BAIN MEDINA BAIN
ENGINEERS & SURVEYORS

Airport Integrated Control Center (AICC)
Phase II: Assessment for Repurposing
Building 1840

Report of Findings
Final Date:
8/21/2015

City of San Antonio Aviation Department

Bain Medina Bain, Inc.

TBPE Registered Firm Engineering Number: F-1712

BMB Team:

CNG Engineering, PLLC
Intelligent Engineering Services, LLP
Faith Group, LLC
Medina Consulting Company, Inc.
West East Design Group, LLC
XIP Consulting, LLC

EXECUTIVE SUMMARY

A Report of Findings on the condition of Building 1840 for Phase I was submitted on May 8, 2015. On June 10, 2015, the BMB team was given the notice to proceed with Phase II of the project. Phase II continues evaluation of the facility with the specific goal of repurposing the Building 1840 into an AICC/AEC/Training facility. The building will potentially be the Airport's new consolidated operations and training center that monitors critical airport data supporting multiple stakeholders and operations. The official designation of the proposed facility will be the Airport Operations and Administration Building.

An evaluation of the site was conducted with regards to parking facilities and pedestrian improvements including ADA access for each, a site drainage issue, space requirements, and layout for HVAC, electrical, and backup power systems. The proposed site plan includes airside access for emergency personnel. The team developed a preliminary conceptual design of the building floorplan and systems necessary for the new purpose. Along with improvements identified during Phase I, proposed HVAC, electrical, plumbing, communication, and specialized AICC/AEC systems were assessed for AICC/AEC functionality and impacts to the structural integrity of the building. An architectural assessment reviewed building elements impacted by AICC/AEC systems, as well as standard elements such as interior finishes, building entrances, and roof and wall panels. A limited asbestos survey was conducted including analysis of samples from building materials that could potentially obtain asbestos. Three locations within the building were identified with asbestos containing materials. These areas will require special demolition/removal methods prior to commencing construction activities in those areas.

A preliminary cost estimate was developed for all site improvements, building upgrades, and specialized systems based on the team's assessments. A summary of the cost estimate is included below.

Items	Budget costs	
AICC/AEC	$	4,125,000
Comm Infrastructure	$	3,432,500
Civil/Site Work	$	460,700
Architectural Core, Shell & Finish	$	982,800
MEP	$	2,176,400
Shelter-in-place	$	50,000
Furniture Fixture and Equipment	$	250,000
Contingency (25-26%) Included in Costs		
Programming (8%)	$	918,000
Design (10%)	$	1,147,600
Construction(3-5%)	$	460,000
TCI Management(3-5%)	$	460,000
CMR Contingency	$	537,000
Total Budget Costs	**$**	**15,000,000**

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I. BACKGROUND

On February 12, 2015, the City of San Antonio for the San Antonio Airport System (SAAS) entered into an agreement with Bain Medina Bain, Inc. (BMB) to provide On-Call General Engineering Consulting Services. Task Order scoping began on the Airport Integrated Control Center (AICC). The Task Order's scope of work was divided into multiple phases. The first phase was an assessment of Building 1840 to determine its condition and deficiencies relative to codes and requirements needed for it to function operationally as office space. A Report of Findings was developed as a result of the Phase I assessment that included recommendations to restore the building as a functional space for a potential tenant (SAAS or other tenant) as a minimum requirement. Findings were presented to City of San Antonio leadership and the final report was submitted on May 8, 2015. On June 10, 2015, the BMB team was given the notice to proceed with Phase II of the project. Phase II continues evaluation of the facility with the specific goal of repurposing the Building 1840 into an AICC/AEC/Training facility.

The base requirements for the facility conversion were collected during the Phase I assessment and through the telecommunications conceptual design provided in the *Airport Integrated Control Center Task 2 – Facility Recommendations* report developed by Faith Group LLC, under a separate contract. For the Phase II task, the team continued to define the renovation efforts and planning necessary for the repurposed function and the cost impacts associated with updating the systems, structure, and site.

