

Schematic Design Package



BLUE VALLEY DISTRICT COMPLEX

May 29th, 2020

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EXECUTIVE SUMMARY

On behalf of Hollis + Miller Architects and our partners at Henderson Engineers and Olsson, we are excited for the opportunity to team with Blue Valley School District to co-create the new District Athletic Complex. District Activities and Athletics and the new complex have the opportunity to reach not only a large number of students, staff and Blue Valley Schools patrons but the community at large creating lifelong memories and legacies for your Community.

Over the past months, our team has worked with School District leaders to gain an understanding of current and future needs and start to imagine what this new complex can be and do to serve your community. We have reached completion of our initial design phase which included Program Confirmation and Schematic Design and this document signifies the decisions made throughout the Schematic Process and serves as a milestone to step back, evaluate budget based on decisions to date and continue forward from an informed position as a team.

Thank you again, and please do not hesitate to contact this office for any questions regarding the Schematic Design decisions documented to date. We look forward to diving in to upcoming Design Phases with your team and watching this project becoming a reality.

Sincerely,

Hollis + Miller Architects



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PROCESS

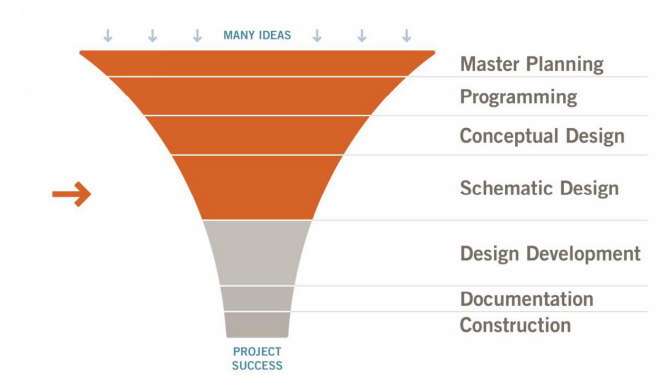


EXPERTISE



DESIGN PROCESS

- 1 Words:
Firm Foundation
- 2 Drawings:
Framework
- 3 Bricks & Mortar:
Finished Product



PRE-DESIGN



PRE-DESIGN

Feasibility Study

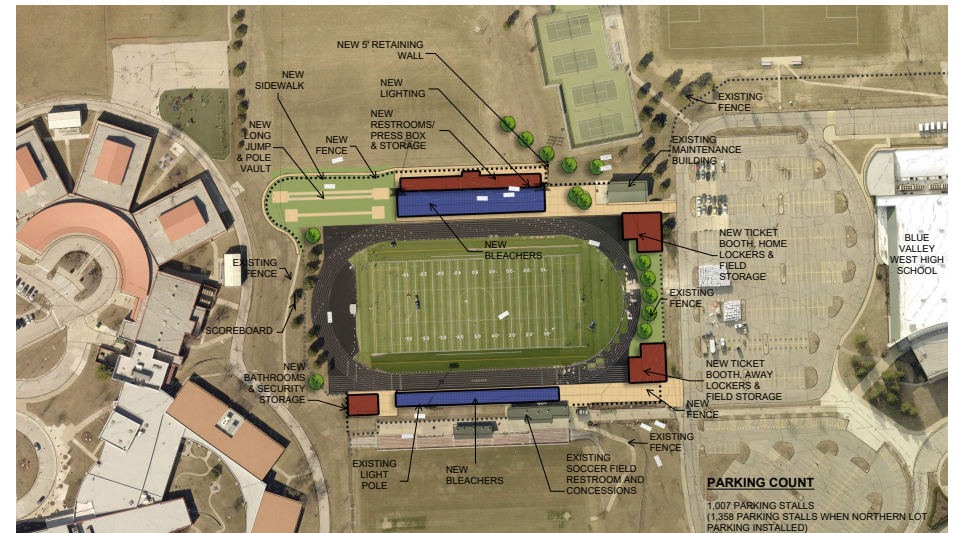
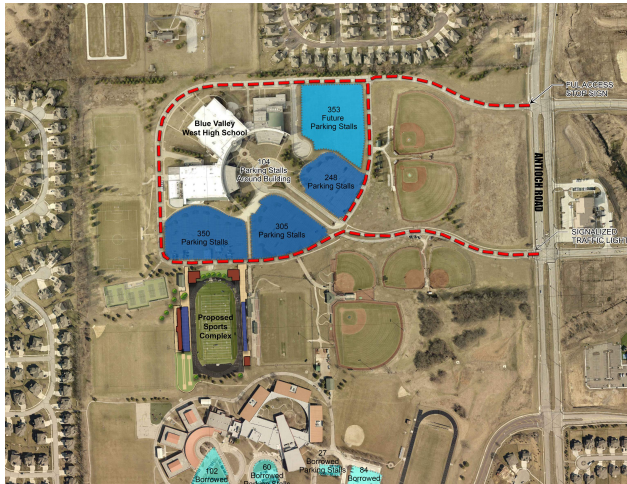
Conceptual feasibility studies for the new, 3rd District Complex were completed in late 2019 into January 2020 to include similar program elements to existing LamDAC complex (bleachers, ticket booths, press box, concession stands, and locker rooms). A 3rd district athletic complex will allow for no more than two schools sharing a district football facility. At this time, BVW and BVW share LamDAC while BVNW, BVN and BVW share SwiDAC. The site for the new facility to be housed at BVW would adjust current facility usage and upon completion would serve as home facility for BVW and BVSW. Feasibility study was based on a \$12M Total Project cost and assumed 5-6 month design duration and 10-12 month construction duration.

Blue Valley West Athletic Complex - AntDAC
Overland Park, Kansas
February 3, 2020
Concept Estimate



Construction Cost Summary

Description	Quantity	Cost	Unit Cost
Offsite Improvements			
By Others			
Sitework	3 Acre	3,847,907	1,167,433
3 Story Precision with Storage & Concess	6,800 SF	1,537,762	222.87
1 Story Mens and Womens Restroom	3,800 SF	1,194,943	314.46
1 Story Home Lockers	4,500 SF	922,180	204.93
1 Story Visitor Locker and Concession	4,300 SF	942,204	219.12
1 Story Visitor Restroom	2,000 SF	616,261	308.13
Construction Subtotal	21,500 SF	8,861,277	\$412.15
Design Contingency	5.00%	443,064	20.61
Escalation to 3rd Quarter 2020	2.25%	209,348	9.74
Total Construction Cost	21,500 SF	\$9,513,689	\$442.50
Soft Cost	20%	\$1,902,738	
Total Project Cost		\$11,416,426	
Budget		\$10,000,000	
Variance		\$1,416,426	



PROGRAMMING



ARCHITECTURAL PROGRAM

Target Program

Category	Qty	Area	Total
Total Book			
Home	1	130	
Visitor	1	130	
Plaza			
Entry Plaza	1	100	
Home Deck	1	100	
Game Deck	1	100	
Announcer	1	250	
Water Deck	1	100	
Water Plaza	1	100	
Other	0	0	
Plaza Other			
Stair	1	80	
Elevator	1	80	
Elevator Core	1	80	
Mechanical Storage	1	1000	
Room Group			
Concession	1	600	
Concession Storage	1	900	
Ticket Booth	1	300	
Ticket Storage	1	60	
Ticket Family	1	60	
Mechanical	1	0	
Other	1	0	
Home Locker Room (H)			
Locker	1	150	
Showers	1	60	
Trunks	1	90	
Visitor Locker (V)			
Concession	1	500	
Concession Storage	1	90	
Ticket Booth	1	30	
Ticket Storage	1	60	
Ticket Family	1	60	
Mechanical	1	0	
Other	1	0	
Visitor Locker Room (V)			
Locker	1	150	
Showers	1	60	
Trunks	1	90	
Office			
Meeting Area	1	120	
Trunk/Storage	1	90	
Other			
Waiting Room	1	200	
Other	1	0	
Food Bar			
Food Bar	1	0	

USER GROUP

The new Blue Valley District complex will be the home to a wide range of user groups. It will be the home field to Blue Valley West but will also host Blue Valley Southwest for games and other school related events. The new complex will need to accommodate a range of athletics from football practice and games, to band and track and field. The complex will also need to support fan experience for both home and visiting teams as well as operations such as security, media and press, officials and training.



BV West Football



BV Southwest Football



Band



Track



Program Comparison

LAMDAC



SWIDAC



Bleacher Count Study

Location	Home	Visitor	Total
LAMDAC	2288	1734	4022
SWIDAC	~2503	~1503	~4006
ANTDAC	2500	1500	4000

Facility Tour

The new District Activities Complex on Antioch Road on the campus of Blue Valley West will be the third DAC complex for the Blue Valley District. The existing DAC complexes of LAMDAC and SWIDAC served as the baseline for the program of the new facility. Knowing that parity between new and existing facility is a concern, comparison studies of bleacher count and amenities offered was conducted.

Home Team Experience

- Entry Plaza
- Locker Room
- Concession
- Restrooms

Visiting Team Experience

- Entry Plaza
- Locker Room
- Concession
- Restrooms

Operations

- Security Office
- Training room
- First Aid
- Storage

Press Box

- Home + Visitor Coach
- Operations & Announcer
- Home + Visitor Press
- Film Deck

SITE LAYOUT EXPLORATION



ARCHITECTURAL SITE

Site Analysis

The Antioch District Athletic Complex site posed unique challenges and opportunities that the design team looked to leverage to make this a premier facility. After studying the site and reviewing previous studies the design team started looking at different ways to organize the site and help manage the patron and team flow through the site. The first set of these ideas were proposed in the three concepts below. Some of the main characteristics the concepts explored were: how the complex was entered both from a patron and from the teams, the adjacencies to the existing facilities, the location of the patron and athlete amenities.

Site Circulation Pedestrian Access

The main approach to the new DAC will be from the north. The design team looked at several ways to organize the entry into the complex. Ideas explored: sense of entry, separation of home versus visitor, queuing, and circulation.



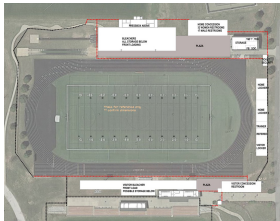
Site Circulation Vehicular + Team Drop Off

Overflow parking is located to the south of the DAC at the Cedar Hills Elementary School and Pleasant Ridge Middle School complex. As part of the site investigation the design team looked at leveraging this access not only for overflow parking but also for team drop off and pick up.



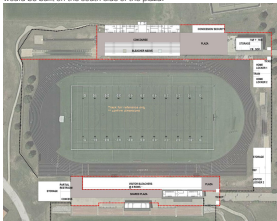
Concept 1

Concept 1's approach to organizing the site was to locate all of the facilities on the north side of the site. All of the athlete facilities are grouped together in a bar on the north side of the track. This created two distinct entrances for the home and visitor patrons. Both the home and visitor bleachers are front loading allowing for storage underneath similar to the existing LandDAC facility. The fan amenities are located off a plaza on the north side of the bleachers.



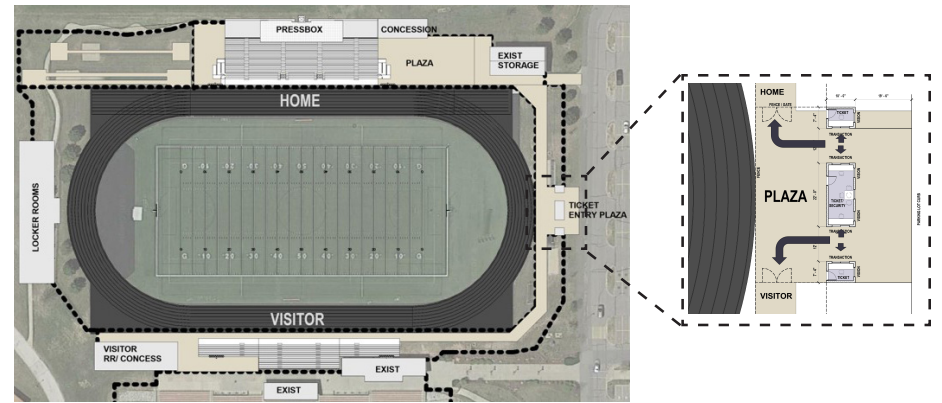
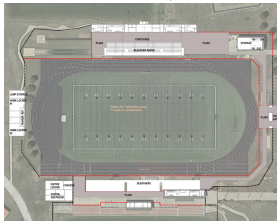
Concept 2

To help reduce the footprint of the home bleacher and fan complex, concept 2 pushes the bleachers tight to the track with the restrooms below the press box creating a concourse. The home concession is located off the plaza on the north side of the complex there are two distinct entrances for the home and visitor patrons defined by the two separate locker room buildings. The visitor fan amenities leverage the adjacency of the soccer stadium to create a plaza behind the bleachers. A small restroom and concession stand with storage would be built on the south side of the plaza.



Concept 3

Concept 3's defining feature is placing the locker room facilities on the south side of the stadium and leveraging the steep slope to place storage below. This allows for separation between the athletes and the fans before and after events and allows for a single entrance plaza on the north side of the complex. The home side utilizes a concourse approach locating all fan amenities below the bleachers with storage between the vomitories under the bleachers. The visitor side leverages the facilities at the soccer stadium creating a plaza behind the bleachers. The remaining visitor fan and athlete amenities are located on the south side of the plaza.



