Matching materials will begin to tie the buildings on campus together and create a material language that is unique to LCCC's campus. The yellow element at the main entry would highlight the entry and draw people in to the main entrance and serve as a unique campus landmark for describing campus locations. As LCCC continues to build, creating these unique elements would individualize the buildings with the common materials to tie them together.



CHANGE IN SPACE USE DISPERSION

The table on this page reflects the changes in square footage by space, of the existing building to the renovated building. The intent of this table is to show what the students, faculty, and athletes are gaining as a result of the renovation and give them a scale of how much the spaces are increasing in square footage.

For example: Currently the students, staff, and athletes are sharing 4,731 square feet of cardio, fitness, weight room, and group class space and the renovation will provide 8,376 square feet of cardio, weights, functional movement, and an additional 4,235 square feet in group classrooms for students and staff. The athletes will also have 3,900 square feet dedicated to their fitness and training.

	Athletics Offices	Staff Offices	Athlete Lockers	Student/Staff Lockers	Athlete Training	Student/Staff Fitness	Student Achievement	Athlete Services	Student/Staff Class/Group
Existing (sqft)	1,454	288	3700 (shared)		4731 (shared)		200	506	515
Renovation (sqft)	2,101	426	5,547	3,980	3,905	8,376	1,018	1,126	4,235

	Multi Purpose Gymnasium	Competition Courts	Lounge	Event Restrooms	Concessions	Racquetball	Outdoor Program	Conference	Pool
Existing (sqft)	22,559	9,470	0	438	6	2,320	0	0	6,933
Renovation (sqft)	15,477	9,470	1,129	945	527	2,320	2,276	209	0

OPINION OF PROBABLE COST

Conceptual Estimate of Construction Cost

Conceptual Estimate of Construction Cost

Prepared by	Tobin & Associates, P.C.
Project	Laramie County Community College - RAC
Date Revised	Tuesday, September 12, 2017

	SF	\$/SF	Cost
Construction Cost			\$11,757,000.00
Inflation	4.00%		\$470,280.00
Architectural/Engineering Design Fees	10.00%		\$1,175,700.00
Materials Testing and Inspection	1.00%		\$117,570.00
FF&E	5.00%		\$587,850.00
TOTAL			\$14,108,400.00

Note: Construction cost includes a 10% design contingency.

Plumbing Upgrade Recommendations

Fire Protection

The owner should anticipate the requirement for not only sprinkling the new areas, but to extend the fire protection into the existing building, possibly including the original gymnasium area. This will require a new 6" fire service from the 8" fire service loop outside of the building. Additionally, the existing multipurpose gym fire protection system will need to be tied into the new service and brought up to current codes with quick response heads. In all, approximately 80,000 square feet of building will need to be sprinkled or modified to meet current codes.

Water Service

The original PE building has a 2" water service, which is sufficient for the portion of the building it serves even with proposed changes. The proposed changes/additions to the 1981 addition and multipurpose gymnasium will require a larger service line. Fortunately the 4" domestic water line is sufficient if the fire sprinkler system is disconnected and brought in separately. The 4" service line will require a new reduced pressure back flow preventer, and will be required to be rerouted outside to a new water entry room to accommodate the proposed renovation of the 1981 addition. Once installed, the existing 1981 addition service line can be back fed. The plumbing for this renovation will be routed back to the water service entry and water heater locations.

Waste Service

The existing 6" waste service is sufficient for both the existing plumbing fixtures as well as the proposed addition. The new fixture groups can tie directly into the existing 6" sanitary line.

HVAC UPGRADE RECOMMENDATIONS

1981 Addition Building Systems

With the age of the existing multi zone unit, and taking into consideration that the unit has pneumatic controls and no cooling, we would recommend replacing this unit as part of the renovation. At this time we believe the new unit could reconnect into the existing duct work mains if replaced.

The former rifle range area will require a new layout for duct work, diffusers and ventilation to accommodate the proposed remodel. The 4,000 square foot area will require exhaust and ventilation for the workout area. This can be served from the multi zone unit assuming it is replaced and rebalanced for the new space use. Currently the multi zone unit serves an area that is proposed to be public rest rooms. This area can be served from the new VAV unit, while the remaining capacity from the multi zone can be used to serve the former rifle range area.

Multipurpose Building Systems

For cooling and heating control, we recommend installing VAV air handlers with chilled water and hot water coils served from the central plant. Due to the amount of exhaust and ventilation required since these units serve locker and gymnasium, a flat plate heat exchanger built into the system would recover significant energy and is recommended. Two units would be ideal, one for the gymnasium multipurpose room, and a second for the 3 story renovation, which would also back feed into the 1981 addition for the new public rest rooms and associated spaces. For the 3 story renovation, approximately twenty-six (26) VAV reheat zones would be installed for proper zone control. All exhaust for these spaces would be connected to the air handler for heat recovery, eliminating the need for additional exhaust fans. Approximate sizes of the air handlers are noted in the schedule below.

ELECTRICAL UPGRADE RECOMMENDATIONS

General Power Systems

General purpose outlets will be provided throughout the remodeled areas for office, exercise equipment, and miscellaneous needs. The concessions area will have numerous general and special purpose outlets. Branch circuits and disconnect switches will serve air handling units and other HVAC equipment.

Lighting Systems

Replace existing gymnasium lighting with LED High-Bay fixtures with high color rendering index (CRI) to achieve required lighting levels for collegiate competition. We recommend installing a lighting control panel to allow adjustment of lighting from competition to practice, and to allow dimming of the lights over the bleacher areas during games.

The remodeled areas and new office, exercise, and locker rooms shall be provided with LED troffers and surface mount fixtures, as required. Occupancy sensors shall be provided in all areas, except for the gymnasium.

Life Safety and Fire Alarm Systems

Exit signs will be installed at all exit doors, and as required to indicate the egress path. Emergency egress lighting will be provided to illuminate the path of egress at 1 foot-candle, average.

The existing notification and initiation fire alarm circuits will be extended to support new device locations. Initiation will be provided by pull stations at exit doors and detectors in the mechanical and electrical rooms, per the building standard. Duct detectors will be installed in supply and return ducts of air handling equipment, as determined by cfm ratings. A new, booster power supply for the notification circuit will be provided. Test and re-certify the fire alarm system after additions/modifications are complete.