The scope of work for this task order to be performed by Bain Medina Bain and its team of professionals shall consist of providing engineering and architectural services required to prepare a Report of Findings assessing the repurposing of Building 1840. Building 1840 is located at 1964 First Avenue, on the north side of the San Antonio International Airport. The building will potentially be the Airport's new consolidated operations center that monitors critical airport data supporting multiple stakeholders and operations. The official designation of the proposed facility will be the Airport Operations and Administration Building.

Building 1840 is owned by the City of San Antonio. It was originally built in 1978 and the interior was renovated in 1996. The most recent tenant occupied Building 1840 and Building 1845 and has since consolidated its operations into Building 1845, leaving Building 1840 available for the City to utilize it for the purpose being evaluated in this report.

BMB would like to acknowledge its team members and their roles that helped with this Phase II assessment:

Bain Medina Bain, Inc. – providing site assessment and overall project coordination

CNG Engineering, PLLC – providing MEP assessment

Intelligent Engineering Services, Inc. – providing structural assessment

WestEast Design Group, Inc. – providing architectural assessment

XIP Consulting, LLC. – providing communication assessment

Medina Consulting, Inc. – Environmental sampling and testing for asbestos

After receiving approval of the Task Order and notice to proceed, the team proceeded to develop a preliminary conceptual design of the building systems necessary for the new purpose and address action items for base codes and functions that were determined during Phase I. Congruent with this task was producing a preliminary cost estimate for the repurposing of the building. The documentation of the findings and estimate were prepared and have been combined into this report.

II. CIVIL ASSESSMENT

A. ROOF DRAINS

Building 1840 is equipped with a roof drain system that captures runoff from the roof along the east and west edges of the roof and directed toward the ground via downspouts on the five downspouts on each side of the building. The downspouts on the east side of the building are tied to a vertical pipe that extends underground and ties into an underground storm drain system. The downspouts on the west side of the building tie into a vertical pipe that extends underground to a ninety degree bend into a pipe that penetrates though the sidewalk and outfalls onto the parking lot asphalt surface. The diameter of the pipe through the sidewalk resulted in reduced concrete cover over the pipe, causing a transverse crack to develop in the sidewalk concrete over the pipes. Also, as the water outfalls onto the parking lot surface, it drains along a contoured swale in the asphalt surface to the south where it empties into a grate inlet. The inlet is tied to an underground storm drain system. The water on the asphalt parking lot surface results in deterioration and cracking of the asphalt surface. To eliminate the issues caused by the roof drain pipe and runoff, we propose re-routing the drain pipes under the reconstructed sidewalk and parking lot area to an underground collector pipe that ties into the storm drain system at the south end of the building. The estimated cost for the installing underground piping, reconstruction of sidewalk, and restoring parking lot pavement at new grades is included in the civil estimate located in the appendix.

B. PARKING LOT LAYOUT

Through the M7 Lease agreement, Building 1840 is allotted 53 parking spaces with 26 parking spaces on site and 27 parking spaces within a 15,410 square foot area of the parking lot across First Avenue. The parking spaces on site include 12 angled parking spaces adjacent to the west wall of the building and 14 parking spaces at the rear of the building along the main access aisle. A possible 15th spot is striped off for non-use. It appears there was a utility/illumination pole at that location that is no longer there. There are currently no accessible parking spaces within the areas designated to Building 1840.

The parking requirements per the City of San Antonio Unified Development Code (UDC) indicate one parking space per 300 square feet of gross floor area for an office building. With a gross floor area of 20,333 square feet, Building 1840 requires a minimum of 68 parking spaces to meet UDC requirements.