Final Schematic Site Plan

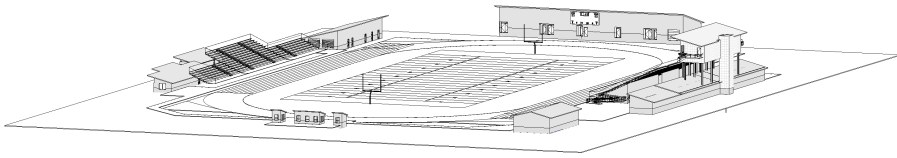
The final schematic design plan utilized ideas presented in all three of the previous concepts. The overall site organization is based on Concept 3's use of a central entrance plaza and locating the locker rooms to the south creating nice book ends to the stadium. It uses Concept 1's approach to separating the soccer stadium from the DAC to allow for simultaneous events while using Concept 2's approach to locating the visitor amenities on the south and creating a home side concourse with the concessions off the plaza.



MASSING EXPLORATION



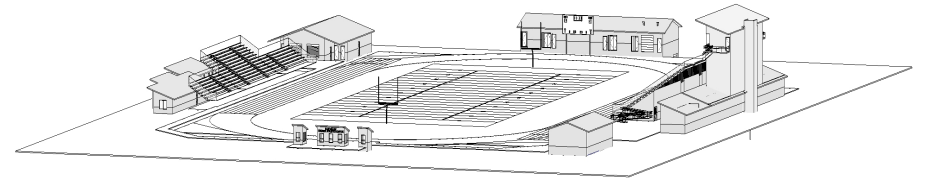
MASSING EXPLORATION



Massing Concept 1

The massing studies primarily looked at two features - roof configuration and pressbox massing.

Concept 1 looked at construction of the press box structure as a mass elevated above the concourse with exposed steel column supports and mono sloped roofs on all new site buildings.



Massing Concept 2

Concept 2 looked at construction of the press box structure as solidifying mass down to the concourse and gable roofs on all new site buildings, except the home pressbox and concourse buildings which are mono sloped roofs.

A combination of the two concepts was determined to be the ideal solution. The solid mass of the press box was preferred over the stilted option, and the mono sloped roof solution of concept 1 was the roof style selected to move forward with.



MATERIAL EXPLORATION



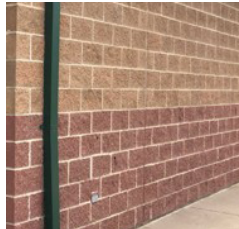
MATERIAL EXPLORATION



Existing Color Palette

While exploring materiality, the team researched three options of materiality for the new buildings of the new district complex.

The existing site buildings – soccer concession, soccer press box and the storage building are constructed with a single wythe red split face CMU block base with a tan split face CMU block above. Green standing seam metal roof and downspouts complete the existing palette. The existing material palette was applied to the new site buildings to create a uniformed site building concept.



Light Color Palette

The light palette introduces a white based ground face CMU with notes of red, tan, green and gray in the exposed aggregate pieces which would complement the existing materials of the existing buildings. The light ground face CMU is complemented with a light metal panel roof to highlight new buildings in the complex, while supporting buildings are constructed with the existing material palette.



Dark Color Palette

The dark palette introduces a charcoal based ground face CMU with notes of red, tan and gray in the exposed aggregate pieces. The dark ground face CMU is complemented with a charcoal metal panel roof and dark gray to highlight new buildings in the complex, while supporting buildings are constructed with the existing material palette.

Conclusion

During meetings with the district it was concluded that the new buildings on the site do not need to use any of the existing palette. All new building are to be constructed out of a complementary palette. While both the light and dark ground face CMU presented were favorable, further exploration is require on the palette and application of material for the new site buildings.



GRAPHICS



GRAPHIC DESIGN

The new athletic complex will be branded at a district level. While this complex will be the home facility to Blue Valley West, the complex will be used by Blue Valley Southeast as well as potentially other schools within the district. The graphic style and graphic colors will be will remain neutral and will not be tied to one specific school. The intent of the graphic design will be to highlight Blue Valley pride.

Narrative

Entry Plaza Signs

Tickets: 6 inch tall and 1 inch deep, brushed aluminum fabricated letters stud mounted to building with 1/4 inch spacers.

Blue Valley School District Main Entrance: 24 inch tall and 2 inch deep, brushed aluminum fabricated letters mounted to canopy

Blue Valley School Plaza: 36 inch tall and 4 inch deep face illuminated letters, fabricated and mounted to base.

Locker Rooms

Home Locker Room: 6 inch tall and 1 inch deep, brushed aluminum fabricated letters stud mounted to building with 1/4 inch spacers, backlit.

Concessions

Placeholder Concession Name: 6 inch tall and 1 inch deep, brushed aluminum fabricated letters stud mounted to building with 1/4 inch spacers, backlit.

General Way Finding

Color Blocking Plaque: 10 inch by 10 inch square powder coated steel plate with CNC cut verbage with concealed fastener attachment.

Restroom

Pictogram and "Restroom": 16 inch square doubled sided aluminum blade sign with dimensional text and pictogram on both sides. Qty. 2

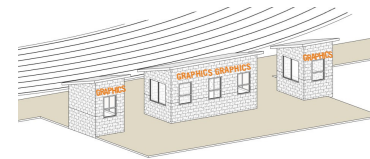
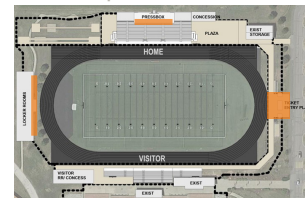
ADA Signs

Provide District standard ADA signs in exterior grade finish at all code locations

Gobo Projectors

Provide qty. (3) exterior grade Gobo Projectors with changeable custom logo lenses (Qty. 2).

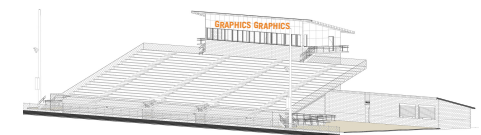
Potential Graphic Locations



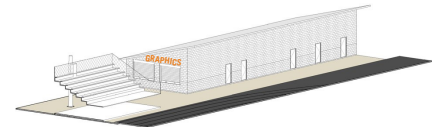
Ticketing



South Endzone Locker Building



Home Bleachers + Pressbox



Visiting Concession

Entrance + Plaza Signage



Concourse + Way Finding



Pin Mounted Signage



Room Signage

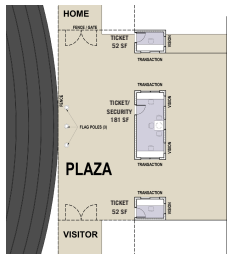
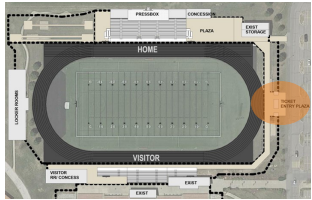
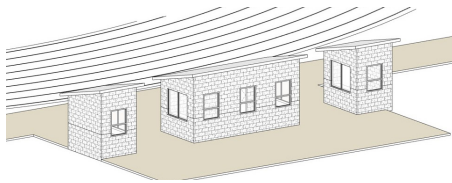


FINAL SCHEMATIC DRAWINGS

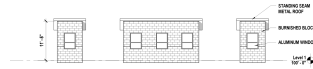


SCHEMATIC PLANS

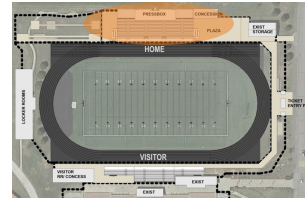
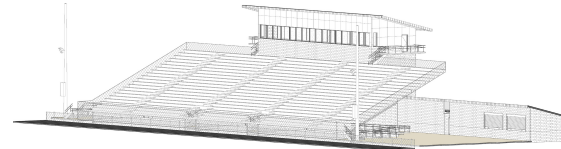
Ticketing & Entry Plaza



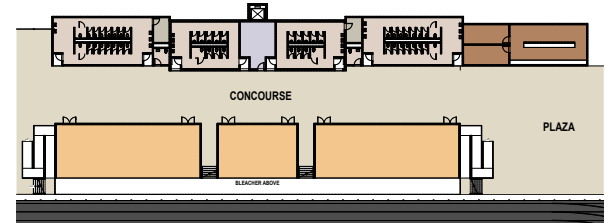
Exterior Elevations



Home Team Concourse + Pressbox

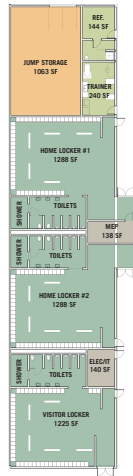
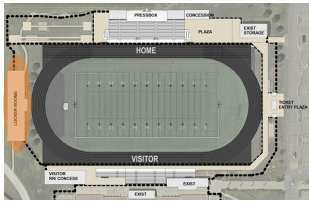
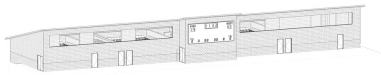


Exterior Elevations

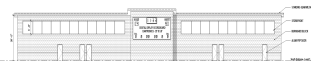


SCHEMATIC PLANS

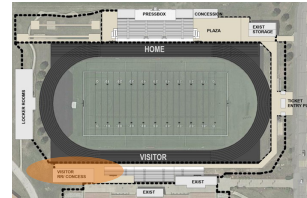
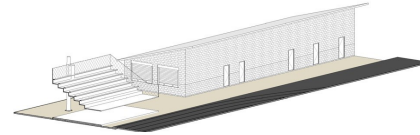
South Endzone Locker Room Block



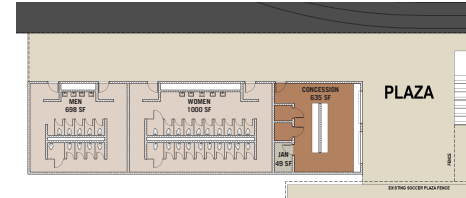
Exterior Elevations



Visitor Restrooms + Concessions



Exterior Elevations



CIVIL NARRATIVE



May 28th, 2020
Blue Valley West - Athletic Complex

City/Site Narrative

Site Location:
Blue Valley West High School
16200 Antioch Road, Overland Park, KS 66085

Site Improvements

A new Athletic Complex is being proposed for the existing track located on the campus of Blue Valley West High School. The proposed improvements call for the installation of bleachers, restrooms, a press box, ticket booths, locker rooms, additional storage space, long jump pit, pole vault pit, new turf field, and updated fencing around the exterior of complex. Along with the Athletic Complex additions, there will also be the addition of ADA stalls to the north of the complex. These improvements are shown on the concept plan attached.

To ensure that pedestrians have access from the north of the proposed complex, a sidewalk will be required near the ADA stalls along with the nearby proposed ticket booths. New curb and gutter will be installed where the new ADA stalls are located, along with any updated curb along the northern perimeter of the site. On the west side of the athletic field, proposed bleachers, restrooms, a press box and concessions will be installed. For the east side, visitor bleachers, restrooms, and concessions will be implemented. A new long jump pit and pole vault pit will be installed on the southside of the bleachers, in the southwest corner of the Athletic Complex.

The proposed locker rooms will be installed on the south side of the field and will face towards the field. There will be an adequate amount of storage underneath the locker rooms due to the steep grade change throughout this location. On the southern portion of the site, an existing fire loop drive will need to be resurfaced in order to accommodate for one-way pickup and drop off zones. Currently, the drive wraps around both the existing elementary school and middle schools.

Site Demolition

The contractors will need to coordinate with Blue Valley School District on where the laydown areas will be located on site for this proposed project. On the west side of the field, demolition will consist of the existing bleachers, associated pavement, fencing and lighting. The existing long jump pit and pole vault pit will be removed and replaced to make room for the new

bleachers. The existing sidewalk and fencing that runs along the outside of the long jump and pole vault area will need to be reworked since the footprint of this area will grow further to the south.

The existing long jump pit and storm sewer located on the north side of the field will be removed to make way for the proposed structures that will house the ticket booth and equipment storage. This storm sewer will need to be reworked/reconstructed as a part of the proposed upgrades.

On the east side of the field, demolition will consist of the existing bleachers, associated pavement, fencing and lighting. Storm sewer on this side of the site will also need to be reworked/reconstructed to accommodate the proposed bleachers and restrooms.

Paving Improvements

Paving improvements will occur on the north and south sides of the proposed Athletic Complex. Roughly eighteen proposed ADA parking stalls are located on the north side of the complex. These stalls will allow for easier access into the complex itself. Pavement, curbs, and sidewalk will need to be removed/reworked and sidewalk ramps will need to be installed for the relocated stalls to meet ADA requirements.

To provide a pedestrian path from north of the Athletic Complex to the southside of the complex, a 5' wide sidewalk (minimum) will run along the outer perimeter of the track.

From the southern portion of the site, a pedestrian (ADA compliant) path is required. To make this area ADA compliant, the sidewalk will require a sequence of ramps and landings to meet ADA standards and regulations. Along with the ramps, a set of stairs will be provided for a more direct pedestrian walking route. In addition to the pedestrian walking paths, a small ATV (Gator, etc.) path will be provided for accessibility into the basement level of the proposed locker rooms. The contractor should assume that the private drive (fire loop) in this area will need to be repaved to chase out grades and allow for the potential of new utility connections or reworking of existing utilities.

It is anticipated that pavement will need to be replaced on the north side of the addition to allow for a sidewalk connection. Pavement will also be replaced in this area to allow grades to tie out to the existing stalls and private drive.

The proposed parking stalls and drive aisle paving for the project will be concrete pavement (KDOT 4.0(AE) with class I limestone aggregate except for the concrete used in the public right-of-way). Asphalt paving should be included as a deduct alternate as the project moves forward in design and bidding.