Note: See the appendix for full MEP report

STRUCTURAL RECOMMENDATIONS

Executive Summary

This narrative for the Level II planning study encompasses a significant remodel to the existing Recreation and Athletics Complex on the LCCC campus in Cheyenne. The original structure utilizes a pre-cast concrete wall and roof system that is in relatively good structural condition where visible. The use of a pre-cast concrete system allowed for large open spaces with minimal programmatic interference from structural support (column) members. The project has two main structural remodel components, the multipurpose gymnasium area and the existing pool

Multi-purpose Gymnasium

The gymnasium will have a three story (2 elevated floors) interior addition added to the west end of the structure that occurs completely within the existing building envelope. This new structure is currently anticipated to be independent from both a gravity and lateral standpoint and will not impose any new loads on the existing structure. This arrangement will incorporate a structural steel frame supported by conventional shallow spread footings. Column locations near exterior wall will be supported by grade beams cantilevered off of spread

footings positioned 6' to 8' inset from the existing footings. The structural steel frame will incorporate tube section columns supporting wide flange girders (connecting the columns and providing beam support) and beams (spaced 6' to 8' on center between columns). The composite floor system is anticipated to utilize 2" steel deck under 4" of concrete topping. Lateral support for the structure will be provided by masonry shear walls at the stairs/elevator or with steel braced frames.

During the design phase, an analysis of the existing pre-cast concrete members will be completed in addition to coordination with the project geotechnical engineer to determine if some loads can be transferred to the existing structure. Potential shoring or reinforcement of the existing structure will be evaluated on a cost basis versus the independent structure to determine final configuration.

Existing Pool Area

The center portion of the complex containing the existing pool will have significant portions of the existing structural system modified to accommodate the proposed program. First, the existing pool will be infilled with a combination

of "flow-fill" concrete and a granulated structural fill under a new slab-on-grade. Final quantities of fill materials will be determined through consultation with the geotechnical engineer. It is anticipated that the original pool shell will remain in place.

Several full height pre-cast twin tee wall panels will be removed to allow for anticipated open areas as shown on the architectural drawings. The removal of these members will require new gravity and lateral system to be installed. Prior to the removal of the wall panels a new (and permanent) structural steel frame will be installed at the inside of the wall and attached to the roof members to provide support once the wall panels are removed. We anticipate tube section columns and wide flange beams for roof framing support. During the design phase an analysis of the existing lateral system and the proposed modifications will be completed to determine the extent of required modifications. It should be anticipated at this time that a minimum of one approximately 12' long 8" thick cast in place full height concrete wall with a new spread footing will need to be installed to restore lateral restraint to the structure.



POTENTIAL RENOVATION DESIGN

Building Code

The governing building code and corresponding standards for determining minimum loading will be as follows:

- 1) 2015 International Building Code with City of Cheyenne amendments
- 2) ASCE 7-10

Loading & Design Criteria

- A. Roof Snow Loads:
- 1) Ground Snow Load (P_g) = 30 psf
 - 2) Flat Roof Snow Load (P_f) = 30 psf for uniform, 23.1 psf for drifting calculations
 - 3) Snow Exposure Factor (C_e) = 1.00
 - 4) Importance Factor (I) = 1.10
 - 5) Thermal Factor (C_t) = 1.00
- B. Wind Design Data:
- 1) Basic Wind Speed = Vult = 120 mph, Vasd = 93 mph
 - 2) Mean Roof Height = \pm 30ft
 - 3) Risk Category = III
 - 4) Exposure Category = C
 - 5) Enclosure Classification = enclosed building
 - 6) Internal Pressure Coeff. = \pm 0.18
 - 7) Directionality (K_d) = 0.85
 - 8) Topographical Factor (K_{zt}) = TBD
- C. Earthquake Design Data:
- 1) Risk Category = III
 - 2) Importance Factor (I) = 1.25
 - 3) Mapped Spectral Response Accelerations:
 - 4) S_s = 0.155
 - 5) S_1 = 0.054
 - 6) Site Class = C, pending geotechnical report
 - 7) Spectral Response Coefficients:
 - 8) S_{ds} = 0.165
 - 9) S_{d1} = 0.089
 - 10) Seismic Design Category = B
 - 11) Basic Structural System = Building Frame Systems
 - 12) Seismic Resisting System = Steel braced frames not specifically detailed for seismic resistance / Ordinary reinforced masonry shear walls.
 - 13) Design Base Shear V = $C_s * W$
 - 14) Seismic Response Coef. (C_s) = 0.059
 - 15) Response Mod. Factor (R) = $R=3$
 - 16) Analysis Procedure = Equivalent Lateral Force Analysis
- D. Frost Depth: 36 inches, pending geotechnical report
- E. Design Loads:
- 1) Dead Load = weight of structure + 10psf lighting, ceiling, mechanical & plumbing
 - 2) Live Load at Elevated Floors = 100 psf minimum, non-reducible
 - 3) Mechanical Loads = weight of equipment and housekeeping pads or 150 PSF if unknown.

APPENDIX

Community Meeting Notes July 12, 2017

Re: LCCC Recreation and Athletics Facility

12:00 - 1:00pm - Laramie County Library

Dr. Schaffer begins by introducing the project and the intent of the community meetings and then Tobin & Associates along with Bob and Bryan, of OLC, ran through the PowerPoint presentation.

The floor was opened up to the community to discuss and ask questions.

Q: Would the complex be open to the community?

A: If there is interest in having spaces open to the community then LCCC will define a way that community members would be able to use the facility through memberships. LCCC wants to get more community members on the campus in hopes of getting them involved in campus activities.

Jason Sanchez (Parks and Recreation)

There needs to be more available spaces so that the various programs can continue to grow
More court availability is needed.

Indoor turf is a must for soccer and people are currently forced to travel to Colorado

It was noted that private clubs contact Parks and Rec looking for spaces as well.

Jason also noted that he believed that there was a need for more pool access.

City Rec. does pay rent for use of facilities

The City pool is close to maximum capacity usage

Concerns about parking were brought up and Dr. Schaffer responded by noting that parking will be taken into consideration as the LCCC Master Plan evolves with upcoming projects.

Q: Will the facility be open to anyone?

A: If there are community based components included within the project, then yes, with a membership or pass of some sort.

Q: Will people travel all the way to LCCC, especially people who live on the north side of Cheyenne?

A: Many people travel to Colorado so there isn't any concern about them driving to LCCC.

Q: Will the Athletics Expansion interfere with the ability to host large events in the MPR?

A: The space would be smaller but still open for large events.

It was mentioned that a new, much larger facility, at the Archer Complex could be used when complete.

Q: What are the funding options for the project?

A: Student fees, Bond, Mill Levy, Revenue from use, and donations.

Q: Is there an issue competing with local fitness businesses?

A: LCCC does not desire to compete with local businesses. They want to provide opportunities that aren't currently available in Laramie County.

Q: What is the next step from here?

A: The design team will provide the Board of Trustees with rough cost estimates for various magnitudes of renovation and additions.

There was one lady from LCCC that also lives on the south side of Cheyenne that was supportive of these types of facilities in that location because the opportunities on the south aren't there yet.

Q: What does the community want/need?