The proposed parking lot plan for Building 1840 will consist of 90 total parking spaces (See Proposed Site Layout under Exhibit A). This number, which exceeds the number of required spaces per the UDC, includes 62 parking spaces located on-site and 28 parking spaces located at the off-site location across First Avenue. Based on ADA Standards for Accessible Design, the number of required accessible parking spaces for a facility with multiple parking areas is calculated by determining the number of accessible parking spaces for each parking facility separately. For Building 1840, the number of proposed on-site parking spaces is 62 spaces, which requires three total accessible parking spaces; two accessible parking spaces with a 60" wide access aisle and one van accessible parking space with a 96" wide access aisle. Building 1840 requires a total of five accessible parking spaces with two of those spaces being van accessible parking spaces. For the 28 proposed off-site parking spaces, ADA Standards require one accessible parking spaces with a 60" wide access aisle and one van accessible parking space with a 96" wide access aisle. Per the ADA Standards, accessible parking spaces for multiple lots can be clustered in one lot if equivalent or greater accessibility is achieved with regard to distance from accessible entrances and convenience. Building 1840 is proposed to consist of public and employee entrances; therefore, it would be desirable to disperse the accessible spaces between the public and employee entrances. The proposed parking layout includes two accessible spaces by the main entrance and three accessible spaces at the northwest corner of the building, which could access the north building entrance and the proposed west side employee entrance. To provide better flexibility in the proposed layout, all five accessible parking spaces shall be van accessible type parking spaces (See Proposed Site Layout under Exhibit A).

The parking area to the west of the building currently has angled parking spaces. The proposed plan converts these angled spaces into 90 degree parking in order to facilitate a rapid and safe exit for personnel vehicles during emergencies. The reconstructed sidewalk shall have ramps at the northwest area of the building to accommodate the accessible parking spaces. The ADA Standards prohibit ramps from extending into the accessible parking access aisles. New parking wheel stops shall be added to the parking spaces in this area.

Building 1840 is allotted one row of parking in the lot at the rear of the building per the M7 lease agreement. The row consists of the 14 parking spaces along the main access aisle. There is a standard sized space that is marked with angled pavement markings. It appears that the space was marked for non-use due to a utility or illumination pole was located within that space, but is no longer there. The parking plan proposed to fill in the existing hole and install new paving to gain use of that space as a parking space. The existing 14 parking wheel stops shall be removed and replaced and a new wheel stop installed at the new space. The proposed layout will match the existing layout for this area.

Additional parking is proposed for the front (south) of the building. This area will be discussed in further detail in the Proposed South Parking section. Additional parking is also proposed at the far rear (north) of the building. This area will be discussed in further detail in the Proposed North Parking section.

C. PROPOSED SOUTH PARKING

To improve public access to the main entrance, it is recommended to construct additional parking in the grass area in front of the building (See Proposed South Parking Layout under Exhibit B). The building is set back approximately 50 feet from the First Avenue curb line. There is a 38-foot wide grass area with small trees and a four and one-half foot wide sidewalk running parallel to First Avenue that connects to additional sidewalk running north and south on both sides of Building 1840. The sidewalk also extends east in front of Building 1845. There is a landscape area that varies in width, between six and eight feet, between the sidewalk and the building face. The sidewalk widens as it ties into the main entrance of the building. The proposed plan includes constructing a parking area within the 38-foot grass area. This new south parking area will consist of eleven new head-in parking spaces, of which two are accessible parking spaces. A new six-foot wide sidewalk is to be constructed directly in front of the new parking spaces to provide connectivity from each parking space to the existing sidewalk and the main entrance. Two van accessible parking spaces shall be located in the middle of the south parking area for nearest access to the main entrance. Parking wheel stops shall be installed at all eleven parking spaces. An approximate ten-foot wide landscaped strip with new irrigation system will be located between the new six-foot wide sidewalk and the existing sidewalk.

D. PROPOSED NORTH PARKING

The proposed site layout includes the construction of additional parking at the rear of the existing lot. An area 215 feet long by 25 feet wide of new asphalt pavement would accommodate 23 new marked parking spaces with wheel stops. The new parking pavement shall accommodate ninety-degree parking spaces that meet the standard 18-foot depth while still providing the UDC required 25-foot wide aisle between the new parking spaces and the existing spaces. An optional concrete ribbon curb can be placed along the perimeter of the new pavement to protect the asphalt edges and allow for drainage. There are two existing utility poles in the natural ground area behind the parking lot. Exact location of the poles should be determined to verify dimensions of proposed pavement can be accommodated.

