

Athletics Facilities Master Planning: Introduction



University of Wyoming

FINAL March 28, 2012





Background

As the University of Wyoming approached the 21st century, Cowboy Athletics embarked on a fundraising and building program that has significantly improved the facilities that support each student-athlete's quest to perform at their best. The Rochelle Athletics Center set a new standard for facilities and expectations. Jonah Field, the new Indoor Practice Facility, the new Indoor Tennis Facility, the Louis S. Madrid Sports Complex, and the recently completed Wildcatter Club & Suites along with a variety of other venue improvements have continued Athletics' development of competitive facilities. Yet, the work is not complete. The Department of Athletics, Facilities Planning, and Sink Combs Dethlefs have collaborated on the Athletics Facilities Master Plan, which has focused on three primary facilities and the programs they serve.

The Arena-Auditorium (A-A) is notorious for its raucous home team atmosphere. But, from a fan and revenue standpoint, it lacks the amenities needed to transform a great basketball setting into a high-performing revenue producer for the program and the University. The new master plan will help create the vision for this transformation.

Like the Women's Tennis program, the golf programs are challenged by Laramie's climate. Creating a new indoor practice facility for the golf teams will add significantly to the quality practice and training time available to the coaches and student-athletes.

Finally, the Swimming and Diving teams require a highly specialized and competitive environment for practice, training, and competition. Planning for state-of-the-art aquatics facilities is a must to stay competitive within the conference and nationally.



UW is a unique university. The altitude, climate, and the passions of the entire state combine to create a revered and cherished athletics program. To build on its great tradition of success, UW Athletics must be prepared to address further challenges. Facilities will play a major role in many of these challenges. Having the right environment in which to learn, train, coach, practice, compete, and excel is absolutely essential. It is extremely important that we develop a plan for facilities that truly fit the Pokes: quality facilities that support the culture and goals of the University. Facilities must be:

- targeted yet adaptable
- efficient to build and to operate
- state-of-the-art with a reverence for the culture that distinguishes Wyoming Athletics
- highly functional to maximize student-athlete training and skill development
- effective for each student-athlete and for the broader communities of campus, Laramie, and the state

The traditions of success at Wyoming seem best reflected in the traditional architecture in the core of the campus near Prexy's Pasture. Like many campuses, some of the athletic facilities, particularly the Arena-Auditorium, do not reflect the same identity and architectural commitment to the iconic "UW style." As part of the Master Plan process, the analysis dealt with functional requirements of size, relationships, and existing infrastructure and facilities. This study was also respectful of campus planning and architectural design principles that can positively impact the campus environment. The athletics facilities must continue to become an engaging part of campus.

Master Planning Process

The University established a steering committee to direct the decision-making process for the Master Plan. Members of the committee included:

- Tom Burman, Director of Athletics
- Matt Whisenant, Deputy Director of Athletics
- Randy Welniak, Sr. Associate AD, Development/Revenue Enhancement
- Bill Sparks, Sr. Associate AD, Business Operations
- Molly Moore, Sr. Associate AD for Internal Operations/SWA
- Bill Hamilton, Associate AD, Event Management
- Roger Baalman, Director of Planning
- Jim Scott, Director of Physical Plant
- Frosty Selmer, Deputy Director, Utilities Management
- Luke Ruff, Student Athlete

The consultant team for the primary facilities of the arena auditorium, aquatics and golf included Sink Combs Dethlefs, sports architects, Counsilman Hunsaker, aquatics consultants, WJHW, audio/visual and IT consultants, ME Engineers, mechanical and electrical engineers, and Martin/Martin, structural engineers.

Steering Committee meetings occurred roughly once per month from April to February 2012. The master planning by the consultants focused specifically on three projects:

- Improvements to the Arena-Auditorium
- Improvements to Corbett Pool
- And a new indoor golf practice facility at Jacoby Golf Course

The process began with analysis of the existing facilities and a simultaneous series of stakeholder interviews to develop programmatic needs. The needs were documented through the development of outline programs for each of the projects, focusing primarily on the sizes of and relationships between spaces needed to fulfill the program objectives. Site analysis played a critical role in the development of the visions for each of the three projects, as did cost analysis.

The consultant team interviewed representatives from the following stakeholder groups:

- Men's and Women's Golf
- Men's and Women's Basketball
- Men's and Women's Swimming and Diving
- Sports Medicine
- Strength & Conditioning
- Equipment Services
- Media Relations
- Arena Operations
- Food Service/Concessionaire
- Facilities Planning
- Physical Plant

Meeting minutes of the interviews may be found within the appendix.

Overall Master Planning Objectives

Essential to the successful completion of the master plan was early establishment of overall master planning objectives. During the first work session in April, the Steering Committee established a series of overall planning objectives for the consultants on the three projects and similar objectives for the remaining projects within the master plan:

The master plan should reflect a planning horizon of ten to fifteen years. It must be a guiding document that will facilitate UW's continuing quest for excellence.

Funding is critical to the implementation of any of the athletic projects. This Master Plan should not only outline the program and implementation vision for each of the athletic projects, but deliverables should include illustrative images that can be used to solicit University and legislative support as well as spur private giving.

The National Collegiate Athletic Association (NCAA) Division I environment is dynamic, as evidenced by the past two years' reconfiguration of conferences across the nation. As the University looks to the future, building a solid foundation of facilities will assist Cowboy Athletics to remain competitive and to generate the revenues required to consistently compete at a high level in all sports.

Ultimately, the success of the Athletics program is defined by the success of the student-athletes, individually and collectively. This master plan must envision the facilities needed by coaches and student-athletes to consistently set and achieve new standards of success. Greater success is instrumental in cultivating the great relationship the Athletic Department has enjoyed with the people of Wyoming.

Guided by the above objectives and using a collaborative, creative, and proactive process, a new vision has been developed for specific athletics facilities that are tailored to UW's campus, traditions, and future.

Within the following pages, goals specific to each of the athletic projects are detailed as are the key elements that define the visions and their ensuing implementation.

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MEP Narratives	50-54
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University of Wyoming Athletics Master Plan Needs Analysis Interview:

Academics:

To meet your longer term goals, what activities or facilities will be needed to support your program?

- No academic requirements. Provide a few work stations for brief work sessions, not academic programming. Keep academic programming centralized.
- Include ADA access to all facilities, especially on the rehab side. Other teams may come in and use the pool for other work-outs. Build the pool to handle swim lessons, recreational uses, team uses.
- Alternate arena uses. Limited by scheduling, permanent floor.

Are there other needs you, your staff, or your student-athletes have that are reliant on facilities?

- No.

University of Wyoming Athletics Master Plan Needs Analysis Interview:

Joe Jensen, Head Coach M&W Golf

Name of Program/Department: M&W Golf, First Tee Program for Youth (200 participants), HS teams, students, members. The “fruit salad” for everyone. A home for everyone.

Number of Student-athletes served (team size or number/gender of sports): 10 M, 10 W

Number of coaches/staff: 1 HC, 1 ass’t plus an ass’t mgr for the course. FT/PT/GA? All FT

How will you define success in 5-10 years? How does that compare to the current situation?

- Currently: weather issues have a strong impact on the ability to service all members of the golf community. An indoor facility will provide revenue opportunities in terms of donor, member, or community use. 28,000 rounds per year. Season starts in April, ends in late October. An indoor facility will add 30-45 days on each end. Indoor hitting will provide year-round use.
- The golf course is a self-sustaining facility. The new indoor facility should also be self-sustaining. Potential need for an endowment. Naming opportunities for hitting bays, the building, etc. Potential donors will expect a certain quality. Not a Taj Mahal, but consistent with UW.
- Can move a green or trees to make it all work better. No capital funding, so Golf doesn’t do much in the way of improvements. Original irrigation system still in place. Needs to be replaced. The practice experience has become a significant part of the golf experience.
- For the team, being able to practice indoors will help immensely. Only school other than San Diego State University without an indoor practice facility. Having the facility will likely reduce the travel burden.

To meet your longer term goals, what activities or facilities will be needed to support your program?

- Practice: Year-round hitting bays, 4-5. Indoor putting facility. Big, flat and square—30-40' putts minimum. Chipping: create amenities around the building—artificial surfaces that can be year round from hitting bays. Add a lot of storage. Lots of team practice, but also a lot of individual practice/training. 20 hrs/week maximum coach/player contact. To succeed, kids need more practice time than that.
- Strength & Conditioning: Access to the RAC. No need for weight training in the building.
- Sports Medicine/Practice Prep/Treatment: same philosophy as training.
- Meeting: Team room concept is important. Could also function for hospitality events—cocktail parties, etc. Expose the building, program, services, and meet the kids. Classroom for First Tee meetings/instruction.
- Coaching (offices, video analysis, etc.): space for Exec Dir of First Tee program, coaches' work space (not a replacement of offices), 1 business manager office (would free up an office in the clubhouse).
- Technology Integration: Cameras from four directions in two bays minimum, launch monitor, flat screens for teaching. Golf simulator is useful—could create a winter league—climate controlled separately from hitting bays; chairs behind for foursomes/spectators. Allows the ability for training year round.
- Locker/Dressing Rooms: Bag storage for athletes. May be an opportunity for fundraising.
- Equipment Issue/Laundry/Repair: Club repair station would be used, but is not a high priority. A “nook” space.
- Academics: Very important part of the golf program. Work stations within the Team Room.
- Recruiting: Team room. 3 academic All-Americans last year. Wireless technology. A place where kids can go and study and lean on one another on the academic side. First impression from exterior will be very important. Match the UW standard.
- Public use: create an area for members or others to enter and wait for hitting bays, etc. Potential for bag storage. Golfers who will use this facility will pay more and will likely expect access to instruction.

Are there other needs you, your staff, or your student-athletes have that are reliant on facilities?

- Potential for Nike sponsorship.
 - Make it part of a complex of indoor and outdoor practice areas. Provide a tee surface just outside the building.
 - Hall of Fame component in lobby.
- Examples: Texas A&M, Air Force, Troon Golf

University of Wyoming Athletics Master Plan Needs Analysis Interviews:

Tom Burman, AD Men's Basketball

Name of Program/Department: Men's Basketball

Number of Student-athletes served (team size or number/gender of sports): 15 max.

Number of coaches/staff: 1 HC, 3 Ass'ts, all FT + FT FT/PT/GA? No GA's

How do you define success for your program today?

- Better the comfort in their offices. Add an entryway. Sell some exposure to the court. Offices, Strength and Conditioning, etc. Develop an entryway that is really first class. Natural light, ticket office, hall of fame, etc. Arena scoring, lighting, video would be top priority.
- Create a social club area.
- Develop a certain look. Like UNM, CU, etc. An entryway. Sex appeal of facilities is number one, no questions. Link facilities visually. Locate coaches offices and club off an entryway. Lifting in the RAC is preferable because of the light and views. Strength inside the arena would be a big plus to prospective student-athletes.
- A dining facility could be of huge benefit. A centralized eating location with views to the arena. Good nutrition. NCAA limits it to one meal per day. Open it up to the University for breakfast and lunch?

How will you define success in 5-10 years? Will that change how your program operates or interacts with other programs?

- Recruiting will be more challenging. Facilities will play a bigger role. Facilities are good. Need all the new bells and whistles. Ribbon Board, etc.
- Create a dedicated video control room in the arena.

To meet your longer term goals, what activities or facilities will be needed to support your program?

- Competition: The portal is great.
- Practice: Create additional floor space for practice—highest priority. Very challenging as is. More baskets. Allow full-court setting plus individual work to the side. 6 total baskets ideal.
- Training: Weight room should have a different look—modernization. Need splash. Make larger. Keep consolidated with locker rooms. Ceiling height is an issue.
- Sports Medicine/Practice Prep/Treatment: Weight room should have a different look—modernization. Make larger. Keep consolidated with locker rooms.
- Meeting: Coaching (offices, video analysis, etc.): Coaches need an area to go.
- Technology Integration: Game day: add another video board to serve west side seats. Wants instant stuff—stats. Enhance the video. Ribbon board—good for stats, scores, as well as advertising. Make it a more interactive fan experience. Have to compete with the quality of broadcasting. Camera locations/angles: 6-8 typically for games. Show the fans all the angles. Distribute cable permanently. Currently, everything is moved out to the arena—laptops, etc. Immediate live carts not necessary. It's more about day-to-day efficiency.

- Video/practice. Create a combined film room for men's and women's basketball (men's space is tight). Viewing area for the team. Locate everything as close to the same space as possible. Proximity of coaches' offices not important. Wire everything so it works efficiently. Each coach does their own video currently.
- Locker/Dressing Rooms: Locker room structure works very well. Move soccer to a different location.
- Equipment Issue/Laundry/Repair: Add a facility to the A-A. Shared use with other teams. Currently hauling everything over to the RAC.
- Academics: Keep it in the RAC
- Recruiting: Light show, laser lights, spotlights, make it all about the recruits.

University of Wyoming Athletics Master Plan Needs Analysis Interview:

Joe Legerski, HC W Bball

Name of Program/Department: Women's Basketball

Number of Student-athletes served (team size or number/gender of sports): 15 max.

Number of coaches/staff: 1 HC, 3 Ass'ts, all FT + FT web design FT/PT/GA? No GA

How do you define success for your program today?

- Win...graduate all kids. Recruit well. Recruiting competition... regionally, internationally.. CU, CSU, DU, etc.
- Facilities play a role in recruiting. Fan attendance is more important. Facilities make a bigger difference to the fans. Draw 4-5,000.
- A high def center-hung scoreboard. Create something that make people get off the couch and come here.

How will you define success in 5-10 years? Will that change how your program operates or interacts with other programs?

- Recruiting will be more challenging. Facilities will play a bigger role. Facilities are good. Need all the new bells and whistles. Ribbon board, etc.
- Reduce seating capacity to 8-10,000 to make the building look more full . Create a better atmosphere. Would play in a 4,000 seat facility if possible. Add suite or club seating. Brighten/enliven the concourse. Entryway to the arena: combine with a hall of fame. Walk into a place that jogs your memories, rather than a sterile environment. Relocate ticket office. "Front door" is currently on east side. Long-term parking will stay to the east of the stadium. Parking structures in the long-term. A centralized ticket office would work for Basketball and football.
- Add padded seats in a premium section. With cup holders. Make those seats wider, if possible.

To meet your longer term goals, what activities or facilities will be needed to support your program?

- Practice: Create additional floor space for practice—highest priority. Very challenging as is. More baskets. Allow full-court setting plus individual work to the side. 6 total baskets ideal.
- Training: Weight room should have a different look—modernization. Need splash. Make larger. Keep consolidated with locker rooms. Ceiling height is an issue.
- Sports Medicine/Practice Prep/Treatment: Weight room should have a different look—modernization. Make larger. Keep consolidated with locker rooms.
- Coaching (offices, video analysis, etc.): a low priority. Very good set-up.
- Technology Integration: Game day: add another video board to serve west side seats. Wants instant stuff—stats. Enhance the video. Ribbon board—good for stats, scores, as well as advertising. Make it a more interactive fan experience. Have to compete with the quality of broadcasting. Camera locations/angles: 6-8 typically for games. Show the fans all the angles. Distribute cable permanently. Currently, everything is moved out to the arena—laptops, etc. Immediate live carts not necessary. It's more about day-to-day efficiency.
- Video/practice. Create a combined film room for men's and women's basketball (men's space is tight). Viewing area for the team. Locate everything as close to the same space as possible. Proximity of coaches' offices not important. Wire everything so it works efficiently. Each coach does their own video currently.
- Locker/Dressing Rooms: Move a locker room into the arena. Combined locker/lounge space works well. Use existing locker room as a model for master planning, without the separate lounge space. No academic needs within the locker room.
- Equipment Issue/Laundry/Repair: Add a facility to the AA. Shared use with other teams. Currently hauling everything over to the RAC.
- Academics:
- Recruiting: Office location not important. At other places, kids notice: ribbon boards, logos flashing, clear identity, practice facility banners hanging, VT locker rooms (does it have TV's?).

University of Wyoming Athletics Master Plan Needs Analysis Interview:

Media Relations: Tim Harkins

Name of Program/Department: Media Relations

To meet your longer term goals, what activities or facilities will be needed to support your program?

- Competition: Pre-wire the arena for television. Currently they have to pull a lot of cable. Wire it also for video board production people. Create a separate video control room to eliminate the use of the trailer. Find a better spot than the press table for the video control people (within the video control room). Post-game interview room: works fine. Does not work well for the coaches' show (currently have to locate the camera outside the door). Combining those two functions is efficient for the TV production staff. Create a small room for VT post-game interviews. Create a dedicated copy room (low priority). Scoreboards: include stats. Press location is ideal and very functional. Good access to internet and power.

- Media hospitality:
- Increase size of door to better accommodate TV trucks. Trucks can stay outside once the permanent wiring is in place. Park an ambulance inside the doors also. Treat the broadcast needs well.
- Not yet fiber, but it will move that direction. Important if centralized control room. Wireless access throughout is important (exists).
- All TV partners do games in HD. Need fiber lines from camera positions to the video control room.
- Tournaments don't present any extra issues.

Arena Operations:

Bill Atencio, Bill Sparks

To meet your longer term goals, what activities or facilities will be needed to support your program?

- Add storage: currently rent three bays of storage of site. Portable backstops.
- Events: Basketball. Commencements (UW, HS, and WyoTech) require floor covering, staging areas, backdrops, plus trailer. 500 students on the floor plus 2-3,000 people in the stands.
- Increasing size of the floor: Look at a different type of goal. Current goals not designed for great mobility.
- Slope of ramp is OK. Use vehicles to move equipment up and back. Clearance either side of main backstops is challenging. Moving scorer's tables and courtside tables is challenging.
- Groundwater: Only lost floor once over last 17 years. Sump pumps at four locations.
- Ticketing: Minimal office in arena at the west entrance. Would like a main entrance that would work for both football and basketball. Five windows. Need satellite locations—add technology for real-time seat sales. Use Paciolan software. Would like a separate recruit entry zone. No AC currently. Need some. Southwest as secondary entrance. Staff: currently 4 cubicles plus an office for ticket manager plus vault. Add a work room. Include a count room for concessions—could be shared with work room.
- First aid room is dedicated. Separate security room (not in arena). Landmark event staff works out of one concession stand currently. Doesn't work for interviews etc. Does work to use concourse as employee orientation. Also use arena for basketball training.
- Brown and Gold vendor: merchandising. Would like to have two locations within the arena. Gameday sales only.
- Fire marshal prevents use of concourse.
- Concessions would like to do food carts: popcorn, lemonade, ice cream, etc.
- Cowboy Joe Club has a storage room under the seats. Concessions also, facilities, and ticket office.
- Fixed display cases in concourse should be removed. ADA issue.
- Aesthetic uniformity is important. Started a renovation program for a timeline.
- Branding: Excellence. Pride. Tradition. Wayfinding, landmarking, etc. would help.
- Hallway entry is heavily used.
- Lighting of the concourse needs improvement.

Collin Vickers, Concessions (part of Athletics):

- Ripped out walls to increase points of sale (adequate for now). Hot dogs, nachos, pretzels, popcorn, and sausages are the only current menu items. Need more power. Space for popcorn poppers. 11 concession stands plus one used for storage. Four are operated by outside vendors (pizza, Mexican food, ice cream, shaved ice—all prepared off-site). Bring in materials from Fieldhouse Kitchen. One stand has an auto-fryer—that's it for the Arena. Each concession does not include prep space. Popcorn is done inside the arena.
- At stadium, catering is provided by a separate entity.
- No beer. Could do beer and wine in the club. Sodas are both bottle and canisters, depends on whether the concession stand has water.
- A central kitchen would serve the Arena very well. 32 events in the AA each year. Kettles, grills, fryers, freezer and cooler space.
- Credit cards/registers are important throughout. All hard-wired.
- Cater food into the hospitality room. Concessions provide drink, hot dogs, and chips and salsa. Would like a kitchen that would allow catering items to be done on-site.

University of Wyoming Athletics Master Plan Needs Analysis Interview:

Facilities Planning/Physical Plant

Roger Baalman, Frosty Selmer, Jim Scott

- Ben Nelson: Structural capacity of Arena Auditorium roof. Unbalanced snow loading is now required by code. Not required when roof was originally designed. The connections at the joints are more the problem than the member sizes.
- The ability for the roof to handle unbalanced loads would be problematic, creating a change of use and code upgrade.
- A traditional video board of 20,000 to 40,000 pounds would be far more stressful than the unbalanced snow load. Looked at distributing the load, but would require modification to the entire dome structure. Ben's opinion is that it is not **economically** feasible to reinforce the entire dome. The wood system is not very adaptable.
- Lighting ring is estimated to be 15,000 lbs. To match this weight with a video board would not have the impact desired.
- Options: Self-supporting steel arch constructed inside the dome. Design it with excess capacity to handle future possibilities. Will require abutments at either end or orient them to align with the existing abutment walls. Installed on the interior presents some challenges for construction, but the finished project is a better solution than an exterior application.
- Could provide a rigging structure.

Corbett:

- Junky HVAC—very little AC. Full system needs replacement. VAV with lots of outside air and heat recovery. Salvaged a heat pipe unit that is now on the roof to control humidification. Gyms are used very little. All systems are original. Get more energy efficient. Mid to late '70's. Evap cooling is OK. Women's basketball uses the gym more than any other user/time.
- Steam provides heat. Steam in good shape.
- Pool filtration equipment. In pretty good shape. Access around perimeter of pool is definitely desirable. Unless inflow is all from the bottom. Filter room can be removed. Tile finish has gotten worse, but it hasn't been bad over the years. Want longest life materials. Acoustics is a big issue.
- Likely chlorine + UV + muratic acid. If the filtration is downstairs, provide an elevator.
- Equipment needs to be accessible and maintainable.
- Limited groundwater problems.
- Lighting has been replaced within one of the gyms. Look to high efficiency.
- Electrical: 13.2 kVA service. Large unit built by GE includes transformer, switchgear, etc. Replace transformer? Plenty of capacity. Small gen set. Look at a larger one that would serve more buildings.
- Energy use: LEED Silver as a minimum. Windows have no R-value. Potential for solar thermal system?
- Digital controls are needed.
- Needs new EST system.
- Add natural light in the pool and gyms.
- Hydraulic elevator: still functional
- Pool must be accessible for public use.
- Hazardous materials. Hasn't been surveyed. Asbestos is likely.

Arena Auditorium:

- Mediocre system. Does have vfd's, high duct velocities. Heating and ventilation only. Room for cooling coils, but not needed. Replace pumps. Replace/clean the coils. Air handlers are under digital control. Need digital control throughout. Concourse as return air system. Smoke control issue? May need fire sprinklering of dome?
- Electrical: need more power:
- 125 lb. steam. Lines run through basement corridor. Fire alarm; likely not compliant. No strobes. No voice evac. Upgrade IRC panel.
- Back-up electrical HW heating system? Needed due to steam shut downs.
- Replace plumbing fixtures. Fixture counts are undersized. Infrared sensors on flush valves.
- Concourse lighting needs to be replaced. Exterior lighting needs to be redone. Snow removal damage. 480 V fixtures are not good in this application.
- Irrigation water.
- Water entry. Has sheared off a couple times due to poor compaction. Concession stands were waterproofed 20 years ago.
- Two forty horse pumps dewater bball floor. Could they go into a cistern for irrigation? Do they need back-up? More moisture bulbs in building control system.

- Ramps and accessibility issues. Floor acclimation has been an issue previously due to dry environment.
- No humidification.
- IT: Plenty of infrastructure. No problems with scoreboard feeds. Security cameras are being installed on the concourse. Plan for future card access to building doors (hardwired). JCI system. Make everything web-based. Cameras at any point of 24-hour access.
- Room 4 is the core access for all of east campus.
- Lighting: keep it simple, but with atmosphere in arena. Occupancy sensors with manual override. Tie occupancy sensors to the VAV's. Natural ventilation is ideal.
- Gen Set: includes sump pumps and some of the heating pumps. Emergency exit lighting needs to be replaced.
- Roger to send MEP plans.
- Hazardous materials less likely.

Golf Course. Jim Scott, Physical Plant Director

- New power tap. Extend gas line. No IT campus lines. Qwest. Map controls back into campus system. Windy area. Sealed combustion water heaters. Radiant heating. Battery packs.
- Potential location for NASA wind turbine. Residential scale—appropriate to this use.
- Irrigation issue is a priority, at \$1.5 million cost. Maintenance facility location creates staffing inefficiencies. Also not large enough to store the full 50 carts (20 are stored outside). Practice facility used to enhance public golf experience as well.
- Don't locate far from clubhouse. People will park at the parking lot and have to walk during the winter.

Long Range Development Plan:

- West end of Willett Drive will terminate in a parking lot. Day-to-day end of Willett would be at Athletics' Drive. On game day, it would extend west to Greek quadrangle.
- Long-term parking structure south or west of Corbett.
- Parking lot between Fine Arts and Fieldhouse will become primarily green space.
- Practice fields/detention will be green forever.
- Visitor-oriented mixed use east of stadium parking. Parking structure on north half of stadium parking lot. 22nd and Grand will become a major public campus entry. 15th Street will be diminished in terms of campus access.
- Recreation/athletics needs to occur east of 22nd.
- Potential for future interchange off of 30th st—will push a lot more traffic onto 22nd.
- West side of Fieldhouse as potential pool site?
- Food service at NW corner of stadium?