A: Field-house and gymnasium space.

Participation was very minimal and the desires would likely be more opportunities.

It was suggested that the design team should put out a survey to the community to get a more complete overview of the desires of community members and willingness to support.

Community memberships to use the facility had positive support so that they aren't required to sign up for a class in order to use the spaces.

It was suggested that it would be valuable to schedule public tours of the existing facility to show the level of inadequacy. Mr. Noble would gladly guide these tours.

LCCC would need to evaluate liability issues if they open to the public.

The project would be seen more favorably if it wasn't the "Taj Mahal."

LCCC needs to live within their means

Non LCCC agencies could contract to provide amenities on campus

Activities for youth instill lifelong fitness and wellness habits.

Q: How would students feel if the RAC is open to the public.

A: Interaction can be beneficial

Community Meeting Notes July 12, 2017

6:00 - 8:00pm LCCC Clay Pathfinder Room 409

Only 2 community members outside of the design team and LCCC staff attended.

Dr. Schaffer is unsure about student desire for a pool but is confident in the need for the turf facility.

LCCC staff raised concerns about additional maintenance, and risk associated with the pool climbing wall images. He also mentioned during the tour that natural light creates an opportunity for algae to grow.

Someone commented that the current basketball competition court bleachers don't get filled during games and questioned the need to increase seating. Among other discussions, Mr. Noble talked about how at the collegiate level, people that go to games don't necessarily have children playing but go for the college fan experience. LCCC does not have the facilities to create a desirable experience for community members.

There was concern about the building coming in over budget as has happened in a past project and having to cut/reduce program that was previously promised.
An accurate cost model will need to be developed in order to avoid this.

A "one stop shop" opportunity for families is desirable so that families can be entertained by multiple activities available in one location.

Meeting the needs of the students and student athletes is the primary concern of the college.

Top needs for community appeal:

- 1 - Court space/time
- 2 - Indoor turf facility

Student/Staff Meeting Notes September 1, 2017

1:00 - 2:00pm LCCC Health Sciences Room 104

Openness of the cardio area was a concern for a student and the possibility of some screening or half walls was discussed to make the space feel more private.

Good ventilation and fans were requested and we let them know that the HVAC systems would be redone and adequate air flow and cooling will be provided.

The yellow pillar at the main entrance was liked and would be a good reference point for way finding.

The new entrance looks inviting.

A physical barrier should exist between the free zone and the paid zones

Don't lose sight of the academic programs that take place in the RAC.

Academic programs would include a classroom for up to 35 students and a kinesiology lab.

The elimination of the indoor track isn't favorable and some sort of track should be identified in the renovation.

Figure 3
STATE OF WYOMING
 NOTIFICATION OF DEMOLITION AND RENOVATION

I. Facility Description (Include Building Name, Number, And Floor Or Room Number)

BLDG NAME:
 ADDRESS:
 CITY: STATE: ZIP: CONTACT:
 SITE DESCRIPTION (type of material being removed)

II. Facility Information (Identify Owner, Removal Contractor, And Other Operator)

OWNER NAME:
 ADDRESS:
 CITY: STATE: ZIP:
 CONTACT PERSON: TEL:
 REMOVAL CONTRACTOR:
 ADDRESS:
 CITY: STATE: ZIP:
 CONTACT PERSON: TEL:
 OTHER OPERATOR:
 ADDRESS:
 CITY: STATE: ZIP:
 CONTACT PERSON: TEL:
 BUILDING SIZE: NUM OF FLOORS: AGE IN YEARS:
 PRESENT USE: PRIOR USE:

III. Type Of Operation: D=Demo O=Ordered Demo R=Renovation E=Emergency Renovation

IV. Is Asbestos Present? YES NO Explain:

V. Procedure, Including Analytical Method, If Appropriate, Used To Detect The Presence Of Asbestos Material:

VI. Scheduled Dates Asbestos Removal (MM/DD/YY) START: COMPLETE:

VII. Scheduled Dates Demo/Renovation (MM/DD/YY) START: COMPLETE:

VIII. Scheduled Work Hours: START: COMPLETE:

IX. Approximate Amount Of Asbestos, Including: 1. Regulated ACM To Be Removed 2. Category I ACM Not Removed 3. Category II ACM Not Removed	RACM To Be Removed	Nonfriable Asbestos Material To Be Removed		Nonfriable Asbestos Material Not To Be Removed	
		CAT I	CAT II	CAT I	CAT II
PIPES					
SURFACE AREA					
VOL. RACM OFF FACILITY COMPONENT					

X. Description Of Planned Demolition Or Renovation Work And Method(S) To Be Used:

XI. Description Of Work Practiced And Engineering Controls To Be Used To Prevent Emissions Of Asbestos At The Demolition And Renovation Site:

XII. Type Of Notification: O=Original R=Revised C=Cancelled

Figure 3
STATE OF WYOMING
NOTIFICATION OF DEMOLITION AND RENOVATION

WPR Notice? Yes No

XIII. Waste Transporter #1

ADDRESS:
CITY: STATE: ZIP:
CONTACT PERSON: TEL:
WASTE TRANSPORTER #2:

ADDRESS:
CITY: STATE: ZIP:
CONTACT PERSON: TEL:

XIV. WASTE DISPOSAL SITE

NAME:
LOCATION:
CITY: STATE: ZIP:
CONTACT PERSON: TEL:

XV. If demolition ordered by a government agency, please identify the agency below:

NAME: TITLE:
AUTHORITY:
DATE OF ORDER (MM/DD/YY):
DATE ORDERED TO BEGIN (MM/DD/YY):

XVI. For Emergency Renovations

DATE AND HOUR OF EMERGENCY (MM/DD/YY):
DESCRIPTION OF THE SUDDEN, UNEXPECTED EVENT:
EXPLANATION OF HOW THE EVENT CAUSED UNSAFE CONDITIONS OR WOULD CAUSE EQUIPMENT DAMAGE OR AN UNREASONABLE FINANCIAL BURDEN:

XVII. Description of procedures to be followed in the event that unexpected asbestos is found or previously nonfriable asbestos material becomes crumbled, pulverized or reduced to powder:

XVIII. I certify that an individual trained in the provision of this regulation (40 CFR Part 61, Subpart M) will be on site during the demolition or renovation and evidence that the required training has been accomplished by this person will be available for inspection during normal business hours (required 1 year after promulgation).