Earthwork

Minor grading will occur around all of the proposed bleachers and buildings to provide positive drainage away from them. Due to a large change in grade, a retaining wall will be needed between the home team's bleachers and the existing tennis courts. Olsson anticipates this retaining wall to be roughly 5' in height. Regrading will also occur on the south and west sides of the proposed long jump and pole vault pits since the new footprint of this area encroaches on the existing sidewalk. As for the southern and southeastern portions of the site, grades in these areas are severely steep (roughly 13' difference). Due to the two buildings located in these areas, Olsson anticipates two-tiers of retaining walls (roughly 5' for each wall) with railings in place. During a site visit with BVS&D, it was made apparent to Olsson that there are currently issues with the existing retaining walls in the area that is south of the existing soccer field. With further instruction and approval, new walls could be attached into this current location. Doing so, would help clean up this portion of the site for the existing and proposed conditions. To the south of the site, Olsson anticipates the need for a large ADA compliant ramp to provide pedestrians with access from the private drive to the top of the Athletic Complex. This ramp will follow along with proposed stairs that will require a check wall on both sides to make grades compliant.

Storm Sewer

The existing storm sewer located on the north, east and west sides of the existing athletic field will need to be reworked/reconstructed due to the placement of the proposed bleachers, bathrooms, ticket booths, locker rooms, etc. Reference the attached Exhibit for clarification on areas where the existing storm sewer will need to be reworked/reconstructed. Drainage patterns will remain consistent with the existing conditions.

Stormwater Treatment: The Athletic Complex will increase the impervious area of the site by a little more than 40,000 square feet from the existing conditions. It is anticipated that Overland Park will require the use of BMP(s) on site to mitigate the impact of the additional impervious area. The site should be able to achieve its required level of service and be in compliance with Overland Park Stormwater Treatment guidelines, by retrofitting inlet(s) on site with catch basin inserts (CBI).

Stormwater Detention: Per City of Overland Park Requirements, detention may be required for the site. To address this request, Olsson will analyze a few potential solutions for the small amount of detention that would be required. The first option would be to implement the use of underground detention chambers near the site.

Option number two would involve working with the city to convert green space just east of the middle school into an extended dry detention basin. There already tends to be storm sewer and a lower grade standpoint in this area. By lowering the elevation of the existing space and converting it into extended dry detention basin, there should be adequate room to create more volume which would meet the City's guidelines.

Domestic Water & Fire Protection Service

An existing 8" DWP watermain is located on the north side of the athletic field. The proposed structures that contain the ticket booth and equipment storage are just south of WaterOne's easement. Any domestic or fire protection service lines will be tapped from this existing watermain. For the 8" DWP watermain on the south side of the site, a proposed locker room will be constructed near this existing main. Once depth, routing, and alignment are officially determined, this area may need to be reevaluated moving forward. As for now, Olsson does not anticipate the relocation of the watermain.

Sanitary Service

As shown on the attached exhibit, proposed buildings will be placed on top of the existing sanitary sewer main. Therefore, the existing sanitary main will need to be relocated in this area to accommodate the proposed improvements. This will require the removal of existing MH (92)83 and sections of the existing main, which extend out from MH (92)83.

Additionally, a new public 8" DWP sanitary sewer main will be rerouted to accommodate the West, East, and South proposed buildings. Currently there is an existing stub coming from the concessions for soccer field, this connection will need to be rerouted to the relocated proposed sanitary sewer main. Reference the attached utility exhibit for further information on the proposed routing.

Gas Service

Olsson is operating under the assumption that gas service will not be required for the proposed Athletic Complex improvements.

Electrical Service

Existing underground power is located along the private drive, on the north side of the existing athletic field. Olsson does not anticipate the need to relocate electrical services at this time, but additional electrical feed(s) will be needed to serve the proposed locker rooms and concessions. Olsson does not anticipate the need for an additional transformer/sectionalizer, however this is subject to change based on the electrical demands of the proposed improvements and Evergy's review of the current electrical output of the existing transformer/sectionalizer. Power for the proposed improvements will be pulled from the existing transformer/sectionalizer that is located on the northwest corner of the field, along the private drive.

Landscaping

Minimal landscaping is planned for the proposed Athletic Complex. The existing landscaped areas around the complex primarily consist of sod and a few shade trees. A majority of the trees will need to be rework/replaced as they will likely be disturbed during the construction process.

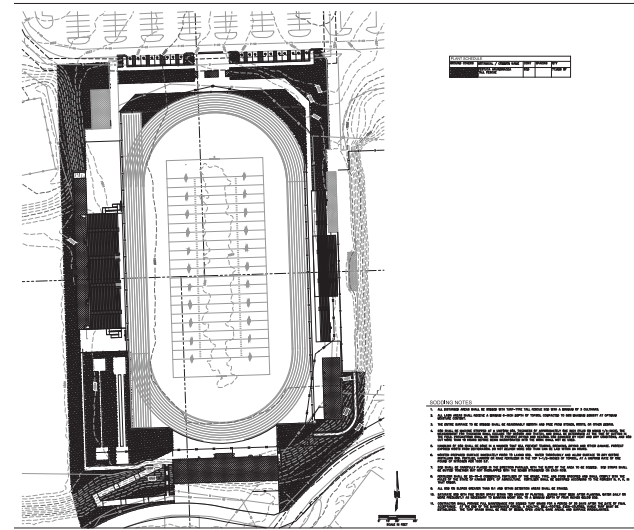
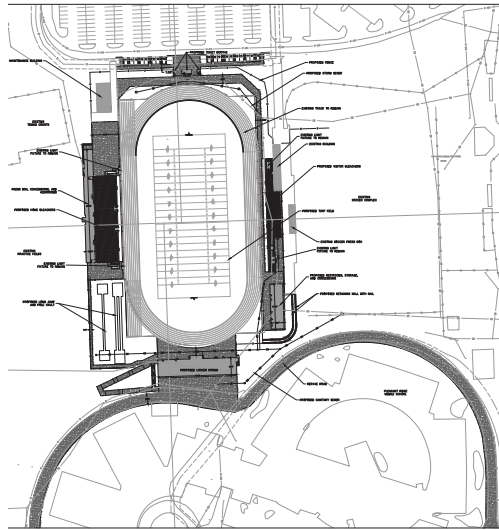


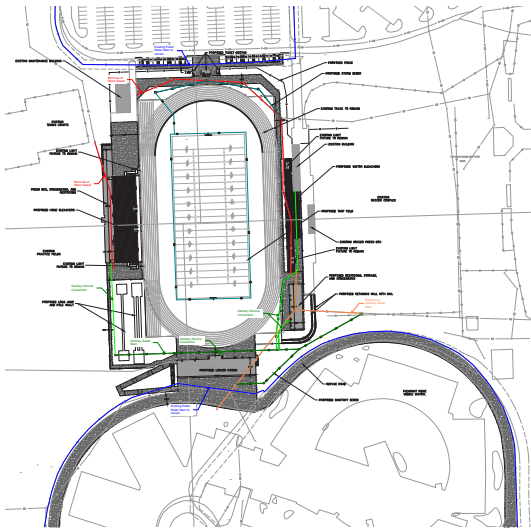
olsson

Olsson will need check the overall site to ensure that it is in compliance with Overland Park's Street Tree Requirements.

Equipment/Turf Field

Both Long Jump and Pole-Vaulting areas will need to be relocated due to the expansion of the entire Athletic Complex as a whole. The new location of these field events will be in the same general area, just shifted further southwest away from the turf field. Additionally, a new artificial turf field will be installed depending on the investigation of the failures on the existing field. Let it be known the track will remain untouched unless the investigation of the field calls for failure under and/or near track perimeter.





SYMBOL	DESCRIPTION
[Red line]	WATER
[Blue line]	SEWER
[Green line]	STORMWATER
[Black line]	UTILITY
[Grey area]	EXISTING UTILITIES
[Dashed line]	PROPOSED UTILITIES

**UTILITY EXHIBIT
BVW ATHLETIC
COMPLEX**



SYMBOL	DESCRIPTION
[Red line]	WATER
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[Green line]	STORMWATER
[Black line]	UTILITY
[Grey area]	EXISTING UTILITIES
[Dashed line]	PROPOSED UTILITIES



STRUCTURAL NARRATIVE



Snow load including accumulations, per the IBC:

Ground Snow Load	$p_g = 20$ psf
Exposure Factor	$C_e = 0.9$
Importance Factor	$I_s = 1.0$
Thermal Factor	$C_t = 1.2$

Lateral Loads – The structure will be designed to resist lateral loads due to wind and seismic effects per the IBC. It will also be designed to resist any lateral soil loads that may be present.

Building Risk Category: II

Wind Load:

Basic Wind Speed	115 mph
Exposure Category	C

Seismic Loads:

Seismic Site Class (to be confirmed)	D
Seismic Design Category (to be confirmed)	B
Seismic Importance Factor	1.00

Materials

Concrete:
 All concrete foundations, exterior slabs, and interior slabs shall develop a 28-day minimum compressive strength of 4000psi. All exposed exterior concrete shall contain proper admixtures to obtain 5% to 7% air entrainment.

Reinforcing Steel:
 All reinforcing steel shall be ASTM A615 Grade 60.
 All welded wire reinforcement shall be ASTM A185 Cold Drawn Wire.

Structural Steel:
 All wide flange structural steel shall be ASTM A992 Grade 50. All structural tube steel shall be ASTM A500 Grade C (50 ksi). All channels, angles, plates and connection steel shall be ASTM A36.

Masonry:
 All concrete masonry units shall be lightweight units and shall comply with ASTM C90. Mortar shall comply with ASTM C270, Type M or S. Coarse grout shall comply with ASTM C476 with 3/8" maximum aggregate and shall develop a 28-day minimum compressive strength of 3000 psi. The minimum 28-day compressive strength of masonry shall be 2500 psi.

Structural Serviceability

Deflections – All members and systems shall be proportioned such that deflections are within acceptable limits for the nature of the materials being supported and the intended use and occupancy per IBC Table 1604.3. Members supporting masonry will be limited to L/600 maximum deflection.

Dynamic Effects – Where required, suitable provision shall be made in the design for the effect of live load which induces impact or vibration or both. Human activity in addition to machinery shall be considered in the design.

Foundations

A geotechnical report for this addition is currently pending; however, it is anticipated that the building will be supported on shallow spread footings at a depth of 3'-0" minimum, for frost protection.

The interior building slab will be a 4" thick slab-on-grade reinforced with welded wire reinforcement. Increased slab thickness may be required in areas subject to higher or concentrated loads.

The sub-grade will be prepared per the recommendations of the pending geotechnical report. It is anticipated that a minimum of 4" of crushed rock drainage fill and a 15 mil vapor retarder will be placed over the sub-grade below the slabs with at least an 18" layer of low volume change material.

Structural Systems

The six new buildings are anticipated to be constructed with CMU load-bearing walls and steel framed roofs. Alternate options for steel framed structures at the south locker rooms and press box will be considered. Also, both steel bar joists and cold-formed joist/truss framing at the roofs will be considered for all buildings. These options are shown below.

South Locker Rooms with Lower Storage

- Walls: 8" CMU above grade (load-bearing)
- 10" to 12" concrete retaining wall below grade
- Floor: 24" to 27" deep wide-flange composite beams at 8' on center w/ 5" total thickness concrete composite slab on 1.5" deck, 3/4" diameter headed studs at 12" on center minimum

- Roof: 28" to 30" deep long span LH-series steel bar joists at 8' on center w/ 2" to 2.5" acoustic metal deck
- Alternate Option: In lieu of 8" CMU walls above grade, construct steel columns and beams to support floor and roof
- Lateral X-bracing will be required at each wall.

Southeast Visitor's Restroom/Concession

- Walls: 8" CMU (load-bearing)
- Roof: Option A: 20" to 22" deep K-series steel bar joists at 6' on center w/ 1.5" metal deck
- Option B: 16" to 18" deep light-gauge steel trusses at 2' on center w/ 5/8" plywood

North Ticket Booths

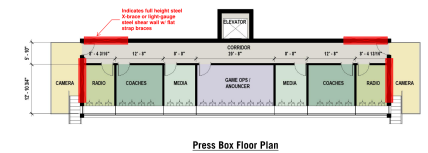
- Walls: 8" CMU (load-bearing)
- Roof: Option A: 10" deep K-series steel bar joists at 6' on center w/ 1.5" metal deck
- Option B: 6" to 8" deep cold-formed joists at 2' on center w/ 5/8" plywood

West Press Box, Mechanical Mezzanine, and Lower Restrooms/Concessions

- Walls: 8" CMU (load-bearing) at restrooms and concessions
- 12" CMU (load-bearing) at press box
- Mezzanine/Press Box Floor: 12" to 14" deep wide-flange composite beams at 8' on center w/ 5" total thickness concrete composite slab on 1.5" deck, 3/4" diameter headed studs at 12" on center minimum
- Roof: Option A: 14" deep K-series steel bar joists at 6' on center w/ 1.5" metal deck
- Option B: 10" to 12" deep cold-formed joists at 2' on center w/ 5/8" plywood
- Alternate Option 1: In lieu of 12" CMU at the press box, construct steel columns and beams to support floors and roof (12" CMU becomes non-structural). Floor and roof framing options would be same as previously described. Full height lateral X-bracing will be required as shown on "Press Box Floor Plan", next page.
- Alternate Option 2: In lieu of 12" CMU at the press box, construct cold-formed metal framing above the mezzanine level (12" CMU remains below

mezzanine). Wall studs would be 8" to 10" wide spaced at 16" on center. Mezzanine floor framing would be same as previously described. Press box floor framing would consist of 18" deep light-gauge steel trusses @ 16" on center with 3.5" total thickness concrete slab on 0.6" metal conform deck. Roof framing would be cold-form option B as previously described. Full height shear walls with light-gauge "flat-strap" bracing will be required as shown below on "Press Box Floor Plan".

Grandstands: By others.