University of Wyoming Athletics Master Plan

Steering Committee

April 13, 2011

Review Expressed Needs:

Consistent themes:

- Functionality/Keep it real.
- Focus on today's needs
- Quality/Meeting UW standards/Identity
- Consolidation of support services, particularly Academics, Coaches' offices, Player or patron centers?
- Energy Efficiency
- Hospitality/Donor outreach
- Recruiting: Facilities matter for males more so than females.

Important Strategic Considerations:

- Arena: influence of scoreboard/loss of seats? Scoreboard, lighting and sound most important for basketball. Rigging capacity is not a high priority. As a campus facility, it has to be multi-functional: graduations, University assembly events. Strong emphasis as a practice facility. Fan amenities also very important. Jim: concerns for operation: unoccupied, practice, event.
- Pool: Significance of needs vs. the existing facility
- Golf: Year-round use; Golf Practice as a revenue source

Next steps:

- Long-term goals/objectives for Athletics
- Food service for training table and events; nutrition as a component?
- Value of Corbett in terms of Swimming program vision
- Arena as more of a revenue source? Storage, Bball Practice, suites
- Accelerated timeline for golf
- Schedule next meeting:
- Look at alternatives to center hung board.

University of Wyoming Athletics Master Plan Needs Analysis Interview:

Name of Program/Department: **Sports Medicine/Strength and Conditioning**

Trent and Bob

What other Athletics programs/services do you interact with on a regular basis? How and why?

- Both programs interact with the sports programs on a daily basis.
- Year-round sports. Extended training and rehab time.
- AA: Largest effect on S&C. Corbett and Golf not really in play. Lots of limitations in current facility. If basketball only facility? Primary, but other sports may use. Create a large square room, no columns or obstructions, high ceilings (28' clearance is ideal for medicine balls). Large double door for equipment move-in, move-out. No direct locker room access.
- Create a gathering area immediately inside door. A place where recruits can immediately understand what the program is about. Or for full team presentations. 20 people. Create a coaches' area—an open work station. With small counters for work-out storage areas, files, etc. 2-3' deep lockers for storage of loose materials. DF's at either end of room. Include a supplement area. Gatorade tower with supplement storage for up to 700 bottles. Counter for blenders and trash/recycling. Flooring with inset platforms. Sound dampening for Olympic lifts. Technology: high speed treadmills, etc. ..wiring.
- 2,500 SF target. Equip. 6 x 8 platforms (5), 9' high multi-use racks (5), cardio (15), dumbbells, utility benches (5), lat pulls, open area with absorbing floor for jump training—an aerobics floor with a durable (athletic flooring) med ball wall area (5 work stations in each). Technology: easy, fast lights, centralized control behind work station. Maximum air flow with great control, including dehumidification. Flat screen, taping, feedback. Acoustics are important in the room and for separation from other spaces. Put the weight room on the ground. Visibility from above into the weight room would be great. Cardio could go upstairs.
- Coaches' change area. Small room. Share with sports medicine. Create men's and women's staff locker rooms.
- Training Room: in conjunction with the weight room. Could share cardio space. Also need to be close to the locker rooms. Information sharing, etc. is important. Rehab area, treatment area, hydro area, offices (3 separate: M & W, physician office/exam room). Exam room large enough for 6-8 people plus benches plus a C-arm machine (portable—5'x5') with its own storage room. Sink with lockable cabinets. Cold plunge and a warm plunge. Underground or above ground. 6x6 for each. Potential Hydroworks pool sized for basketball players. Separate hydro with glass walls with humidity control. 4-5 treatment tables. Share the rehab component (cardio plus plyo area). If separated, duplicate size and equipment). Ice and Water room with storage for 12+ coolers plus two ice machines. A large storage closet. Joint staff locker rooms with shower/toilet. Two taping stations, 5' wide each, separate from treatment area. No stairs.
- Corbett: a room 20'x20' with an ice machine. 2 treatment tables, work station for trainer, upper extremity wall unit, one office, no physicians room. This would change if in a new facility combined with the high school.
- Golf uses the RAC for everything they need.
- Storage is critical for both programs.

University of Wyoming Athletics Master Plan Planning Team Meeting:

Meeting Minutes

June 24, 2011

Tom Burman, Roger Baalman, Bill Atencio, Bill Sparks, Joe Jensen, Jim Scott

8:00 Golf Practice Facility

Site/Floor Plan: Relocate building to be sheltered by trees adjacent to 18 green. Adjust cart path. Enlarge chipping green.

Preliminary Renderings: **Look at faux stone on lower portion of the building. Understand Cost—get Roen to price ASAP.** Upgrade soft costs to 40%. Utilities: Water in street. Gas at clubhouse. Power as a separate drop. IT from clubhouse. Pump sewage or do septic. LEED Silver equivalent. Native landscaping. Look at option of standing seam metal roof as a lifetime issue.

9:00 Competition Pool

Investigation of Corbett Expansion **Look at pushing pool to the north.** Parking to the north eventually goes away. Maintain only fire access between the pool and the Fieldhouse. Relocate entry so that parking access is from the east, not south. Replace classrooms with same capacity, character. Dry land training can occur on the deck--allow for 50 students-athletes. Deck space preferred. Can also accommodate tip and rolls for on-deck competitors. Include a coaches' work station/home base in either case. Visiting teams can simply use general student locker rooms. If a remote site, high schools would use the general locker room. A competition pool first. 500 seats OK.

Discussion of Alternate Sites: Tom: Funding may be more available with a new site. \$20 million from legislature must have high school access. Corbett Pool expansion would be less favorable. Thornton Pool at \$15 million. A similar pool is desirable. **Target \$20 million project cost.**

Detention pond site is less desirable. **Could be located north of baseball and east of tennis.** Share the existing parking to the north, specifically for events. Provide limited parking on-site. Preferred over Harney. Utilities are readily accessible. No problem with groundwater. Sandy soils with some clay.

****Roger would like firm numbers for Corbett by 7/15.**

10:00 Arena Auditorium

Updated Concept Direction Training Table: May need to precede the AA improvements. Keep the training table. Carry suites forward as long term improvements.

Build Commissary with Training Table above as a smaller first project? Include basement with Training and Strength. Capture views to the arena floor and the stadium from the training table.

Strength/Sports Medicine: prefer to have them on the same floor as the lockers.

Phase 2 would be the lobbies, concourse, club and raising of floor for practice. Also include video board/scoreboard as a high priority.

Locate offices like Option 1. Potential to locate offices inside bowl at top of ring beam???

****Take a hard look at ADA access to the floor.**

No student seating behind visiting team. Locate students close to floor and behind HT bench on northwest court. Clamshell to fill portal at centerline.

Move Soccer to Women's Basketball Locker Room.

Locate public restrooms and media in service portal area.

Club access through Hall of Fame.

Phase 1: South east addition including sports med/strength at lower level, commissary/tix at concourse level, training table above. Potential space for bball coaches offices? Include raising of basketball floor, ADA mod's and lower level renovations.

Phase 2: Scoreboard/ribbon board options

Phase 3: Club with east concourse/lobby expansion and coaches offices above. Renovation of other concourse level areas.

11:30 Discussion/Direction/Next Steps

******Next meeting? Roger out July 22-27. Try to meet before Roger leaves, if possible. Check with Roen and send out potential meeting dates to Zoe.**

March 14, 2011

Mr. Andy Barnard
Sink Combs Dethlefs
475 Lincoln Street, Suite 100
Denver, Colorado 80203

Re: University of Wyoming Arena Auditorium Study
Martin/Martin, Inc. Project No: #19095.S.02

Dear Andy:

At your request, we completed a cursory qualitative and quantitative assessment of the existing roof structure of the University of Wyoming Arena Auditorium to support a future video/scoreboard weighing approximately 40,000 lbs. We understand that our study will be blended into your overall Athletics Master Plan, currently underway. Our study was based on the following:

- Graduate Student Report: "Nonlinear Buckling Analysis of the Arena Auditorium Located in Laramie, Wyoming," by C.D. Stauffer, April 25, 1992.
- Interviews with Patrick McManus, PE, SE, PhD; Lecturer-University of Wyoming and Structural Technical Director of Martin/Martin, Inc.
- Martin/Martin, Inc. numerical analysis.

1.0 Discussion

Results and conclusions from the 1992 numerical analysis were helpful, although not conclusive for the current Athletics Master Plan because of three limitations:

1. The scope of the report was primarily focused only on the global failure mode of two loading conditions: (1) balanced uniform snow load over the dome, and (2) unbalanced snow load on one half of the dome only. The 1992 finite element numerical analysis concluded the unbalanced load case was more critical compared to the balanced load case. The study did not investigate the dome's ability to support a singular large point load from the apex of the dome.
2. The study investigated the failure mechanisms (i.e. buckling of the individual dome members) using classical mechanics theory but did not specifically examine the dome structure subjected to Building Code requirements in Chapter 23 of the International Building Code.
3. A design check of key wood-to-wood framing connections within the dome was not within the scope of the study.

Even with the cited limitations of the 1992 study, three key points are useful to consider. The first point is that the existing roof dome structure is more susceptible to failure from unbalanced loading compared to a uniform and balanced loading. Although not considered in the study, a large point

load from a future scoreboard would introduce considerable stresses in a concentrated region of the existing dome structure. Such a concentration of load will overload the existing dome structure.

The second key point to consider is the importance of the base condition of the dome itself. The report cited only one boundary condition was considered and the stress results within individual dome members were highly sensitive to the boundary conditions investigated. Suspending a considerable load from the apex of the dome will introduce forces at the base of the dome that will require strengthening.

A third point made by the report is the observation that domes are generally robust in their ability carry loads in an efficient manner but that the Wyoming Arena Auditorium is a relatively 'flat' dome shape, reducing the ability to carry a majority of load in compression of the dome members. A 'flatter' dome shape means that more of the roof load is carried by a combination of bending and arch action of the dome.

After reviewing the 1992 numerical analysis report as well as interviews with Dr. McManus, we believe it is possible to strengthen the dome to support the concentrated weight of a video board, but that it could likely involve significant cost to do so. Not only would many of the dome's wood beams require strengthening, but significant effort would also be required to upgrade wood-to-wood connections as well as the base connections. The connections suspended from the dome to the video/scoreboard would have to be sufficiently distributed (spread out) to minimize large concentrated forces at any one joint.

Supporting the proposed equipment from new structure constructed independently of the domed roof structure is feasible and would alleviate the need to strengthen much of the existing dome. Steel arches are proposed as a starting point and would likely be more economical compared to wood arches. The arches could be installed either inside or outside of the existing dome roof. Consideration of thrust forces at the base of the arches would have to be addressed and could be done so with the use of concrete walls similar to the existing walls around the Concourse level.

2.0 Summary and Conclusions:

- A. The existing domed roof structure of the Arena Auditorium was not designed to support a concentrated equipment weight of 40,000 lbs from the apex of the dome. Although dome-type structures are inherently robust, a concentrated load at its apex would significantly overstress individual members of the dome as well as member-to-member connections in the vicinity of the support points and base connections of the dome.
- B. Strengthening individual roof members and member-to-member connections to resist increased member stresses is feasible, although likely not economically practical given the numerous members that would likely require strengthening.
- C. Supporting the 40,000 lb video board could be supported independently from the existing roof structure using a pair of steel arches erected *inside* the existing dome structure as conceptually shown in the attached sketches. The pair of arches could follow the profile of the existing dome and be founded on concrete walls (to resist the thrust) similar to the existing concrete walls around the perimeter of the Concourse.
- D. Supporting the 40,000 lb video board could be supported independently from the existing roof structure using a pair of steel arches erected *outside* the existing dome structure in a manner similar to the attached sketches. The pair of arches could follow the profile of the existing dome and be founded on concrete walls (to resist the thrust) similar to the existing concrete walls around the perimeter of the Concourse.

We appreciate this opportunity to be of service. Please call if you have any questions regarding this report or if we may be of further assistance.

Respectfully Submitted,

A handwritten signature in black ink that reads "C Ben Nelson". The signature is written in a cursive, flowing style.

C. Ben Nelson, P.E., SECB
Principal

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8.0 AUDITORIUM ARENA AUDIO VISUAL

Introduction

The purpose of this narrative is to describe the range of possibilities for modern arenas in regards to acoustics and audio-video systems. This document is intended to be a starting point from which to develop specific program recommendations and design direction for the Auditorium Arena renovation.

8.10 PHASE 1

8.11 Audio Systems

The arena seating bowl speaker system will be a distributed cluster system using an array of speaker cabinets to provide sound to the permanent seating areas. These speakers may be located above and around a center hung scoreboard or potentially located at the existing cluster location provided weight capacities can be met. Additional speakers will be located to provide sound to the floor, or court, for house PA announcements, pre-recorded music playback, or for pre-game events. "Fill" or "Delay" speakers will be installed to provide more consistent sound coverage for the upper seating areas.

The system will be designed to allow clusters or groups of speakers to be selectively turned on or off, depending on the event. For example, if an event such as a high school graduation intends to use the permanent sound system, the speaker system can be configured to provide the optimal sound coverage required for that type of event. In this case, end stage presentation, audience and graduates on the floor, with the upper seating area speakers turned off.

The speaker system is expected to provide a minimum sound pressure level (SPL) of 100 to 105 dBA.

PA Control Position

The audio control position serves as the operational center for almost all of the audio related signals throughout the facility. A 24 to 32 channel mixing console will be included to allow the operator to control all the audio signals. The sound system will be capable of using compact discs and microphones. Two handheld wireless microphones will be included as part of the system for use inside the seating bowl. This system will also include an isolation interface to allow connection of a computer-based audio playback system such as Click Effects® or Game Ops Commander®.

Panels located at center court, and at each entrance to the floor, will allow connection of microphones and other audio signals to the sound system. The panel also provides a connection point for multi-pair audio cables that connect groups of microphones used for an "end stage" setup. These panels include connections for portable monitor speakers and for 4 channels of Production Intercom (to be used by the production staff of the Arena).

The control room racks or housings will include all of the equipment requiring adjustment by the operator during an event. This includes audio patch panels, distribution amplifiers for broadcast signals, source machines such as compact disc players, and any other supplemental equipment.

Amplifiers and digital signal processing equipment will be installed in equipment racks preferably located on an upper level of the arena. Power requirements for the arena sound system are estimated to be 50 – 60, dedicated 120 VAC, 20 amp, circuits terminating in the sound equipment racks. These circuits should originate from a dedicated “K” series transformer fed from the emergency power system. An additional 4 –10, 20 amp circuits should also be located in the audio control position to provide isolated power for the sound control equipment. All audio system power to be provided with isolated ground outlets or terminations.

Intercom System

To allow coordination between technical crews, an intercommunication (intercom) system must be provided. The system provides a minimum of four dedicated channels (more may be required based on direction of arena management) for use by the major technical groups, i.e.; lighting, sound, video, etc. This system allows hands free operation, requiring little or no operator action to talk or listen to others on the system. At portable locations, headsets with boom microphones will be used to ensure good listening conditions. A series of intercom outlets will be included throughout the catwalk and at the spotlight positions to coordinate lighting cues and instructions. An upgrade to include wireless intercom equipment as part of the overall intercom system may be desired at additional cost.

Hearing Impaired and the ADA Requirements

To assist the hearing impaired, a dedicated RF wireless system will be provided for the seating bowl. While the ADA requires a quantity of receivers based on the seating capacity of the audience or spectator area, in practice it is best to start with 12 – 16 receivers with the understanding that more receivers can be purchased by the owner/operator as needed or required by the ADA. 25 percent of the receivers must be hearing aid compatible using an inductive loop “T” coil appropriate for the receivers.

Life Safety Interface

It is common for the Arena sound system to supplement the life safety/fire alarm systems in new sports facilities. Based on the design direction for the sound system, it is recommended that primary reliance on the sound system for voice evacuation be confined to the seating bowl. All other public areas (including concourses and suites) receive signaling and voice evacuation messages via traditional life safety annunciation devices while the permanent sound systems in these areas will be muted during an emergency message.

It is important to realize that the Arena’s seating bowl sound system utilizes components that are not UL or NFPA listed for fire alarm use; nor is this system supervised as the NFPA requires of dedicated fire alarm systems.

Broadcaster Accommodations

It is typical for the Arena sound system to share certain audio feeds with the broadcast media. To accommodate this sharing of signals, dedicated “line-level” outlets providing house PA along with tie-lines will be included in the:

- Broadcast camera locations.
- Main television broadcast panel (in the TV truck parking area).

- Video Replay Production System.
- Announcer and operator positions.

These outlets will permit signals to be shared and routed between the audio control position and the broadcasters.

Interview Room

This room will be used for press conferences or post game interviews. For that purpose, the room will include a dedicated sound system and broadcast connection panels. The sound system will consist of ceiling mounted speakers controlled from a wall mounted panel. This panel will allow selection of one of five audio programs; Arena PA Announcer, Home Radio Broadcast, TV Broadcast, an auxiliary channel, or the microphones located in this room.

A separate wall panel will provide microphone and line level audio signal to be connected to the room sound system. The sound system will also provide local independently isolated outputs for use by broadcasters recording the press conference. Program from this system will also be sent to the PA control position to be patched into the arena seating bowl sound system or other area(s), if required.

Team Locker Rooms

A room-wide sound system for locker rooms supporting events within the arena, (e.g. Men's Basketball, Women's Basketball, Volleyball, Officials, etc.) consisting of several logical zones. Each zone will have local volume controls, source selections, and local input for an iPod or similar playback device. This system will have up to five possible audio program choices; Arena PA, Home Radio broadcast, TV broadcast, Auxiliary channel from PA control, and a local input. Each "zone" or locker room will have a wall mounted control panel with dedicated volume control and program selection for the entire zone.

For locker rooms having a presentation room, an audio video system will be included to provide large-format viewing of game or practice video. This may be accomplished with either video projection or large-format LCD displays. The LCD displays are becoming more common because of decreasing cost and they can be integrated with electronic white boards and overlays. The system will include an integrated control system to help simplify system operation through touch panels and logical graphical user interface pages.

Provisions to keep existing game clocks functional will need to be coordinated. Conduit pathways to reinstall the existing game clocks, as well as, providing a pathway for new clocks to be installed in Phase 2 should be planned.

Weight Training

A local equipment rack will house source equipment such as a CD Changer, AM/FM Tuner, video sources, IPTV Tuner and also provide auxiliary inputs for iPod or similar devices. This local rack will house control system equipment, digital signal processing devices and the amplification dedicated for the system. The Weight Room will be provided with distributed loudspeakers mounted at the ceiling or structure level. A Control system with touch panel will control the AV system devices, TV Tuners and televisions within the space.

8.12 Broadcast Cabling Provisions

Camera Locations

There are no formal guidelines to our knowledge for this facility. Seating bowl camera positions are to be consistent with current basketball broadcast practice, as allowed by the seating configuration and architectural design of the seating bowl.

Phase 1 camera or junction box locations to include (for reduced cost not all of these locations may be wired in the initial construction):

- All four corners of the event floor.
- Each side at Center Count on event floor.
- End of court behind each goal.

Broadcast Cabling System

It is expected that the new arena will achieve a limited "pre-wired" status via a coordinated system of cable tray, conduit, TV truck and camera platform breakout box access. The base building design will include the access and pathways required for installation of a pre-wired system. These pathways will include the requirements of network/play-by-play TV and radio, as well as, local broadcasters. The location for the termination panels at the truck dock should provide for a cable route to the trucks that does not cross any ingress or egress pathways.

Cable System Types:

- Play-by-Play TV broadcasters. Runs from camera and announce locations to TV truck dock parking. Cabling to be shared with in-house video production which will limit number of locations/cameras that can be dedicated to in-house use when a play-by-play broadcaster is in place.
- Radio cabling – Radio announcer position to telecommunications only (i.e.; ISDN line).
- Local TV stations - No cable provided, limited live broadcasting expected.
- Coaching video cabling - To be integrated into broadcast cabling system, with limited dedicated cabling.
- In-house production cabling - To be integrated into broadcast cabling system, with limited dedicated cabling.

TV Mobile Production Unit Access

Sufficient TV Truck parking should be provided near the facility for TV crew events. A minimum of two spaces is necessary. Minimum power required for each vehicle is (2) 200 amps, 120/208 volts, 3 phase.

Satellite Uplink Parking

Space for two mobile satellite uplinks with clear line-of-sight and no obstructions to the southern horizon should be reserved near the broadcast truck parking area. This is expected to occur in the service yard, adjacent to the broadcast vehicles. Minimum power required for each vehicle is (1) 100 amps, 120/208 volts, 3 phase.

Common Carrier/Fiber Optic System Access

The TV truck cable termination area/room should include space for telephone and fiber optic (i.e.; Vyvx) termination/transmission equipment, should there be a need for this service in the future. This allows for both network and local broadcasters to send their signals out of the building without the use of satellite uplink or microwave units.

The utility providing the “last mile” cable for fiber optic broadcaster service, which is often the local cable or phone company, should be coordinated with the site civil work to ensure that ducts/conduit are placed from the arena to their location(s) in the street.

Local Television Stations, ENG Broadcasting

Parking is to be provided for a minimum of 3 SNG/ENG van type vehicles near the truck dock, with a temporary cable pathway established to allow cabling to enter the building on an infrequent basis. As noted above, permanent ENG cabling is not expected to be required. It is anticipated that ENG vehicles will operate on internal generator power and therefore no permanent power provisions are recommended.

Broadcast Feed Video Distribution

There are several areas within the arena that will regularly receive feeds from the event broadcaster. These include the scoreboard video system, the distributed TV system and coaching video. This system will accept multiple feeds from the broadcast facility or mobile truck and distribute them to the locations mentioned above.

8.13 Multi-Channel Television Distribution System

This system will serve virtually all of the TV sets installed in the Arena during this and future building phases. The processing or “head end” equipment will likely be located in the video replay room and it is recommended the headend system be installed to accommodate all phase 1 areas and provide expandability for future phases.

Sources for distributed TV channels include:

- A redistribution of the local cable television system’s signal. The rights for this service will need to be negotiated by the Owner.
- Local over-the-air broadcast stations acquired through the cable television system.
- WJHW recommends retaining conventional off-air antennas at this time for two reasons: in the event that cable discussions are not successful, and to be used in the event of cable outages.

Additionally the following channels will be “added” to the cable television system:

- Local TV production from the broadcast truck.
- The Arena video and audio feeds (assumed as 4):
 - Event broadcast video with radio-play-by-play.
 - Event broadcast video with press-box announcer.
 - Two aux or patchable channels.
- Down-linked satellite and DSS video signals (see section below).

Broadband Coaxial Cable Distribution

The Distributed Television System (DTV, also known as MATV) system provides for broadband coaxial cable distribution of television sources utilizing technology similar to that used in conventional cable television systems and broadband local area networks. Systems of this type may also be called Master Antenna Television (MATV) systems, broadband distribution systems, CATV or simply cable TV.

The system is expected to have 8 - 12 channels, excluding cable channels, with at least an 860 MHz analog bandwidth, with cabling and passive devices rated to at least 1 GHz. Given the current cost reductions in fiber optic systems and the increasing cost of copper cabling, it is anticipated that the main “trunk” signal distribution system between the head end, cable TV service demarcation point and the low voltage closets will be fiber optic. Copper will be run from the closets to the TV set outlets.

IPTV Network Distribution

A recent trend for this type of facility is for IP Television systems (IPTV) to replace the coax cable used by conventional Cable TV systems described above. These IPTV systems use dedicated computer network cabling run back to riser closets and served by Ethernet switches and specialized set top boxes at each television. This approach can be costly and is estimated at \$2,000 or more per display. Certain teams and facilities have found ample benefit for IPTV systems in concessions, premium club and suite spaces where they are able to sell additional sponsorships, branding and commercial opportunities.

These IPTV systems can also serve digital menu boards if there is desire for this type of display at the concessions allowing a fluid transition between menu boards for the various events hosted in the arena. These menu boards can also display advertising as well as the menu selections.

If the ability to implement a full IPTV system is impractical then twisted-pair category cable should be installed along with coax cabling to insure future upgradability.

Satellite Reception and Transmission

It is anticipated that satellite signals will serve two primary functions—Arena entertainment (replay; lounges, etc.) and scouting (coaching) for any team that may have its offices in the arena. The following satellite dishes and receivers will be provided to accommodate each function:

- One, small 30 inch diameter digital (DSS) dish is planned with 4 receivers located within the scoreboard control area of the Arena. This capability will allow channels to be introduced into the Distributed television system and viewed anywhere this system is connected.

The complement of dishes can be increased should more simultaneous programming options be desired.

8.14 Scoreboard and Video Display Systems

There are four major components to the video display and scoring systems. These include:

- Main Scoreboard Assembly, which typically includes:
 - Video displays
 - Game in Progress (GIP) functions, including score, clock, period, bonus, time outs left, shots on goal, fouls, etc. This can be a fixed digit or “virtual” display as part of a matrix or video display.
 - Stats Information, either as a matrix or fixed digit display
 - Advertising signs, fixed or electronic
 - Building identification/naming rights signage
- Scoring and matrix control system, to create and manage non-video display content
- Auxiliary/supplementary scoring displays in the seating bowl (e.g.; auxiliary GIP displays or fascia displays). This category can also include locker room and shot clocks, practice court configuration, ticket window reader boards, etc.
- An in-house video production system, to generate signals for display on the scoreboard video displays.

Scoreboard Video Display

This is where live game action video, video replays, animations, and commercials, etc. are routinely shown.