_____ Date: (Signature of Owner/Operator)

XIX. I certify that the above information is correct.

_____ Date: (Signature of Owner/Operator)



Laramie County Planning and Development Office

Building Division
3861 Archer Pkwy Cheyenne, WY 82009
Phone: 307-633-4512 Fax: 307-633-4519
planning@laramiecounty.com
www.laramiecountyplanning.com

COMMERCIAL SUBMITTAL REQUIREMENTS

INCOMPLETE APPLICATIONS CAN NOT BE ACCEPTED

Please visit our new and improved Laramie County Parcel Viewer for information on the property and aerials: <http://arcims.laramiecounty.com/>

All Building Permit Applications must include the following:

1. Completed Application Form
2. Recorded deed for proof of property ownership (for new Residential construction)
3. Certificate of Review from the Planning Division
4. One plot plan
5. One set of building plans
6. One set of engineered foundation plans stamped by a registered Wyoming Engineer
7. Proof of Health Department Approval (additions only)
8. Proof of Driveway Access Approval. Please contact Leo Pando at (307) 633-4302 to discuss requirements
9. Fire District Approval may be required

NOTE: AN OPEN HOLE INSPECTION REPORT OR SOILS REPORT (from a register Wyoming Engineer is required prior to requesting footer/foundation inspection.)

WE ARE GOING GREENER! Please note that we require one full set of plans as well as an electronic set whenever possible. If electronic copies are not submitted, we will require 2 full sets of plans. Please contact us if you have questions.

Please refer to attached for complete instructions and information.

NOTICE:

The Applicant, his Agents and Employees shall comply with all the rules, restrictions and requirements of Laramie County Zoning Regulations and Laramie County Building Codes governing location, construction and erection of the above proposed work for which the permit is granted. The Building Official or his agents are authorized to order the immediate cessation of construction at any time a violation of the codes or regulations appears to have occurred. Violation of any of the codes or regulations applicable may result in the revocation of this permit.

Buildings must conform with plans as submitted to the Laramie County Planning & Development Office. Any change of plans or layout must be approved prior to the changes being made. Any change in the use or occupancy of a building or structure must be approved prior to proceeding with construction.

The Applicant is required to call for inspections at various stages of the construction, and in accordance with the aforesaid rule, the applicant shall give the Building Inspector not less than one day's notice to perform such activities.



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The Applicant must comply with current Planning & Development office expiration policy. Laramie County is not liable for workmanship. Permits are not transferable.

The following items expand on the submittal requirements. Not all projects require all items listed below, please contact us if you have any questions.

1. **Application Form:** can be obtained at the Laramie County Planning & Development Office or on-line at the Laramie County website at www.laramiecountyplanning.com
2. **Proof of Ownership:** A copy of the recorded deed will be required to verify ownership of the property.
3. **Plot Plans:** (sample available upon request) They are to be drawn on 8 ½" x 11" size paper, and must show:
 1. North arrow
 2. Location of proposed building
 3. Distances between each property line to proposed building (the minimum is from 2 property lines)
 4. Distances between proposed building and any existing structures
 5. Identify the street or county/state road being accessed from
 6. Driveway location with driveway width and surface type (and distance to the closest property line)
 7. Location of well and septic system (if applicable)
4. **Building Plans:** Two identical sets (only one set is required if submitted on paper that is 11"x17" or smaller) of Building Plans are required for all residential buildings. Plans should include all of the items listed below which apply to your particular project. Plans and specifications must be drawn to scale on substantial paper, unless the plans are being submitted electronically, and must indicate locations, nature and extent of the work proposed, and should show in detail that it will conform to the adopted Laramie County Building Code, and shall state the design standards meet or exceed wind and snow loads for the area. The recommended scale for plans is 1/4" = 1'. Plan Review fees are calculated at 65% of the building permit fee based on provided valuation. Fee adjustments may be made if needed.

If the project is an addition or remodel, be sure to clearly label all existing and all proposed construction.

The following information is required for full plan submittal:

- A. **Foundation and Floor- Framing Plan:** All foundations shall be designed and wet-stamped by an architect or engineer licensed by the State of Wyoming. Additionally, if a site-specific soils report is not provided, an "open hole" inspection shall be conducted by an architect or engineer licensed by the State of Wyoming. Contact the Planning & Development Office for exceptions for an addition to an existing residence. Foundation and floor framing plans must include the following information:
 1. Location of continuous foundations and pier footings
 2. Size and depth of footings
 3. Thickness of concrete slabs
 4. Size and spacing of girders
 5. Size and spacing of floor joists
 6. Location of crawl holes and vents
 7. Size of stem walls
 8. Location and size of re-enforcing steel to be installed



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9. Elevation of foundation in relation to grade

B. Floor Plan: Floor plans must show the following:

1. Exterior dimensions
2. Interior dimensions
3. Use of all rooms
4. Size of all windows and doors
5. Size of supporting headers above wall openings
6. Direction of joists and rafters
7. Location of all plumbing fixtures
8. Location and type of heating and air conditioning facilities
9. Location of smoke detectors
10. Drawings shall be to scale

C. Elevation Views: This is a drawing or exterior view of each new wall. The drawing must include:

1. Doors, windows and other openings
2. Vertical dimensions
3. Exterior finishes
4. Wall bracing or shear panel location or means of obtaining required lateral bracing

D. Cross Section Views: The cross section views must include:

1. Interior and exterior finishes
2. Size, spacing and type of materials used
3. Insulation, type, location and "R" value
4. Typical connections
5. Complete roofing specifications

E. Roof Plan: the roof plans should include drawings of the following:

1. Hips, valleys, ridges
2. Any special framing at roof area
3. For additions to existing buildings, locations of bearing walls and slope of roof in existing buildings;
and
4. Shall include a copy of the truss certifications (truss specs shall be available at the job site for the inspector.)

5. **Foundation Plans:** Two identical sets (only one set is required if submitted on paper that is 11"x17" or smaller) of Foundation Plans that are engineered by a Wyoming Licensed Engineer are required for all residential buildings. All drawings must be stamped.



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- 6. Permit for access driveway:** If access is from a county road, the application is available from the Laramie County Planning & Development Office, or on-line at the Laramie County website at www.laramiecountyplanning.com. The fee for the county access permit is \$25.00.

If access is from a state highway, please contact the WyDOT District Engineer in Laramie at (307) 745-2100.

- 7. Open Hole Report:** Please see #4A - If a site-specific soils report is not provided, an "Open Hole Inspection Report" shall be conducted by an architect or engineer licensed by the State of Wyoming. This is to be submitted prior to requesting a footer/foundation inspection. Please note that our inspectors must verify the footer/rebar/caissons prior to any concrete being poured.