MECHANICAL, ELECTRICAL, + PLUMBING NARRATIVE





4. Return grilles will have acoustical boots and return air openings through walls to structure will have acoustical boots.
- N. Building Automation and Control System
1. The BACS will be all electronic and will utilize direct digital control for all energy management and time of day control.
 2. The HVAC equipment will tie in to the existing building controls system. Additional Jace's may be required to accommodate new equipment for addition.
- O. General Mechanical Requirements
1. Specifications will require the Contractor to submit shop drawings for all major pieces of equipment and materials. Layout and coordination drawings shall be required for piping, fire protection and sheet metal.
 2. All motors shall be built to NEMA standards and have high temperature winding insulation. All motors 1 HP and larger shall be high efficiency type. Motors 1/2 HP and above shall be 460 volt, three phase. Smaller motors shall be 120 volt, single phase.
 3. Openings and sleeves shall be provided for all piping and ductwork passing through construction. Openings shall be sealed with an approved fire sealant in fire rated construction. Fire dampers or combination fire/smoke dampers shall be installed where required by Code.
 4. All equipment furnished shall be adjusted to operate properly. All bearings shall be aligned. All safety devices shall be tested. Major pieces of equipment shall have factory personnel start-up. Any necessary adjustments shall be made to the systems.
 5. After the installing contractor has finished his final adjustments, the mechanical systems shall be tested and balanced by an Owner approved independent Testing and Balancing Agency. The Testing and Balancing Agency shall provide a complete report after all systems are functioning properly. Systems to be tested shall include:
 - a. All air supply, return, and new exhaust systems.
 6. Access doors will be specified for installation in general construction where necessary to provide access for operation and maintenance. The minimum size of the access doors is to be 24" x 24".
 7. Housekeeping pads shall be installed under all major floor mounted mechanical equipment.

PART 5 - PLUMBING DESIGN CRITERIA

- 5.1 DESIGN CRITERIA
- A. The following outlines the general requirements for all plumbing systems.
 - B. Domestic Cold Water



- PART 3 - UTILITY SERVICES**
- 1.1 GENERAL
- A. Domestic Water Service: Water One (913) 895-1800
 - B. Fire Water Service: Water One (913) 895-1800
 - C. Sanitary Sewer Service: Johnson County Wastewater (913) 715-8500
 - D. Natural Gas: Kansas Gas (800) 794-4780
 - E. Electric Service: Evergy (816) 471-5275
- PART 2 - CODES AND REGULATIONS**
- 2.1 THE FOLLOWING CODES WILL BE USED IN THE DESIGN OF THIS PROJECT:
- A. 2018 International Building Code
 - B. 2018 International Existing Building Code
 - C. 2018 International Mechanical Code with local amendments
 - D. 2018 International Plumbing Code
 - E. 2018 International Fuel Gas Code
 - F. 2018 International Fire Code with local amendments
 - G. 2018 International Energy Conservation Code with local amendments
 - H. National Fire Protection Association (NFPA) Standards
 1. NFPA 13, "Installation of Sprinkler Systems", 2010 Edition.
 2. NFPA 24, "Standard for the Installation of Private Fire Service Mains & Their Appurtenances", 2010 Edition.
 3. NFPA 25, "Inspection, Testing and Maintenance of Water-Based Fire Protection Systems", 2011 Edition.
 4. NFPA 72 - "National Fire Alarm and Signaling Code", 2011 Edition
 - I. NFPA 70, 2011 National Electric Code
 - J. ASHRAE 62.1-2007 Ventilation for Acceptable Indoor Air Quality
 - K. Americans with Disabilities Act
- 2.2 SEISMIC REQUIREMENTS
- A. The seismic classification shall be determined by the Structural Engineer.

PART 3 - MEPT DESIGN ANALYSIS

- 3.1 SITE DISTRIBUTION
- A. Electrical:



1. Electrical distribution: Buildings within 300 ft adjacent to each other as identified/distinguished in sections below will be served from a single pad mount utility transformer (by utility) with pad by contractor. Primary conduit routing will be by contractor and coordinated with civil engineer and utility company. Secondary service lateral will be brought into each building at 480V and distribute to adjacent buildings within 300 ft with 480V feeders. Buildings separated by more than 300 ft will be served from separate utility transformers and primaries.
 2. Provide site pedestrian lighting in public plaza areas. LED pedestrian scale based.
 3. Fiber distribution: Provide (2) 4" conduits to each building for district fiber. Incoming fiber will be coordinated with district and with civil engineer.
 4. Sanitary: provide a single 4" sanitary stubbed out of each individual building for tying in to sanitary coordinated by civil engineer.
 5. Storm: It is assumed that buildings will be guttered and storm tie-ins designed by civil engineer as coordinated with gutters by architect.
 6. Water: Refer to building info below for water line size estimates to each building. Main waterlines to buildings stubbed within 5'-0" will be designed by civil engineer.
- 3.2 WEST BUILDING OF COMPLEX
- A. Press Box
1. Separately metered power (assume 208V, 3 phase) to this building and adjacent buildings.
 2. Power and data device layout as necessary to accommodate coach s/press/student power, AV, and device needs.
 3. All LED lighting/occupancy based controls with local override at interior spaces.
 4. Accommodations for telecom/data for camera points at each end of pressbox.
 5. Data/Wi-Fi for press locations/press use.
 6. Provide ceiling fan in each space for air circulation.
 7. Spaces will be heated only. Provide electric baseboard heaters each space.
 8. Separate fiber to building with wall mounted telecom rack for data
 9. Single tap off main with new 4" water service line & BEP to serve building restrooms and concession, coordinate with civil for new meter location.
 10. Electric tank type water heater per building w/ recirc/expansion tank
 11. 0V standard plumbing fixtures (floor mounted flush valve water closets)
 12. Sanitary exit to west and tie to main coordinated w/ civil



13. Assume gutters for storm
- B. Concessions
1. Separately metered power to group of buildings. 208V, 3-phase.
 2. Separate fiber to each building with wall mounted telecom rack for data
 3. Domestic water service from west stubbed into MEP room and coordinated with civil to be shared with adjacent restrooms.
 4. Electric tank type water heater w/ recirc pump.
 5. Provide interior grease interceptor w/ effluent connecting to sanitary line at adjacent restroom, assume gutters for storm.
 6. Spaces will be heated and ventilated only. Provide electric cabinet unit heaters, wall louvers and transfer grilles for outside air intake and exhaust.
 7. Provide ceiling mounted fans for air circulation
 8. Provide mini-split in any MEP room containing a transformer.
 9. All LED lighting / occupancy-based controls with local override (keyed switch in restrooms).
 10. GFCI receptacles for concessions equipment, many with dedicated circuits.
 11. Data/Wi-Fi for concessions POS equipment, ticketing equipment
 12. Pedestrian-scale fixtures for lighting of walkway behind bleachers between north and south buildings.
- C. Restrooms/Security Office/Under Bleacher Storage
1. Separately metered power to group of buildings. 208V, 3-phase.
 2. Spaces will be heated and ventilated only. Provide electric cabinet unit heaters, wall louvers and transfer grilles for outside air intake and exhaust.
 3. Ducted exhaust to single combined exhaust fan for restrooms. Provide approximately 75 CFM per fixture. Exhaust fan to operate continuously during occupancy.
 4. Provide mini-split in any MEP room containing a transformer.
 5. All LED lighting/occupancy based controls with local override at interior spaces.
 6. Accommodations for telecom/data for video surveillance as needed.
 7. Data/Wi-Fi for security office.
 8. Floor mounted rack to serve as head end location for complex.



9. Separately metered domestic water service from west stubbed into MEP room shared w/ concession and coordinated with civil
10. Electric tank type water heater w/ recirc/expansion tank
11. BV standard plumbing fixtures (floor mounted flush valve water closets)
12. Sanitary exit to west and tie to main coordinated w/ civil
13. Assume gutters for storm
14. Separate fiber to each building with wall mounted telecom rack for data

3.3 SOUTH LOCKER ROOM BUILDING

- A. Locker Rooms
1. Separately metered power (assume 208V, 3-phase) to this building and adjacent buildings.
 2. Spaces will be heated and ventilated only. Provide electric cabinet unit heaters, wall louvers and transfer grilles for outside air intake and exhaust.
 3. Ducted exhaust to single combined exhaust fan for restrooms. Provide approximately 75 CFM per fixture. Exhaust fan to operate continuously during occupancy.
 4. Provide mini-split in any MEP room containing a transformer.
 5. All LED lighting/occupancy based controls with local override at interior spaces.
 6. Accommodations for telecom/data for video surveillance as needed.
 7. Data/Wi-Fi as needed.
 8. Separate fiber with wall mounted telecom rack for data
 9. Separately metered water from main south of building (assuming 2") coordinated with civil.
 10. Sanitary exits to south side of the building and coordinated w/ civil, assume gutters for storm.
 11. Electric tank type water heater w/ recirc/expansion tank
 12. BV standard plumbing fixtures (floor mount flush valve water closets)
 13. Separate fiber to each building with wall mounted telecom rack for data
- B. Training Office/Lower Level Storage/Elevator Requirements
1. Spaces will be heated and ventilated only. Provide electric cabinet unit heaters, wall louvers and transfer grilles for outside air intake and exhaust.
 2. Provide mini-split in any MEP room containing a transformer.

3. New pressbox elevator equipment room shall be conditioned by cooling only mini-split.
4. All LED lighting/occupancy based controls with local override at interior spaces.
5. Accommodations for telecom/data for video surveillance as needed.
6. Data/Wi-Fi to support program.
7. Provide elevator sump pump in elevator pit w/ effluent ending exterior over splash block (if building has fire sprinklers).
8. BVSD standard plumbing fixtures
9. Electric tank type water heater per building w/ recirc/expansion tank
10. Sanitary exit to single main coordinated w/ civil
11. Assume gutters for storm
12. Separate fiber to each building with wall mounted telecom rack for data

3.4 EAST CONCESSIONS AND RESTROOM BUILDING

- A. Concessions
1. Data/Wi-Fi for concessions POS equipment.
 2. Separately metered power to group of buildings. 208V, 3-phase.
 3. Separate fiber to each building with wall mounted telecom rack for data
 4. Domestic water service from east stubbed into MEP room and coordinated with civil to be shared with adjacent restrooms.
 5. Electric tank type water heater w/ recirc pump.
 6. Provide interior grease interceptor w/ effluent connecting to sanitary line at adjacent restroom, assume gutters for storm.
 7. Spaces will be heated and ventilated only. Provide electric cabinet unit heaters, wall louvers and transfer grilles for outside air intake and exhaust.
 8. Provide ceiling mounted fans for air circulation
 9. Provide mini-split in any MEP room containing a transformer.
 10. All LED lighting / occupancy-based controls with local override (keyed switch in restrooms).
 11. GFCI receptacles for concessions equipment, many with dedicated circuits.
 12. Data/Wi-Fi for concessions POS equipment, ticketing equipment

- B. Restrooms
1. Spaces will be heated and ventilated only. Provide electric cabinet unit heaters, wall louvers and transfer grilles for outside air intake and exhaust.
 2. Ducted exhaust to single combined exhaust fan for restrooms. Provide approximately 75 CFM per fixture. Exhaust fan to operate continuously during occupancy.
 3. Separately metered water from main east of building (assuming 2") shared w/ concessions and coordinated with civil.
 4. Sanitary exits to east side of the building and coordinated w/ civil, assume gutters for storm.
 5. Electric tank type water heater w/ recirc/expansion tank
 6. BV standard plumbing fixtures (floor mount flush valve water closets)
- ### 3.5 TICKET OFFICE BUILDINGS
1. Provide recessed unit heater.
 2. Separately metered power (assume 208V, 3-phase)
 3. All LED lighting/occupancy based controls with local override at interior spaces.
 4. Accommodations for telecom/data for video surveillance as needed.
 5. Data/Wi-Fi for security office.

PART 4 - HVAC DESIGN CRITERIA

4.1 DESIGN CRITERIA

- A. Outdoor Design Temperature
1. The ASHRAE outside summer and winter design conditions for Kansas City, MO will be used for design purposes.
 2. Ambient Design Conditions:

a. Heating:	-2.1°F db (99.6%)
b. Cooling:	97.2 db (0.4%)/ 76°F wb (MCWB)
c. Dehumidification:	84.4°F db (1.0%)/ 77.7°F wb (MCWB)
- B. Inside Temperatures
1. The following temperatures (Winter/Summer) are assumed Climate and Thermal Comfort Design Criteria:

a. All areas unless noted	72°F / 75°F, 50%-60% RH summer
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- (no humidification in winter)
- b. Electrical Equipment Rooms Ventilated/ Ventilated
- C. Minimum Ventilation Requirements
1. The minimum ventilation requirements will be provided with mechanical ventilation subject to compliance with the International Building Code and ASHRAE Standard 62.1-2010: Ventilation for Acceptable Indoor Air Quality. The ventilation will be determined by the ventilation rate procedure as prescribed in ASHRAE Standard 62.1-2010 to establish minimum ventilation rates.
- D. Noise Criteria (NC) Guidelines for Air System Design
1. The NC Guidelines indicated below are provided by the acoustical consultant, Acoustical Design Group Inc.

a. All areas unless noted	NC 40 – NC 45
b. Meeting Rooms, Conference, Classrooms and Offices	NC 30 – NC 35
c. Commons	NC 30 – NC 35
d. Kitchens, Back of House and Corridors	NC 35 – NC 40
- E. Occupancy
1. Occupancy for the project will be determined by the occupant densities listed in ASHRAE 62.1-2010 for the most applicable categories unless otherwise directed by the Owner.
- F. Temperature Setbacks
1. During unoccupied hours the Building Management System (BMS) will allow the building to drift to setback temperatures of 82°F summer (a6) and 65°F winter (a6). If any building temperature sensor exceeds the summer setback temperature or drops below the winter setback temperature the HVAC system will operate in occupied mode until the space is satisfied.
- G. Energy Efficiency
1. The building will be constructed subject to compliance with 2018 International Energy Conservation Code for minimum energy efficiency compliance with local building codes. No specific energy reduction target has been established at this time.
- H. Envelope Values
1. Envelope values for various parts of the building as summarized below were used in determining the preliminary basis of design HVAC sizing.
 - a. The existing Original building envelope values were estimated from ASHRAE 90.1-1999 for areas between 3,601 and 5,400 heating design days (HDD) and greater than 3,601 cooling design days (CDD).