For this facility, two typical designs, end wall and center hung, are potential configurations for the displays. Each has unique advantages and disadvantages.

The first option is an end wall display assembly. This can be the less expensive solution as it includes one or two medium sized video displays on the baseline ends of the building. While larger displays are required, due to the longer average viewing distance, the total square footage of displays is similar when compared to the center hung option. It is also particularly well suited for use for end stage type events, such as convocations and graduations. It does not require a hoist, with service normally being provided from a lift or catwalks behind the display, accessed from the roof structure or from a stair or ladder behind the end wall. Its location does require the sports fan to turn away from the action to look at the end wall location.

A typical end wall display will be in the 10.5 ft x 18.5 ft to 14 ft x 25 ft. range or larger, based on the desire for size vs. cost.

A center hung assembly, the second configuration, is located right over the playing surface and does not require the viewer to look away from game action. Being four sided, each surface is smaller than the end wall display, but multiplied by four, the total cost is generally higher, especially when the more extensive structure and a hoist is added to the overall cost. It is possible to service the center hung assembly from a lift, dispensing with the hoist; however this prevents the assembly from being raised to create sightline or rigging clearance for end or center stage events. We would expect the size of the center hung to be determined by the 16:9 video display modules, which is expected to range in size from a 6 ft x 11 ft. to 9 ft x 16 ft. or larger displays, based on the desire for size vs. cost.

Both options are viable solutions, and the one that best fits the functional needs of the arena and the project cost is the correct choice.

The 16:9 aspect ratio display size for the video screens is used as all content created by the in-house system as well as sharing of TV signals and video programs will be in 16:9. We would expect that the in-house video production system will be HD, due to continually falling costs and lower price point products being introduced for HD production.

While the production system will likely be HD, the resolution of the video displays will not be, due to size and cost. To be “true” HD, a video display must have a minimum of 720 lines or pixels of resolution in height. With the conventional 10 mm pixel spacing for the video display, this would require a display height of 23.5 ft, which would be overly large for the space and costly. Increasing resolution by reducing the pixel spacing to 6 mm or 4 mm would dramatically increase cost and is likely not affordable for the project. Even if the display is not full HD resolution, the display processing system will accept an HD signal and it has been routinely demonstrated that an HD signal on a non-HD LED display will result in a superior image compared with a non-HD (or standard definition digital “SD”) signal.

Clock/Scoring Displays

It is essential for players, fans and coaches to be able to see the game clock, score and other information such as time outs remaining, possession of jump balls, etc. This information is generally shown separate from the video image, on fixed digit or matrix displays. These displays can be color or less expensively, monochrome matrix displays. Matrix displays allow for images other than just numbers to be shown for advertising or entertainment purposes and for non-sporting events.

If the facility is to be routinely used for practice, or events not requiring the use of the video display or staffing for the scoreboard control room, use of fixed digit display for basic Game in Progress (GIP) information may be dictated. This allows the scoring and clock system to be operated by simply plugging in the dedicated controller which saves on set up, personnel and electrical power consumption costs.

The dedicated score/clock control consoles are anticipated to be located at the scorer’s table court side for basketball and volleyball. Other statistical entry often occurs on a computer connected to the system, either courtside or at the AV control position. Text and graphic generation and control is almost always from a dedicated computer workstation at the scoreboard/AV control position.

In addition to clock and score, typical information includes quarter/half, bonus, possession arrow, time-outs left, penalty clocks, matches won (volleyball), etc. Other common information are the numbers of the players for each team in the game and each player’s current points, fouls and shots or saves.

Auxiliary Displays

Many arenas duplicate much of the same clock/scoring information on other displays in addition to the main center hung or end wall assemblies. This is done for supplemental, easier viewing from some seating locations and particularly the coaches’ bench seats. This is

especially true if an end wall main assembly is installed. These displays, when included, are typically small, inexpensive units, except when a portion of a color fascia display is used for this purpose.

Other displays often used in this type of system include:

- Fascia displays on the face of pre-case seating risers or above the last row of seats, for GIP, advertising, crowd prompts, and other information.
- Basketball goal shot clocks.
- Lacrosse and indoor football play clocks.
- Locker room clocks (show the game clock time, counting down to game time before the game and during halftime). Usually placed in each team and officials' locker rooms.
- Ticket window reader boards to provide information as to the function or open/closed status of each window.

Ribbon Boards

Color LED animation displays are an obvious trend in recent facilities with long lengths of sideline displays and in some occurrences encircling the entire seating bowl. The continuous configuration greatly enhances sponsor, score display opportunities and closed captioning now mandated by ADA requirements. Generally most arenas deploy displays that are 2-1/2 feet high with pixel spacing of 10mm to 16mm.

Electronic Scorer's and Courtside Tables

If desired at additional cost, color LED animation displays are becoming more typical for use as sideline advertising instead of the traditional scrolling signage. The programmability of these displays greatly enhances sponsor and other display opportunities. These displays are generally deployed with pixel spacing of 10mm.

Exterior Displays

There are three common categories of exterior displays.

- Entrance ribbon boards. These are typically color LED displays, either at the entrances or above the ticket window area that provide the opportunity for advertising, promotional messages, etc.
- Building ID, lighting effects, dynamic signage. This type of display can range from a full video display to simply changeable lighting that provides an iconic exterior presence to the building. Some of these items are only effective at night, depending on the type of lighting or display used.
- Exterior or roadway marquee. This is usually directed at non-arena traffic and features upcoming events, promotional and community messages, advertising, etc. It can be a free standing sign assembly or attached to the building, depending on what road is being serviced and what allows for good viewing sightlines. The type of message and its duration may be dictated by transportation department rules.

8.15 Scoreboard Video Production System

The Video Replay System will generate separate video signals to be displayed on each of the sporting facility's video displays. This system performs much the same function as a broadcast TV truck, but on a smaller scale with less capability. It is anticipated that the replay system will have full HD video capabilities.

The systems are typically composed of:

- Cameras (typically three) and accessories (tripods, viewfinders, etc.). In higher priced systems, one camera might be wireless.
- Slow-motion, instant replay device(s).
- Clips/Character Generation.
- Video Player(s) and Recorder(s).
- Video production switcher.
- A matrix routing switcher within the video production system.
- Computers to be used for non-linear editing.
- Audio, video, fiber and camera patching between devices.
- Preview, program and confidence monitors.
- Miscellaneous distribution and equalization components.
- Equipment racks and furniture consoles.
- Audio mixing, routing and distribution.

Control Room

The main operating area for the Video Replay System is typically on the Event Floor Level near the truck dock. There will also be very limited operations capability from the main AV control position.

Audio and video tielines from the Video Replay Room will route to both the PA system and the Broadcast Truck Dock.

Cameras

A number of video cameras are dedicated to the video production system. Cameras will have the ability to be connected at broadcast enclosure locations throughout the arena and patched through to the production system. Based on the camera location, the operator will have the option of shooting in either a studio configuration (tripod) or handheld configuration. It is anticipated that Triax will be the standard camera cabling with SMPTE fiber being an upgrade at addition cost.

8.16 Broadcast Cabling Provisions

Camera Locations

There are no formal guidelines to our knowledge for this facility. Seating bowl camera positions are to be consistent with current basketball broadcast practice, as allowed by the seating configuration and architectural design of the seating bowl.

Camera or junction box locations to include during this phase are listed below (for reduced cost not all of these locations may be wired in the initial construction):

- All four corners of the event floor.
- Each side at Center Count on event floor.
- End of court behind each goal
- Main follow cameras, center court midway up the seating bowl, opposite team benches.
- “Near side” (opposite from main follow) extended side line and/or diagonal corners.
- Ends, at rear of seating bowl.
- Catwalk, center hung scoreboard platform

8.17 OPINION OF PROBABLE SYSTEM COSTS FOR PHASE 1

Arena Sound Reinforcement System	\$600,000 - \$900,000
Arena Sound System Upgrades (Interview Rm, Lockers, Weight Rm, etc.)	\$350,000 - \$450,000
Arena SMATV System	\$250,000 - \$300,000
Arena IPTV System (in addition to SMATV)	\$800,000 - \$1,000,000
Arena Televisions (approximately 150 to 250 units)	\$150,000 - \$275,000

Arena Broadcast Cable System	\$400,000 - \$550,000
Arena Scoreboard (depends on configuration, size, resolution, etc.)	\$800,000 - \$1,200,000
Arena Fascia / Ribbon Board Displays	\$1,100,000 - \$1,600,000
Arena Video Replay System	\$400,000 - \$1,200,000

These Opinion of Probable Cost (OPC) numbers include the technical systems equipment for the auditorium arena and its installation. This opinion is preliminary and is based on recent projects of similar scope/size and reflects our understanding of the level of technical sophistication as discussed in our meetings. As concepts are refined, detailed design development begins and comments are received from the University, these numbers may be revised.

This OPC does not include any electrical work or conduit infrastructure for the technical systems described. This includes, but is not limited to, any outlet back boxes, in-wall, in-slab or underground conduit, wall or floor coring or penetrations, or electrical power installation as provided by Division 16.

The building acoustical treatments will be provided under the architectural and finishes package.

8.20 PHASE 2

8.21 Audio Systems

Private Club

This system will consist of distributed speakers mounted throughout the space in either a ceiling, surface or pendant configuration depending on the architecture of the space. Additional speakers and televisions may be located in front of the “drink rail” seats so that people in that area can see the video and hear the seating bowl sound system program. A wall mounted touch screen control panel will be used to control the sound system and the televisions in this area. This control panel is usually located in or near the bar area and selects from the various audio programs available and the TV program to be viewed on an individual television or groups of televisions. This TV control can be eliminated for a reduction in cost and the standard handheld infrared remote would provide control.

The audio system has provisions for local events not using the seating bowl, such as luncheons or business meetings. To support this use, a separate wall mounted panel will allow connection of microphones and other audio signals to this system.

Private Suite

Audio programs inside the suites will be heard over the suite television speakers. There are a number of “channels” that can be dedicated for in-house video and audio. Examples of the channels would be:

- Event broadcast video with event broadcast audio.
- Event broadcast video with radio-play-by-play.
- Event broadcast video with press announcer.
- In-house video with Arena PA.

Main Concourse

Speakers can be located in the vicinity of concession, merchandise, and other points of sale to allow those waiting in line to stay in touch with the arena event.

Typically, each of these speakers will play the Home Radio broadcast for spectator sports events, when available, optionally, the audio system operator can substitute any other Arena program (such as the bowl announcements and music) as required. Concourse volume and program selection occur from the audio control position.

It must be remembered, with open concourses, sound from concourse speakers can “bleed” into the seating bowl. Level and adjustment of the concourse speakers must be controlled independently of the seating bowl sound system to prevent this sound from being heard within the seating bowl.

Public Restrooms

Speakers within each public restroom encourage event patrons to stay in touch with game/event action. Ceiling or wall mounted speakers in the restrooms typically play the radio broadcast if available; however, the audio operator will have the ability to substitute other programs, as well as, adjust the volume.

Ticket Windows

A dedicated speaker system can provide audio at the Ticket Booths. Typically this system will provide audio from the Home Radio (or other signal selected in the audio control position) through speakers mounted above the ticket booth windows or canopy. In addition, a paging microphone will be provided to allow Ticket Window staff members to make announcements to fans. A message playback device will also be included to allow playback of pre-recorded messages and announcements.

To assist the hearing impaired, a dedicated RF wireless system will be provided for the ticket windows. A wireless system similar to the transmitter/receiver combination or a hearing aid compatible system using an inductive loop "T" coil loop is appropriate for this application.

Point of sale intercoms can be provided at each ticket window as part of the architectural window design and are typically not part of the sound system specification.

Public Entrances and Exits

Speakers can be located at each major entrance to allow fans to hear the arena program as they walk up to or leave the arena. Home radio broadcast is typically heard through these speakers, especially for pre and post game. The sound system operator will be able to control the overall loudness and program selection from the PA Control Room.

Life Safety Interface

It is common for the Arena sound system to supplement the life safety/fire alarm systems in new sports facilities. Based on the design direction for the sound system, it is recommended that primary reliance on the sound system for voice evacuation be confined to the seating bowl only. All other public areas (including concourses and suites) receive signaling and voice evacuation messages via traditional life safety annunciation devices while the permanent sound systems in these areas will be muted during an emergency message.

It is important to realize that the Arena's seating bowl sound system utilizes components that are not UL or NFPA listed for fire alarm use; nor is this system supervised as the NFPA requires of dedicated fire alarm systems.

8.22 Multi-Channel Television Distribution System

Concession and Novelty Stand Televisions

Televisions are expected to be located at concession stands. These are typically located so that concession personnel cannot watch the game or see replays. Most sporting facilities locate televisions so that concession staff and often first patron in line do not see television; this approach is believed by many to prevent delays in point of sale transactions. Electronic menu boards may also be implemented at additional cost as described under the IPTV section above.

Suite Televisions

Number of TV sets per suite:

- One or two inside the flat floor area.

Club Televisions

Televisions are expected to be located throughout the club area. These televisions may be positioned for both game activities and also non-game special events. Often video presentation systems are installed to provide for multi-person viewing of an AV presentation. This may be accomplished with either video projection or as cost decreases large-format LCD displays are becoming more common. The system will include an integrated control system to help simplify system operation through touch panels and logical graphical user interface pages.

Televisions in Concourses and other Areas

Televisions potentially may be provided at the following locations:

- Main Entrances
- Elevator Lobbies
- Administration Areas
- Points of Interest or Fan Kiosks
- Outside of Restroom Areas

8.23 OPINION OF PROBABLE SYSTEM COSTS FOR PHASE 2

Sound System Upgrades (Restrooms, Concessions, Ticketing, etc.)	\$150,000 - \$250,000
Club Audio Video System	\$75,000 - \$150,000
SMATV System Extension	\$100,000 - \$150,000
IPTV System with Menu Board Function (in addition to SMATV)	\$400,000 - \$600,000
Televisions (approximately 100 to 150 units)	\$100,000 - \$175,000

These Opinion of Probable Cost (OPC) numbers include the technical systems equipment for the auditorium arena and its installation. This opinion is preliminary and is based on recent projects of similar scope/size and reflects our understanding of the level of technical sophistication as discussed in our meetings. As concepts are refined, detailed design development begins and comments are received from the University, these numbers may be revised.

This OPC does not include any electrical work or conduit infrastructure for the technical systems described. This includes, but is not limited to, any outlet back boxes, in-wall, in-slab or underground conduit, wall or floor coring or penetrations, or electrical power installation as provided by Division 16.

The building acoustical treatments will be provided under the architectural and finishes package.

8.30 General for All Phases

Conduit and Raceways

Low voltage cables should be segregated by the type of signal carried by the cable. Audio tieline cables should be run in metallic conduit to protect the weak microphone signals from interference due to other cables. These conduits will be routed from the wall panels or floor boxes to the respective AV control position. Interim junction or pull boxes shall be provided as required to facilitate cable installation. Splices are not permitted in microphone or line level cabling. The minimum AV conduit size is 0.75 inches.

In open ceiling or accessible ceiling areas, video and touch panel control cables can be run in cable tray, cable basket, or J-hooks. Where these cables traverse an inaccessible ceiling, conduit is to be provided.

Speaker cable in open or accessible ceiling areas may be run with J-hooks. Where these cables traverse an inaccessible ceiling, conduit is to be provided. Speaker cable should not run with other low voltage wiring in cable trays or baskets.

Follow industry standards and guidelines for installation and routing of telecommunication, data, fiber optic, and category network cables.

AUDIO VIDEO SYSTEM – CORBETT POOL

9.01 MAIN SOUND REINFORCEMENT SYSTEM

The spectator seating and pool deck area sound system is expected to provide clear, intelligible announcements. While speech is the most important program source, the system can deliver acceptable musical quality considering the type of acoustical environment found within natatorium spaces.

The spectator seating area speaker system will be a distributed system using multiple speaker cabinets to provide sound to the permanent seating areas. Additional speakers will be located around the pool to provide sound to the pool deck and dive pool areas and will allow for house PA announcements, pre-recorded music playback, or for pre-meet events. No underwater speakers are planned as part of the permanent facility sound system. For synchronized swimming, system outputs on the pool deck level would provide audio signal to portable amplifiers feeding underwater speakers.

The system will be designed to allow various groups of speakers to be selectively turned on or off, depending on the event. All zones may be combined for a single large event or separated as follows:

- Dive pool deck
- Competition pool deck
- Spectator seating

The speaker system is expected to provide a sound pressure level (SPL) of between 95 to 100 dBA.

9.02 Control Location

The control location serves as the operational center for almost all of the audio related signals throughout the facility. A simple mixing interface within the processing system or outboard device will be included to allow the operator to control all the audio signals. The sound system will be capable of using compact discs and microphones. Two handheld wireless microphones will be included as part of the system for use inside the pool area. This system will also include an isolation interface to allow connection of audio playback device such as an iPod or MP3 player.

Panels located at announcer locations will allow for connection of microphones and other audio signals to the sound system.

The control location racks or housings will include all of the equipment requiring adjustment by an operator during an event. This includes audio patch panels, distribution amplifiers for broadcast signals, source machines such as compact disc players, and any other supplemental equipment.

Amplifiers and digital signal processing equipment will be installed in equipment racks located in a centrally located storage room. Power requirements for the pool sound system are estimated to be 10 – 15, dedicated 120 VAC, 20 amp, circuits terminating in the amplifier equipment racks. These circuits should originate from a dedicated “K” series transformer fed from the emergency power system. An additional 4 – 6, 20 amp circuits should also be located in the control position to provide isolated power for the sound located equipment at this position. All audio system power to be provided with isolated ground outlets or terminations.

9.03 Public Circulation

Main Concourse

Speakers can be located in the vicinity of concession, merchandise, and other points of sale to allow those waiting in line to stay in touch with the event. Typically, each of these speakers will play the pool audio from the event in progress. The audio operator will have the ability to substitute other programs as well as adjust the volume.

Public Restrooms

Speakers within each public restroom encourage event patrons to stay in touch with game/event action. Ceiling or wall mounted speakers in the restrooms typically play the audio from the event in progress. The audio operator will have the ability to substitute other programs as well as adjust the volume.

Ticket Window

A dedicated speaker system can provide audio at the Ticket Booth. Typically this system will provide audio from the event in progress or other signal selected at the audio control position through speakers mounted above the ticket booth windows. In addition, a paging microphone will be provided to allow Ticket Window staff members to make announcements to fans waiting in line. If desired, a compact disc player will also be included to allow playback of pre-recorded messages. This will require staff to “burn” audio CDs of the desired message. An increased cost upgrade would be to install a digital message repeater which can record and store multiple messages and play them back on a timed schedule.

Point of sale intercoms can be provided at each ticket window as part of the architectural window design and are typically not part of the sound system specification.

Public Entrances and Exits

Speakers can be located at each major entrance to allow fans to hear event program as they walk up to or leave the facility. The sound system operator will be able to control the overall loudness and program selection from the PA control position. If desired this system could be tied into the message playback system described under the ticket window paragraph above.

9.04 Paging

The paging system will be configured into multiple zones such as; locker rooms, team rooms, offices, pool area, dive area, spectator seating, and the building exterior. Ceiling speakers will be used throughout the interior spaces and horn type devices implemented on the building exterior. An “all page” button at each page location will route the page into all the paging zones simultaneously. This paging will be separate from the other sources and will override or mute any other program source for the duration of the page. Each page will be preceded by a chime tone to gain listeners attention. Paging will originate from three locations with a dedicated paging microphone in each of the following spaces:

- Managers Office
- Reception / Entry

- Timing Room / Meet Management

9.05 Team Locker Rooms

A locker room-wide sound system is planned, consisting of several logical zones (e.g. Men's, Women's, Visitors, etc.) with each zone having local volume control and source input for an iPod or similar device.

9.06 Hearing Impaired and the ADA Requirements

To assist the hearing impaired, a dedicated RF wireless system will be provided for the seating bowl. While the ADA requires a quantity of receivers based on the seating capacity of the audience or spectator area, in practice it is best to start with 4 – 8 receivers and the understanding that more receivers can be purchased by the owner/operator as needed or required by the ADA. 25 percent of the receivers must be hearing aid compatible using an inductive loop "T" coil appropriate for the receivers.

9.07 Life Safety Interface

All areas of the natatorium will receive signaling and voice evacuation messages via traditional life safety annunciation devices. The permanent sound systems in all pool areas will be muted during an emergency alarm and message.

9.08 Conduit and Raceways

Low voltage cables should be segregated by the type of signal carried by the cable. Audio tieline cables should be run in metallic conduit to protect the weak microphone signals from interference due to other cables. These conduits will be routed from the wall panels to the respective AV Control position. Interim junction or pull boxes shall be provided as required to facilitate cable installation. Splices are not permitted in microphone or line level cabling. The minimum AV conduit size is 0.75 inches.

In open ceiling or accessible ceiling areas, video and touch panel control cables can be run in cable tray, cable basket, or J-hooks. Where these cables traverse an inaccessible ceiling, conduit is to be provided.

Speaker cable in open or accessible ceiling areas may be run with J-hooks. Where these cables traverse an inaccessible ceiling, conduit is to be provided. Speaker cable should not run with other low voltage wiring in cable trays or baskets.

Follow industry standards and guidelines for installation and routing of telecommunication, data, fiber optic, and category network cables.

9.20 MULTI-CHANNEL TELEVISION DISTRIBUTION SYSTEM

The Distributed Television System (DTV, also known as MATV) system provides for broadband coaxial cable distribution of television sources utilizing technology similar to that used in conventional cable television systems and broadband local area networks. Systems of this type may also be called Master Antenna Television (MATV) systems, broadband distribution systems, CATV, or simply cable TV.

The system is expected to have 2 - 3 channels, excluding cable channels, with at least an 860 MHz analog bandwidth, with cabling and passive devices rated to at least 1 GHz. Coax RG Type copper cabling will be run throughout the facility.

This system will serve virtually all of the TV sets installed in the pool including offices, locker rooms, concourse, lobby, concessions, etc.

The processing or “headend” equipment will be located in a storage room, preferably adjacent to the audio amplifier enclosures or racks.

Sources for distributed TV channels include:

- A redistribution of the local cable television system’s signal. The rights for this service will need to be negotiated by the Owner.
- Local over-the-air broadcast stations acquired through the cable television system.
- WJHW recommends retaining conventional off-air antennas at this time for two reasons: in the event that cable discussions are not successful, and to be used in the event of cable outages.

Additionally the following channels will be “added” to the cable television system:

- Local TV production from the broadcast truck.
- The pool video and audio feeds as described in 9.47 (Assumed as 1).
- Down-linked satellite and DSS video signals (see following section).

9.21 Satellite Reception and Transmission

It is anticipated that satellite signals will serve two primary functions—Pool entertainment and scouting (coaching) for any team that may have its offices in the Pool. The following satellite dishes and receivers will be provided to accommodate each function:

- One, small 30 inch diameter digital (DSS) dish is planned with 2 receivers located within the headend control area of the Pool. This capability will allow channels to be introduced into the Distributed television system and viewed anywhere this system is connected.

The complement of dishes can be increased should more simultaneous programming options be desired.

9.22 Concession Stand Televisions

Televisions are expected to be located at concession stands. These are typically located so that concession personnel cannot video the event or see replays. Most sporting facilities locate

televisions so that concession staff and often the first patron in line do not see television; this approach is believed by many to prevent delays in point of sale transactions.

9.23 Televisions in Concourses and other Areas

Televisions will be provided at the following locations:

- Entrances Lobbies
- Elevator Lobbies
- Administration Areas
- Locker Rooms
- Concessions

9.30 SCOREBOARD AND VIDEO DISPLAY SYSTEMS

Major Elements

It is characteristic that the scoreboard and control system for scoring be designed by the pool engineer and installed by the pool contractor.

9.40 BROADCAST CABLING PROVISIONS

9.41 Camera Locations

There are no formal guidelines to our knowledge for this facility and a permanent, “pre-wired” broadcast cabling system is not typically installed in these buildings.

Access to a TV truck parking location through access panels in various walls would allow for convenient installation of temporary or portable cabling. Typical camera locations would include:

- All four corners of the pool deck.
- Each side at the center of pool at deck level.
- Elevated main follow camera(s) at center, top of spectator seating area.
- “Near side” (same side as main follow) extended side line or diagonal corners.
- Catwalk or roof structure, each end of competition pool and at dive area.

9.42 Broadcast Cabling System

Broadcast cabling – No permanent broadcast cabling is typically installed in venues of similar use.

Coaching video cabling - No coaching video cabling is known to be required at this point.

9.43 TV Mobile Production Unit Access

Sufficient TV Truck parking should be provided near the facility for TV crew events. A minimum of one space is necessary. Minimum power required for each vehicle is (2) 200 amps, 120/208 volts, 3 phase.

9.44 Satellite Uplink Parking

Space for one mobile satellite uplink truck with clear line-of-sight and no obstructions to the southern horizon should be reserved near the broadcast truck parking area. This is expected to occur in the truck parking area, adjacent to the broadcast vehicles.

9.45 Local Television Stations, ENG Broadcasting

Parking is to be provided for a minimum of 1 SNG/ENG van type vehicle at the truck parking area, with a temporary cable pathway established to allow cabling to enter the building on an infrequent basis. As noted above, permanent cabling is not expected to be required. It is anticipated that ENG vehicles will operate on internal generator power and therefore no permanent power provisions are recommended.