E. OFF-SITE IMPROVEMENTS

Building 1840 can use a portion of the parking spaces across First Avenue per the M7 Lease agreement. The area designated to Building 1840 currently consists of 27 marked parking spaces. There are eleven ninety-degree parking spaces at the edge of the lot along First Avenue, thirteen angled parking spaces facing the interior of the lot, and three ninety-degree parking spaces adjacent to the chain link fence at the west side of the lot. For the Proposed Site Layout, a fourteenth parking space was added to the row of spaces facing the interior of the lot. All parking spaces should be furnished with new parking wheel stops. An approximate 30-foot wide strip of the lot along the First Avenue curb line was resurfaced and parking lines re-striped in 2012. Although the resurfaced area appears to be in good shape, the Proposed Site Layout includes resurfacing the entire area designated to Building 1840 along with new pavement markings within that area. Resurfacing the full area will help keep all future maintenance for the entire site on the same schedule.

F. ON-SITE IMPROVEMENTS

The Proposed Site Layout includes additional improvements to the Building 1840 site. Although the rear parking area was resurfaced near the end of 2014, the main access aisle was not resurfaced at that time. The site plan proposes to resurface the main access aisle and all parking areas designated to Building 1840. Resurfacing all areas will keep all future pavement maintenance for the entire site on the same schedule.

In addition to the sidewalk improvements discussed in the Proposed South Parking section, reconstruction of the existing sidewalk along with new landscaping around the building should be completed to for an aesthetic and updated look for the site. For pedestrian improvements, the sidewalk near the southwest corner of the building should be extended to the curb and equipped with an ADA compliant curb ramp. The existing sidewalk on the east side of the building that extends to the curb should be reconstructed and equipped with an appropriately designed ADA curb ramp. It is recommended to resurface a 225-foot segment of First Avenue in front of Building 1840 due to wear resulting from construction traffic onto the site, to provide an updated look, and for the placement of new crosswalk markings and illuminated in-pavement warning systems. ADA compliant curb ramps should also be constructed on the south side of First Avenue at each crosswalk to provide better overall access.

Additional exterior lighting is proposed for the parking lot areas. The LED lamped energy efficient lighting would be installed on new 25-foot poles, satisfy requirements for the CCTV security system, and help provide general overall safety for staff and visitors.

The area directly behind the building is to be reconfigured to accommodate the generator, HVAC, and electrical elements. The layout for each of these elements needs to be planned out to provide proper connectivity, maintenance access, and security. The space required for the new elevator needs to be included in the design for this area, along with acceptable grades and clear widths for pedestrian access to the building's two rear entrances.

G. AIRSIDE ACCESS

The operations at Building 1840 under the proposed use necessitate access to the secure airside areas of the airport. A heavy duty cantilever slide gate with magnetic gate operator that is designed for critical infrastructure use shall be installed at a location to be defined by airport staff. The gate will require installation of a security access system and the appropriate power requirements per the manufacturer's specifications supplied to the location. The gate will be designated as AOA Gate 263.

III. STRUCTURAL ASSESSMENT

A. STRUCTURAL IMPACTS DUE TO MODIFICATIONS

The nature of pre-engineered metal building construction is to design custom rigid frames with just the right section properties to meet the original design intent of the building. The collateral loads used in pre-engineered metal building design are normally on the order of 2psf to 5psf. This is to account for the metal roof panel, insulation draped across the purlins, and minor lighting, electrical, and mechanical ducting loads. Without the signed and sealed metal building shop drawings and design calculations, significant demolition of existing finishes would be required to obtain extensive field documentation of plate widths/depths and thicknesses. Further, destructive material sampling would be required to determine the grade of plate used. As this level of investigation was not authorized, new equipment loads must be supported from the floor framing and hard ceilings should be supported by ceiling joists spanning between interior partitions.