The new building addition envelope values will be estimated from IECC 2018 for climate zone 4A.

- I. Exhaust Systems
1. A new roof mounted exhaust fan will be provided to handle new restrooms and janitor closets.
- J. IT/AV Room System
1. Telecom rooms housing heat producing equipment shall be served by new dedicated cooling only indoor split system units.
- K. Electrical Rooms
1. Electrical rooms housing transformers or additional heat producing equipment shall be served by new dedicated cooling only indoor split system units.
- L. Air Distribution
1. All new ductwork construction shall be based on SMACNA medium and low pressure type. All medium type air conditioning supply ductwork shall be constructed to 4" standards and shall be sealed per SMACNA Class A requirements. Low pressure ductwork shall be constructed to 2" standards and shall be sealed per SMACNA Class B requirements.
 2. Supply, return and outside air ducts shall be galvanized steel. All supply and return ductwork shall be lined with 1.5-inch thick, 2.0 pcf (minimum) duct liner and 2-inch thick, 2.0 pcf (minimum) liner shall be provided in plenums, large ducts and inside fan casings. All unconditioned outside air ducts shall be wrapped with minimum R-6.0 insulation.
 - a. Exposed medium pressure supply ductwork in flex areas shall be pre-manufactured double-wall oval duct with a paint grip steel. It shall be medium pressure supply ductwork constructed to 4" standards and shall be sealed per SMACNA Class A requirements.
 - b. Exposed low pressure supply ductwork in flex areas shall be a double wall spiral with a paint grip steel. Low pressure ductwork shall be constructed to 2" standards and shall be sealed per SMACNA Class B requirements.
 3. Insulated flexible duct connectors to diffusers and terminal boxes shall be limited to 5 feet in length.
 4. A traditional overhead distribution system with ceiling diffusers shall be utilized to dispense the air throughout each space.
- M. Noise and Vibration Control
1. Acoustical and vibration treatment will be provided to help control HVAC system noise.
 2. Vibration isolators and flexible connections shall be provided, as required fans, etc.
 3. Rooftop units should be mounted on vibration isolation curbs.

1. Shutoff valves 2" and smaller will be bronze body ball valves. All valves will be 125psi SWP rated.
 2. Domestic cold water will be provided for all plumbing fixtures and devices that require potable water.
 3. The cold water distribution piping will be sized for a maximum velocity of 6 FPS.
 4. All domestic cold water piping will be insulated with 1" thick "all service jacket" fiberglass insulation.
 5. Minimum domestic cold water sizing shall be "N" for any horizontal piping. Final runs to fixtures may be "N" minimum.
- C. Domestic Hot Water
1. Domestic hot water shall be distributed throughout the buildings via electric tank type water heaters
 2. An expansion tank will be provided for the water heating system to meet domestic hot water requirements.
 3. Temperature and pressure relief valve drains will be routed to a floor drain. An expansion tank will be provided.
 4. Domestic hot water will be delivered at 140 °F to individual fixtures and mixed down to suitable temperatures via means of a thermostatic mixing valve at each fixture (110 °F at lavatories).
 5. Domestic hot water will be recirculated by means of a pump. This recirculation pump will be provided with an aquastat and time switch.
 6. Shutoff valves 2" and smaller will be bronze body ball valves. All valves will be 125psi SWP rated.
 7. The hot water distribution piping will be sized for a maximum velocity of 5 FPS.
 8. All domestic hot and hot water return piping will be insulated with 1" thick "all service jacket" fiberglass insulation.
 9. Minimum domestic hot water sizing shall be "N" for any horizontal piping. Domestic hot water circulation piping and final runs to fixtures may be "N" minimum pipe size.
- D. Sanitary, Waste and Vent System
1. Floor drains will be provided with trap guards.
 2. Plumbing vents within six lineal feet of the roof outlet will be insulated with 1" thick "all service jacket" fiberglass insulation.
 3. Cleanouts will be added at the end of line sanitary runs to facilitate maintenance.

4. Access panels will be added at chase risers to facilitate maintenance.
- E. Building Storm Water
1. Assume gutters and downspouts for storm.
 2. Access panels will be added at chase risers to facilitate maintenance.
- F. Pipe Materials
1. Each plumbing fixture or group of plumbing fixtures shall be protected from hydraulic shock with piston type water hammer arrestors sized for the fixture or number of fixtures served.
 2. Lead free shutoff valves shall be provided for each gang of fixtures for maintenance purposes. All equipment must be installed with isolation valves for shutoff service.
 3. Hot water temperature shall be maintained with a piped return system with balancing valves at each branch and a "cartridge" bronze recirculation pump located at the water heater.
 4. Domestic Hot and Cold Water (above grade) – Type "L" copper with sweat joints and wrought copper fittings
 5. Storm, Sanitary, Waste and Vent (below grade) – PVC DWV with push-on (neoprene) joints below floor.
 6. Cast iron no-hub piping shall be utilized above slab, and schedule 40 PVC below slab.
 7. Storm, Sanitary, Waste and Vent (above grade) – No-hub cast iron with approved stainless steel couplings above floor.
 8. Heavy duty hubless couplings shall be provided for storm piping.
 9. Storm piping shall meet acoustical requirements and shall meet code required sizing requirements.
 10. 1" thick "all-service jacket" fiberglass insulation shall be utilized on both vertical and horizontal storm piping.
 11. Plumbing vents within six lineal feet of the roof outlet shall be insulated with 1" thick "all service jacket" fiberglass insulation.
- G. General
1. The plumbing systems shall be designed to promote the implementation of cost effective and energy efficient strategies for the system design, equipment selection, distribution and overall system integration. The plumbing systems shall also be designed to incorporate the ease of maintenance, flexibility, and redundancy of critical components.
 2. Isolation valves shall be provided throughout the facility to enable servicing, expansion, renovation or construction of any part of the facility without interruption of plumbing services to adjacent spaces. Isolation valves shall be included at each restroom.

3. Condensate drains shall be provided from air conditioning equipment to discharge indirectly to floor drains located in janitor's closets or other to be determined areas.
 4. General purpose floor drains shall be in each restroom, including restrooms with one water closet and lavatory, as well as in janitor closets and mechanical rooms.
 5. Equipment floor drains shall be located near each water heater or piece of equipment requiring a floor drain.
 6. Domestic hot water shall be distributed throughout the buildings via electric tank type water heaters.
 7. An expansion tank will be provided for the water heating system to meet domestic hot water requirements.
- H. Condensate Drainage
1. Condensate drains will be provided from air conditioning equipment to discharge indirectly to floor drains located in mechanical rooms. Interior condensate drain piping shall be copper with 1" fiberglass insulation.
 2. Condensate drains will be provided from rooftop units to a splash block on the roof. Condensate drain piping shall be uninsulated PVC.
- I. Plumbing Fixtures
1. All plumbing fixtures shall maintain the following water consumption values:

Water Closet	1.28 GPF
Urinal	1.25 GPF
Lavatory	0.5 GPM
Sinks	1.5 GPM
Showers	1.75 GPM
 2. Water closets shall be floor or wall mounted vitreous china with sensor operated battery powered flush valves. Where shown on architectural plan, fixtures shall be mounted at ADA accessible elevation.
 3. Lavatories shall be vitreous china wall mounted type with ADA compliant push button type metering faucets with 0.5 gpm flow restrictors and ADA insulation kits.
 4. Urinals shall be wall hung vitreous china with sensor operated hard wired flush valves. Where shown on architectural plan, fixtures shall be mounted at ADA accessible elevation.
 5. Electric water coolers shall be wall hung with stainless steel finish with bottle filler. Fixture shall be mounted at ADA accessible elevation unless more than one fixture is located in the vicinity.
 6. Janitor's mop sinks shall be 24" x 24" x 12" fiberglass floor mounted type.

7. There shall be recessed box type freeze-proof wall hydrants on the exterior of the building every 100 feet.
8. General-purpose floor drains shall be in each toilet room, including toilet rooms with one water closet and lavatory. Each public toilet shall have approximately one floor drain for every four water closets.
9. Fixtures shall be provided with chromium plated brass trim and individual stop valves.
10. Appropriate "barrier free" fixtures shall be provided in accordance with the "Americans with Disabilities Act" (A.D.A.).

PART 6 - POWER DESIGN CRITERIA

6.1 DESIGN CRITERIA

The following outlines the general requirements for all power systems.

- A. General
 1. Energy
 - a. IECC 2018 requirements shall be used for lighting power density and voltage drop calculations.
 2. Power Distribution
 - a. In general, large heating, air conditioning, and mechanical/plumbing equipment will be served at 480V, three-phase, 60 hertz. Lighting shall be served at 277V, single-phase, 60 hertz. Motors of 1/2 horsepower and larger shall be served at 480V, three-phase, three-wire, 60 hertz. Motors less than 1/2 horsepower shall be served at 120V, single-phase, two-wire, 60 hertz.
- B. Basic Materials
 1. Conductors:
 - a. All branch circuit wiring conductors and feeders shall be copper and color coded.
 - b. All wiring shall be run in conduit. A green wire ground shall be provided in each conduit.
 - c. The minimum size conductors allowed for branch circuit wiring shall be No. 12 AWG.
 - d. The minimum size conductors allowed for control wiring shall be No. 14 AWG.
 - e. The minimum size conductors allowed for signal wiring shall be No. 18 AWG.
 - f. Conductor insulation type shall be THHN/THWN for wire sizes No. 12-8 AWG, and THW or THHN/THWN for wire sizes No. 6 AWG and larger.

- g. Neutral conductors shall be full size throughout system as a minimum. Oversized neutral conductors shall be provided in areas with potential high harmonic currents.
2. Raceways:
 - a. A complete raceway system shall be provided for all power conductors.
 - b. Rigid metal conduit, rigid aluminum conduit, intermediate metal conduit and/or electrical metallic tubing shall be used within the building. Rigid metal conduit or rigid aluminum conduit shall be used where conduit is installed both exposed and in a location that is susceptible to damage. RAC shall not be used outdoors, below grade, imbedded in concrete or other areas corrosive to RAC.
 - c. Flexible metal conduit shall be used for connections to motors, transformers, miscellaneous vibrating/rotating equipment, and recessed light fixtures.
 - d. Liquid-tight flexible metal conduit shall be used in wet or damp locations.
 - e. Minimum conduit size shall be 1/2".
 - f. All exposed raceways installed in finished spaces shall utilize a surface mounted raceway system and be painted to match surrounding areas.
 3. Wiring Devices:
 - a. Switches shall be 20 amp, 120-277 volt, a.c. only; toggle type, single pole, double pole, three-way or four-way, specification grade; quiet type.
 - b. Receptacles shall be 20 amp 125 volt a.c. single or duplex type with wrap-around steel strap, automatic grounding feature, with nylon or lexan face; specification grade conforming to federal specifications. Receptacles for maintenance and special equipment shall be provided as required by code.
 - 1) All receptacles below 5'-1/2" above the adjacent walking surface will be tamper resistant type.
 - 2) All receptacles in exterior locations shall be in-use extra duty weatherproof with weather-resistant GFCI type receptacles.
 - c. Device coverplates will be stainless steel finish and compatible with their respective device.
 - C. Electrical Distribution Equipment
 1. Safety Switches:
 - a. Heavy duty, dead-front, NEMA Type 1, 3R or 4 as required, quick-make, quick-break, padlock feature, fusible or non-fusible shall be provided as required with separate grounding bar.
 2. Motor Starter Equipment:

- a. Individual motor starters shall be provided. All starters shall be combination type with fused disconnect or circuit breaker capable of being padlocked in the off position.
 - b. All automatically controlled starters shall have a local hand-off-auto switch to allow for individual testing of the motor. All starters shall contain pilot lights to visually indicate operation.
 - c. A disconnecting means shall be installed within sight of motors and other equipment where specifically indicated.
 - d. The Central Building Automation and Energy Management System (BMS), specified in another division, shall be utilized wherever possible to reduce the amount of electrical energy consumption.
 - e. Variable frequency drives shall be specified under Division 23 for any equipment requiring variable speed controllers.
3. Combination Motor Starters:
 - a. Thermal magnetic molded case circuit breaker disconnect with externally operated, padlockable handle. NEMA 1, 3R or 4 enclosure will be provided as applicable.
 4. Panelboards:
 - a. 480V/277V panelboard shall be equal to Square D type "NF".
 - b. 208Y/120V panelboard shall be equal to Square D type "NGOD".
 - c. Bolt-on, fixed trip, molded case, thermal magnetic trip circuit breaker protection devices rated to withstand the available fault current. Separate neutral and ground buses.
 - d. Branch panelboards shall be surface or recessed mounted as conditions require.
 - e. Typed directories shall be provided in each panelboard with labeling based on final room numbers.
 - f. A laminated nameplate will be installed for each panelboard.
 5. Distribution Panelboards - Circuit Breaker Type
 - a. Distribution panelboards shall be equal to Square D type "I-Line".
 - b. Provide with copper bus.
 - c. Breakers will be thermal magnetic type, quick-make, quick-break, trip-indicating, ambient compensated, bolt-in type.
 - d. Laminated nameplates will be installed for each distribution breaker and for the overall panelboard.