9.46 Broadcast Feed Video Distribution

There are areas within the pool that will regularly receive feeds from the event broadcaster. These include the distributed TV system and potentially the coaching video system if installed. These systems will accept feeds from the broadcast facility or mobile truck and distributes them to the locations mentioned above.

9.47 Video Replay / Internet Broadcasting

If desired, one permanent camera could be installed and processed for video streaming of an event over the internet or setup in a simple "Web Cam" fashion. The addition of more cameras and routing equipment would provide a system that could provide multiple camera angles and a better broadcast, but an operator would be required. If this type of premium broadcast is desired for an athlete's friends and family or for scouting and recruiting purposes, addition programming is needed to determine the most appropriate design.

9.50 OPINION OF PROBABLE SYSTEM COSTS

Natatorium Sound Reinforcement System	\$150,000 - \$250,000
Natatorium Sound System Upgrades (restrooms, entrances, ticketing, etc.)	\$75,000 - \$100,000
Natatorium SMATV System	\$75,000 - \$100,000
Natatorium Televisions (approximately 30 to 40 units)	\$40,000 - \$50,000
Natatorium Broadcast Cable System	\$150,000 - \$300,000
Natatorium Video Replay / Internet Broadcast System	\$100,000 - \$275,000

These Opinion of Probable Cost (OPC) numbers include the technical systems equipment for the natatorium and its installation. This opinion is preliminary and is based on recent projects of similar scope/size and reflects our understanding of the level of technical sophistication as discussed in our meetings. As concepts are refined, detailed design development begins and comments are received from the University, these numbers may be revised.

This OPC does not include any electrical work or conduit infrastructure for the technical systems described. This includes, but is not limited to, any outlet back boxes, in-wall, in-slab or underground conduit, wall or floor coring or penetrations, or electrical power installation as provided by Division 16.

The building acoustical treatments will be provided under the architectural and finishes package.

10.00 ACOUSTICAL PERFORMANCE DESIGN GUIDELINES AND CONSIDERATIONS

10.01 Auditorium Arena

Modern arenas are multi-use facilities for reasons of economic necessity, even though a sports team may be the primary user of the building. It is our understanding that the arena seating bowl acoustical design should be optimized for true multi-purpose use, with superior acoustical treatment. The goal is to provide an environment that supports good speech intelligibility and music quality with little or no impact on crowd noise intensity.

Room Acoustics

In keeping with the multipurpose mission of the facility, the recommended acoustical treatments are:

- Roof deck treatment should include acoustic-rated, lapendary baffles suspended from roof joists/truss covering approximately 80% of exposed roof deck. Lapendaries should include a cantenary design with a minimum 3 foot gap between the roof deck and lowest hanging point of the banner.
- Providing low frequency absorption voids, “Bass Traps”, created by enclosing a cavity above tile ceiling with vertical acoustical baffles extending from the front edge of the ceiling to the roof deck. The bass trap is usually built in “found space” above suites or in corners, but can be created using a halo ceiling system above the upper seating area.
- Vertical walls above the last row of seating completely around the arena, the front faces of any control room/press areas, and any corners exposed to the bowl are to be treated with a combination of perforated metal acoustical panels to a minimum height of 8 ft. above the tread and backed by 2” thick insulation. Treatment should continue from tread height to deck above. Insulation (typically colored black) should continue from 8 ft to the underside of deck.
- Any large vertical surfaces lower in the bowl, such as behind Barrier Free accessible seating, Loge seating faces, camera platforms, and faces of pre-cast seating risers (where electronic signs or glass is not present) to be treated with perforated metal acoustical panels or Tectum “finale”.
- All seating (with the possible exception of suite seating) to be fully upholstered with cloth or acoustically porous material over open cell foam. High seat-back style chairs are acoustically preferable. Plastic seats or seats covered with faux leather are not desirable.
- Installation of acoustically beneficial house reduction/masking and vomitory blackout curtains.
- No glass walls, sliding doors, store front assemblies, etc. to be used for suite fronts. Where security access to the suites is a concern, rolling grilles are recommended.

Noise Control

Environmental Noise - The site does not appear to be impacted by significant environmental noise sources such as aircraft over flights, train noise and vibration, or roadway noise that would require acoustically upgrading the building exterior isolation. Most noise heard inside the building will be from arena utilities (air conditioning and circulation) and human activities. While space planning of mechanical systems and noise sensitive spaces will help minimize environmental noise impact, the building skin should be designed appropriately to limit noise intrusion due to weather or building mechanical systems.

Building Interior Noise Control

Isolation between locations in building – There are several noise producing activities in the Auditorium Arena. Care must be taken so that one function and/or the mechanical system do not adversely impact another activity.

Partition Considerations – All sound rated partitions surrounding or separating noise sensitive rooms or spaces should extend to structure above and have an STC rating of at least 50 (likely higher in some cases). In cases where the need for isolation is less critical, partitions can simply extend above deck. Penetrations in sound rated walls should be avoided and when necessary sealed around their entire perimeter, and the vertical and horizontal perimeter joints of the walls should be sealed airtight. Air transfer grilles must not be installed in sound rated walls; should open plenums be required, duct transfer boots should be specified.

Acoustically Sensitive Spaces

Team Areas – The entire perimeter partitions around team areas should be acoustically rated and extend to structure above. This is also true of training rooms and coach's offices.

Interview Rooms – Interview room partitions should extend to structure above. A fiberglass ACT ceiling system is recommended along with carpet and 2" thick acoustical wall panels above chair rail height on the back wall (opposite the talent) and the back 70% of the side walls.

Meeting/Conference Rooms – Rooms intended to be used only for hospitality, and not presentations, should have ACT ceilings. Meeting rooms that are used for presentations should have fiberglass ACT and 1" thick acoustical wall panels on 50% of the wall surface area above chair rail height. If the ceiling features gyp board coffers or other features, the areas between the coffers should be ACT.

HVAC Noise Control - HVAC systems are to be designed and balanced to meet the criteria outlined below.

WJHW recommend mechanical systems not exceed the following interior noise levels.

- | | |
|---|----------|
| • Interview/Media Rooms | NC30-35 |
| • Press/Suites | NC 35 |
| • Offices, Conference Rooms, Locker Rooms | NC 35 |
| • Training Room | NC 40 |
| • Main Seating Bowl/Concourse | NC 40-45 |
| • Public Toilet Rooms | NC 45 |
| • Mechanical Rooms | 85 dBA |

Air Terminals - Air rushing through air terminals (diffusers or grilles, supply or return) can add noise back into a system that is otherwise quiet. Select air terminals that under worst-case field conditions have a manufacturer's noise rating 5 NC points less than the required NC level for the room being served. For example, a private office needing an NC/RC-30 should have diffusers rated at NC-25. This is necessary for two primary reasons:

Manufacturers generally report the lab tested noise levels in terms of an NC value caused by the diffuser in a specific room. The room where the diffuser will be installed may not be anything like the room used in the manufacturer's data. Most rooms have multiple diffusers. The noise from each diffuser (supply and return) combines resulting in a louder noise level in the room. Never install volume dampers at diffusers. Keep them far enough upstream that laminar flow (or a smooth velocity profile) is obtained well before the air hits the diffuser. Manufacturers rate their diffusers' noise without obstructions that create turbulent airflow at the blades. As an alternative to dampers, use Terminal Boxes with variable frequency drives.

Air Velocities - To help keep air velocity noise within acceptable limits use the following recommended maximum air velocities (fpm) based on the desired noise level for the room served:

Our guidelines for duct velocities are shown below.

	Velocity at Air Terminal	Initial 10 feet Before Terminal	10 to 20 feet Before Terminal	20 to 30 feet Before Terminal
NC 30 Supply	425	500	700	850
NC 30 Return	500	600	800	950
NC 35 Supply	500	600	800	1000
NC 35 Return	600	700	900	1150
NC 40 Supply	550	625	900	1250
NC 40 Return	650	750	1000	1350

Terminal Boxes - Terminal boxes (mixing boxes, VAV boxes, fan-powered boxes, etc.) have two noise problems to be aware of: the *discharge* noise (inside the device) that is transmitted down the inside of the ducts, and the *radiated* noise that comes from the exterior housing of the box itself and travels through the room's finished ceiling. Openings such as ambient air intakes, particularly with fan-powered boxes, may require inlet silencing to reduce radiated noise to an acceptable level. Minimize a box's discharge noise by sizing it to operate in the middle to lower region of its airflow range when at maximum design airflow rate. Place all terminal boxes only in ceiling plenums over non-critical rooms such as open office areas, corridors, toilets, or storage rooms. This will reduce the effects of their radiated noise on the rooms adjacent to where they are located. If a terminal box must be placed over a noise sensitive room, select a box with a radiated noise rating 5 NC points less than the NC requirement for the room, and keep at least three feet clear between the bottom of the box and the finished ceiling.

Duct Lining - Fiberglass duct liner board is one of the most cost-effective ways to reduce noise traveling in duct systems. An acoustic benefit from duct liner is usually not seen until the liner's thickness reaches 1 inch. Therefore, ½-inch thick duct liner board should only be used where acoustic concerns are not an issue. Concerns have been raised recently regarding possible harmful health effects due to microbial growth or possibly carcinogenic loose fibers. It is generally felt that *properly installed* duct liner board in a *properly designed* HVAC system will not cause any adverse health effects. An overview of the available research in this area and a brief discussion of the pros and cons can be found on page 43.32 of the American Society of Heating, Refrigerating and Air-Conditioning Engineers (ASHRAE)

Handbook 1995 Applications. In light of the concerns over this product, the specifications for it should require strict oversight and compliance with safe installation practices as defined by the manufacturer and the Sheet Metal Association of Contractors North America (SMACNA). Bacteriostatic linings are available which minimize opportunities for microbial growth on duct lining which has become dirty and damp through poor filtration and humidity control practices.

Sound Attenuators - When other attenuation methods are not effective enough, a sound attenuator may be necessary. Generally, attenuators providing the most attenuation are longer and cause a larger drop in system pressure. A number of things should be kept in mind when selecting and locating an attenuator: To achieve an attenuator's rated performance, both the entrance and the exit of the attenuator must have a laminar flow condition. Therefore, locate attenuators at least 5 duct diameters from the air-handler (upstream or downstream) to a duct elbow. To keep mechanical noise from breaking back into the duct downstream of an attenuator, place attenuators in the mechanical room wall, abutting next to the wall if fire codes are an issue or use round duct between the attenuator and the wall.

Air Handlers - The primary source of noise and vibration in air handlers is the fan. However, the paths of this noise and vibration are numerous. A large portion of the airborne *noise* is sent down the supply ducts; some goes back through the return ducts and the rest is radiated through the unit's walls. Much of the *vibration* is attenuated by the fan's spring supports. But a sizable amount of vibration is caused by the airborne low-frequency noise incident on the unit's walls. To isolate all the vibration and noise paths: Mount the entire air handling unit on spring isolators rather than just mounting the fan motor assembly on springs. Use open, stable spring mounts with appropriate static deflection, non-skid pads, integral leveling and mounting bolts such as Mason Industries' SLF. This will isolate both the fan's inherent vibrations and the vibrations caused by the excessive low-frequency noise levels. Suspend connecting piping on spring isolating hangers. If piping must be rigidly suspended from the building, use a flexible pipe connection fitting such as Mason Industries' Super-Flex connectors. Attach electrical connections using flexible conduit with at least a 90 degree bend.

Return Path - Noise in the return path is often overlooked in a system design. Contrary to popular myth, noise travels equally well with or against the airflow. Therefore, the rules for the supply path also apply to the return path when it is ducted. In a non-ducted return system the following items should be explored: The path from the air handler to the first noise-sensitive room should be of sufficient length to adequately attenuate the noise from the mechanical room or air chase. If a duct is employed to bring air from a ceiling plenum to the air handler's inlet, then a sound attenuator or duct lining may be employed. Return grilles opening into ceiling plenums with excessive mechanical system noise should have a sheet-metal duct "boot" or "hat" placed over the opening. When floor to roof partitions obstruct the free flow of ceiling plenum air, use transfer ducts to avoid allowing sound in one room being heard in the other:

Supply Path - Various aspects of the supply duct path affect noise attenuation. The supply path between the air handler and the first diffuser take-off must be of sufficient length to allow noise attenuation to occur. Duct lining is the most cost-effective attenuation method,

but it needs adequate duct length to accomplish its task. Likewise, a sound attenuator also needs an adequate amount of duct to accommodate its length and to provide laminar flow at its entrance and exit. To avoid duct rumble, the duct geometry at the air handler should not turn the air in a direction contrary to the rotation of the fan.

10.02 Corbett Pool

Modern aquatic buildings are multi-use or multi-user facilities for reasons of economic necessity. It is our understanding that the pool acoustical design should be optimized for true multi-purpose use, with superior acoustical treatment for both a competition environment as well as recreational use. The goal is to provide an environment that supports good speech intelligibility and music quality in key areas of the facility.

Indoor swimming pools, due to the requirement to be moisture, corrosion and mildew resistant are often acoustically difficult spaces, which create an uncomfortable listening environment resulting in poor speech intelligibility. The intent for the acoustical design, therefore, is to provide appropriate treatments to limit noise buildup, reduce reverberation time (RT), and provide improved speech intelligibility. The following elements are recommended to assist in these provisions should providing a comfortable environment for coaches, participants, and spectators.

Room Acoustics

A Natatorium commonly consists of hard surfaces and a large room volume where the reverberation time (RT) in the space is typically in excess of 5.0 seconds without acoustical treatment. This creates a soundscape which results in excessive noise volume and poor speech intelligibility. To help mitigate these acoustical issues, a large amount of acoustically absorptive material is required.

We recommend the material be concentrated on the ceiling, in particular, as well as upper vertical wall surfaces. The placement of acoustical material in these locations maximizes the square footage available and limits the possible abuse and water damage that could occur at lower elevations

In addition to the placement, the material selection is critical. Typical fabric wrapped acoustical wall panel solutions do not hold up well in the high humidity environment of the Natatorium. Instead, vinyl banner construction, slotted concrete block, and perforated metals are recommended. These materials provide a more robust construction that can stand the abuse of wet, humid, and chemical environments.

Roof Deck - We recommend acoustical treatment(s) be applied across a minimum 80% of the gross ceiling area. This allows room for lighting, mechanical and structural penetrations while maintaining a high concentration of acoustical material.

The following options are recommended and certified by their manufacturers for use in natatoriums.

- Lapendary or Hanging acoustical vinyl baffles suspended under non-acoustical metal deck; minimum 2-inch thick with an NRC rating of 1.0 or better. These materials are excellent acoustical absorbers, but often are seen as less desirable architecturally as they do not have clean edges and may show wrinkled fabric.
- Epic ER 2.5A acoustical metal deck or CSI Versadek; minimum NRC 0.90 rating. These panels provide a clean ceiling look with good acoustical performance. Cost

can be an issue. Due to the wet environment, fiberglass infill in the deck should be bagged and the sheet metal should be galvanized after the perforations are made to avoid rusting at the perforations.

- Fiberglass Lay-In Ceiling Panels; minimum NRC 0.80 – typically a 1 inch fiberglass panel. The panel should be rated for high humidity areas. Placement of lay-in panels is generally to concentrate them above the spectator seating area.

Vertical Wall Surface - Vertical wall treatments should be considered on walls starting above 10 feet. The actual square footage required depends on room volume, ceiling treatment, and available wall area; additional information will follow as design progresses. However, for initial budget considerations, we recommend planning for 40-60% coverage of the vertical surface.

The following acoustical wall treatments are recommended for use in natatoriums:

- Perforated Metal Wall Panels; minimum 2 inches thick with an NRC rating of 0.90 or greater. Fiberglass infill should be bagged and perforated metal should be specified to be galvanized after perforations are made to avoid rusting.
- Acoustical Concrete Block; 8 inch slotted block with fiberglass infill and an NRC rating of 0.70 or greater. Slotted block can be painted, but care should be taken not to fill the slots or cover the infill fiberglass with paint.

Noise Control

Environmental Noise - The site does not appear to be impacted by significant environmental noise sources such as aircraft over flights, train noise and vibration, or roadway noise that would require acoustically upgrading the building exterior isolation. Most noise heard inside the building will be from arena utilities (air conditioning and circulation) and human activities.

Building Interior Noise Control

Isolation between locations in building – There are several noise producing activities in the natatorium. Care must be taken so that one function or the mechanical system does not adversely impact another activity.

Partition Considerations – All sound rated partitions surrounding or separating noise sensitive rooms or spaces should extend to structure above and have an STC rating of at least 50 (likely higher in some cases). In cases where the need for isolation is less critical, partitions can simply extend above deck. Penetrations in sound rated walls should be avoided and when necessary sealed, as with the top and bottom of the walls. Air transfer grilles must not be installed in sound rated walls.

Acoustically Sensitive Spaces

Team Areas – The entire perimeter partitions around team areas should be acoustically rated and extend to structure above. This is also true of training rooms and coach's offices.

Meeting/Conference Rooms – Rooms intended to be used only for hospitality, and not presentations, should have ACT ceilings. Meeting rooms that are used for presentations should have fiberglass ACT and 1" thick acoustical wall panels on 50% of the wall surface area above chair rail height. If the ceiling features gyp board coffers or other features, the areas between the coffers should be ACT.

HVAC Noise Control - HVAC systems are to be designed and balanced to meet the criteria outlined below.

WJHW recommend mechanical systems not exceed the following interior noise levels.

- Offices, Lobby, Conference Rooms, Locker Rooms NC 35
- Training Room NC 40
- Pool/Spectator Areas NC 40
- Public Toilet Rooms NC 45
- Mechanical Rooms 85 dBA

Air Terminals - Air rushing through air terminals (diffusers or grilles, supply or return) can add noise back into a system that is otherwise quiet. Select air terminals that under worst-case field conditions have a manufacturer's noise rating 5 NC points less than the required NC level for the room being served. For example, a private office needing an NC/RC-30 should have diffusers rated at NC-25. This is necessary for two primary reasons: Manufacturers generally report the lab tested noise levels in terms of an NC value caused by the diffuser in a specific room. The room where the diffuser will be installed may not be anything like the room used in the manufacturer's data. Most rooms have multiple diffusers. The noise from each diffuser (supply and return) combines resulting in a louder noise level in the room. Never install volume dampers at diffusers. Keep them far enough upstream that laminar flow (or a smooth velocity profile) is obtained well before the air hits the diffuser. Manufacturers rate their diffusers' noise without obstructions that create turbulent airflow at the blades. As an alternative to dampers, use Terminal Boxes with variable frequency drives.

Air Velocities - To help keep air velocity noise within acceptable limits use the following recommended maximum air velocities (fpm) based on the desired noise level for the room served:

Our guidelines for duct velocities are shown below.

	Velocity at Air Terminal	Initial 10 feet Before Terminal	10 to 20 feet Before Terminal	20 to 30 feet Before Terminal
NC 30 Supply	425	500	700	850
NC 30 Return	500	600	800	950
NC 35 Supply	500	600	800	1000
NC 35 Return	600	700	900	1150
NC 40 Supply	550	625	900	1250
NC 40 Return	650	750	1000	1350

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MEP Analysis (prepared by ME Engineers)

ARENA AUDITORIUM MECHANICAL SYSTEM REQUIREMENTS

- A complete, functional mechanical system shall serve the arena renovation. The system shall be reliable and constructed of quality, commercial grade equipment throughout to meet the state and local codes. The following outlines the design parameters of the major system components:
- HVAC SYSTEMS
 - New heating and ventilation units shall be provided to serve the remodels. Interior and exterior mounted central handling system will be provided with the following components:
 - 100% Economizer Section.
 - Hydronic heating coil with 2-way valve.
 - 90% efficient direct evaporative cooling section
 - 30% and 60% filters (for LEED credit)
 - Return / outside air section
 - Air Blender
 - Variable volume supply fan(s)
 - Appropriate access sections.
 - Return air and low leakage outdoor air dampers.
 - 4"double-wall construction.
 - Internal spring isolation.
 - Trane, Johnson Controls or equal.
 - Heating will be provided via Campus Steam distribution system
 - All spaces shall be provided with heating.
 - Acoustic treatment will be applied as needed to meet sound levels in noted spaces as defined by the sound level criteria. Each air handler will have supply duct silencers.
 - All supply and return ducts will be lined.
 - Areas of game day operation will be served by units separate from those serving areas of year round operation.
 - The controls will be set-up for variable outside airflow based on space pressurization (maintain positive with respect to outside), CO2 concentration in the space, and 100% outside air capability for economizer operation.
 - Outside air and exhaust ducting to be coordinated and architecturally integrated into the perimeter wall layout.
 - Spaces with 24/7 process loads will be provided with transfer fans for ventilation.
- PLUMBING SYSTEMS
 - Systems will be designed in accordance with applicable Local Building and Plumbing Code standards and State requirements, using approved materials and installation methods.
 - Domestic water system upgrades shall be coordinated with existing systems to minimize, or prevent if possible, any new water taps to the city mains.
 - Provide reduced pressure backflow preventers at each entry.
 - Cold water will be routed to all required fixtures and hose bibbs.

- The domestic cold water pressure requirement is 40 psig at the most remote upper level fixture.
- Interior cold water hose bibs with backflow preventers will be provided in toilet rooms.
- Freeze proof wall hydrants will be located along exterior wall for maintenance personnel.
- High-capacity hose valves shall be located in the restroom plumbing chases (with access doors for maintenance personnel).
- Provide trap primers or passive trap protection at all floor drains.
- Where piping penetrates fire separations, an approved fire stopping installation shall be provided.
- Domestic hot water will be generated at local gas-fired heaters or steam to water converters.
- Each concourse restroom group, or multiple adjacent groups will have a dedicated water heater.
- Natural gas will be delivered at 5 psig to all cooking concession stands, gas-fired domestic water heaters, (if applicable) and the main kitchen.
- Step down PRVs (with vents to the exterior) and shut-off cocks will be provided for each system.
- The building will have a gravity drain system to be accommodated by the Civil Division.
- Oil-minder sump pumps will be provided for elevator pits. These pumps will be indirectly discharged into an approved receptor, which discharges to the sanitary sewer. The pumps will shut down and alarm if/when oil is sensed.
- Floor drains and floor sinks will be provided where required adjacent to equipment, in toilet rooms, in wet mechanical rooms, concessions stands and locations indicated on drawings.
- All floor drains and floor sinks shall be primed.
- All concessions will have localized, on-floor grease traps at three compartment sinks.
- Storm system will be piped as a standard gravity release system as per the requirements of the Authority Having Jurisdiction.
- Perimeter overflow scuppers will be provided through parapet walls or over-flow drains will be piped to lamb's tongue Downspout Nozzles. Over-flow outlets will be piped to locations which are not architecturally conspicuous, but where they will be noticed if in use. This will alert maintenance personnel to service the main drainage system.
- All elevated buildings will have overflow drains.
- Plumbing fixtures will be standard commercial grade, low flow.

ARENA AUDITORIUM ELECTRICAL SYSTEM REQUIREMENTS

- A complete, functional electrical system shall serve the arena renovation. The system shall be reliable and constructed of quality, commercial grade equipment throughout to meet the state and local codes. The following outlines the design parameters of the major system components:
- ELECTRICAL SERVICE & DISTRIBUTION
 - The electrical service to the existing arena shall be configured to accommodate the renovation, including all phases of the renovation.
 - Modify existing 15KV service to accommodate new pad mounted 15KV – 480V transformers which will feed the renovated arena loads.
 - The 480V distribution will be modified / replaced to accommodate the renovated arena loads.
 - The distribution system shall provide power to all arena equipment including, but not limited to broadcast trucks, concert power, scoreboards, concession equipment, mechanical equipment, owner furnished equipment, laundry equipment, dock equipment, office equipment, advertisement/graphics, televisions, ATMs, pay phones, lighting and convenience receptacles.
 - The electrical service, distribution, conduit systems, supports, cabinets, equipment, fixtures and grounded circuit conductors shall be properly grounded in accordance with latest issue of the NEC.
- EMERGENCY GENERATION
 - On-site diesel generator(s) shall be provided to serve all emergency and standby loads required for the arena life safety systems. The system shall include, but are not limited to egress lighting, elevators, fire pump, fire alarm, public address system, security, sewage ejectors, building management system and smoke control fans as well as associated HVAC support mechanical equipment.
- LIGHTING
 - All interior and exterior areas of the arena will be provided with a lighting system to maintain illumination levels recommend by IES, ASHRAE, NEC, NFPA and the local codes. All fixtures shall be commercial grade.
- ARENA LIGHTING
 - The arena lighting shall utilize metal halide fixtures with operable blackout capability that will illuminate the court to meet NCAA requirements and satisfy the television broadcasters. Supplemental quartz lights will be connected to the emergency system as well as the aisle lighting as needed to illuminate the bowl for egress in the condition that power is lost during an event.