B. SECOND FLOOR CEILING HEIGHT

Clearance between the second floor and the bottom of the rigid frames is 9'-8" at the eave and 13'-5 ½" at the ridge. The frames have bottom flange bracing that connect to the purlins that run over the top of the frames. These are critical to the capacity of the rigid frames and should not be removed. Between these braces, the clearance between the second floor and the bottom of the roof purlins is 11'-6" at the eave and 15'-3.5" at the ridge.

C. STRUCTURAL IMPACTS TO MEET HIGHER RISK CATEGORY CRITERIA

As an office building, Building 1840 would have been designed as a Risk Category II building. If the renovated building is designated as an "essential facility", "fire, rescue, ambulance, or police", "emergency shelter", "emergency response", "emergency preparedness, communications, or operations center", "aviation control tower", or "air traffic control center", the 2015 International Existing Building Code, as adopted by the City of San Antonio in May of this year, requires that the structure be upgraded for the higher wind and seismic loading associated with the design requirements of a Risk Category IV building. This will require extensive strengthening of the pre-engineered metal building. Development of these structural implications has not been approved at this time.

IV. ARCHITECTURAL ASSESSMENT

A. ROOF AND WALL PANEL REPLACEMENT

The 37-year old building exterior is in fair condition generally (on a scale of good/fair/poor) with all components at or near their typical life expectancy of about 37 years for the metal panel roof, 35 years for the steel profiled wall panels and 44 years for the aluminum windows and storefront. The wall panels have been painted with an elastomeric paint that is also in fair condition, but that is in the chalking phase and there is peeling in a few areas. The integrity of the roof and wall panel systems is dependent to a large extent on the neoprene washers for the screws fastening the panels to the structure and sealant at the panel joints. These washers at this time are very brittle and there is some evidence of portions of the neoprene and portions of the hex pan spacer covering failing – breaking. There is evidence of having added sealant at each fastener in one region of the roof indicating that there was probably an issue with the roof at that area. There are various roof patches where equipment penetrations were removed.

There appears to be no sheathing behind the wall panels based on some existing holes from abandoned utility entries, though this has not been confirmed. Vinyl-faced metal building insulation supported with poultry fabric can be evidenced on the underside of the roof and inside of the upper wall structure where exposed over the ceiling. A separately framed interior wall has been constructed around the entire perimeter of the building and batt insulation can be evidenced in those stud cavities above the suspended ceiling at the second floor. Batt insulation has also been placed over the suspended ceiling tiles at that level.

There is no insulation between the lay-in ceilings and the roof deck at the exterior walls. Daylight can be seen along the juncture of the roof gable end closures and wall panels. The gaps in some locations are large enough that it is not only a serious breach in whatever air/weather barrier that exists, but presents a significant entry point for blowing rain. That is likely the case where there is wet batt insulation and broken ceiling tiles near the northwest corner of the building on the second floor in the reception area.

Recommendations for the exterior shell of the building taking into consideration the condition of the building and the general office use of the facility will be a strategy of repairing and renovating existing components in-place. We therefore recommend replacement of the existing metal building roof with a new lock-seam metal roof that does not require exposed fasteners. Positive closure is required at the perimeter of the building at the juncture of the roof system and wall panels and a complete insulation envelope must be provided at these breaches. We recommend a sprayed insulation system at the exterior wall from the top of the interior stud wall to the roof deck. Because the existing construction utilizes a combination of vinyl-faced metal building insulation draped over the purlins and batt insulation above the ceiling, a similar approach will be undertaken in order that the alteration does not create an assembly less compliant with the energy code than the condition before the alteration. Compliance with the current IECC for roof and wall elements that are being repaired or replaced in kind will not be required; however, consideration will be given to providing additional insulation value, closer to the requirements of the current IECC.

Recommendations for the existing metal wall panels are to seal small holes, replace damaged panels and replace failed fasteners and neoprene seals throughout. Finally, the panels require re-painting and sealing of gaps and open seams.