- e. Main disconnects shall be provided where required by code.
6. Transformers (480V, three-phase, three-wire primary to 208Y/120V, three-phase, four-wire secondary)
 - a. Dry type, ventilated, 200°C insulation system temperature class.
 - b. Provide with copper windings.
 - c. K-Factor rated (Provide for all computer panelboards)
 - d. 115 degree C temperature rise
 - e. NEMA standard voltage taps.
 - f. NEMA standard low level sound ratings.
 - g. Shielded and isolated type for audio equipment use.
 - D. Grounding:
 1. Service grounds are existing to remain in existing high schools. New service grounds will be provided for concessions buildings.
 2. New concrete encased electrode (ifer ground) shall be provided with building addition and new addition structure bonded to existing service grounds.
 3. All new feeders and individual branch circuits shall be provided with a separate grounding conductor.
 4. Ground buses shall be provided in all new electrical distribution equipment.
 - E. Mechanical Equipment Connections
 1. Electrical power connections shall be made to all mechanical equipment, including furnishing of all electrically associated devices such as disconnect switches, contactors, magnetic or manual starters, lock-out switches, etc., which are not furnished under the Mechanical sections.
 - F. Security Systems:
 1. Security system rough-in provisions shall be provided as described in the Technology section and per Owner's requirements.
 - G. Telecommunication Systems:
 1. Telecommunication system rough-in provisions shall be provided as described in Technology section and per Owner's requirements.

PART 7 - LIGHTING DESIGN CRITERIA

7.1 DESIGN CRITERIA

The following outlines the general requirements for all lighting systems.

- A. Code Requirements
 1. The minimum lighting feeder and panelboard capacity will be designed in accordance with the NEC.
- B. Lighting Fixtures and Materials
 1. White LED and Power Supply Specification
 - a. Will be evaluated based on manufacturer's product literature and data. At a minimum the LED fixture will incorporate Lumileds, Nichia, Cree or Osram LEDs.
 - b. Comply with ANSI C78.377 for white light LED color range. Minimum 70% maintained initial-rated lumens at average rated life of 50,000 hours. Minimum of 72 and 85 color rendering index for exterior and interior white light LEDs, respectively. LED binning specification tolerance to be maximum 15% of rated values.
 - c. 3500K for interior environments and 3500K-4000K for exterior environments.
 2. Emergency Lighting
 - a. Under emergency lighting conditions, an average illumination of 1 footcandle will be maintained along the egress paths as required by code.
 - b. All emergency lighting will be powered by battery packs integral to general lighting fixtures.
- C. Light Switches and Coverplates
 1. Lighting switches will be quiet type, toggle or key type, specification grade, color as desired by Architect or Owner.
 2. Coverplates for wall devices will be coordinated with lighting controls and will match wiring device covers. All plates for multiple gang requirements will be one-piece combination.
- D. Locker Room
 1. Suspended high efficiency LED light fixtures will be utilized throughout spaces for general lighting.
- E. Private Offices
 1. Suspended or recessed high efficiency LED light fixtures will be utilized throughout private office spaces for general lighting.
 2. Task lighting will be provided by Owner and integrated with systems furniture on an as-needed basis.

7.2 LIGHTING CONTROLS

- F. Restrooms
 1. LED linear cove light fixtures provided on both stall and lavatory sides of restrooms.
 2. Additional downlighting at mirrors and overhead to be provided.
 - G. Mechanical/Electrical/Data/Storage Rooms
 1. Pendant or surface mounted fluorescent strip fixtures with wire guards.
 - H. Athletic Fields
 1. All sports lighting and controls are existing to remain and will not be revised as part of this project.
 - B. Site and Parking
 1. Exterior site lighting will be designed to meet Development and local outdoor lighting standards in conjunction with IESNA standards.
 - a. Decorative bollards and pedestrian poles may be included at the exterior entry for the building for purposes of wayfinding and needed supplemental light at the entry. Decorative bollards may be used at other key exterior building entry locations as yet to be determined.
 2. It is anticipated that the project will include exterior building facade/landscape/site signage lighting. Final lighting design to be determined and will be coordinated with building facade fenestration, material, and signage elements. Lighting conceptual drawings of certain types of these spaces are included as an example of what could be provided.
- A. Athletic Complex Areas
 1. General
 - a. Exterior lighting will be controlled by a relay-dimmer based automatic central control lighting system consisting of lighting control relay panels and shall be provided with timed automatic control of spaces. This automatic lighting control system shall be tied to the BAS system. A zoned system (per energy code requirements) for interior lighting, exterior lighting, security lighting, and landscape lighting shall be provided and coordinated to meet the requirements of the Owner's operations. Local manual override switches shall be provided in each privately occupied space. Public space local control and override switch locations shall be coordinated with the Architect and Owner. Commons will have multiple dimming zones with local controls to aid in AV projection tasks. An automatic daylight control dimming system will be provided in the commons areas and possibly the media center if provided with enough glazing. The daylighting control system will be provided to comply with the energy code and will be compatible with the automatic lighting control system.

PART 8 - FIRE PROTECTION

8.1 FIRE SPRINKLER SYSTEM

- A. Fire Water Service:
 1. An 8-inch nominal diameter fire protection service line will be extended into the building on the southeast exterior wall from a point five (5) feet outside the building line. Flow information for the site is not available at time of this report and is to be determined. The final size of the fire service entry will be adjusted based on flow test when received. A listed and approved backflow preventer in accordance with applicable codes and standards will be installed in the fire service line inside the building(s).
- B. Locker Rooms and Weight Rooms will be provided with low-voltage local control consisting of ceiling mounted occupancy sensors, power packs and low-voltage switches.
- C. Private offices and conference rooms will be provided with low-voltage local control consisting of ceiling mounted occupancy sensors, power packs and low-voltage switches. Multiple dimming zones will be provided in conference rooms to aid in AV projection tasks. An additional automatic daylight control system will be provided for the perimeter zone.
- 2. Typical Lighting Controls
 - a. Night lights will be utilized in corridors and circulation areas. Some (not all) emergency light fixtures will be used for night lights (to be left on 24/7).
 - b. Override time limit for lighting control outside normal business hours will be set at 2 hours with the ability to adjust as desired by Owner.
- 3. Occupancy sensors will be provided in the following areas:
 - a. Private offices
 - b. Locker Rooms / Weight Rooms
 - c. Restrooms / Concessions
 - d. Closets/Storage Rooms
 - e. Press Boxes
- 4. Occupancy sensors will be the manual on-automatic off type and will include an additional relay to relay occupancy information to the BAS.
- 5. Automatic shut-off means will be provided in all spaces, where required, to meet code requirements.
- 6. Daylight sensors will be considered for the following areas:
 - a. Offices
 - b. Press Boxes

- 2. An updated hydrant flow test indicating the available city water pressure will be evaluated to determine if a fire pump is required.
- 3. Coordination with the Civil engineer will be required to determine the final location of the incoming fire protection service line(s).
- B. Fire Booster Pump
 1. A fire booster pump is not anticipated at this time. This assumption is to be confirmed once flow test data becomes available.
- C. Fire Standpipe System
 1. A Fire Standpipe System is not anticipated to be required at this time. This assumption is to be confirmed upon review of final building elevations.
- D. Fire Sprinkler System
 1. Fire Sprinkler Systems shall be designed and installed in accordance with the requirements of National Fire Protection Association (NFPA) Standards 13, 20 (if required), 24 and 25, the International Building and Fire Codes and the Blue Valley School District Standards.
 2. All portions of the area of work will be provided with an automatic, wet and dry fire sprinkler system.
 3. A dry-pipe sprinkler system will be provided in covered concourses and all areas subject to freezing as required by NFPA 13.
 4. Wet system risers will be limited to 52,000 ft² maximum. Dry sprinkler systems size shall be in accordance with NFPA 13 and be determined based on available delivery times to be determined by the installing contractor.
 5. All fire protection system water supply control valves on the system side of the fire-service entry will be equipped with electronically supervised control valves. Dry sprinkler system riser(s) (as required) shall be equipped with a water flow alarm pressure switch and low/high air pressure supervisory switch. The wet sprinkler system(s) shall be equipped with a waterflow switch.
 6. Any covered patios or overhangs of combustible construction will be provided with dry sidewalls where possible or an automatic dry sprinkler system.
 7. All equipment shall be UL listed.
- E. Design Criteria



1. A minimum Light Hazard design criteria (0.10 GPM/SF over 1500 SF hydraulic remote area) shall be provided throughout the area of work unless required otherwise. Hose Allowance is to be included on base of riser.
2. A minimum Ordinary Hazard Group I design criteria (0.15 GPM/SF over 1500 SF hydraulic remote area) shall be provided throughout mechanical and electrical equipment areas. Hose allowance is to be included at base of riser.
3. A minimum Ordinary Hazard Group II design criteria (0.20 GPM/SF over 1500 SF hydraulic remote area) shall be provided throughout storage areas. Hose allowance is to be included at base of riser.
4. Sprinkler spacing and pipe sizing shall be designed for hazards present based on building area occupancy and use with pipe sizing based on the contractor provided hydraulic calculations of the system.
- F. Automatic Sprinklers
 1. Sprinklers type and style as indicated or required by application. Sprinkler operating temperatures to comply with NFPA 13. Sprinklers in light hazard areas shall be quick response type.
 2. High temperature sprinklers shall be provided in kitchens, or near other heat-producing sources.
 3. Provide dry-type pendent sprinklers in walk-in coolers/freezers. Provide concealed type or sprinkler guards where installed below 8 feet.
 4. Sprinklers shall be located not less than 6-inches from the edge of tiles in all areas with finished ceiling.
 5. Sprinklers shall be semi-recessed chrome pendent, brass uprights, or concealed with white cover plates.
- G. Sprinkler System Pipe
 1. Pipe shall be routed as high as possible in all areas where sprinkler pipe is routed exposed. Pipe shall be coordinated with all disciplines, architect and owner and shall be routed to minimize visibility. Sprinkler pipe shall be painted to match surrounding finishes.
 2. All piping 2-inch and smaller:
 - a. With the use of welded or roll grooved fittings: ASTM A135 or 795, Grade A, Schedule 10 or 40, seamless or ERW, black steel pipe.
 - b. With the use of threaded fittings: ASTM A135 or 795, Grade A, Schedule 40, seamless or ERW, black steel pipe. All 1-inch piping shall have threaded ends.
 3. All piping 2-1/2" and larger: ASTM A135 or 795, Grade A, Schedule 10, ERW, black steel pipe, threaded or roll grooved ends.

4. All system components shall be listed for the actual designed system pressures and listed for 175-psig minimum working pressure.
 5. All piping on the exterior shall be externally galvanized or painted.
 - H. Fire department connection(s)
 1. Fire department connection(s) shall be freestanding type. Each connection shall consist of A 4" Storz connection as required by the Authority having Jurisdiction. Final Fire Department Connection type and location will be coordinated with the AHJ.
- 8.2 FIRE DETECTION AND ALARM SYSTEM:**
- A. General System Requirements
1. The building(s) shall be equipped with a fully addressable, non-coded manual and automatic fire alarm system installed in accordance with the requirements of National Fire Protection Association (NFPA) Standards 72 and 70, the International Building and Fire Codes and the Blue Valley School District Standards.
 2. The fire alarm shall be manufactured by Johnson Controls and meet the requirements of the Blue Valley School District Standards.
 3. The fire alarm control panel shall be a microprocessor-based system with fully addressable alarm devices. A remote annunciator panel shall be located at the main point of fire department access.
 4. The fire alarm system shall provide occupant notification utilizing an Emergency Voice/Alarm Communications (EVAC) system.
 5. Two separate and reliable power supplies are required for the fire alarm control panel in accordance with NFPA 72. The fire alarm system shall utilize Class B circuits throughout the building.
 6. The system shall provide automatic fire detection and alarm, complete with manual pull stations, ceiling mounted smoke/heat/carbon monoxide detectors, air handling unit shutdown, notification appliances, elevator recall, sprinkler monitoring, magnetic door hold release, battery stand-by and off-site monitoring.
 7. The system shall utilize a digital alarm communicator transmitter (DACT) which shall be acceptable to the central station and shall comply with UL 864. Contractor shall select the appropriate DACT based on available communication methods.
 8. Provide equipment and connection(s) for bi-directional amplification system as required by Authority Having Jurisdiction. Provide all necessary labor, testing and documentation regarding first responder radio signal strength. Coordinate testing with AHJ.
 9. Equipment and connection(s) shall be provided to perform auxiliary functions including but not limited to:
 1. All system components shall be listed for the actual designed system pressures and listed for 175-psig minimum working pressure.
 2. All piping on the exterior shall be externally galvanized or painted.
 3. Fire department connection(s) shall be freestanding type. Each connection shall consist of A 4" Storz connection as required by the Authority having Jurisdiction. Final Fire Department Connection type and location will be coordinated with the AHJ.