- LIGHTNING PROTECTION
 - The arena shall be provided with lightning protection that is a Franklin system in accordance with NPFA 780 or an Early Streamer Emission if required by the Owner's insurance carrier.
- FIRE ALARM
 - The fire alarm system shall be provided in accordance with the program requirements, latest industry standards, applicable codes (NFPA, ADA, NEC). The fire alarm system shall be a fully addressable, electronically supervised, microprocessor based integrated with an emergency voice communication system, detection, manual pull stations, audio/visual devices, smoke control (if required) and flow/tamper switch monitoring. System shall be compatible with and report to the campus Edwards based fire alarm system.
- SECURITY
 - Provide a complete and functional integrated security system with access control, intrusion detection, door monitoring, surveillance cameras and monitors. The security system shall incorporate hardware and software specifically designed to support multi-systems, multi-users, multi-tasking, point monitoring and system administration and operation. System shall be interfaced with the fire alarm system.
- TELECOMMUNICATION SYSTEM
 - The telecommunication system shall include voice and data systems operated over fiber optics and twisted pair copper type media. The telecommunications systems shall be provided and installed to meet the National Electrical Code (NEC), ANSI/EIA/TIA Standards, BICSI, NEMA, IEEE standards and other applicable local codes.

CORBETT POOL MECHANICAL SYSTEM REQUIREMENTS

- A complete, functional mechanical system shall serve the natatorium renovation. The system shall be reliable and constructed of quality, commercial grade equipment throughout to meet the state and local codes. The systems will be designed to take advantage of the latest technology to be energy efficient, easily maintainable while meeting the requirements of the project budget. Specific challenges within the mechanical and plumbing systems include but are not limited to the following:
 - LEED Silver or equivalent rating will be required
 - Update the building automation systems to the Campus Wide Johnson Control system, interface and monitor system remotely
 - Building energy use will be monitored and displayed to demonstrate energy efficiency features of the building
 - Update the existing HVAC systems to maximum energy efficiency
 - Dehumidification shall be accomplished via a heat pipe type energy recovery system. This system will maximize energy efficiency, without sacrificing comfort or dehumidification capacity.
 - New systems shall take advantage of dry climate and utilize evaporative cooling
 - New low flow plumbing fixtures will reduce the water consumption of the facility by 30%+ over LEED baseline.

CORBETT POOL ELECTRICAL SYSTEM REQUIREMENTS

- A complete, functional electrical system shall serve the natatorium renovation. The system shall be reliable and constructed of quality, commercial grade equipment throughout to meet the state and local codes. The systems will be designed to take advantage of the latest technology to be energy efficient, easily maintainable while meeting the requirements of the project budget. Specific challenges within the electrical and technology systems include but are not limited to the following:
 - LEED Silver or equivalent rating will be required
 - Review the existing pad mounted transformer and distribution to determine whether replacement is required.
 - Updating the power distribution to feed new pool equipment.
 - Updating the power distribution to feed new and/or modified HVAC equipment.
 - Updating the existing lighting of the interior spaces. Options include utilizing daylighting where possible, automatic adjusting controls, high efficiency fluorescent lighting.
 - Updating the natatorium lighting to utilize daylighting, metal halide or potentially LED uplighting. Lighting will be energy efficient and located for accessible maintenance.
 - Updating the existing egress life safety concerns within the facility. A new fire alarm will be provided. A new generator will feed all life safety loads within the facility and may be sized to accommodate adjacent buildings.
 - Updating the technology systems to support new telephone and data requirements. Options include new fiber and copper systems to support both wired and wireless technology.

CORBETT POOL EXISTING FACILITY ANALYSIS (prepared by Counsilman-Hunsaker)

Section 1: Existing Facility

The University of Wyoming's Corbett Pool was built in 1972. It has an "L" shaped configuration with 1 Meter and 3 Meter springboard diving. The pool utilizes directional eyeball wall inlets for the return inlet system. The rebar in the pool's reinforced concrete shell is corroding and signs of corrosion are visible thru the tile. Approximately 15-20 leaks are visible around the exterior of the pool shell in the tunnel that surrounds the pool.

The pool recirculation system draws water from VGB compliant main drains and the pool surge tank. Water flows via gravity from the pool overflow gutter system to the surge tank. The surge tank is located under the diving boards. The pool is designed with a 750 GPM recirculation rate and a 6 HR turnover rate. The pool utilizes a high rate sand filtration system that is approximately 5-6 years old. Currently, the filter backwash water connects directly to the storm sewer. Due to this water being chemically treated, most municipal health department swimming pool codes require that the backwash water be sent to the sanitary sewer. The pool chemical controller is a Strantrol System 5 and was replaced fairly recently. The original pool design utilized gas chlorine as the pool sanitizer and caustic soda as the pool pH buffer. A variable frequency drive (VFD) is connected to the recirculation pump. The existing pool mechanical and chemical rooms are located below grade in the basement level. Access for pool chemical deliveries and pool equipment maintenance is a concern for the existing layout.



Section 2: New Mechanical Equipment and Layout

Based on the pool size difference between the existing Corbett Pool and new pool described in the Pool Narrative, it does not make economical sense to reuse any of the existing pool equipment. For high-end University competition pools, it is recommended to have two (2) full sized recirculation pumps to ensure that the facility remains in operation even in the event that one of the pumps is out of operation. A VFD will be provided for each recirculation pump to ensure that each pump is working as efficiently as possible while still maintaining the design flow rate. A new high rate sand filtration system will be provided with either semi-automatic or fully-automatic backwash control based on the final decision of the University. The filter backwash water will discharge into a backwash catch basin through an air gap before discharging into the sanitary sewer system. A new fully automated chemical controller will be provided with an Ethernet connection for remote access and monitoring. The chemical controller will have the ability to control both the filter backwashing and the recirculation pump VFD systems. A calcium hypochlorite (solid chlorine) chlorination system will be provided for the pool sanitizer. Muriatic Acid carboys and metering pumps will be provided for the pH buffer. An Ultraviolet Dechloramination and Disinfection system will be provided for each body of water as a supplemental sanitizer to help reduce chloramines in the pool water and air above the pool water. Direct fired natural gas commercial pool heaters will be provided for the pool heating system. The pool heaters will have venting for intake air and exhaust fumes.

The pool mechanical room will remain in the existing location. Improvements will be made in the form of a freight elevator and/or ramp system to provide better access for servicing and replacing pool equipment. The pool chemical rooms will be relocated to the ground level with preferable access doors on the exterior building wall to provide easy access for chemical deliveries.

CORBETT POOL MASTER PLAN

Section 1: Swimming Pool Executive Summary

The University of Wyoming Aquatic Center will be designed to meet the needs of the University for the next fifty years. It is important to provide maximum flexibility for programming, which will be the key to maximum utilization.

The Aquatic Center will feature one (1) 50 meter competition pool and one (1) spa. The 50 meter pool will be constructed of cast-in-place concrete or pneumatically applied concrete. The interior finish for the 50 meter competition pool and spa will be unglazed ceramic mosaic tile. All loose and deck equipment will be as required by the applicable Health Department Regulations and the requirements of the NCAA, FINA, NFSHSA (i.e., ladders, grab rails, safety ropes and anchors, lifeguard chairs, stanchions, deck anchors, etc.). The filtration systems will utilize high rate pressure sand filters. The sanitizer for the competition pool and spa will be calcium hypochlorite. The pH buffer will be muriatic acid. An Ultraviolet Dechloramination and Disinfection system will be provided for each body of water as a supplemental sanitizer. Miscellaneous maintenance and first aid equipment will be provided that meets the applicable Health Department Regulations.



The natatorium and swimming pool will meet the following performance standards:

Overhead lighting:		
Competition Pool	=	100 foot candles
Water Temperature:		
Competition Pool	=	78 – 82 degrees F.
Spa	=	100 – 104 degrees F.
Air Temperature	=	84 - 86 degrees F.
Relative Humidity	=	50%
Reverberation Time	=	2.0 to 3.0 seconds
Turnover Rate of Filtration System:		
Competition Pool	=	5.5 hours
Spa	=	30 minutes
Free Chlorine Level	=	1.0 - 3.0 ppm
pH level	=	7.4 - 7.6

Section 2: Swimming Pool Program

Competition Pool

The indoor competition pool will have dimensions of approximately 50 meters (172'-0") x 25 yards (75' - 1½") with a minimum depth of 7 feet and a maximum depth of 17 feet. Eight (8) 9' - 0" wide 50 meter lanes will be marked with black floor markers across the pool floor and nineteen (19) 8' - 6" wide 25 yard cross-course lanes will be marked with blue floor markers across the pool floor. A 24" deep fully recessed gutter system will be provided on the ends of the pool and a rollout gutter will be provided on the sides of the pool for recirculation of pool water. Wall targets and floor markers will be provided for a competitive race course. Cup anchors will be provided in the pool gutter wall for floating lane lines. Grab rails with recessed steps will be provided for easy entry and exit. A toe ledge in the pool wall along the pool perimeter will provide a means for swimmers to rest during training. Equipment to be provided will include (not all inclusive): starting blocks, in-deck timing system, 1-meter and 3-meter diving boards, 5-meter diving platform tower, sparger system, water surface agitators, floating water polo goals, two (2) 4'-0" wide bulkheads, movable guard stands, pace clocks, ADA handicap lift, maintenance equipment, and safety equipment. The water temperature in this pool should be kept between 78-82 degrees F.



Spa

The aquatic center will also feature one spa near the diving area. The spa will be 3'-0" deep with a capacity of approximately 12 people. The spa will be made of concrete and feature a tile interior with hydrotherapy jets. Skimmers will be provided for recirculation. An emergency shut off switch and timer will be provided near the spa for the recirculation and hydrotherapy pumps. The water temperature in the spa should be kept at 100-104 degrees.



Spectator and Athlete Considerations

Overhead Lighting: Natural lighting should be provided if consistent with the architect's design concept. This may take the form of sky lighting or top lighting, utilizing clerestory features over the center of the pool. It is sometimes desirable to utilize natural light through the use of wall windows. The problem of reflected glare on the water, and associated eye strain is a major concern in natatoria design for spectator events because the window light on the water creates a reflection on the surface and the swimmers' heads appear in silhouette. The spectator cannot see beneath the surface of the water. This phenomenon is a serious problem for lifeguards. This dilemma can be solved by the use of movable window shutters, curtains and/or a saw tooth wall plan, which features openings directed away from the spectator area. A common solution is to avoid wall windows opposite spectator seating and to provide strategic locations for fenestration that minimize reflected glare bouncing off the water surface for spectators and lifeguards.

Spectator Seating: Side decks must create satisfactory sight lines from the spectator seating. If the facility is to support competitions, permanent spectator seating should be considered. If possible, seats should be located overlooking the entire length of the competition pools from both sides. The preferred location is from above the pool deck in second floor galleries. Space for temporary seats may also be considered on the pool deck. If spectator seating is provided, access may be via vomitories from an outside corridor and/or down feed stairs from an aisle behind the top row of the seats. Consideration must be given to ADA requirements for access and seating by those who are infirmed or

otherwise disabled. There should be no aisle in front of the first row because it will negatively impact the line of sight of the spectator gallery by moving it further from the pool. Convenient stairway access from the pool deck to the permanent elevated spectator area should be considered. Material options for bench seating include wood (traditionally yellow or Port Orford cedar, although some exotic rainforest woods have been used), aluminum (anodized or powder coated) or a fiberglass reinforced plastic material. For indoor applications, FRP or plastic should be considered. Electric outlets and hose bibs should be provided for custodial tasks. Janitors' closets may be strategically located in the spectator gallery, at the deck perimeter and in the dressing rooms. Their omission may discourage thorough custodial cleaning. A popular railing system to consider in front of the spectators in the natatorium is a structural safety glass system with an aluminum rail on top. This allows good spectator viewing of races through the railing system. Heavy gauge aluminum, galvanized steel or epoxy painted steel has been used for economy. While epoxy coated mild steel railings, structural trusses, columns, beams and other elements can be used in a natatorium, other items should be avoided where there are appropriate substitutes.

Climate Control: Some facilities have systems that dehumidify the air in the natatorium and heat the swimming pool water or heat the ambient air in the natatorium through a heat exchanger with the rejected heat. Ventilation may be used to control humidity and chlorine concentrations under certain climatic conditions. Air movement should be kept within the following limits: air velocity at any point below 8 ft. above the pool deck should not exceed 25 f/m in order to avoid creating a chill as a result of evaporation on the wet skin surface. Spectator areas should have higher air velocities of cool air. High velocity warm air in the face of spectators can be very uncomfortable. Cool air, therefore, should be introduced into the spectator seating area. Diving board and platform areas should have velocities below 25 fpm. Circulation fans must be designed and located so that they produce minimal noise in the natatorium space. Air velocity over the pool and deck should be limited to 25 fpm to avoid cooling the swimmers and excessive evaporation. In the spectator seating areas, fully clothed spectators should not be subjected to the same temperature of air as the balance of the natatorium. Spectator ventilation should be introduced by a dedicated system to provide cooler air. Ceiling fans have also been used to improve spectator comfort. A slightly negative pressure in the natatorium should be considered to reduce moisture drive through the walls and chlorine vapor migration into other parts of the building.

Section 3: Swimming Pool Systems and Equipment

Pool Construction

Pool shells of cast-in-place concrete or pneumatically applied concrete will be provided depending on the results of the geotechnical investigation, construction staging, cost, and site access. An option to use either method may be included if appropriate for the soil conditions. Different swimming pool contractors use different methods of concrete pool shell construction.

Hydrostatic Relief Systems

A means of stabilizing the pool shell when abnormal subsurface hydrostatic pressure occurs will be provided, which otherwise can cause the pool shell to float when the swimming pool is empty. This hazard is minimized if a full basement surrounds the pool tank; however, if the pool walls rest in an unexcavated mass, the danger does exist.

The design of a hydrostatic relief system is usually based upon the predictable levels of the subsurface water table. Because other developments can also create a hazardous situation when the pool is empty, it is important to understand these various dangers and to design a comprehensive system that will prevent destructive forces from developing. Various systems have been developed including automatic check valves, concrete ballast, dehydration systems, refilling systems and gravity drains. The primary issue, as in any preventative action task, is to understand the various kinds of hazard and damage that may occur.

Even a benign water table is not justification to dismiss the potential problem. An unnatural hydrostatic pressure condition can develop if a break occurs in a water pipe in either the fresh water system or the pool water system. This rapid introduction of water into the otherwise "dry" substrata can create an unstable condition for the pool shell. In the case of the fresh water line, the condition can go undetected for months in certain circumstances. For this reason the pool will feature some means of draining the substrata below the pool shell.

In addition to a conventional automatic hydrostatic relief mechanism(s), it is recommended that a sight well be provided in the pool deck, adjacent to filter room or immediately outdoors of the natatorium. Such a feature will allow the visual inspection of the water table under the pool and in the case of the outdoor sight sump, dewatering can be conveniently executed.

Pool Finish

The interior finish for the pool and spa will be unglazed ceramic mosaic tile. Wall targets and floor markers will be black and/or midnight blue. Depth markings and warning signs for the pool deck will be required by code in contrasting ceramic tile. Depth markings will be shown in standard and/or metric measurements. "NO DIVING" signs will be provided at all pool areas with a depth of water 5'-0" or less. Depth markers will be provided per code at not more than 25 ft intervals.

Overflow Recirculation Systems

The purpose of the perimeter overflow system is to receive and capture water at the pool surface. This water is then transferred to the filter plant, either by direct suction connection, or through a surge tank, which helps stabilize the water displacement in the swimming pool.

A 24" deep fully-recessed gutter will be installed on the ends of the competition pool and 24" deep rollout gutter will be installed on the sides. A surge tank will be required for the pool. The spa will utilize a skimmer system.

Filtration Systems

The filters will be high rate pressure sand filters operating at a flow rate of up to 15 GPM per square foot of filter area. While many manufacturers rate their system at 20 GPM/sq. ft., field experience has shown that the lower flow rate results in better water quality. The system will be designed to completely turn over the water for the competition pool every 5.5 hours and the spa every 30 minutes.

Filter room and filter face piping will be PVC Schedule 80 piping used throughout the pool and spa piping system because of its non-corrosive quality; however, only molded fittings are recommended. All flanges will be reinforced with a steel ring molded into the flange to avoid cracking due to vibration. Heat exchanger by-pass piping will be copper or CPVC

Pumping Equipment

Horizontally mounted centrifugal pumps will be utilized for all the pool and spa recirculation pumps and spa hydrotherapy pumps. The pumps will be certified by the National Sanitation Foundation (NSF) and bear the certification mark. Pump casing will be cast iron fitted with a replaceable bronze case wear ring. Pump impeller will be enclosed type of cast bronze, statically and dynamically balanced, and trimmed for the specified design conditions. A hair and lint strainer will be provided, for each pump, constructed of fiberglass or epoxy coated stainless steel construction with a clear observation top. Pressure gauges will be installed on the discharge of the pumps and compound gauges will be provided at the intake port of the pumps, after the hair and lint strainer.

Piping Systems

Exposed piping in the filter room and surge tank will be Schedule 80 PVC for strength and resistance to corrosion. All piping below the floor of the pool shell will be encased in concrete and will be Schedule 40 PVC.

All valves will be identified in the filter room. Valves will be described as to their function and referenced in the operating instruction manual and wall mounted piping diagram to be prepared by the contractor.

The pool and spa will utilize a combination of floor and wall inlets.

Chemical Treatment Systems

Calcium hypochlorite will provide the primary chemical sanitizing for the pool and spa. The halogen requirement of the pools will be automatically monitored and controlled by a chemical controller capable of monitoring 0 to 6 parts per million of chemical and showing Oxidation Reduction Potential (ORP) in addition to the traditional readings of sanitizer and pH.

Muriatic Acid will be provided as the pH Buffering System. Chemical feeders for muriatic acid will be peristaltic type pumps. Two (2) fifteen (15) gallon acid drums or one (1) 55 gallon acid tank by LMI will be provided for each body of water. Chemical feed pumps will be furnished and connected to the filtered water return lines to the pool(s) as shown on the pool plans. The pumps will be capable of feeding a solution to the pool(s) to maintain pH level against the back pressure involved and will be fully adjustable while in operation.

An Ultraviolet Dechloramination and Disinfection System will be provided so that the pool and spa water will be monitored and treated by UV sterilization in the range of 220nm to 400nm to kill bacteria, viruses, molds and their spores and to continuously remove chloramines. The concentration of free chlorine residual will at all times meet the requirements of the Health Department authority having jurisdiction over the swimming pool. Any proposed UV system must have a UL listing on the complete system and be listed under NSF Standard 50.

Water Chemistry Controller

A programmable chemical automation system will be furnished for the pool and spa for continuous monitoring of water chemistry (ORP/HRR, PPM, pH and Temperature), Langelier Saturation Index, and for automatic control of the chemical feeders, heater, and water level. Installation of the system will be as specified by the manufacturer. A factory-authorized representative will provide training to the owner and the training will be video taped per the specifications. Such a system will not only improve the water quality of the pool, but will also improve the overall environment of the natatorium because of the greater degree of chemical balance of the water. This can result in much less aggressive atmospheric conditions.

Inserts and Anchor Sockets

- A. Anchors for grab rails and stair railings will be provided.
- B. Anchors for backstroke stanchions will be provided.
- C. Heavy-duty cup anchors for all floating lane lines will be provided.
- D. Anchors for starting blocks will be provided.
- E. Anchors for diving boards will be provided.
- F. Anchors for the handicap lift will be provided.

Deck Equipment

- A. Grab rails and recessed steps for the pool will be provided as required. These will be provided by stainless steel grab-rails set in chrome plated bronze wedge anchors and escutcheons with set screws. Recessed steps in the pool wall will be provided.
- B. Backstroke and recall rope stanchions will be provided. The backstroke stanchions will be fitted with pennants and the recall stanchions with a rope.

- C. 24" x 32" track start starting platforms will be provided for the pool. These may be removed from the deck when not in use. Diving from the starting platforms should be restricted to supervised practice or competition of athletic teams.
- D. Lifeguard chairs to meet the minimum standards of state regulations will be provided in portable (wheeled) units that may be stored out of the way during periods when lifeguards are not required.
- E. A surge tank access hatch will be furnished and installed over the surge tank. The access hatch will be a single door 2 ft.-6 in. x 2 ft.6 in with 1" fillable pan to receive ceramic tile and grout or concrete deck fill. The frame will be 1/4 inch extruded aluminum with built in neoprene cushion and continuous anchor flange. Door will be 1/4" aluminum plate reinforced with aluminum stiffeners as required.
- F. Surge tank ladder rungs will be 1/2 inch Grade 60 steel encased with co-polymer polypropylene plastic.
- G. Handicap lift(s) will be provided to meet ADA guidelines.

Loose Equipment

- A. 6" diameter floating lane lines will be provided with an adequate number of storage reels.
- B. Lane line storage reels will be fabricated from a heavy-duty aluminum reel joined together by a 1-1/2 inch aluminum axle. This unit must ride easily on four hard rubber wheels.
- C. 31" octagonal pace clocks will be provided on portable carts with battery power.
- D. Floating water polo goals will be provided for water polo practice and competition.

Maintenance Equipment

- A. Wall brush will be a flexible polyethylene material with five (5) rows of nylon bristles. Pool brush holder will be permanent mold cast aluminum with hydrofoil flap.
- B. Skimming net head will consist of one-piece molded plastic frame with a reinforced, integral handle bracket suitable for quick attachment to a standard 1 1/4 or 1 1/2 inch diameter handle using bolts and wing nut.
- C. Adjustable telescopic and stainless steel poles to will be provided.
- D. Testing kit to feature liquid reagents, color comparator, waterproof instructions and treatment charts, chemistry guide and watergram. Test kit to have the ability to test for free and total chlorine (0.5 – 5.0 ppm), bromine (1-10 ppm), pH (7.0 – 8.0), acid and base demand, total alkalinity, calcium hardness and cyanuric acid.
- E. A vacuum cleaner will be provided with pump and strainer.
- F. Stainless steel cleaner will be provided.

Safety Equipment

- A. Ring buoys and extension ropes will be provided.
- B. Life hook and an aluminum extension pole will be provided.
- C. Spineboards will be provided with head immobilizer, head strap, body straps, side roll ups, adhesive strips and required staples.
- D. A first aid kit will be a 24 unit kit per American Red Cross standards as manufactured by Swift First Aid, or equal.
- E. Rescue tubes for each lifeguard chair will be provided.

- F. A safety eye wash station will be a self-contained system in which eyewash bottles are securely positioned in a portable holder. Eyewash bottles will be 32 ounces and easily removable from case, and will contain a sterile, saline solution with the ability to neutralize a varying quantity acids or caustics.
- G. A safety eyeglasses dispenser station containing ten (10) pairs of safety glasses will be provided.

Pool Covers

A swimming pool cover system will be provided and be the standard catalogued product of a company regularly engaged in the manufacture of such products. Alternate swimming pool cover systems will not be considered unless equal to the specified product and must be submitted for approval. Submittal data must include complete documentation relating to all the specified features and include manufacturer's sales literature, specification sheets, energy conservation audit, installation/maintenance manuals and engineering drawings.

Pool Heaters

The pool heaters for the pool and spa shall be orificed for operation on Natural Gas and be certified by the American Gas Association Laboratories. Each pool heater shall have a minimum thermal efficiency of 88% and comply with the energy efficiency requirements of the latest edition of the ASHRAE Standard 90.1-1999.

The pool heater shall be approved for indoor installation. Each pool heater shall be approved for conventional venting (see mechanical detail) and shall be classified Category I, negative draft, and non-condensing, using a type "B" double wall vent material.

Swimming Pool Timing System

A Timing System and Scoreboard will be provided by either Colorado Time Systems or Daktronics. The scoreboard will display times for 10 lanes plus 3 event information lines and a facility name line. The scoreboard may be attached to the wall at the end of the natatorium opposite the diving pool, or mounted on a support structure. It should ideally be mounted in a location that can easily be seen from the entire deck and spectator areas. Final location should wait until a scheme of the facility and timing system is approved by the owner.

Master Planning for a Golf Practice Facility

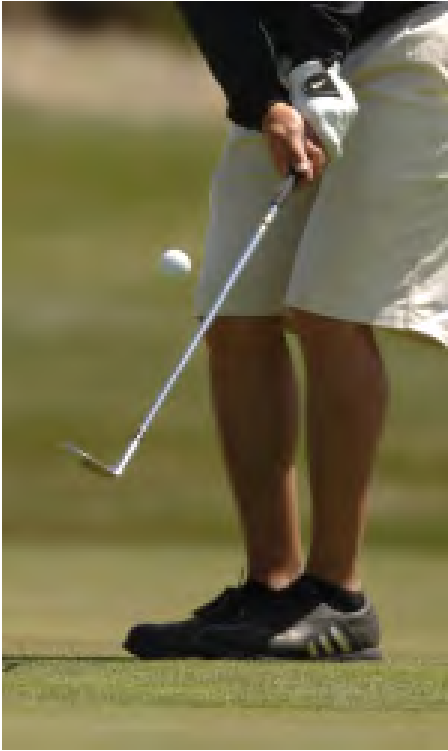


University of Wyoming

FINAL March 28, 2012



Programs to be Served



The Golf program includes intercollegiate teams for men and women. Each team averages approximately ten student-athletes. With the operation of Jacoby Golf Course comes adjunct programs for local high school golf teams, instruction and recreational play for students and broader community members, and the First Tee program that encourages youth to begin playing golf.

The coaching staff includes the head coach, one assistant coach, and an assistant golf course manager. Each member of the staff is a full time employee.

Existing Facility Analysis



Existing Clubhouse

Jacoby Golf Course

The University owns the Jacoby Golf Course. It is an 18-hole course with clubhouse and cart barn/maintenance facility. Practice facilities include the outdoor driving range, a practice putting green, and a practice chipping green. No indoor practice/training facilities exist on site. The clubhouse includes a pro shop, a small concession/cafe, restrooms/locker rooms, and one office for the course manager.