For other related permit information, please contact:

- (307) 635-5608 South Cheyenne Water & Sewer District
- (307) 633-4090 City/County Environmental Health Department (Septic permits)
- (307) 777-6163 State Engineer's Office (Well permits)



Commerical Building Permit Application

Laramie County Planning and Development Office
 Building Division
 3861 Archer Pkwy Cheyenne, WY 82009

Phone: 307-633-4512
 Fax: 307-633-4519
 planning@laramiecounty.com
 www.laramiecountyplanning.com

INCOMPLETE APPLICATIONS CAN NOT BE ACCEPTED

Rcvd By	Rcvd Date	PR #	BP #
Address of Project	New Address?		yes <input type="checkbox"/> no <input type="checkbox"/>
Name of Business			
Land Owner Information			
If there are additional owners (such as a Business Owner), please list on separate sheet and attach			
Name	Phone		
Address	City		
Email	State	Zip	
Contractor Information			
Name	Phone		
Address	City		
Email	State	Zip	
Primary Contact Person	Phone		
Electrician	Phone		
Property Information			
Legal Description (Subdivision, Block and Lot or Tract)			
Zone District	Township	Range	Section
			Map Page
Project Information			
Structure Use	Prior Use		
Check all that apply and fill in square footage areas specific to this project			
Purpose of Permit	New <input type="checkbox"/>	Addition <input type="checkbox"/>	Renovation <input type="checkbox"/>
	Other <input type="checkbox"/>	Demolish <input type="checkbox"/>	Move <input type="checkbox"/>
	Manufactured Bldg <input type="checkbox"/>	20 yrs old <input type="checkbox"/>	Structurally Altered <input type="checkbox"/>
	Fire Sprinklers <input type="checkbox"/>		
Foundation Type	slab on grade <input type="checkbox"/>	crawl space <input type="checkbox"/>	block / pier / caisson <input type="checkbox"/>
			basement <input type="checkbox"/>
Bldg area square footage	1st floor	2nd floor	other
Design Occupancy Load			
<p>Description of Work: Complete description of the work done including any plumbing, mechanical (Heating, ventilaiton or air conditioning), electrical, fire sprinkler or alarm. (Work is not included in the permit unless description in this scope of work.)</p>			
<p>By my signature and under penalty of perjury, I hereby certify that I am the owner of the referenced property, or the owner's authorized agent. I have read and examined this application and know the same to be true and correct. All provisions or laws and ordinances governing this type of work will be complied with, whether specified herein or not. The issuance of a permit does not presume to give authority to violate or cancel the provisions of any state or local law regulating construction, or guarantee issuance of a well or septic permit, this permit becomes null and void if work or construction authorized is not commenced within 180 days, unless prior authorization has been issued by this office. This permit expires 1 year from the date of issuance providing the 1st inspection has occurred within the initial 180 day period. I understand that occupying this structure prior to obtaining a Certificate of Occupancy is against the law. Failure to comply may result in a \$750 fine with each day of occupancy being a</p>			
Signature of Owner / Agent	Date		
Printed Name			
Valuation (cost of project) \$	Approved		
Fees	BP Fee	PR Fee	MP Fee
Check #	Cash	Receipt #	Total Fees

LCCC
PHYSICAL EDUCATION BUILDING
MEP Evaluation: September 2017



Nicholas Pickering PE
Senior Mechanical Engineer
Amec Foster Wheeler

Rick Shields PE
Senior Electrical Engineer
Amec Foster Wheeler

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EXECUTIVE SUMMARY

Amec Foster Wheeler was tasked with evaluating the existing MEP systems of the Recreation and Athletics Center (RAC). Working with LCCC staff, Amec Foster Wheeler reviewed existing drawings, and performed site investigations to determine the existing conditions of the MEP systems in the RAC. From these investigations and discussions, we have compiled a report which includes an analysis of the existing systems, impacts on these systems as related to the proposed renovation, and recommendations to support the renovations.

INTRODUCTION

Report Organization

This study is separated by each major discipline (Plumbing, HVAC, and Electrical). Each discipline is broken into three sections. Section 1 is the review of the existing systems, capacity and condition. Section 2 includes the review of the addition/renovation on the existing systems. Section 3 includes recommendations for modifications and additions to the existing systems to meet the needs of the proposed renovation, as well as current code requirements.



Figure 1 - RAC Building Layout Diagram

PLUMBING ANALYSIS – PHYSICAL EDUCATION BUILDING

1.1 Review of Plumbing Services and Systems

Existing Systems

The original building has a completely separate water, domestic hot water, and sewer system from the 1981 addition. In the 1981 addition, a new fire/water line was installed, along with water heaters, and a new 6” sewer main. A new gas service was not added to the 1981 addition.

Fire Protection

During the 1981 addition, a new 4” water service was brought to the building. This 4” service has a 3” fire main that serves only the multipurpose gymnasium. The rest of the 1981 addition does not have fire sprinkler protection. The original building does not have fire sprinkler protection in any part of the building.

Water Service

From the 4” fire service, a new 2” water main extends out once inside the building to serve new plumbing fixtures installed in the 1981 addition. The service has a pressure reducing station, but does not include a backflow prevention device. The original PE building has a completely separate 2” water main.

Waste Service

The original PE building has a 6” sanitary sewer that exits out the East side of the building. There it ties into an 8” main. The 1981 addition has a separate 6” sanitary sewer that also exits the addition on the east side of the building, and ties into the same 8” main as the original PE building.

Water Heaters

The existing building is served by two separate domestic water heater plants. The original building has two water heaters in a mechanical room adjacent to the pool. The 1981 addition includes 3 water heaters, each with 390,000 BTUH input, and 378 Gal/HR Recovery and 85 gallons of storage. These are low efficiency water heaters, and look to have been replaced in early 2011.



Figure 2 - Existing Fire/Water Main



Figure 3 - 1981 Addition Water Heaters

1.2 Review of Addition/Renovation Impact on Plumbing

Fire Protection

The 4" fire protection main is insufficient for current design standards in a number of ways. It is only sized to handle the multipurpose room. In our experience the authority having jurisdiction will require that the remodeled building be fully sprinkled and brought up to code. At a minimum, that will require a new 6" line. Fire and water combination entries are no longer allowed.

Water Service

As noted above, the water service for an addition will have to be separated from the existing combination fire protection/water service main. Below is a summary of current water service requirements and future service requirements.

Table 1 - Water Service Requirements

Water Service Requirements	Size (in.)	Fixture Units	Demand GPM	Required Size (in.)
Existing Service	2	183	62	2
Proposed Building	-	564	135	4

Waste Service

Below is a summary of the 1981 addition building fixtures and service size compared to the proposed fixtures and service size.

Table 2 - Waste Service Requirements

Waste Service Requirements	Size (in.)	Fixture Units	Required Size (in.)
Existing Service	6	144	4
Proposed Building	-	404	6

Water Heaters

Below is a summary of the 1981 addition domestic hot water plant compared to requirements for the proposed building changes.