- a. Monitoring automatic fire sprinkler systems for waterflow alarms and valve tamper switches
 - b. Air-handling unit shutdown for HVAC systems
 - c. Recall and shut-trip for elevators
10. An Emergency Key Cabinet (Knox Box) shall be provide for the building. The location of the cabinet shall be coordinated with the City of Overland Park Fire Department.
 11. All equipment shall be UL listed.
- B. Initiating Devices
1. Carbon Monoxide Detectors shall be provided in any areas with gas fired equipment. Install equipment per NFPA 72 and manufacturer's requirement.
 2. Smoke detection shall be provided above all fire alarm control equipment, elevator lobbies, elevator machine rooms (if applicable), elevator shaft (if required), electrical rooms, audio visual rooms, data rooms, and any areas required for activation of the smoke control system.
 3. Duct smoke detection shall be provided in all air handling equipment over 2,000 CFM and within 5 feet of all smoke or fire/smoke dampers.
 4. Heat detection will be provided in elevator machine rooms (if applicable), elevator shafts (if required) and any areas that require detection that are not suitable for smoke detectors.
 5. Manual pull stations shall be provided at all exits from the building and at all rated stairs from levels above and below the main level of exist discharge.
- C. Occupant Notification Appliances
1. Audible and visible notification shall be provided throughout all areas of the building in accordance with NFPA 72 requirements. Occupant notification will utilize audible (speakers, visible (strobes), and combination audible/visible (speaker/strobe) notification appliances.
 2. Mounting height, locations and specifications of audible and visual notification appliances will be per ADA and NFPA 72.
 3. Provide listed notification appliance wire guard in areas where appliances are subject to damage.
 4. Provide strobe synchronization per NFPA 72.
 5. Where notification is required on the exterior, weatherproof speaker/strobes shall be provided.
- D. Wiring
1. All Signaling Line Circuits shall be Class B.

2. All Notification and Initiating Circuits shall be Class B.
 3. Where required by NFPA 70 wiring shall be installed in conduit.
 4. In addition to the requirements of NFPA 70 the following shall also apply:
 - a. Fire alarm wiring above non-accessible ceilings shall be installed in conduit.
 - b. Fire alarm wiring in area and rooms without ceilings shall be installed in conduit.
- E. Sequence of operations
1. Fire alarm sequence of operations shall be provided to meet the requirements of NFPA 72, the AHJ and the Blue Valley School District Standards.
 2. Fire alarm signal initiation shall be by one or more of the following devices and/or systems:
 - a. Manual pull stations
 - b. Smoke detectors
 - c. Heat detectors
 - d. Automatic sprinkler system water flow
 - e. Kitchen hood suppression system
 3. Supervisory signal initiation shall be by one or more of the following devices and actions:
 - a. Carbon monoxide detectors
 - b. Valve supervisory switch
 - c. Duct-mounted smoke detectors
 - d. User disabling of zones or individual devices
 - e. Loss of communications with any panel in the system.

PART 9 - TECHNOLOGY SYSTEMS

- 9.1 PROPOSED DESIGN ANALYSIS
- A. The overall goal is to provide the customer with an extension of the telecommunications structured cabling system (SCS) that offers a cost effective system providing flexibility, a potential for growth (both physical and bandwidth considerations) and the capability of supporting the various communication systems required by the Using Services in the renovated and added areas. Design to follow (shown in order of standard priority as to adherence) the stipulations of the Scope of Services, and the latest versions of BICSI TDDMM Manual, ANSI/TIA 568, 569, 606, J-STD-607-D for structured cabling and ASA 12.60 Parts One and Two.

9.2 STRUCTURED CABLING SYSTEM (SCS) - PATHWAYS AND SPACES

- A. **(SCS) Pathway** – Physical transport of the cabling infrastructure for these systems shall be accomplished by conduit and open-top hooks (J-hooks) in combination with a wire-basket based cable tray system extending outward from each TR in a star topology; additional pathway in the form of cable tray will be provided for the purpose of connecting all TR's. The pathway is to provide a flexible, re-usable, expandable pathway for premise distribution of the telecommunications services throughout the facility.
- B. **The cable tray system** shall be sized for a maximum 40% fill capacity. For those sections of cable tray that will provide the pathway between TRs for the backbone cabling (copper and fiber) also contain the horizontal cabling for that area the cable tray shall be larger to provide a channel to allow for separation and ease of installation. In this pathway, separation of the cabling (backbone fiber from backbone copper and backbone from horizontal) shall be accomplished by using cable tray divider strips, cable mitigation and/or bundling efforts. At the entrance to the TRs the cable tray will need to be larger to accommodate the number of cables entering the TR as to retain the 40% fill ratio. Electrical metallic tubing (EMT) shall be installed from the work area outlets to accessible space (each conduit shall extend 6" into the accessible plenum) in the plenum. Minimum sizing for conduits shall be 2" (27mm), UON. For any space that does not provide an accessible ceiling the conduits acting as the SCS pathways shall extend to within 6" (minimum) of the closest section of cable tray or accessible ceiling (whichever is closest). Conduit bend radii shall be coordinated with the cable bend radii. Flexible metal conduit shall not be used except when installing floor-access boxes in a raised floor. Conduits shall be properly bonded to the cable tray system with bonding bushings. Insulation bushings shall be placed at all ends of the conduit near the work area outlets. When using open-top hooks they shall be placed at a minimum every (4) four feet and at any location where there is a direction change. Load capacity of conduits and open-top hooks shall be determined by the fill ratios depicted in Table 9 of the ANS/TIA-569-D standard with the given the 40% fill ratio and the future expansion calculations into be included; actual hook selection shall be made with this information in mind and the manufacturer's load instructions. Pull boxes shall be properly sized and placed as specified in ANS/TIA-569-D.
- C. **Fire stop** - All penetrations of fire rated assemblies shall be addressed immediately with the proper fire stopping techniques to retain the integrity of the assembly. All fire stop systems utilized shall have been tested by a nationally recognized testing laboratory (NRTL) and certified as compliant with the conditions of acceptance within the individual test standard.
- D. **Telecommunications Room (TR)** - All Telecommunication Rooms are designed to service a specific area of the facility with respect to horizontal cable distribution; it is the space that facilitates the interconnection between the copper horizontal cabling and the facility's backbone cabling. They may also be used for intermediate and main cross-connections. Each room is to be centrally located within the area being served to ensure that the permanent link shall stay within the required 295' limitation.
1. Detail Design - Size / Shape:

- a. All Rooms shall be rectangular in shape and free of obstructions, such as columns and surfaces shall be treated to eliminate dust.
 - b. Wall finished shall be light in color to enhance lighting
 - c. Floor space required serving area for each TR shall be no greater than 10,000 sq ft
 - d. Telecommunications Rooms shall be a minimum size of 10'-0" by 8'-0"
 - e. Light fixtures shall be mounted at a minimum of 9'-0" AFF and provided 500 lux at a measurement of 3'-0" AFF after equipment racks are installed and loaded
 - f. No drop ceilings; walls to go to the deck
 - g. All spaces shall be climate controlled 365 24x7 in accordance with ANS/TIA 569; contaminant free.
 - h. Door/s to open outward (towards the serving space) and shall be a minimum of 36" wide x 80" tall; shall be fitted with a lock to control access.
 - i. Floor to be VCT or sealed concrete to avoid dust and static electricity
 - j. All walls shall receive 3/4" thick (4' x 8' sheets) AC grade fire-rated plywood, painted on all 6 sides with 2 coats of flat white paint except for fire-retardant stamp. Plywood sheets are to be mounted beginning 6" above finished floor.
2. Additional Telecommunications Room Requirements:
 - a. Ladder-type cable tray at 7'-6" above finished floor around the perimeter of each room with additional ladder tray sections extended over the top of the racks.
 - b. Typical floor mounted equipment racks shall be 84" tall, 19" wide, 2-post units with horizontal and vertical wire management, located in the center of each room, no closer than 6" to the wall, with no less than 36" clearance in front and behind.
 - c. 100% spare rack capacity shall be provided based on the amount of rack capacity utilized by patch panels.
 - d. A minimum of (1) spare rack shall be provided for mounting of WAN / LAN equipment (project assumes all active equipment is furnished by others).
 - e. Incoming fiber service shall be terminated in rack-mounted fiber optic patch panels (FOPPs) using type LC connectors.
 - f. All copper patch panels shall be rated Category 6 and have no less than 25% spare port capacity.

- g. Each TR shall receive a dedicated and labeled Telecommunications Grounding Busbar (TMGB or TGB) electrically connected to the main electrical service ground as recommended by ANS/TIA J-STD-609-D.
- h. Labeling for all fiber and U/UTP cabling shall comply with the ANS/TIA 606-C and customer requirements. Installer to provide label samples and receive acceptance from the customer prior to implementation.

9.3 STRUCTURED CABLING SYSTEM (SCS) - CABLING AND WORK AREA OUTLETS

- A. **SCS Interior:** The SCS horizontal interior cabling shall consist of horizontal plenum rated Category 6 U/UTP cabling and components for data /voice/security communications. Each drop location will receive (2) two cables which are wired ANS/TIA T568B pair configuration, UON; all cabling is capable of providing voice, data, and security connectivity. All other IT cabling (i.e. intercom system, etc.) to be determined based upon application requirements.
- B. **SCS Exterior:** Locations designated as requiring data connectivity such as electrical transformer, water metering device, external security requirements, and any Building Automation Systems shall be coordinated and documented to facilitate the placement of proper pathway and cabling to support equipment that is to be provided by others.
- C. **Intra-building backbone cabling:** The general design of the in-building backbone will be a star topology. There shall be no more than two hierarchical levels of wiring cross-connections in the backbone wiring. Interconnections between the Entrance Facility (EF) and any TR shall pass through three or fewer cross-connections. Only a single cross-connection shall be passed through to reach the main cross-connection. Cross-connections may be located in the telecommunications rooms. All wiring cross-connections will be located in secured rooms.
- D. **Intra-building Fiber backbone cabling** - for this project shall consist of 12-strands of a single mode FOC armored cabling; this cabling will be installed in a star topology from the Entrance Facility (EF) to each Intermediate Telecommunications Room.
 1. To facilitate future adds, moves and changes the intra-building fiber backbone cabling shall be allocated a 30' service loop within the Entrance Facility (EF); the service loops shall be managed the installation of D-Rings on the plywood backboards (see Note 1).
- E. **Intra-building Copper backbone cabling** - is to accommodate the designed phone stations and any additional analog cabling required by project, plus provide an additional 25% spare for future growth; this cabling will be installed between the Entrance Telecommunication Room and the Intermediate TRs in a star topology. Installed trunks shall terminate on 110 blocks prior to cross connecting to the equipment racks; backbone trunk cabling between TRs is to be plenum rated (see Note 1).

- F. **Note 1:** To facilitate future adds, moves and changes the intra-building copper backbone cabling shall be allocated a 30' service loop within the Entrance Facility (EF); the service loops shall be managed the installation of D-Rings on the plywood backboards within the Entrance Facility (EF). The fiber slack shall be managed in a figure 8 configuration; the copper trunk should be managed by routing the cabling around the TR plywood backboards using the proper bend radius as attempting to form a figure-8 could kink the internal pairs causing damage.
- G. All backbone cabling design will be coordinated with the District prior to the completion of the design and the beginning of the implementation phase of the project.
- H. **Work Area Outlets** shall be coordinated with electrical outlets, adhere to ADA requirements, and be located as directed by the Using Service, but at a minimum:
 1. For each office environment:
 - a. Quantities to be coordinated with use of room but minimum to include (2) faceplates each with (2) jacks/cables will be provided in the room. Each faceplate will be provided on a different wall.
 - b. (1) Faceplate with (2) jack/cable at ceiling for WLAN connectivity
 - 1) See Wireless Access Points below for quantities
 2. A standard outlet shall consist of one 6-11/16 inch square by 2-5/8 inch deep backbox with a single gang plaster ring. Cover plate shall be high-impact plastic or nylon with the appropriate number of jack assemblies and blanks installed. The cover plate shall include a minimum of 4 available positions for jacks. All four pairs of each jack shall be terminated. There shall be a minimum of one telephone outlet for a wall mounted telephone connected to the TR with Category 6 U/UTP cable in all common areas, mechanical rooms, communication rooms, and electrical rooms. Color and placement of all outlets to coordinate with Division 26.
- I. **Wall mounted telephone outlets** shall be configured to standard ADA dimensions. Faceplates for wall height telephone outlets shall have one current highest ANS/TIA Category 6 rated jack and studs for mounting a wall type telephone set.
- J. **Wireless Access Points:** A grid of data drops (consisting of a single CAT6 plenum rated U/UTP cable) to be located in the plenum to provide connectivity for the customer designed WLAN. Each drop location is to be mounted on the ceiling and is to be provided with (10) ten feet of cable slack to allow for customer relocation efforts of data enclosure. The components of the backbox/enclosure system shall adhere to the requirements of a plenum utilized for return air (components of pathway and cabling shall be plenum rated). Plenum grid locations to include:

1. Wireless access points are to be furnished by the school district.

K. All categorized horizontal voice, data, and security cabling associated with the SCs shall be tested in accordance with permanent link test of ANSI/TIA 568 using level III accuracy, full test results (in numerical order) shall be provided to the local customer. Testing for all other technology based cabling shall be performed given accepted industry best practices; the results are to be provided to the local customer. For all cabling any adverse findings or failures will be corrected and retested.

9.4 APPLICATIONS

A. **Rough-in for Security Systems - Access Control System (ACS)** - Rough-in shall be provided to facilitate installation of access control system devices throughout the interior of the facility. System details, as provided by others, will be required to properly provide rough-in components (outlet boxes, blank cover plates, and empty conduit with pull wires). Pathway requirements for the access control system shall mirror that of the standard structured cabling installation.

B. **Rough-in for Security Systems – Video Surveillance** - Rough-in shall be provided to facilitate installation of a video surveillance system throughout the interior and exterior of the facility. System details, as provided by others, will be required to properly provide rough-in components (outlet boxes, blank cover plates, and empty conduit with pull wires). Pathway requirements for video surveillance shall mirror that of the standard structured cabling installation.

Rough-in for Audio / Video (A/V) - Rough-in shall be provided to facilitate installation of AV system devices throughout the interior of the facility. System details will be required to properly provide rough-in components (outlet boxes, blank cover plates, and empty conduit with pull wires). Pathway requirements for AV shall mirror that of the standard structured cabling installation.