Existing Indoor Hitting Bay



Existing Indoor Putting Green/Team Lounge

Indoor Golf Practice Facilities

The Golf programs have two on-campus indoor facilities, both located in converted spaces within the Fieldhouse. The hitting bay is located within a former handball/racquetball court. The putting green/team lounge is located in converted office space on the upper floor of the Fieldhouse.

Desired Facilities Improvements

The intercollegiate teams compete in the spring and fall. And, as with all intercollegiate sports today, training and practice occurs year round. The practice experience has become an especially significant part of the golf experience. The University of Wyoming is the only current Mountain West Conference school besides San Diego State University that does not benefit from an indoor practice facility that is associated with a driving range.



The climate in Laramie creates a significant impediment to the program's student athletes and their development. The teams travel extensively to practice, especially during the spring semester. The climate also affects recruiting efforts, the life blood of a consistently competitive athletics program.

The golf course is a financially self-sustaining facility. 28,000 rounds are played per year during a season that starts in April and ends in late October. Weather has a significant impact on the golf course's ability to service all members of the golf community.

The goal is to create an indoor golf practice facility at Jacoby Golf Course that can become an essential practice and training tool for the intercollegiate golf team members as well as a revenue-generating facility to augment the golf course's operations. An indoor facility will extend the driving range use by 60-90 days each year. Indoor hitting bays and a golf simulator will foster year-round use, which will translate into year-round revenues. The facility should be able to sustain its own operation year-round, perhaps requiring an operational endowment.

Overview of the Facility Program

The program is centered around a large multi-purpose practice space that includes 4-5 hitting bays that can function as either indoor netted bays or driving range tees plus a large putting surface that can accommodate chipping as well. Each hitting bay should be set up for a video analysis system. An outdoor synthetic chipping green surface should be located adjacent to the hitting bays. A single bay golf simulator completes the practice/analysis components.

Support facilities include a team room with seating, TV's, a computer station and a small counter for food service. The team room should be directly adjacent to the practice area and may be used for some booster or community hospitality events. A small bag storage room for the teams should be adjacent as should a restroom for each gender. An office should be provided for the head coach and one assistant coach. Within the building should be a hall of fame display area. If possible, a club repair station should be incorporated.

A small storage room should be located adjacent to the indoor practice area, with a range ball dispensing machine located directly outside under cover.

The full program is outlined on the following spreadsheet.

Proposed Indoor Golf Practice Facility Program

<u>Competition/Practice Venue</u>	<u>GSF</u>
Indoor Practice Facility	1,780
Simulator	250
Support Facilities	
Team Room	510
Bag Locker	200
Office	130
Restrooms	130
Range Ball Storage	70
Vestbule	200
Mech/Storage	180
<hr/>	
Total	3,450

The Master Plan Vision

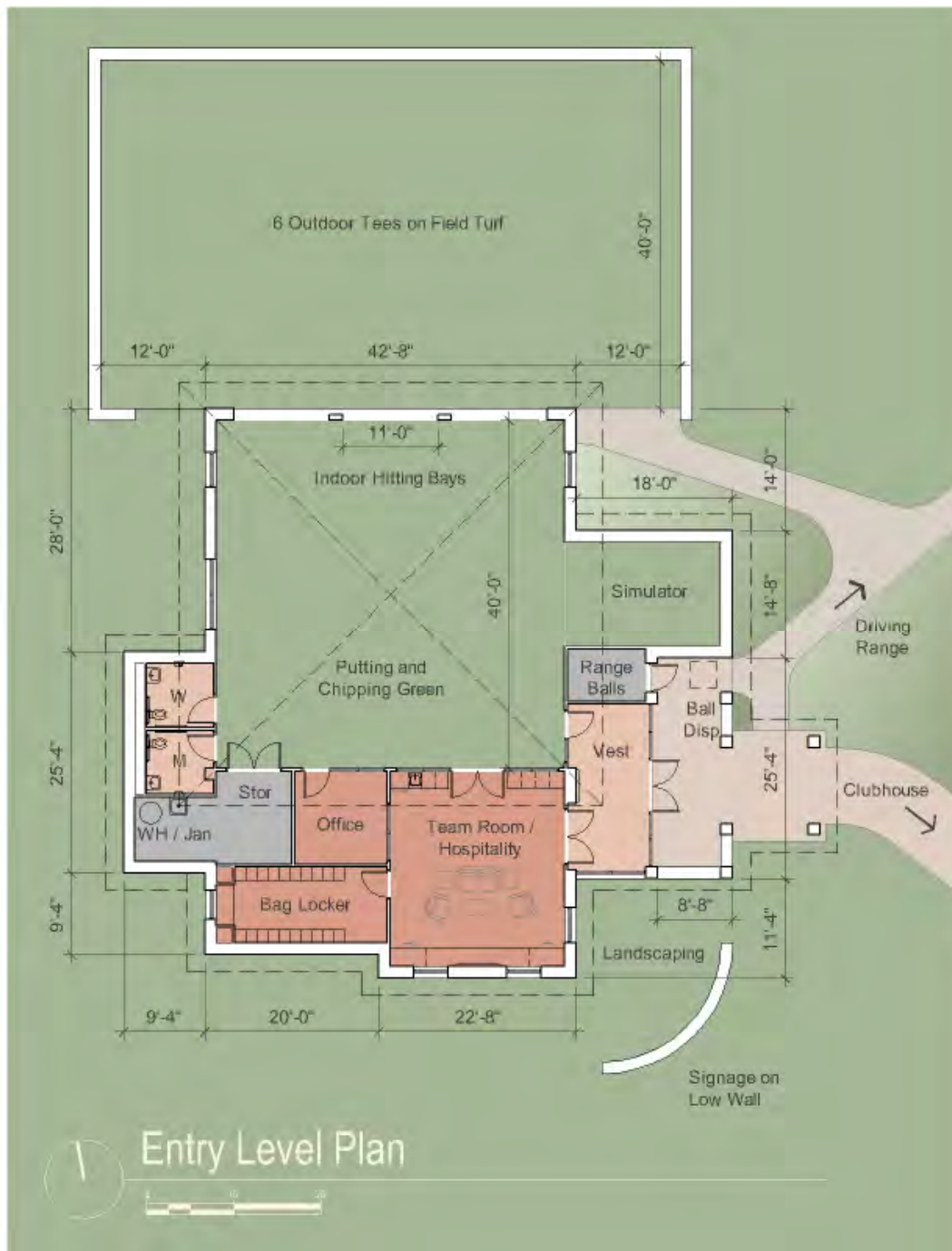
The new facility will be located west of and adjacent to the existing driving range tee boxes. The facility will be oriented to the centerline of the driving range. The tee box for the tenth hole will be relocated to facilitate the proposed location. The cart paths will also require relocation, with a cart parking/turnaround area located between the building and the driving range tees.

The main entry to the building is located so that it is visible from the clubhouse. A secondary entry is located near the cart turnaround and provides direct access into the indoor practice facility.



Inside the facility, the two offices will control access into the building. The entry corridor will lead directly to the team room and will host the Hall of Fame display area. The team locker spaces and men's and women's restrooms will bracket the team room. Direct access will be available from the indoor practice space to the team rooms and the restrooms.

The storage room and the simulator will flank the indoor practice space. Large garage doors will open onto the practice chipping green and the driving range beyond.



It will be important that the architectural style reinforce the building's tie to the UW campus as well as acknowledging the residential, pitched roof forms of the clubhouse. Thus, initial concept studies feature a stone base, strong eaves below steeply pitched metal roofs. Dormers and high windows provide daylight into the primary practice space.



Projected Costs and Implementation Plan

The total projected cost for the 3,450 SF facility is \$1,200,000. The projected costs reflect total costs to design and construct the golf facility, but does include the costs to relocate or modify the existing tee boxes and practice greens, nor the modifications to the cart paths. An allowance has been included for a sewage ejection pump and domestic water service to the facility.

The project will be funded through private donations. Naming opportunities will include the building, indoor practice areas, the team lounge, the simulator, the exterior chipping green, the offices, and the hall of fame. Potential donors will expect a certain quality consistent with UW.

As noted above, the facility will be sustained through revenues created through personal instruction, clinics, hospitality events, winter leagues, and individual practice times. Also, as noted above, it is expected that the indoor facility will reduce current travel needs and expenses.

Construction is planned for 2012

Master Planning for the Arena-Auditorium



University of Wyoming

FINAL March 28, 2012





Programs to be Served

The Arena-Auditorium (AA) is a multi-faceted building. The primary programs and events it serves are:

- Men's Basketball
- Women's Basketball
- Special events (concerts, commencements, etc.)
- Off-season camps and clinics

The AA must serve the basketball programs in whole. Thus, it must function as a competition venue, a practice venue, host to strength and conditioning and training services for the student-athletes, offices for the coaches, and home team and visiting team locker rooms.



Each Basketball program includes approximately fifteen student-athletes. The coaching staff for each program includes the head coach and three assistant coaches. In addition, each program has additional support staff (e.g. Director of Operations, Director of Player Development, etc.). Each member of the staff is a full time employee.

Supporting programs that are also housed within the Arena-Auditorium (AA) include:

- Women's Soccer—the program includes 26 student-athletes.
- Strength and Conditioning (S&C)—the Basketball programs' student-athletes are the primary constituents served within the Arena-Auditorium. However, with meaningful improvements, the S&C program's capabilities to serve additional student-athletes and ease congestion at the Rochelle Athletics Center could be improved as well. Staff includes one full-time S&C coach per program.
- Sports Medicine/Athletic Training—the Sports Medicine/Training program is also directly focused on the Men's and Women's Basketball programs. Similar to S&C, though, facilities improvements may allow Sports Medicine/Training to better serve student-athletes whose locker rooms are located in the North Fieldhouse. Planned staffing will include three full-time trainers plus several part-time assistants.
- Arena Operations—Arena Operations facilitates the events that occur within the arena and can be labor intensive. Easy set-up and take-down for events are critical, requiring good loading, sufficient storage, and easily convertible systems such as telescopic seating, lighting, and audio-visual (A/V).
- Media & Public Relations—Media & Public Relations is most involved with the arena for competition events. Efficient, well-planned accommodations for press/media, broadcast facilities, and scoring/public address (PA)/video board functions are essential.
- Concessions/Food Service—currently focused solely on events, improved food service operations at the AA can not only benefit the arena patrons, but also football stadium patrons. The existing commissary that serves War Memorial Stadium is located in an undersized and poorly positioned space in the Fieldhouse. The arena has a very small commissary area and each concession stand's prep areas are undersized, limiting menu options and the potential efficiencies of the food service operations. Concession sales represent a potential opportunity to increase revenues for the program. The Department of Athletics does not have a centralized training table (dining facility) for its student-athletes. Given the importance of nutrition and the development of community among student-athletes, a training table function could prove highly valuable. Another potential revenue stream could be developed through the rental of the training table space for community events or its use as a hospitality venue before, during, or after games.
- Ticket Office—the Ticket Office serves the arena patrons, particularly for event-day ticket sales. Improved space, distribution, and operations can allow the ticket office to fulfill basketball needs and more effectively assist with football game day ticket sales.
- Cowboy Joe Club—members of the Cowboy Joe Club (i.e. boosters and donors) should enjoy an upgraded game experience. Facility improvements are required to create an environment on par or better than the recently completed Wildcatter Club & Suites.
- Visiting teams and game officials—facilities specifically sized and located to accommodate these non-University users are essential to a multi-purpose arena.

Analysis of the Existing Building

The Arena Auditorium is a 15,000 seat arena constructed primarily for basketball games. The venue occasionally hosts other events including concerts, commencements, and other assembly events. However, due in large part to the limited Laramie market area, structural limitations of the AA (roof), and the lack of appropriate support facilities within the arena, basketball games still dominate the building's event schedule.

The basketball teams also use the main court as their primary practice facility. Hence, the Arena Auditorium (AA) is used daily throughout the school year as both a competition and practice venue.



Seating Bowl of the Arena Auditorium looking to the North

The facility is a very straightforward assembly venue. The seating bowl is a perfect circle with a single rake bowl section. There is little differentiation other than location within the bowl for the 15,000 seats.

The concourse is at grade level, entering the seating bowl at the mid-point. The arena floor is approximately 25' below grade level. Pumps remove the groundwater found at or above the level of the arena floor. All spectator facilities are located off the concourse. Restrooms and concessions are contained within "lean-to" structures on the outboard side of the concourse. Large earth berms disguise this outer ring of spaces. Hall of Fame displays are consistently distributed along the inboard wall of the concourse. A continuous band of windows provide daylight to the otherwise

Spartan concourses. Entries to the concourse are evenly distributed at the northeast, southeast, southwest, and northwest points of the building. The main ticket office is located at the northwest entry.

The North Fieldhouse building abuts and provides access to the arena at the south side, connecting both at the Concourse Level and at the lower Locker Level. The Locker Level is located above the arena floor level. Two ramps provide access from this level to the arena floor. Both ramps are steeper than allowed by the Americans with Disabilities Act. Thus, the arena floor is essentially inaccessible by ADA standards. The locker level is essentially limited to the southwest quadrant of the building, tying into the loading ramp at the western point of the arena.



Existing Strength & Conditioning

Center



Existing Sports Medicine Center



Existing Men's Basketball Locker

Room

Facilities located at the Locker Level include small storage areas, a media hospitality room, a converted post-game interview room, visiting team locker rooms, officials' locker rooms, a ticket sales office, and the Men's Basketball home team locker room. The Women's Basketball home team locker room is located within the footprint of the North Fieldhouse. The Women's Soccer home team locker room, a small sports medicine suite, and the Strength and Conditioning center round out the program elements at the Locker Level. Home team players access the floor via the south ramp. Visiting teams and loading/service functions access the floor via the west service ramp.

Some improvements have been made to the seating bowl to accommodate wheelchair seating areas. However, the building is not in compliance with the ADA requirements, most notably due to the lack of distribution for the seating, especially in the lower seating bowl. Likewise, the restrooms have been modified to better accommodate disabled patrons without achieving full compliance. The Fire Marshall limits intrusions into the concourse width due to emergency egress requirements. A limited study by the consultant team indicates that the emergency egress is more than adequate for the building's occupancy. The building is not fire sprinklered, which may be cause for the Fire Marshall's exiting concerns.



View of the Pre-engineered Wood Dome

Structure

The structural system for the arena consists of a cast-in-place concrete superstructure including the seating risers. The dome roof structure is a pre-engineered glue-laminated wood dome structure with limited excess structural capacity as outlined in the structural engineering report in the appendix.

The existing mechanical system is tied into the campus infrastructure. The air handlers serving the distribution system use steam-fed heat exchangers to heat the air. No cooling is provided in the building. The air handlers are located below the concourse within each quadrant of the building. Fresh air intake and exhaust air is fed through large vertical concrete shafts which are visible within the exterior bermed areas of the building. Air is supplied high at the perimeter of the seating bowl and by ductwork suspended from the catwalk above the arena floor. The return air locations are generally low, near the arena floor and on the concourse. The air handlers have sufficient capacity, but will need to be retooled as part of the renovations.

In general the existing electrical systems in the Arena Auditorium are dated but functional.

- The existing electrical system for the arena is fed from the 13,200 volt campus electrical utility system.
- The existing service feeding the arena is adequate for the current loads, but will require a full system replacement to accommodate the future program needs.
- The existing generator is not adequate in size to accommodate a future smoke control system (if required).
- The existing fire alarm system does not meet current code requirements for notifications in the bowl during events.
- The light fixtures throughout the arena utilize inefficient sources such as incandescent and are often located in areas which are difficult to maintain.
- The existing arena event lighting and control system are not adequate for adjusting the lighting during events.

- The existing lighting control system for the arena does not meet current energy code requirements nor is it adequate for the complexities required in a multipurpose venue such as the Arena Auditorium.

The scoreboard/video board system is outdated and in need of replacement. The current configuration features only one video board, which means that the board is not easily viewable by roughly one-third of the seats. Those seats must rely on two small, simple scoreboards located on the retaining wall near the court. The system is not linked to monitors in the concourse or other spectator-oriented areas, a typical feature of today's arenas.

The sound system was replaced in the early 2000's. The primary issue with the sound system is poor distribution and intelligibility throughout the seating bowl. The sound system is linked to other spectator-oriented spaces within the arena.

Broadcasting infrastructure has been developed over time, using spaces that are not necessarily sized or located appropriately. Cabling for the satellite trucks occurs through the west service dock area.

Proposed Facilities Improvements

While the list of primary programs served seems modest, the lengthy list of support services demonstrates the range of facility requirements needed to accommodate the core programs. A modern day multi-purpose arena is a sophisticated building type that must cater to the needs of the program users, the spectators, the operators (including the concessionaire), and radio and TV broadcast needs, which continue to advance in terms of sophistication and desired flexibility.



Recent Transformation of The Pit, University of New Mexico's Famed Arena

Recent or planned transformations to similar buildings, particularly in the Mountain West region, are setting a new standard for competition and practice venues. The scope and quality of improvements range from the very modest Moby Arena Renovations planned at Colorado State University to the significant renovations and expansions of The Pit at the University of New Mexico. The proposed improvements to the Arena-Auditorium are squarely in the mid-range of improvements to other facilities and are long overdue.

Team Areas

The intercollegiate basketball teams compete in the fall and winter. Training and practice activities, however, have evolved into a year-round regimen. An additional facet of the AA's facility requirements is its ability to function also as the primary practice facility for the Men's and Women's Basketball programs. Its current single court configuration is insufficient to accommodate the range of drills and practice techniques required for competitive success. The goal of the master plan is to convert portions of the lower seating bowl to telescopic seating to allow expansion of the floor surface and inherently more flexibility for practices (and camps). Other improvements, including lighting, sound, scoreboard/video board, and acoustical/audio-visual improvements will be essential to the desired transformation.



UNM's Davalos Basketball Practice Facility



University of Colorado Men's Basketball Locker Room

Augmenting the AA's desired use as a full-fledged modern practice facility are needed improvements to all facilities that support the success of the Men's and Women's Basketball programs. An expanded, more functional Sports Medicine/Athletic Training space is required to adequately serve the student-athletes' broad range of daily needs as well as those for diagnosis and rehabilitation of injuries. A new suite is envisioned that includes an open taping/treatment area with 4-5 treatment tables, 3 taping stations, and an adjacent wet area with a warm and a cold plunge. Supporting spaces include three private offices, a dry storage room, an ice/water room, and two small staff locker rooms that can be shared with Strength & Conditioning staff.

The Strength and Conditioning room should be directly adjacent to the Sports Medicine/Athletic Training suite, joined by a shared rehab area with space for several cardio stations, a variety of free weights, weight machines, and a solid wall for medicine ball work. The main room for strength and conditioning will provide 3,000 square feet for team work-outs. The space should feature a tall ceiling and, if possible, daylight. Support spaces within the S&C center should include one private office, a nutrition bar, and a sizable storage room.



UNM's Sports Medicine Center at The Pit



University of Northern Colorado Strength & Conditioning Center

It is critical that the Strength and Conditioning and Sports Medicine/Athletic Training functions be located at the same level as and within a short distance to the home team locker rooms.

A central equipment/laundry space and a shared film room should also be located for easy convenience to the home team locker rooms. The equipment function can also address needs for other teams located in the North Fieldhouse, primarily Women's Volleyball, Wrestling, and potentially Women's Soccer.

The home team locker room spaces must be comparable in size and amenity to fulfill Title IX requirements. The current Men's Basketball locker room suite provides a good model and features a locker/dressing area, showers/toilets, a players' lounge area, and team meeting space. Its location at the top of the player access ramp is ideal. The coaches' locker rooms should be located near to the team's locker suite. The players' lounge spaces can be accessed separately and will be used for small hospitality gatherings associated with events.

Academic Support services are envisioned to remain at the RAC, thus no space has been allocated in the AA.

Spectator Areas

Generally speaking, the current spectator areas, particularly the seating bowl, are adequately sized or oversized. The objective of the planned improvements is more about quality, versatility, and greater revenue generation.

The existing seating bowl is a circular configuration with access via vomitories that enter mid-bowl. All seats are fixed chairback seats. ADA access, while recently improved, is limited to the concourse level seating zones. No accessible route exists for wheelchair-bound spectators to access the premium floor seating. At 15,000 seats, the venue has proven to have an excess of capacity. A smaller seating capacity of 10,000 to 12,500 seats is sufficient, which could allow existing space within the seating bowl to be captured for other uses, predominantly revenue-generating specialty seating areas.

All seats should also be upgraded to wider seats, 20-21" in lieu of the industry standard 19" wide seats. A minimum of approximately five hundred seats should be further upgraded to padded seats to create a new club seating amenity. These seats should be premium, located close to and centered on the competition court. Exclusive access to these seats should also be provided. ADA-compliant access will also be essential.

As part of the seating bowl improvements, seating areas for the media and the band can be located further away from the floor to devote the best seats to spectators.



Save Mart Center, Fresno State University

Within the seating bowl, other improvements are needed. New scoreboards and video boards are essential, as is an improved sound system, and better, more flexible lighting. High definition video boards should be installed in either a center-hung configuration or as a series of two or four boards placed in the upper reaches of the seating bowl similar to the current video board. Ribbon boards,

which will add to the dynamics of the spectator experience and can be a great revenue source are also included within the master plan concept.



New Lobby at The Pit



New Concourse at The Pit

Outside the seating bowl, opportunities abound to improve the spectator experience. The concourse is wide enough to handle circulation, but it is consistently dull and uninviting. Adding graphics, better lighting and creating landmarks and wayfinding will give the concourse a livelier and more user-friendly personality. And the hall of fame displays, which are currently underwhelming as part of the concourse, should be moved to a dedicated space that can better glorify the past accomplishments of the University and its student-athletes and coaches.

The entry sequence into the Arena-Auditorium can also be greatly improved. The current configuration of four equally prominent entry points is not reflective of the parking distribution and related circulation paths to the building. Similarly, the ticketing function is located directly opposite its ideal placement where it can serve both AA and War Memorial Stadium events. By creating new, prominent lobby spaces and a ticket office on the east side of the building, the entries will be better associated with parking and can better focus the AA as a part of the Athletics complex of facilities centered around the famous statue of “Steamboat.”

Restrooms and concession stands can also be improved immensely. Fixture counts for restrooms must be increased to meet today's standards and provide appropriate parity between men's and women's restrooms. Accessibility must also be improved. Concession stands will benefit from better space configurations, creating appropriate food prep and sales spaces. Locating concessions stands such that queuing does not interfere with concourse circulation will also be a significant benefit. Portable food carts provide opportunities to increase sales points and variety of menu offerings while allowing the number of sales points to be customized to match the anticipated crowd size. And creating at least one or two concession spaces that can prepare grilled foods will add to the revenue-generating capabilities of the AA.

Revenues can also be increased by adding a team store function on the east side of the building, working, like the ticket office, equally well for AA and stadium events. Exterior access may allow the team store to operate outside of A-A hours.

Event Support Facilities

Events cannot function efficiently without well-conceived support facilities. The desired improvements include significant expansion of storage areas with easy access from the arena floor. The storage will better handle portable basketball backstops, portable floor covering, and portable staging. It is important to move these storage functions to a location that doesn't require negotiation of a steep ramp.

The desired quality and variety of food service for the AA requires the development of a full concessions commissary to store and prepare food associated with events or the training table function. A well-placed commissary could also serve the stadium.

With the conference television agreement, a significant number of athletic events will be televised or recorded. High definition broadcasts are also redefining the support facility requirements for TV. A new control room must be included to provide control for the video boards. Dedicated cable runs must be developed to connect the satellite link-up trucks with the camera positions in the arena. And flexible camera positioning must be included to maximize the capabilities of the AA to act as a premier basketball practice facility. Equally important from an internal perspective is the ability to film practices. Making this process easy for the Cowboys and Cowgirls would improve game planning efficiencies.

Officials' locker rooms, visiting team locker rooms, security/first aid rooms, and custodial areas need to be included within the planned improvements.

The full program is outlined on the following spreadsheet.