Table 3 - Water Heater Requirements

Water Heater Requirements	Recovery (GPH)	Storage (Gallons)	Unit Efficiency	Input (MBH)
Existing Service	1140	255	80%	1170
Proposed Building	1100	950	95%	500

1.3 Plumbing Upgrade Recommendations

Fire Protection

The owner should anticipate the requirement for not only sprinkling the new areas, but to extend the fire protection into the existing building, possibly including the original gymnasium area. This will require a new 6" fire service from the 8" fire service loop outside of the building. Additionally, the existing multipurpose gym fire protection system will need to be tied into the new service and brought up to current codes with quick response heads. In all, approximately 80,000 square feet of building will need to be sprinkled or modified to meet current codes.

Water Service

The original PE building has a 2" water service, which is sufficient for the portion of the building it serves even with proposed changes. The proposed changes/additions to the 1981 addition and multipurpose gymnasium will require a larger service line. Fortunately, the 4" domestic water line is sufficient if the fire sprinkler system is disconnected and brought in separately. The 4" service line will require a new reduced pressure backflow preventer, and will be required to be rerouted outside to a new water entry room to accommodate the proposed renovation of the 1981 addition. Once installed, the existing 1981 addition service line can be backfed.

Waste Service

The existing 6" waste service is sufficient for both the existing plumbing fixtures as well as the proposed addition. The new fixture groups can tie directly into the existing 6" sanitary line.

Water Heaters

The existing water heaters are sufficient for the recovery needed for the addition of the new locker rooms, but do not have enough storage. The water heaters were installed in 2011 and do not need to be replaced in the near future. To accommodate the additional demand, recommend adding a 750 gallon storage tank and circulator to meet peak demand.

MECHANICAL SYSTEM ANALYSIS – PHYSICAL EDUCATION BUILDING

2.1 Review of Existing Mechanical Systems

Existing Systems Summary

The original building has systems that are completely separate from the 1981 addition. The systems in the original building include heating only units for the gymnasium and locker rooms, and a separate air handler for the pool. These units are located on the roof. Neither the original building nor the addition currently have any cooling. It is our understanding that this is the only building apart from the agriculture building that does not have cooling.

1981 Addition Building Systems

The 1981 addition added a heating only 4-zone multizone system which is located inside the building in a mechanical room. This system mixes with outside air to temper the amount of heat delivered to the 4 zones. It is a constant volume system. The hot water to the system is delivered from the central heat plant via 1-1/2" HWS/R lines from a 4" supply/return main.

The 1981 addition originally had a rifle range which has since been converted into an aerobic space. The rifle range had a large exhaust fan and air intake. This system was not removed in the conversion to the aerobic space, with the only heat coming from two ceiling suspended fan coil units.

Multipurpose Building Systems

The multipurpose room is heated and ventilated by (3) tower H&V units. The hot water to the system is delivered from the central heat plant via 3" HWS/R lines from a 4" main. The system is capable of full airside economizer via louvers on the towers. When economizing, (6) relief vents located on the roof are able to open to allow the air out of the space. Additionally, a trombe wall is installed on the south side of the multipurpose room to deliver passive solar heating to the space.

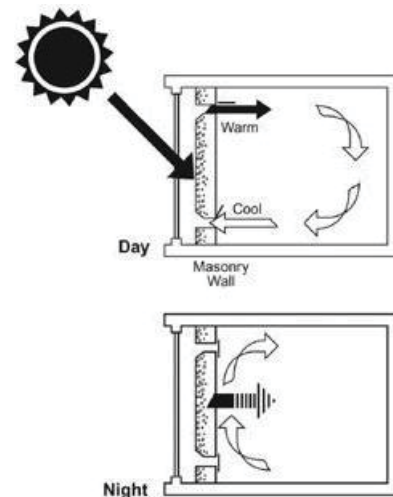


Figure 4 - Trombe Wall

2.2 Review of Addition/Renovation Impact on HVAC

1981 Addition Building Systems

The multizone unit serving the 1981 addition is a heating only unit. The unit is also original to the renovation and nearing the end of its useful life. In discussions with the maintenance staff, this building is one of the few left on campus without cooling. The school has replaced many of their old multizone systems with modernized versions which include a 3 deck system, eliminating the mixing of cold air with hot air, and instead tempering the air with outside air. The existing system is housed in a large mechanical room with enough room for installation of a modernized system.

With the renovation, part of the area served by this multizone unit would be converted into public bathrooms and concessions. By removing this renovated area from the multizone unit, air would be available to properly serve the renovated rifle range.



Figure 5 - 1981 Addition Multizone System

Multipurpose Building Systems

The multipurpose gymnasium is currently capable of providing the required amount of outside air and exhaust CFM. However, the current functioning system does not have any means of controlling cooling beyond just using 100% outside air in the summer months. This can prove problematic during the summer months when temperatures reach above 90°F. Additionally, the existing systems are original to the building (approximately 35+ years old) and are near the end of their useful life. In talking to the maintenance staff, the towers are difficult to work in, and to get replacement equipment in and out.

The trombe wall system appears to have been disabled. This system was originally design to allow for passive heating, and we were able to note in the field that air was moving through the system. Unfortunately, since the site visit was performed in the summer, this confirms that the wall is not working as intended. Extra heat was being passively added to a room that was in need of cooling.

2.3 HVAC Upgrade Recommendations

1981 Addition Building Systems

With the age of the existing multizone unit, and taking into consideration that the unit has pneumatic controls and no cooling, we would recommend replacing this unit as part of the renovation. The below table estimates the capacities required for this change. At this time we believe the unit could reconnect into the existing ductwork mains if replaced.

Table 4 - 1981 Addition HVAC Requirements

MZU-1	CFM	Heating (MBH)	Heating (GPM)	Cooling (MBH)	Cooling (GPM)
Existing System	12000	400	42	-	-
Proposed System	12000	400	42	245	51

The former rifle range area will require a new layout for ductwork, diffusers and ventilation to accommodate the proposed fitness classrooms/studios. The 4,000 square foot area will require ventilation for the workout area. This can be served from the multizone unit assuming it is replaced and rebalanced for the new space use. Currently the multizone unit serves an area that is proposed to be public restrooms. This area can be served from the new VAV unit, while the remaining capacity from the multizone can be used to serve the former rifle range area.

Multipurpose Building Systems

For cooling and heating control, we recommend installing VAV air handlers with chilled water and hot water coils served from the central plant. Due to the amount of exhaust and ventilation required since these units serve locker and gymnasium, a flat plate heat exchanger built into the system would recover significant energy and is recommended. Two units would be ideal, one for the gymnasium multipurpose room, and a second for the 3 story renovation, which would also backfeed into the 1981 addition for the new public restrooms and associated spaces. For the 3 story renovation, approximately twenty-six (26) VAV reheat zones would be installed for proper zone control. All exhaust for these spaces would be connected to the air handler for heat recovery, eliminating the need for additional exhaust fans. Approximate sizes of the air handlers are noted in the schedule below.