PART 10 - SECURITY SYSTEMS

10.1 SECURITY SYSTEMS DESIGN ANALYSIS

- A. The Electronic Security System (ESS) shall consist of a number of independent and discrete sub-systems, integrated to provide the user with a single system presentation for control and monitoring of security devices. Sub-systems comprising the ESS shall include a Video Surveillance System and an Intrusion Detection System.
- B. All electronic security sub-systems shall have a level of immunity to power interruptions, be time synchronized, and employ a level of redundancy or failure recovery so as to minimize the loss of data, monitoring, and control.
- C. Security equipment shall be on emergency power if available (on-site generator) with a 30-minute UPS battery backup to cover the circuit transfer from normal to generator power.

D. Codes and Standards

1. The following codes, regulations, and standards shall be used in the design of this project:

- a. NFPA 730, "Guide for Premises Security"
- b. NFPA 731, "Standard for the Installation of Electronic Premises Security Systems"
- c. ADA - Americans with Disabilities Act Accessibility Guidelines (ADAAG), U. S. Architectural and Transportation Barriers Compliance Board
- d. ANSI/CABO A117.1 - Access and Usable Buildings and Facilities
- e. American National Standards Institute (ANSI)
- f. Underwriters Laboratories (UL)
- g. American Society for Testing and Materials (ASTM)
- h. National Electrical Manufacturers Association (NEMA)
- i. National Standards Foundation (NSF)
- j. ANSI/TIA-568 – Commercial Building Telecommunications Cabling Standard
- k. ANSI/TIA-569 – Commercial Building Standards for Telecommunication Pathways and Spaces
- l. IEEE 802.3x CSMA/CD Standard
- m. Applicable State and Local Codes.

E. Equipment Rooms

1. Security system headered equipment shall reside principally within the Telecommunications Rooms as coordinated with telecom designers.
2. Dedicated floor mounted locking equipment cabinets having environmental and access monitoring shall be provided for security equipment.
3. All security cabling shall be routed in conduit from device installation location to the shared cable tray system, to accessible ceiling where it is supported by J-hooks, or be installed completely in conduit back to the serving security equipment cabinet.
4. Low voltage cable tray design shall accommodate security cabling where practicable.

F. Coordination

1. All pathways (raceways) shall be coordinated with Division 26 and 27; all cabinet locations shall be coordinated with Division 27; firestopping components shall be coordinated with Division 7.
6. System Communications
 1. Security systems shall reside on an owner-provided VLAN and coordinated with the owner.

2. Network switches shall provide Power over Ethernet, full output for each port.
3. Switches shall be by owner.

10.2 VIDEO SURVEILLANCE SYSTEM

- A. Video Surveillance system shall provide both live and recorded high quality images to assist security staff in assessing alarm situations, providing general surveillance, and to facilitate forensic investigations of security events.
- B. Cameras shall utilize IP (network) technology for both power (Power over Ethernet – PoE) and transmission of digital video streams over the security network.
- C. These cameras shall be remotely viewable and recordable from an authorized network device.
- D. A server based Video Management System (VMS) shall reside on the security network for management and recording of video images.
 1. VMS shall be capable of:
 - a. Remote access
 - b. Multiplexed monitor viewing
 - c. Simultaneous live and recorded viewing of video
 - d. "Pushing" video to client alarm monitor stations
 - e. Forensic image pixel searching
 - f. Integration with Access Control System
 - g. Providing simultaneous service to both local and remote users
 - h. Mobile viewing of video (iPad, Smartphone, etc.)
 2. Video Recording elements include:
 - a. Direct attached storage to VMS servers
 - b. RAID 6 hard drive storage arrays
 - c. Sufficient hard drive space for:

PART 11 - AUDIO-VISIO SYSTEMS

11.1 GENERAL REQUIREMENTS

A. Equipment Rooms

1. Each Equipment Room will have one or multiple equipment cabinets to house processing and amplification equipment. Each location will use fiber-optic cables to connect all rooms together and to interface with the telecommunications network as needed.
2. Cable television and/or satellite television distribution equipment will be mounted to a plywood

backboard on the wall.

B. Sound System Performance Characteristics

1. Sound systems will be designed for both speech and music. Weatherized loudspeakers will be provided at all outdoor locations.
2. Sound systems will be designed for paging, background music, and voice reinforcement typical of stadiums and venues of similar scope and size. Systems will not be designed to serve as the primary sound system for touring productions such as concerts or musical acts.

C. Athletic Complex Connections

1. A fiber connection will be provided from the press box to each IDF for transporting signals between AV devices located in equipment racks in the IDF(s) and locally located devices at varying locations across the complex.
2. All network connections will be included as part of a converged network allowing for BYSD staff to access AV equipment via network connectivity.

11.2 COMMON WORK

A. Sound System Performance Characteristics

1. Pathway requirements will vary dependent on signal types as follows:
 - a. Microphone level and Production Intercom signals require independent conduit pathway from the device location to the AV system closet location.
 - b. Line level, video/control, and signals utilizing coaxial cable (assistive listening, television distribution, and wireless microphone (RF) signals) require conduit stubs from the device location using the combined technology cable tray system. These cables shall be bundled separately by signal type and separated from other signal types in the tray. Conduit routing via a more direct path may be required in lieu of utilizing the cable tray to ensure excessive cable length is mitigated. Some of these signals have specific distance limitations.
 - c. Loudspeaker level signals may be run as appropriately rated cable where located above accessible ceilings. Provide conduit stubs to accessible locations where loudspeakers are wall mounted or in inaccessible ceilings. Provide conduit in all exposed or open to structure areas. Individual home runs are not required per circuit; multiple loudspeaker level conduits may be consolidated/upused along the route. Utilize the combined technology cable tray system as applicable.
 - d. Data and Fiber signals require conduit stubs from the device location and may utilize the combined technology cable tray system. These cables may be bundled with other data / fiber signal types in the tray. Conduit routing via a more direct path may be required in lieu of utilizing the cable tray to ensure excessive cable length is mitigated. These signal divisions have specific distance limitations.
2. Upon entering the AV system closet, all cabling will utilize a ladder rack support system within the room for routing to the equipment racks. Cables shall be bundled separately by signal type.



- B. Cabling**
1. Cable type shall be as recommended by the manufacturer of the equipment and shall be selected as required to provide full system functionality.
 2. Some cable types (e.g. loudspeaker level or coaxial cables) may require a larger wire gauge or better rating for longer distances.
 3. All cabling shall be rated for the environment in which it is installed.
- C. Device Locations**
3. Audio system input/output (I/O) plates will utilize active audio network components. As such, they shall conform to standard network distance limitations.
 4. Video distribution system components as a portion of the AV and IPTV systems will utilize network-based protocols. As such, they shall conform to standard network distance limitations.

11.3 TELECOMMUNICATIONS REQUIREMENTS

- A. AV System Network**
1. The AV system network will reside on a converged network with other facility network traffic.
 - a. The audio system will utilize a standards-based transport protocol (Dante, AES67, QSYS, etc.). PoE+ network ports will be required for numerous AV system devices.
 - b. The video distribution system will utilize a standards-based transport protocol (HDBaseT, H.264, etc.).
 2. An audio network management system will be provided to ensure security and system management of all audio devices on the network. (Audinate Dante Domain Manager)

11.4 AUDIO SYSTEMS

- A. Assistive Listening System (ALS)**
1. As defined by the Americans with Disabilities Act (ADA), Assistive Listening Systems (ALS) are required for specific spaces, particularly those that contain audio amplification. Portable ALS transmitters and receivers will be provided (along with all accessories, including: cases, chargers, batteries, headphones, neck loops, signage, etc.) for use in any assembly area where audio amplification is provided.
 2. Permanently installed ALS FM transmitters with local antennas will be provided for spaces where required and/or where portable systems are not deemed practical.
- B. Sideline Communication Systems**
1. Transmt/receive pairs will facilitate wireless communication as defined by the client.
 2. Infrastructure to be provided at AV equipment racks and any local device locations as necessary.



- C. PA Audio System**
1. System Configuration
 - a. Loudspeakers mounted above the field will provide even coverage and SPL for each defined use case.
 - 1) All loudspeakers used will be outdoor rated for the average temperature and humidity at the complex location.
 - b. Loudspeakers will provide program audio playback from a selected source or provide playback of live speech from the microphone system.

- D. Microphones**
1. Wired microphones will be located in the press box location to deliver live speech.
 2. A wireless microphone system with multiple transmitters will provide live speech reinforcement for a variety of events where the person speaking is mobile.

- E. Audio Input / Output (I/O) & Sources**
1. I/O plates will be located in the press box as well as any other client defined locations
 - a. I/O plates will require network connections to the nearest IDF for connection to the audio network.
 - b. TBD audio only sources will be provided such as a streaming device, CD player, etc.
 2. Paging may be provided as input to the system, pending client verification, and system compatibility.

- F. Processing & Amplification**
1. Centrally located, network enabled digital signal processing, and amplification will accept and route all audio signals throughout the complex.

11.5 VIDEO SYSTEMS

- A. Digital Signage Displays**
1. Digital signage displays placed throughout the complex at select locations will display owner furnished content from an owner furnished PC.
 2. Owner furnished PC will require HDMI connection to the display provided by the AV contractor, and a network connection to the nearest IDF.
 1. Professional grade, outdoor rated displays will be provided throughout the facility, which are



designed for 24/7 operation.

- B. Scoreboard**
1. An owner specified and furnished scoreboard display, software, and control will facilitate game replay, signage, and scoreboard features.

11.6 CONTROL SYSTEMS

- A. AV Control System**
2. An AV control processor located centrally in an AV equipment rack will provide controls of audio, video, and other potential systems as defined by the client, pending compatibility.
 3. Control touch panels will be installed in select locations to provide intuitive user interfaces for control of the systems connected to the AV control processor.
 4. Remote control capabilities will be facilitated by software installed on select, client defined PC instances.

11.7 TELEVISION DISTRIBUTION SYSTEMS

- A. Display locations, content, signal, and distribution have not been confirmed yet. The below systems may be included as functional systems, infrastructure only, or excluded. Currently, these systems represent a placeholder pending future decisions.**

- B. IPTV System**
1. The Television Distribution system will consist of an IPTV system.
 2. The IPTV system will be a portion of the converged facility network.
 3. All fixed television locations will be fed from the IPTV system.
 4. Display control will be provided as a portion of this system. RS-232 connection from the tuner to the display will be provided.

- C. IPTV System Head End**
1. The following sources will be ingested by the system:
 - a. Terrestrial over-the-air (OTA) television feeds: A terrestrial antenna will be provided in an exterior location to be determined during design to receive local digital television channels (VHF/UHF). IPTV ingest equipment will be required and consist of multi-channel



- turners/encoders.
- b. Cable Television (CATV): A local cable television provider to be determined later will provide the incoming feed. A bulk processor will be provided as a portion of the project to handle IPTV ingest. Owner input and coordination with the provider will be required.
 - c. Satellite Television (SATV): [DirecTV][Dish Network] will be the basis of design. A satellite dish will be provided in an exterior location to be determined during design to receive the required signal. Satellite distribution components and a bulk processor will be provided as a portion of the project to handle IPTV ingest. Owner input and coordination with the provider will be required.

- D. Digital Signage Content Distribution System**
1. The Digital Signage System will be integrated as a portion of the IPTV system.
 2. The concession stand menu boards will be operated as a separate access level on the same system as the primary IPTV system.
 3. Each TBD location will be provided with digital signage displays for room scheduling, upcoming events, and wayfinding.

PART 12 - BROADCAST SYSTEMS

12.1 GENERAL REQUIREMENTS

- A. The scope of "Broadcast Systems" for this project will include Broadcast Prewire systems and associated pathways to provide "limited" capabilities to select locations within and around the facility.**
1. "limited" capabilities would be in contrast with a more traditional prewire system, which would typically include specific cable types (SMPTe, SDI, 22 AWG twisted pair, category) per signal classification (camera, video, audio, network). Limited connectivity will consist of fiber connections only, which has the potential to require active electronics on each end for conversion to desired signal types. This strategy is recommended due to the lower cost, reduced complexity, and increased flexibility of a fiber only prewire system.
 2. Locations will be selected to balance overall flexibility within the facility and overall cost to the project.

12.2 COMMON WORK

- A. Cable Pathways**
1. Broadcast systems pathways will consist of dedicated, oversized end/or spare conduits to allow for future modifications and additions of cabling.



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2. Broadcast prewire positions will be served via direct conduit connections to the prewire enclosure and utilize minimum 2" conduits up to multiple 4" conduits depending on the anticipated capacity needs.
3. Cable tray will be provided in appropriate locations to serve higher capacity needs and will allow for future modifications and additions.

B. Prewire Enclosures

1. Broadcast prewire systems will be terminated within industry standard enclosures on rack panels. (Bullock Fabricating AU-89 Series)
2. Exterior locations will utilize a similar enclosure and be pedestal mounted if required.

C. Cabling

1. Cabling routed via conduit to exterior enclosure locations will require the use of outdoor rated cable. Upon entering the building, it will need to either: be routed within conduit to the destination, transition to indoor rated cabling within 50' of entering and route via any available pathway, be dual rated as an indoor/outdoor cable and route via any available pathway.
2. Special considerations (including avoidance if possible) will be required for cabling routed via return air plenums, as plenum rated broadcast cabling is less common and typical indoor/outdoor rated cabling does not carry a plenum rating.

12.3 BROADCAST PREWIRE SYSTEMS

- A. A Broadcast Prewire System will be provided via fiber connections at general use and broadcast specific locations to IDPs. Connections will be provided to patch from the fiber in floor and wall boxes throughout the facility, and will consist of the following.

1. X single-mode fiber connections from each IDF to the MDF
2. X single-mode fiber connections from the MDF to the Truck Dock
3. X single-mode fiber connections from broadcast prewire specific locations (to be determined)