Program/Function/Space			Master Planning Needs/Comments
	NSF	GSF	
A Arena Auditorium			
Pracitice Court	14000	16100	Expand arena floor to create two 94' cross-courts or at minimum 3-point shooting on side baskets that will not interfere with main court drills.
Competition Venue			Rotate orientation 90 degrees and add telescopic seating to accommodate practice courts 2 large video boards + ribbon boards at perimeter Upgrade sound system Additional concert/show rigging not a priority Remote cameras good (no staff). 6-8 positions preferred Locate TV truck/broadcast centrally Lighting upgrades; add fixtures with shutters
Seating			12,000 seat target capacity
General	67739	77900	Existing are durable plastic with steel frame (no pad)
ADA	2500	3125	Verify existing quantity and acceptance of 2010 ADA; increase bowl distribution including floor access
Speciality seating (500 Club Seats)	2839	3549	Retain some speciality floor seating; add 20"-21" padded chairs and cup holders to dedicated club seating
Media	600	750	Can move off floor; locate position in bowl (west)
Band and Student	580	725	Relocate behind new north basket near visiting team bench
Event Support			
Lobby	8000	10000	Retain SW Campus/student entry Add at least one new "main entry": link tix, club, HOF
Tickets	870	1088	Expand POS to 5-8, near east parking, combine for War Memorial and A-A, upgrade technology. Create a separate VIP/Family/recruit entrance
Offices, Work Space and Count Room	1270	1588	1 ticket manager's office, 4 cubicles for student workers, work room
Team Store	1500	1875	Add merchandise space to new east concourse
Concessions	5000	6250	1:300 target POS ratio: 12,000 general seats/40 POS (restricted due to existing concourse size). Increase prep. space at each location
Commissary	5100	6375	Add commissary capable of grilling foods plus cold and frozen storage. Could also serve the Stadium.
Storage	3000	3750	Generally more storage required throughout; Storage specifically needed for floor protection, staging, backdrops, portable backstops.
Club	5000	6250	Add club space for around 500 patrons. View to floor preferred.
Suites	0	0	Limited market for this amenity - not priority
Restrooms	7781	9726	Verify toilet counts, improve accessibility
Concourse	24800	31000	Expand where possible. Upgrade appearance. Upgrade lighting (aesthetics and fc). Upgrade wayfinding. Add natural light/view. Move Hall of Fame displays
Lower level Hospitality Room	500	625	Create a new, larger interview room for visiting teams. Separate media hospitality from President's guests, boosters, public, etc.
Video/Production Room	650	813	Locate at truck ramp
Hall of Fame/Donor	1100	1375	Existing cases to be removed. Relocate HOF function.
Technology	300	375	Fiber will be coming. Plan for HD at a minimum. Pre-wire for broadcast; include a control room/production room. Install new scoreboards/video boards; a ribbon board would be ideal.
Officials' Locker Rooms (2)	700	945	Match Existing
Security/First Aid	150	203	Ambulance access necessary. Locate near sports medicine if possible.
Novelty Sales	250	338	Create another sales location near main entry
Total	154229	184723	

B Basketball Programs				
Men Support Facilities				
Offices	0	0	Create new offices to free up space in NFH for other sports. Incorporate view to arena floor?	
Locker Room	1926	2600	Location is good; renovate	
Coaches Locker room	333	450	Space and location are good	
Team Meeting	0	0	In locker spaces	
Team Lounge/Hospitality Room	0	0	In locker spaces	
Women Support Facilities				
Offices	0	0	HC + 3 assistants. Offices do not have to be immediately adjacent to Lockers. Match Men's.	
Locker Room	1926	2600	Match Men's size/amenities.	
Coaches Locker room	333	450	Two needed for male/female staff members	
Team Meeting	0	0	In locker spaces	
Team Lounge/Hospitality Room	0	0	In locker spaces	
Visitor Support Facilities				
Locker Room(s)	1333	1800	Relocate within lower A-A	
Total	5852	7900		
C A-A Shared Support Space				
Strength and Conditioning	740	925	Would like higher ceiling- 28' preferred AA Location is OK View to outside or court or daylight would be improvement Square plan 2000-3000sf, no columns, OH door for equip, include entry/gathering space Two drinking fountains, flush deadlift platforms Adjacent to Sports Med; share rehab.	
Offices	150	188	Enclosed office not required, provide workstation	
Storage	200	250	Provide for Medicine balls, lifting belts, stretch bands, jump rope, etc	
Supplement area	60	75	Gatoraide disp., storage, counter for blenders	
Rehab area	250	313	Equipment: (3) Step mills, (3) upper body ergometer, (3) upright bikes, free weights (triple-tier racks), lat pull, medicine ball wall (durable) Adjacent to Sp. Med and Weight Room; if not adjacent, place near Sports Medicine	
Sports Medicine	280	350	Acoustic separation with weight room 4-5 treatment tables, 2-3 taping separate cold and warm plunge hydro (6'x6')	
Ice/Water/Hydro Room	240	300	Yes. Reasonable access to court.	
Storage	80	100	For tape and other supplies	
Offices	240	300	2 at 120 SF each. Physician's office/exam room.	
Staff locker room	0	0	Share with Officials' locker rooms	
Academic Support	0	0	In RAC	
General Locker Room	0	0	Shared with Officials	
Equipment/Laundry	0	0	Central A-A location if space available	
Dining	0	0	Training Table Function not desired	
Tunnel/Basement	4050	5063	Includes Media Room, rest rooms, lobby, storage	
Total	6290	7863		

Proposed Building System Improvements

A complete, functional mechanical system will serve the arena renovation. The system shall be reliable and constructed of quality, commercial grade equipment throughout to meet the state and local codes. The systems will be designed to take advantage of the latest technology to be energy efficient and easily maintainable while meeting the requirements of the project budget. Specific challenges within the mechanical and plumbing systems include but are not limited to the following:

- LEED Silver or equivalent rating may be required
- Update the building automation systems to the Campus Wide Johnson Control system, interface and monitor system remotely
- Building energy use will be monitored and displayed to demonstrate energy efficiency features of the building
- Update the existing HVAC systems to maximize potential energy efficiency
- New systems shall take advantage of dry climate and utilize evaporative cooling
- Project shall provide comfort cooling, without the need for chilled water
- New low flow plumbing fixtures will reduce the water consumption of the facility by 30%+ over LEED baseline

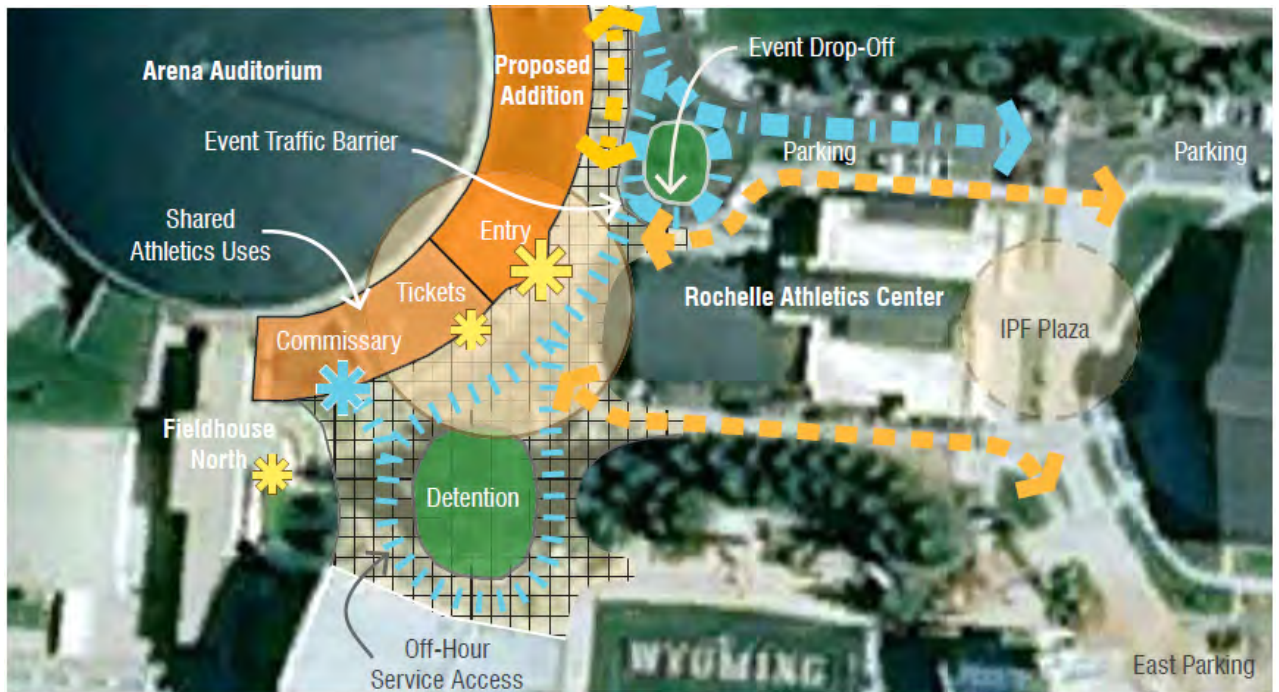
A complete, functional electrical system will serve the arena renovation. The system shall be reliable and constructed of quality, commercial grade equipment throughout to meet the state and local codes. The systems will be designed to take advantage of the latest technology to be energy efficient and easily maintainable while meeting the requirements of the project budget. Specific challenges within the electrical and technology systems include but are not limited to the following:

- LEED Silver or equivalent rating may be required
- Meeting with the University to determine the necessary requirements to feed new service entrance equipment, transformers, etc.
- Updating the power distribution to feed new scoreboards and ribbon boards.
- Updating the power distribution to feed concession loads.
- Updating the power distribution to feed broadcast equipment – including truck connections, head-in and camera positions.
- Updating the existing lighting of the interior spaces including concourses, concessions, restrooms, etc. Options include high efficiency LED, metal halide and compact fluorescent lighting. Daylighting solutions will be implemented where feasible. There is currently daylight available in the bowl which can be utilized to minimize artificial lighting for maintenance and everyday access.
- Updating the existing egress life safety concerns within the facility. A new fire alarm and smoke control system will likely be provided. A new generator may be required to feed all life safety and standby loads within the arena – including egress lighting, smoke control system, elevator(s), ribbon boards, etc. Coordination with the University will be required to determine if the existing generator should be augmented, replaced or relocated to another building on campus.

- Updating the event lighting for high definition broadcasts with new high efficiency shuttered sports lights. High efficiency fixtures will be utilized to limit the load on the existing structure.
- Updating the event lighting to include multipurpose scenes for commencement, concerts, theatrical events, etc.
- Updating the technology systems to support new point of sale, telephone and data requirements. Options include new fiber and copper systems to support both wired and wireless technology.
- Explore a potential distributed antenna system (DAS) within the arena to support today's and future cellular content as a revenue generating element.

Refer to the appendix for additional information.

The Master Plan Vision



Site Plan

To fulfill the programmatic requirements, space must be added to the Arena-Auditorium. The master plan does so on the east and southeast sides of the arena. As the University's athletics facilities have developed, the "center of gravity" for athletics facilities has become the circular entry drive that is framed by North Fieldhouse to the west, the west stands of War Memorial Stadium to the south, and the Rochelle Athletics Center to the east. It is logical that the Arena-Auditorium's expansion and improvements reinforce this evolution.



Long range view from the east



Approach to the proposed new Northeast Entry



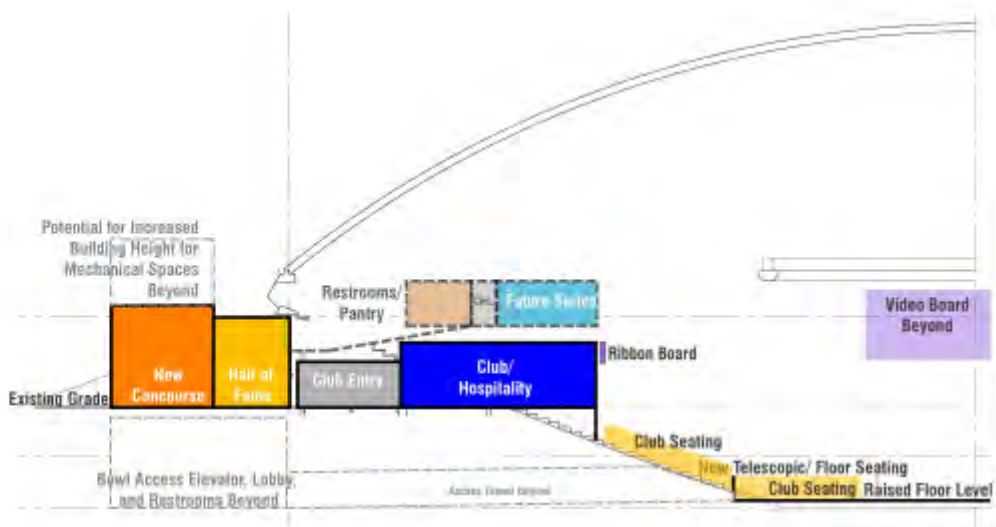
One of two new lobbies

Building Additions

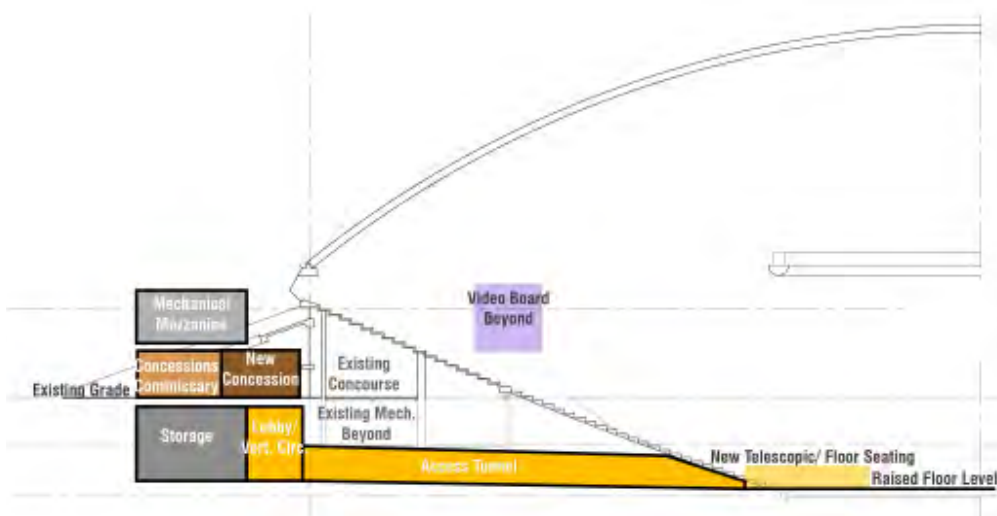
The vision develops an emphasis on entry into the east side of the AA. By creating a new concourse on the eastern perimeter of the building, several opportunities are created:

- The outboard concourse can employ a transparent glass wall that makes for a much friendlier concourse experience and showcases the activity within the building to those who pass by or approach
- Expanded entries at the southeast and northeast can create a much stronger entry sequence and identifiable imagery
- The existing concourse space can be captured to fulfill the programmatic requirements for a dedicated club space which can also expand into the seating bowl and serve the new club seats near the arena floor
- A new Hall of Fame space can be created that can function as a pre-function space for the new club, or, in association with the new concourse space, can become an independent hospitality space

Equally beneficial is a similar building expansion that occurs between the southeast entry expansion and the existing North Fieldhouse building. Although the footprint of the expansion at this location is comparatively small, the advantage is the creation of a service zone that features a vertical link that can serve five different levels, including the arena floor level. To complete this link, the master plan proposes the construction of a tunnel connection from the lowest level of the new addition to reach the arena floor. The tunnel, in combination with a new large elevator, will provide access to the arena floor and its seating areas for disabled patrons, addressing the most glaring ADA deficiency of the existing building. A large storage area, media room, and public restrooms, also located within the addition's footprint, fulfill very important programmatic needs associated with the arena floor. The sections below describe the vertical relationships of spaces and the improved access to the arena floor.



Building Section



Section through Southeast Addition



Arena floor being used for practice

The planned renovations will transform the seating bowl into a vibrant practice and competition venue. Expanding the floor will allow the arena floor to accommodate full team practices.

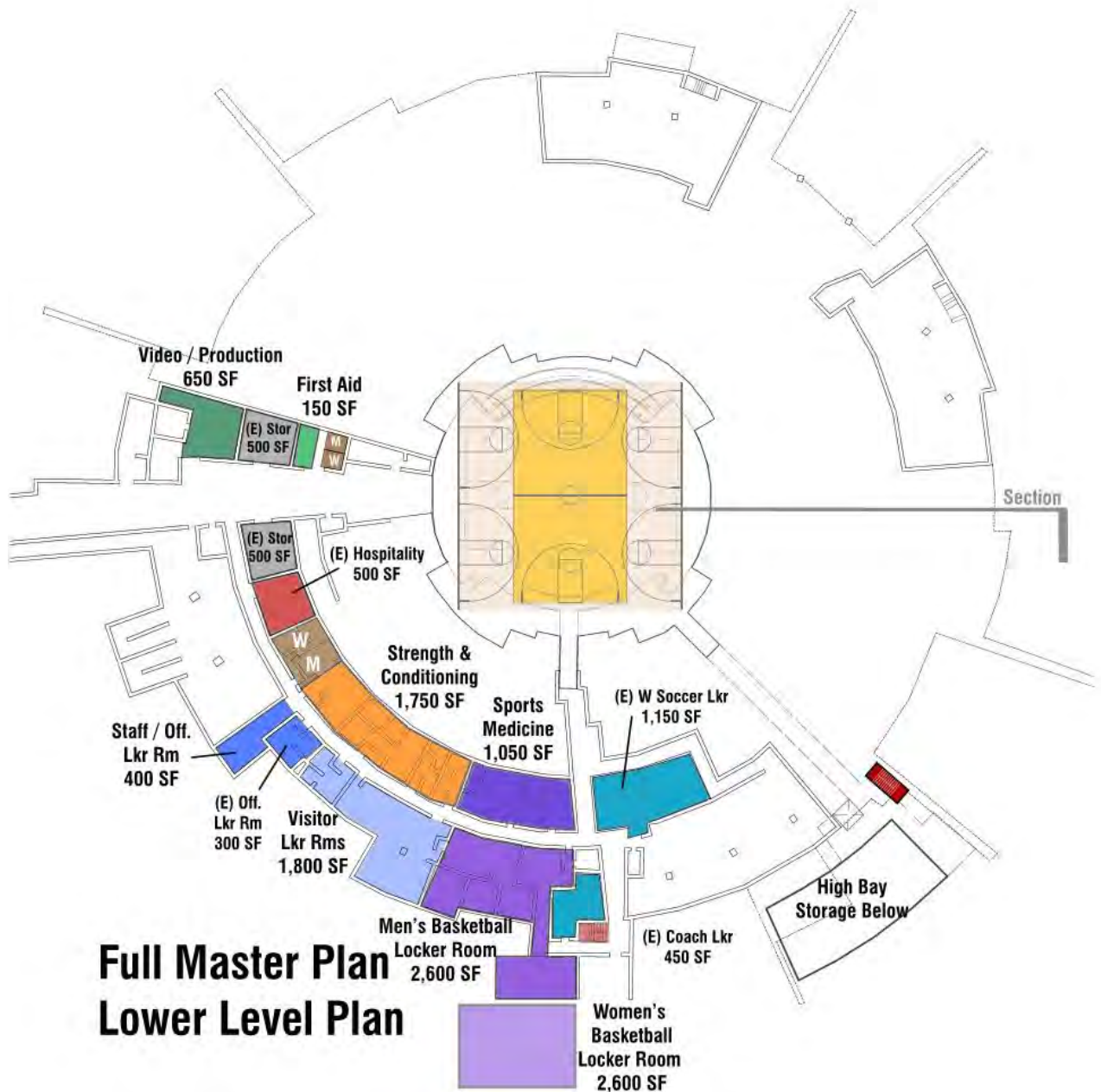


A gameday view of the revitalized seating bowl

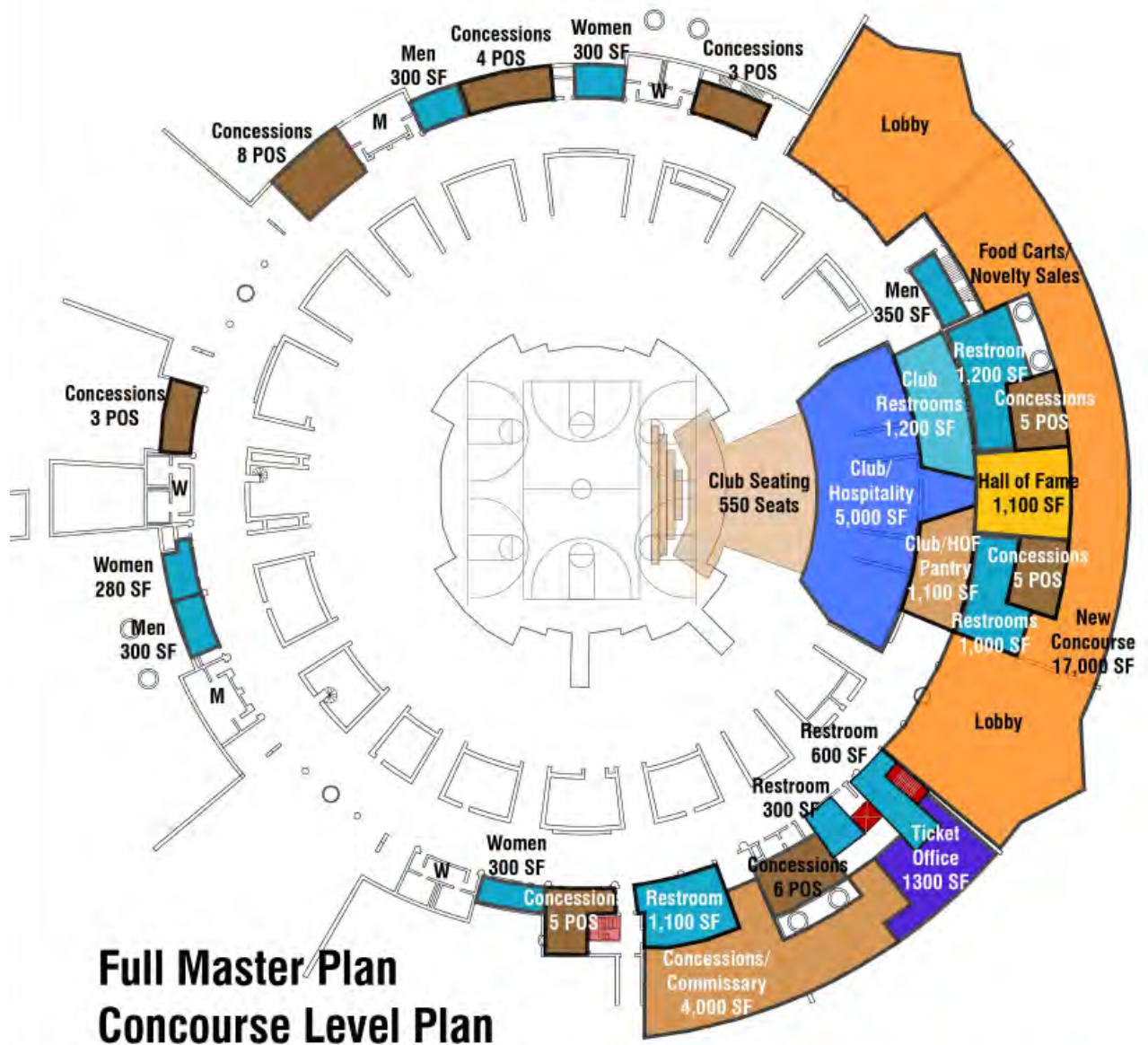
Seating replacement, new video boards, ribbon boards, lighting, and sound system upgrades will transform the character of the seating bowl.

Added storage, restrooms, a media room, and the new tunnel/elevator connection will enhance the versatility of the building and help to place fan amenities where needed. Disabled fans, in particular, will benefit from the improvements, as will the media and VIP patrons.





At the locker room level, all spaces will be improved. The Women's Basketball locker room will be renovated and expanded to match the Men's Locker Room in size and quality. The existing Sports Medicine space will be renovated and expanded. Strength and Conditioning will be moved into the space currently dedicated to visiting team locker rooms. The new space will be larger than the current space and will feature a direct, shared rehabilitation room link to Sports Medicine. New visiting team locker rooms will be created within the footprint of the existing weight room and officials' locker room.



At the concourse level, the expansion includes a new concessions commissary with direct access into a small service court. On the concourse side of the commissary, a new, full service concession stand will benefit from the direct adjacency. The new ticket office space is also located at this level, adjacent to the southeast entry, creating an indoor lobby space that will work very effectively, both on game-days and during regular business hours for the ticket office.

The new concourse expansion offers a great opportunity to change the ambiance of the arena from an internalized, concrete intensive environment into a daylit interior with views to the outside and featuring colorful graphics and warm materials.



The proposed concourse expansion

Renovations at the concourse level will vastly improve the spectator experience as well. Existing restrooms will be renovated and expanded in several areas into currently ineffective concessions spaces. In turn, new or improved concession spaces will be created in the new addition and the current location of the ticket office. Concourse lighting, graphics, and finishes will be improved, including the addition of technological infrastructure that will allow patrons to stay in touch with the game while on the concourse. New messaging monitors will allow the concession signage and menus to respond to the planned event and provide fans with changing displays to advertise upcoming events.