B. STOREFRONT SYSTEMS

The storefront system at the South entry façade is in fair condition with the need for replacement of glazing beads where they have failed and replacement of perimeter sealant. The punched windows along the west and north sides are similar to the single-glazed storefront system with brake metal flanges added for attachment to the metal panels. These windows are similarly in fair condition with some deterioration of the glazing beads and perimeter sealant that is in need of replacement. We therefore recommend replacement of failed or damaged glazing gaskets, cleaning and replacement of perimeter sealant throughout. We will also look at applying surface-applied window film on existing single-pane glazing to reduce solar heat gain.

1. North Entries

The double doors at the northeast entrance do not comply with life safety or accessibility codes because the individual door leaves are too narrow and the vestibule does not provide the required depth for doors-in-series. That entry will require replacement of the existing storefront with a 36” wide door and a fixed sidelight in the same opening at the exterior, and a new storefront for the interior vestibule entry set further into the building to allow the required maneuvering clearance for doors-in-series. Both north entry approaches have greater changes in level than allowed by the requirements for accessibility, and neither provide appropriate landings with the required maneuvering clearances. Therefore, the sidewalks leading from parking to the north entries will be replaced, re-sloping to meet the change in level restriction at the doors and also enlarging the landings, providing for the required maneuvering clearances.

2. South Entrance

The existing main entry vestibule is also not accessible because the maneuvering clearances for the doors are inadequate for doors in sequence. The flares on the sides of the ramped sidewalk at the front of the vestibule are also not in compliance because they are in excess of the allowed cross slope. At the south entry, reconstruct the storefront vestibule to provide the required clearance between doors in series, and replace a portion of the sidewalk in front of the vestibule to comply with landing and sidewalk slopes and cross slopes. There is also existing porcelain tile at the existing south entry that is in poor condition and would in any case be partially removed in reworking the sidewalk so that the recommendation is removal of all of the existing tile at that location. The new vestibule that will be deeper in plan will be constructed with the same exterior footprint and encroach on the existing lobby space for the additional depth. In this way, the vestibule will still be under the existing exterior soffit and will not require its own “roof”.

C. EXTERIOR ACCESSIBLE ROUTES

New handicap accessible parking spaces (5) are proposed; one pair at the new parking area at the front (south) side of the building, and three spaces at the west side of the building at the north end, closest the northwest entry. The sidewalks are being revised with new ramps and landings adjacent the spaces to complete the accessible route to the building. See the Civil Assessment portion of this report for more detail and a site drawing showing these spaces.

D. PROPOSED WEST ENTRANCE

A new west entrance is proposed as indicated on the attached First Floor Conceptual Plan that will serve as direct access for Airport Operations to their vehicles in reserved parking for that purpose along the west side of the building. The door will be located at one of the existing window openings and will give access to the exterior from an equipment pick-up space so that operations personnel can quickly and efficiently grab their gear on the way out the door in an emergency event.

E. DEMOLITION COST

Selective demolition will be required to accommodate revised special arrangements and to provide all new finish materials. The opinion of probable cost for Selective Demolition is included in the detailed estimate found in Section XI.

F. INTERIOR FINISHES COST

The interior has received at least one major renovation in 1998 for Fairchild Aerospace. The current interior configuration is substantially the same as reflected in the documents for that renovation. It appears that some of the finishes also date from that renovation and others have been renewed, though the condition of most finishes is only fair to poor on a scale of good/fair/poor. The partitions, doors and some ceilings are in good condition in keeping with their longer typical life expectancy.

There is an existing terrazzo floor at the building's main entry lobby that is in very good condition and can likely be retained, though the programmatic concerns for the lobby may change the size and configuration of the area exposed. Similarly, there is a large conference space with patterned stainless steel entry doors that are a good candidate for retention in the renovated facility. The main entry stair open to the existing lobby is structurally in good condition; however, the carpet is in poor condition and the railing is not compliant with current code.