Table 5 - Multipurpose Bldg HVAC Requirements

AHU	Serves	CFM	Heating (MBH)	Heating (GPM)	Cooling (MBH)	Cooling (GPM)
AHU-1	Multipurpose	17000	450	48	480	101
AHU-2	Class/Locker	20000	278	30	410	86
MZU-1	1981 Addition	12000	400	42	245	51

The passive heating trombe wall system will need to be modified for the remodeled areas of the multipurpose area. A choice needs to be made to disable the system entirely, or to make modifications that would stop the passive heat from being added to the space in the summer months.

Central plant HWS/R and CWS/R

Using the recommendations noted previously, the HWS/R and CWS/R will need to be utilized to serve this renovation. As the building is not currently cooled, chilled water lines will need to be brought to the building from the north chilled water plant. An assessment will need to be completed to determine if the plant has the required capacity to meet the new load, and modified as necessary. Per discussions with the owner, the proposed routing of the new chilled water lines would be from the north plant, south to the Health Science Building basement, then



routed to a new mechanical room in the recreation building. The tables below estimate the additional cooling and heating loads required for the remodel/addition that will need to be verified with the existing central heat plants.

Table 6 - Central Plant HWS/R Requirements

Exist. HWS MBH	Required HWS MBH	Exist. HWS GPM	Required HWS GPM	Exist Service Pipe	Required Service Pipe	Upgrade Required?
972	1128	102	120	4"	4"	No

Table 7 - Central Plant CWS/R Requirements

Required CWS MBH	Required CWS GPM	Required Service Pipe
1135	240	4"

BAC Control Systems

As part of the building upgrades and addition, the existing pneumatic system is recommended to be upgraded to a microprocessor based Direct Digital Control (DDC) system for the monitoring and control of the mechanical and electrical equipment. The DDC System will be of electronic components employing direct digital control to comprise a complete system, furnished and installed by the automatic temperature control contractor. The DDC system will have a protocol interface of as required by the owner. The system will be complete in all respects, put in operation and calibrated and adjusted under occupied conditions. All temperature control work will be done by a single source responsibility.

Air Handlers (AHU-#): Variable air volume air handlers will be DDC controlled. Allow for 25 unit points minimum including, but not limited to, the following: Outside Air damper, Return Air damper, Outside Air Temperature, Relief Air Damper, Outside Air CO2, Outside Air Flow Measurement, Return Air Temperature, Return Air CO2, Mixed Air Temperature, Return Fan Status, Return Fan Start/Stop, Return Fan Modulation, Mixing Plenum Pressure, Filter Differential Pressure Sensor, Supply Fan Status, Supply Fan Start/Stop, Supply Fan Modulation, Heating Valve, Cooling Valve, Low Temperature Detection Alarm Thermostat, Unit Discharge Air Temperature, High Static Pressure Limit Switch, System Static Pressure Sensor, DAT Zone (per zone), Space Temperature (per zone), Building Static Pressure. Sequence will include, but will not be limited to, the following sections: Life/Unit safety, Warm up, Cool down, outside air flow reset, Discharge air temperature reset, static pressure reset, Occupied, Unoccupied. Units will also require DDC controls for all terminal boxes including damper modulation, damper position, space temperature, discharge air temperature, heating modulation. Controls for the multizone unit in the 1981 addition will be similar to the above, but will also have additional control and sensors for zone dampers (4).

Exhaust Fans (EF-#): Exhaust fans will be DDC controlled. Allow for 3 points including, but not limited to, the following: Discharge damper, Fan Start/Stop, Fan Status. Sequence will include, but will not be limited to, the following: Life/Unit safety, Occupied, Unoccupied

ELECTRICAL SYSTEM ANALYSIS – PHYSICAL EDUCATION BUILDING

3.1 Review of Existing Electrical Service

Electrical Service and Distribution

The building's electrical service is 277/480V, three-phase, served from a 500-kVA pad-mount transformer. The main distribution panel (MDP) is a 600-amp, GE, Type QMR, switch and fuse, single section panel installed in 1981. The MDP serves 277/480V branch panels "PA, PB, LA, LB, LC, LD," and 120/208V panels "LC, LE, LF." There is another load served from a 100-amp switch in the MDP that is not labeled, and could not be located. All bus positions in this panel are in use, with no spares available. A load study for the building was not available to determine the actual peak kW used. However, LCCC staff reported that the building is short on power

Note that there are two panels in the facility labeled as "LC." One is a 120/208V panel in the original 1972 building, and the other is a 277/480V panel for gym lighting in the 1981 addition.

Branch panels "PA, LA, LB," and 120/208V panel "LC" are GE panels, and located in the original 1972 building. "PA, LA, LB," are fed from 60-amp switch and fuse buckets, and have minimal spare capacity. Panel "LC" is fed from a 100-amp switch with 70-amp fuses and a 45-kVA step-down transformer. This panel serves the original building's 120 and 208V loads, and has no spare capacity.



Figure 6 – Existing MDP

Branch panel "PB" is a GE panel installed in 1981, located in Mechanical Room 127 of the 1981 addition, and is a 100-amp, fed from a 60-amp switch and fuse in the MDP. This panel serves the mechanical equipment in the 1981 addition, site lighting, and soccer field lighting. Based on the connected loads, there is minimal spare capacity on this panel.

Branch panel "LD" is a GE panel installed in 1981, located in PE Equipment Room 114 of the 1981 addition, and is a 100-amp panel fed from a 60-amp switch and fuse in the MDP. This panel serves the lighting in the 1981 addition, except for the gymnasium. Based on the connected loads and the recent LED lighting updates, there is some spare capacity.

Branch panel "LE" is a 120/208V GE panel installed in 1981, located in PE Equipment Room 114 of the 1981 addition, and is fed from a 60-amp switch and fuse in the MDP and a 45-kVA step-down transformer. Panel "LE" sub-feeds panel "LF" in the gymnasium, and serves all 120/208V loads in the 1981 addition. Based on the connected loads, there is minimal spare capacity on the panel.

Branch panel "LC" is a 277/480V GE panel that was originally installed in 1981, but has been replaced at some point since the 1981 installation. The panel is a Type "A" series, which has only been in production for the last 20 years. This panel is fed from a 100-amp switch with 60-

amp fuses in the MDP. The panel serves the lighting loads for the gymnasium, and based on the update to fluorescent fixtures, has some spare capacity.