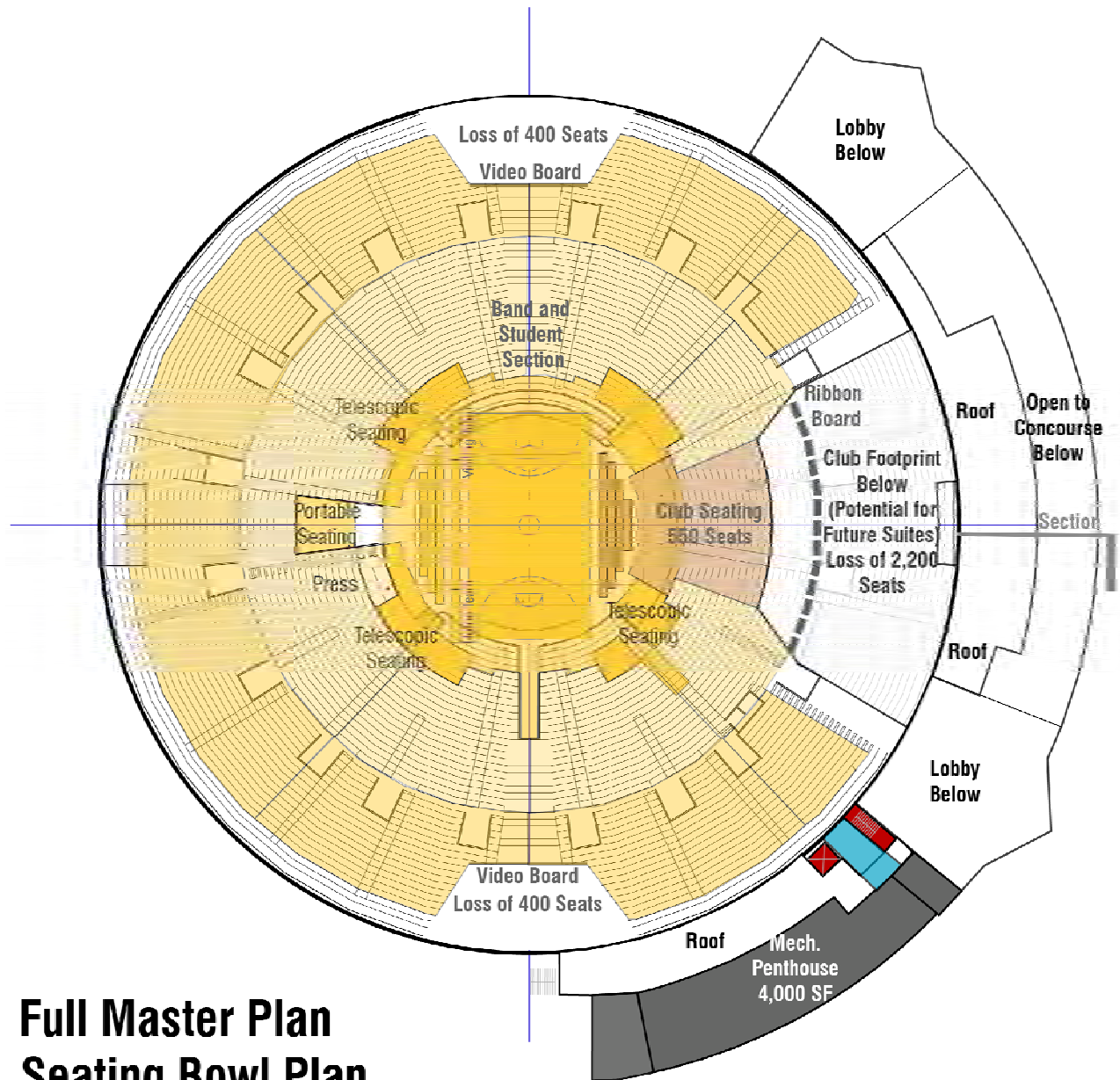
Above the concourse level, a new level has been created to house mechanical equipment for the new addition and the concourse addition.



Entry into the new Club

The east side of the seating bowl, including the associated concourse spaces will undergo significant renovation to create a new club room with dedicated amenities and the requisite proximity to the converted club seating sections and the playing floor. The club environment will combine great views to the floor as well as a flexible, well appointed multi-use space that can become a complement to the rental opportunities now available in the Wildcatter Club & Suites at War Memorial Stadium.

The orientation of the club requires that the competition floor be rotated 90 degrees from its current orientation. This is made possible by the expansion of the competition floor by removing the existing ramps and retaining walls that bound the floor. Some lower seating rows will be removed and new retaining walls will be created to expand the floor surface. The floor will also be raised to meet the bottom of the player's ramp as it emerges from the vomitory. New telescopic seating sections will enable the quick conversion from practice facility to competition venue.



Full Master Plan Seating Bowl Plan

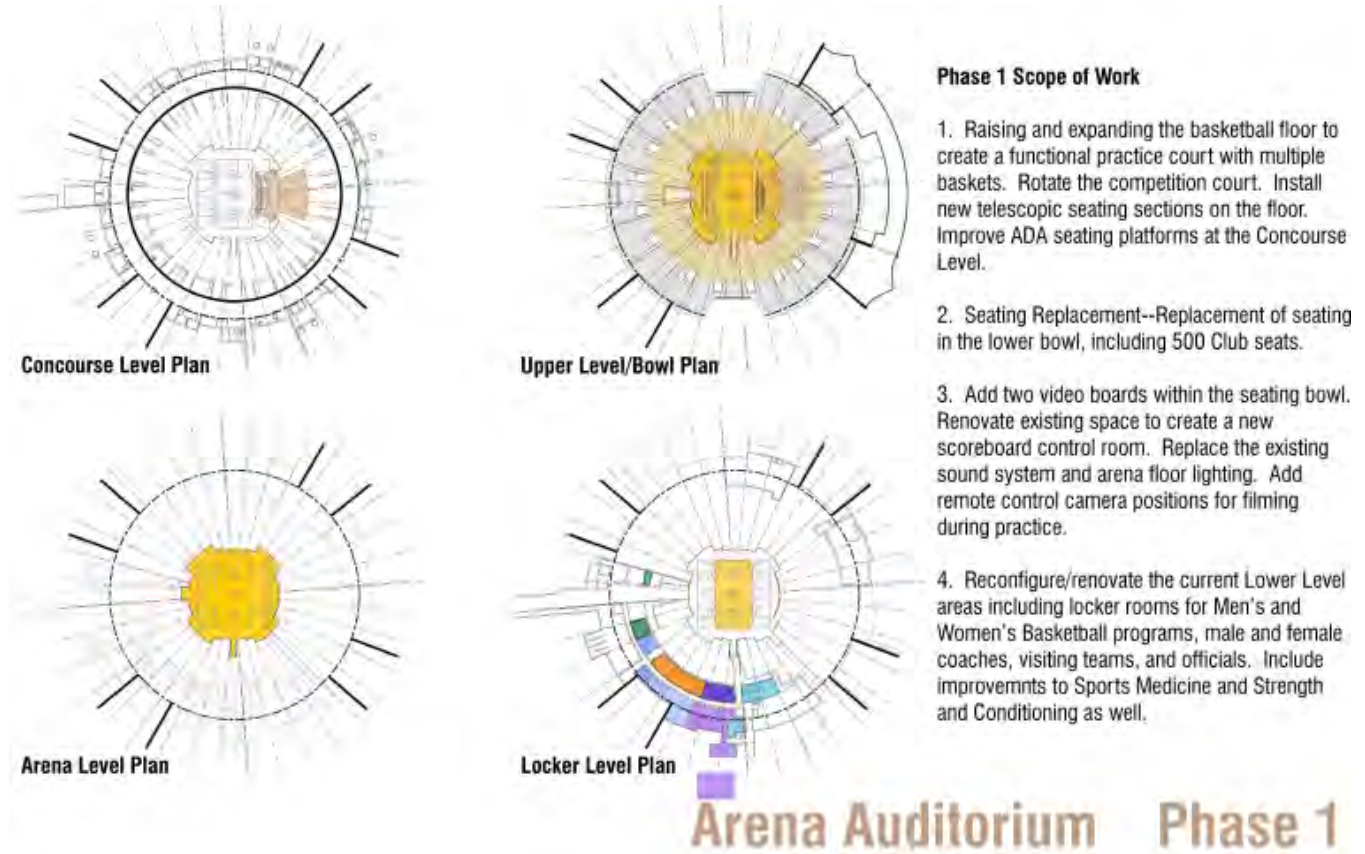
As noted above, the addition of a new tunnel under the seating bowl will connect the floor to the new elevator in the southern portion of the addition.

The proposed renovations will transform the arena into a great competition venue and a highly functional basketball practice facility. The renovations will also transform the concourse into a functional and dynamic spectator environment with easy access to restrooms, food service, and the Hall of Fame. And renovations will convert current spaces that are poor matches to their current use into spaces that are appropriately used and located relative to other functions.

Projected Costs and Implementation Plan

The project will likely be phased. The master plan concept illustrates a two phase plan.

Phase 1



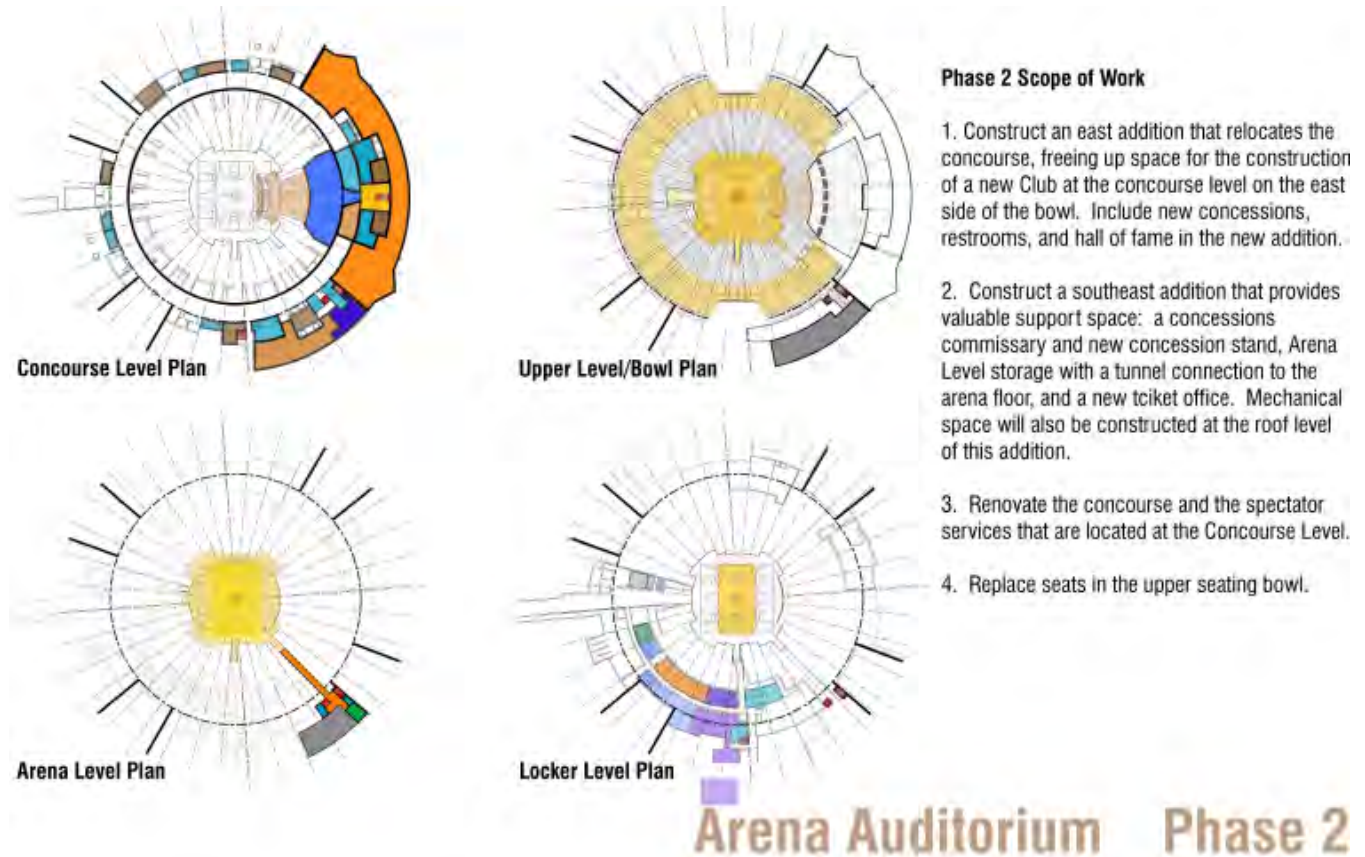
The attached diagram illustrates the proposed Phase 1 scope of work, which in summary includes:

- Expand court size (more floor space for coaches to use for practices), re-orient and replace AA basketball floor.
- Reconfigure lower seating bowl to include new club seating area for 500+ spectators as well as dedicated media, band and student sections.
- Upgrade lighting (more current/efficient technology that provides better venue coverage and allows lights to be dimmed or “shuttered” for more dynamic pre-game/event introductions and special effects)
- New video scoreboards/LED ribbon boards (two video boards on opposite ends of main court and LED ribbon boards under club seating area)
- New sound system (new speakers and amplifier arrays) that allows more effective coverage of both lower and upper seating areas. This would be used for sporting events, commencements, and special events.
- Renovate the majority of the current Locker Room Level to create enhanced Sports Medicine, Strength and Conditioning, visiting team/officials locker rooms, post-game interview room, etc.
- Upgrade and enhance men’s and women’s locker rooms/team rooms

The total project costs (including construction and non-construction costs) for Phase 1 could range from \$8.25 million to \$9.5 million. The projected costs do not include any allowances for inflation.

The Phase 1 project will be funded through a combination of State funds and private donations. Primary naming opportunities will include the arena, the video boards, the renovated locker rooms and training areas, and the court.

Phase 2



The Phase 2 scope of work focuses primarily on technology and seating upgrades to the seating bowl. Proposed work includes:

- Develop entire east side (facing RAC) as the major facade of the facility including two new Entry lobbies.
- Create an entire new look for the concourse area including all concession areas (fewer, but more points of sale), merchandise areas, restrooms, way finding, etc.
- Create a new, central Ticket Office to serve the A-A and War Memorial Stadium.
- Create a Hall of Fame and Club area at the east concourse.
- Develop a concession commissary within the southeast portion of the addition that will serve the A-A, War Memorial Stadium and other Athletics events.

- Include an elevator that that will improve access for patrons (including disabled patrons) seated on or near the arena floor.
- Build a tunnel connection, restrooms, media room, and new storage areas to connect the elevator to the arena floor area.

The total project costs for Phase 2 could range from \$21 million to \$24 million. The projected costs do not include any allowances for inflation.

The Phase 2 project will be funded through a combination of State funds and private donations. Primary naming or sponsorship opportunities will include two new entry lobbies, the Hall of Fame, the Club, the tunnel in combination with the club seating, and the concourse improvements.

Master Planning for Corbett Pool



University of Wyoming

FINAL March 28, 2012



Programs to be Served



The University of Wyoming swimming and diving program aspires to be ranked nationally as a top 25 program. For the current 23 male and 35 female student-athletes, the existing Corbett Pool facility is inadequate to accomplish that goal. With a competitive facility, the University expects to increase the programs to 30 males and 45 females and excel at both recruiting and training the best student-athletes.

The local high school swim team may also be served by the new competition pool and its support facilities. Recreation, intramural, and club sport programs are likely users, including program activities such as competitive swimming, water polo, inner tube water polo, kayak/water sports instruction, and scuba or other specialized instructional or certificate programs.

Community use will primarily be tied to either the high school or University competitions. Opportunities will likely exist, however, for high altitude training camps as well as camps run by the coaching staff. All of these uses offer revenue-generation opportunities to help offset the costs of operating the pool.

Analysis of the Existing Facility



Existing Natatorium with View to Classroom Glass Wall



Existing 1-meter Spring Board

The natatorium is one of several components of the Corbett complex. Academic users, intramurals, student recreation users, community users, and student-athletes all use portions of the building. The master plan analysis focused solely on the natatorium components of the facility, with the recognition that any of the other facilities affected by the master plan proposal must, at a minimum, replace or restore those facilities to their current condition.



Existing Classroom with Views beyond Curtains to Pool

The existing Corbett pool facility, which was built in the mid-1970's, lacks several facets important to the success of the University's student-athletes. The current pool's size is both too short for the student-athletes to swim the preferred length of 50 meters and too shallow for diving over 3 meter springboard. Secondly, the water body is contiguous, which makes it impossible for dual practice or hosting of simultaneous events.



Existing Shower Facility, Men's Locker Room



Existing Locker Room

In terms of supporting core competition and training activities, the pool's deck space is minimal, the pool is supported by outdated and utilitarian locker spaces, and the lack of amenities and enhancements limits the student-athlete's experience. During competitions, spectators and athletes are removed from each other by a glass partition, separating the spectators from the action and isolating the student-athletes from the energy of the crowd.

The existing pool mechanical equipment is located in the basement below the pool deck. While this is a reasonable use of space, periodic maintenance or replacement of the equipment is severely hampered by difficult access to this level.

Potential Development Partnerships

The University of Wyoming's goal is to raise the standard for both the current and prospective swimming and diving student-athletes. Although the University could market the new aquatic facility as a destination venue for high-altitude training, catering to potential outside interests is not a priority.

An opportunity does exist, however, to partner with Laramie High School. The high school's existing pool offers, like Corbett, numerous challenges in operation and programming, prompting the need to explore options for a new pool. A partnership with the high school would fulfill an educational need in the community as well as help develop potential student-athletes locally.

Desired Facilities Improvements

Throughout the Mountain West Conference and across the nation, 50 meter swimming and 5 meter diving are medians for competition aquatics facilities. The University of Wyoming is poised to achieve this standard with the renovation and expansion of Corbett Pool.

The program for an updated facility is centered around the new pool, anchored by an extensive deck which would be capable of hosting dry land training and ample staging space for meets. Satellite coach's offices, storage, and a wet classroom should be accessible from the deck. Spectators will be accommodated through a bleacher seating area with a minimum capacity of 500 people. Interior clear heights within the natatorium should be a minimum of thirty feet above the main pool body and forty feet above the diving area. Pool mechanical spaces are a critical component of the program, requiring adequate size, access, and utility infrastructure to support a large body of water.



New 50-meter Pool with 3-meter platform at Colorado Mesa University

The following program spreadsheet outlines the basic components. More detailed information, particularly regarding the aquatics facilities, can be found in the Counsilman Hunsaker report in the appendix.

Proposed Swimming and Diving Program

	GSF	Remarks
Competition/Practice Venue		
50-meter Pool	26,660	
Diving well		With Pool
Spectator Seating	3,920	
Subtotal	30,580	
Support Facilities		
Lobby	1,175	
Control/Office	220	
Lifeguard	245	
Wet classroom	810	
Pool Storage	615	
Pool Mechanical	3,340	
Dry Land Training	0	On pool deck
Coaches Offices	480	(4) at 120 sf each
Team Meeting	825	
Video Room	470	
Sports Medicine	1,260	
Men's Varsity Locker Room	900	
Men's Coaches Locker Room	180	
Women's Varsity Locker Room	1,000	
Women's Coaches Locker Room	180	
Men's General Use Locker Room	3,515	Wet and Dry Use
Women's General Use Locker room	5,490	Wet and Dry Use
Vis Coach/Family Change Rooms	400	(2) at 200 sf each
Misc/RR/Circulation New	8,800	
Subtotal	30,240	
	60,820	New and Renovated Program Space

Site Selection Considerations

The potential partnership between Laramie High School and the University opens the possibility of locating the aquatic facility to a location other than the Corbett Building location. Building sites that are north and east of Willet and 22nd could be available and be within the campus boundary for athletics. The planning team investigated several opportunities to develop a stand-alone aquatics facility at several of these sites.



Sites Considered for a Stand-alone Aquatics Facility

Creating a stand-alone aquatics facility has drawbacks when compared to expanding Corbett Pool, however. First, the potential new development sites aren't significantly closer to the high school and are further from the core of campus, decreasing ease of access and the resulting efficiency of the student-athletes' training programs. Second, and more importantly, the investigated sites lack the utility infrastructure needed to support the facility, adding millions of dollars to the budget.

Updating the current facility presents real opportunities to enhance already developed land. Improvements to Corbett Pool on the south would visually enhance the University's presence along Grand Avenue. Construction on campus property can swiftly integrate into the University's utility system and also allow for reuse of some existing parking.

Updating the current facility also maintains close proximity to necessary services and avoids doubling up on program. Student-athletes and coaches can access strength training and academic support spaces within the Rochelle Athletics Center and offices within Fieldhouse North. Staff can optimize efficiency by utilizing the laundry facilities at the RAC and in FHN (Fieldhouse North).

During the master planning process, analysis included evaluations of development opportunities on the north, east, and south sides of the existing Corbett Pool. Expansion to the north was found to be too disruptive to the future green space and Fine Arts theater expansion that will replace the current parking lot. Expansion to the east (including options that contained a portion of the new pool within the existing Corbett Pool footprint) impinges on the parking lot to the south of the Fieldhouse and on the recently completed retention pond/practice fields project. Although expansion to the south eliminates existing parking, its visibility from Grand Avenue, internal space relationships, and flexibility of configuration made this the preferred site for expansion.

The Master Plan Vision

The vision anticipates that a significant addition will be designed on the south side of the existing Corbett Pool. The location offers adequate site area and opportunities to use existing space within Corbett Gym that can continue to function for general student use as well as visiting team use.

By locating the new aquatics facilities outside the footprint of the natatorium, the existing pool can remain in use while the bulk of the new construction is accomplished. Once the new pool is constructed, the existing natatorium becomes an ideal location for support facilities. Thus, much of the new program space will be located within the shell of the old natatorium. This will include most of the home team space including locker rooms, team room, sports medicine and a video room. Mechanical space for the new pool will also be located at grade within this footprint, eliminating the need for basement access. The basement would become free for storage or other program space. The remainder of the Corbett building would be left in its current configuration and use.

The new natatorium will feature a ten-lane 50-meter pool with movable bulkheads to maximize flexibility of use. One end of the pool will accommodate the dive tower and diving well. Seating will be located on the upper level, separating spectator circulation and access from that of the competitors. Please refer to the full narrative produced by Counsilman Hunsaker for a detailed outline of the proposed facility requirements.

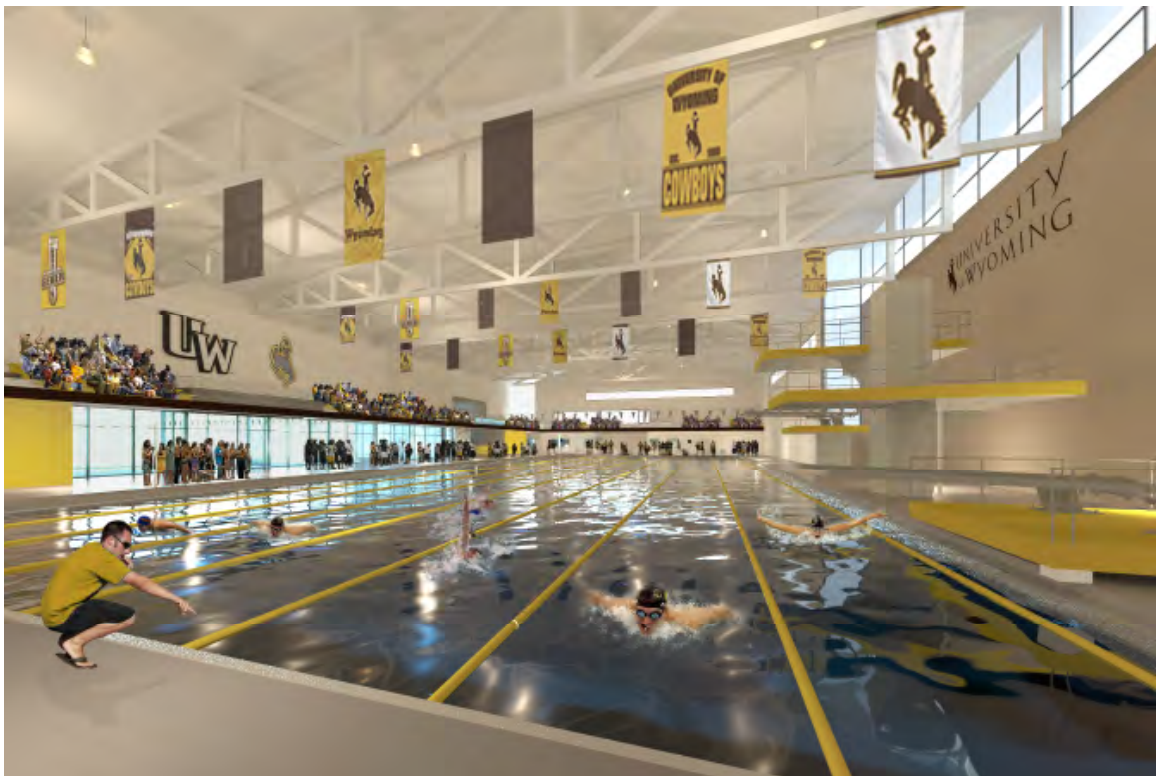
Lastly, the renovation and addition to Corbett Pool will explore and implement as many sustainable ideas as possible with the intention of achieving Leadership in Energy and Environmental Design (LEED) equivalent to certification. Innovations in stormwater management, solar heating and photovoltaics as well as increased daylighting and thermal efficiency, are just a few of the viable options available.



During the master planning process, the consultant team developed initial three-dimensional massing studies to better understand the impacts of scale and placement that the facility could have on its site and neighboring buildings. The attached renderings reflect the preferred master plan vision, which includes the incorporation of an arced roof that reflects other campus athletics buildings, the development of an easily identifiable and welcoming entry point, and the potential incorporation of daylighting.



View from the Southwest



Interior Perspective Looking North

Projected Costs and Implementation Plan

The project will require phasing in an effort to reduce the amount of down time for pool use. By constructing the new addition first and then renovating the existing space, pool operations will be shut down only during the timeframe in which the existing natatorium is converted to the pool mechanical room—a process projected to take three to six months. The overall construction timeline could take roughly 32 months to complete with time lines as follows:

Design	nine months
New construction	sixteen months
Changeover of pool mechanical	four months
Final renovations to Corbett	three months

Total costs could to be \$18,500,000 to \$20,000,000. Consistent with recent funding models, the University anticipates that funding will be derived from matching gifts to an initial commitment of funds from the State Legislature.