Emergency Power System

Emergency power is served from the campus emergency generator located over 2000' away on the east end of the campus. Panel "EM" is a 225-amp, 277/480V, GE panel installed in 1981, fed from a 60-amp fused disconnect, located in Mechanical Room 127. This panel sub-feeds a 120/208V 6-circuit panel in this room via a 3-kVA step-down transformer, and well as a 277/480V panel "EM" in the original building's main electric room. Together, these panels serve emergency and exit lights, coil pumps, fire alarm, and temperature control panels. Due to the length of the feeder from the generator, and associated voltage drop, there is minimal to no additional capacity on the emergency panel.

Lighting Systems

Most of the lighting throughout the facility has been updated with LED fixtures, except for the gymnasium, which has 8-lamp fluorescent high-bay fixtures. Numerous occupancy sensors have been installed throughout the facility in place of wall switches. Gymnasium lighting is controlled from the circuit breakers.

Fire Alarm and Life Safety Systems

The exit signs throughout the facility have been updated. Emergency lighting and fire alarm systems are powered from one of the campus' life safety generators. The fire alarm system has been updated to a Notifier NFS-320 with voice-evacuation. Initiation of the fire alarm is by pull stations located at exit doors, and detectors located in mechanical and electrical rooms, and at gymnasium doors. Speaker-strobes are located throughout the facility.



Figure 7 – Fire Alarm Panel

3.2 Review of Addition/Renovation Impact on Electrical

Electrical Service and Distribution

The proposed improvements to the facility will require new electrical panels to support additional loads in the new areas. The existing branch panels have minimal spare breaker position, and are near their load capacity. The existing electrical service to the building has minimal spare capacity to support new loads and the MDP has no spare positions to feed new loads. New panels will be required to support concessions, athletic equipment, office spaces and elevator. The existing branch panels "LD" and "LE" in the PE Equipment Room will need to be relocated due to the remodel, which gives the opportunity to replace them and increase their capacity.

Emergency Power System

The emergency power system is at its capacity due to the length of the feeder from the generator. A load study of the emergency panel will be required to determine if additional loads

for emergency lighting and exit signs can be supported. If the system will not support additional loads, the options are installing a small emergency generator to serve the building, or specifying integral batteries in the new exit and egress lighting fixtures to provide the emergency back-up requirements.

Lighting Systems

Most areas in the building have recently been upgraded to LED fixtures, some of which may be salvaged and re-installed in corridors and locker rooms. Areas of the remodel with new room layouts will require new lighting and controls. The gymnasium lighting will need to be replaced to achieve lighting requirements for collegiate-level competition, and a lighting control panel will be required.

Fire Alarm and Life Safety Systems

The fire alarm system has recently been updated, and the main panel will be able to support the additional devices required by the remodeled areas. A new booster power supply will likely be required in the new 3-story area to support the additional speaker strobes. Testing and recertification of the system after the remodel will also be required. The existing fire alarm panel is in the PE equipment storage room, which may require the panel to be relocated.

IT/Data and Special Systems

A new Intermediate Distribution Frame (IDF) and data cabling to the Main Distribution Frame (MDF) will be required in the new three-story area due to the distance from the MDF, and the number of drops required for the new area. At a minimum, the ticket booth, and each office will require two CAT 6 drops. Conference room and broadcast booth (if provided), will require additional drops. Additional CAT 6 drops will be required for wireless access points. A large sound system will be required for the gymnasium, as well as smaller sound systems for fitness rooms.

3.3 Electrical Upgrade Recommendations

Electrical Service and Distribution

- Remove existing 500-kVA pad-mount transformer and secondary feeders. Replace with new 750-kVA pad-mount transformer. Install new 1200-amp rated feeders to new MDP, approximately 90 feet.
- Remove existing "MDP" and replace with new 277-480V 1200-amp MDP (GE Spectra Series) in the main electric room of the original building, and re-connect the existing branch panel feeders.
- Remove panel "LE" and the associated 45 kVA transformer in PE Equipment Room and replace with a new 120/208V, 225-amp Main Circuit Breaker 60-position panel (GE A-series) and a 75-kVA transformer. Extend and reconnect existing branch circuits. Provide new 125-amp feeder from MDP to new transformer, approximately 130 feet.
- Remove panel "LD" and replace with new 277/480V, 400-amp 60 position panel (GE A-series). Extend and reconnect existing branch circuits. Provide new 400-amp feeder from MDP to panel "LD," approximately 130 feet.
- Add new 277-480V, 225-amp, 42 position panel (GE A-series) "PC". Provide new 225-amp feeder from MDP to panel, approximately 200 feet.

- Add new 120/208V, 225-amp, 60-position panel (GE A-series) and 75 kVA transformer. Panel to be located next to, and fed from new panel “PC.”
- If budget allows, it is recommended that the interiors of existing panels “PA, PB, LA, LB, LC(1), LC(2), and LF” be replaced with new bussing and breakers.

General Power Systems

General purpose outlets will be provided throughout the remodeled areas for office, exercise equipment, and miscellaneous needs. The concessions area will have numerous general and special purpose outlets. Branch circuits and disconnect switches will serve air handling units and other HVAC equipment.

Emergency Power Systems

We recommend that a 30-day load study be performed on the emergency panel to determine if the existing panel can support new loads. Based on the results of the study, a determination can be made whether to add new loads to the existing system, provide emergency fixture with batteries, or install an emergency generator (50 kW, natural gas with automatic transfer switch).

Lighting Systems

Replace existing gymnasium lighting with LED High-Bay fixtures with high color rendering index (CRI) to achieve required lighting levels for collegiate competition. We recommend installing a lighting control panel to allow adjustment of lighting from competition to practice, and to allow dimming of the lights over the bleacher areas during games.

The remodeled areas and new office, exercise, and locker rooms shall be provided with LED troffers and surface mount fixtures, as required. Occupancy sensors shall be provided in all areas, except for the gymnasium.

Life Safety and Fire Alarm Systems

Exit signs will be installed at all exit doors, and as required to indicate the egress path. Emergency egress lighting will be provided to illuminate the path of egress at 1 foot-candle, average.

The existing notification and initiation fire alarm circuits will be extended to support new device locations. Initiation will be provided by pull stations at exit doors and detectors in the mechanical and electrical rooms, per the building standard. Duct detectors will be installed in supply and return ducts of air handling equipment, as determined by cfm ratings. A new, booster power supply for the notification circuit will be provided. Test and re-certify the fire alarm system after additions/modifications are complete.

Definitions

OSA	Outside Air
CFM	Cubic Feet per Minute
Btu/h	British thermal units per hour
MBH	1000 Btuh
CWS/R	Chilled Water Supply and Return
HWS/R	Hot Water Supply and Return
GPM	Gallons per minute
LAT	Leaving Air Temperature
SQFT	Square Foot
IMC	International Mechanical Code 2015
BAS	Building Automation System

T O B I N
A N D A S S O C I A T E S
A R C H I T E C T U R E
A N D P L A N N I N G

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