A more detailed assessment of interior finishes and interior construction was provided in the Phase I Assessment report; however, the assumption for this Phase II Assessment is that interior finishes with the exceptions noted above will be new to include ceilings, carpet, vinyl tile and paint as well as all cabinetry, plumbing fixtures and ceramic tile at the restrooms. The

existing solid core paint grade doors are generally in good condition and can be retained in locations where the partitions where they are located will remain. New doors required by the revised floor plan configuration will be solid core paint grade to match.

Because the two story B-occupancy facility will now be fully sprinklered in this renovation, corridors, stairs and elevator shafts do not require a fire resistance rating and there are no other fire resistance rated elements or partitions in the renovated structure.

The opinion of probable cost of the interior finishes for the renovation is included in the detailed cost estimate found in Section XI.

G. PROPOSED ELEVATOR COST

A new holed hydraulic passenger elevator is proposed to serve the renovated facility and located as indicated on the conceptual floor plans. We have assumed for the purpose of the cost analysis a 2500 lb. capacity general purpose elevator with a single speed side operating door with accommodation for a stretcher (Basis of Design: Schindler 330A Borehole Hydraulic Elevator, General Purpose, Front Opening). The proposed new elevator shaft is assumed to be framed of light gage metal studs with batt insulation, stucco finish over continuous insulation and sheathing, steel structure and hoist beam as required, concrete foundation, pit and sump pump.

The opinion of probable cost for the proposed elevator and shaft structure is included in the detailed cost estimate found in Section XI.

H. FIRST FLOOR CONCEPTUAL LAYOUT

A proposed first floor conceptual layout is attached and has been based on preliminary programmatic information provided in a meeting on June 19, 2015 with Mr. Ryan Rocha as follows:

- For shelter-in-place option, we should concentrate on a first floor option that will protect the occupants of the building and provide some level of operability. We will not further study the option of a two-story shelter-in-place that would protect the second floor AICC because of the cost to provide a new independent structure for that entire portion of the building. We should however, provide a duplicate Dispatcher Training Room on the first floor that will also back up some of the critical AICC functions. Aviation does not have a specific standard that should be followed and BMB will suggest a standard that will provide a degree of safety in the event of a catastrophic weather event, keeping in mind the project budget. [The shelter-in-place option was subsequently deemed beyond the scope of the current assessment Phase II.]
- A multi-purpose conference space is required for training purposes with a capacity of 50 persons in a seminar table configuration, plus space for an instructor and podium. This space is a likely shelter-in-place to safely house the occupants of the building in the event of emergency weather conditions; however, the large span/width of the room make it less desirable for that purpose. BMB will further study options and make recommendations regarding the shelter location.

- Airfield Operations has 16 staff with a maximum of 8 on a shift. They can operate out of systems furniture work stations and the stations are not dedicated office spaces for specific staff members. Additionally, Ops 202 and Ops 210 need a shared double office space adjacent to the Airfield Operations emergency exit and equipment pick-up space.
- The existing metal lockers for Airfield Operations will be moved to the new space. The lockers are 12 x 6 in a 9 over 9 stacked configuration.
- Airport Safety will require space for 3 staff: one private office for the director and one shared double office space for two additional staff.
- There will be a need for an administrative assistant centrally located to serve the office spaces and a shared copy room space should also be centrally located.
- A kitchen similar to the one indicated on the Aviation Second Floor Conceptual Plan should be provided on the first floor at a location where it is available to be shared by all first floor occupants, but isolated enough to contain the noise and food odors somewhat. An open concept without a door is preferred and the space should accommodate a vending and kitchen facilities comparable to the one indicated for the second floor.
- The existing first floor kitchen space may be an ideal location for a duplicate Dispatcher Training room on the first floor. It is located directly below the dispatcher training on the Aviation second floor concept plan, and in any case for the final design of the second floor, it would ideally be located below the second floor Dispatcher Training Room for efficiency of communication and conductor runs.
- The existing Conference Room located off of the Lobby should remain and a new Conference Room provided in addition to the new Multi-Purpose Conference Room and adjacent to it at the front of the office spaces.

I. SECOND FLOOR STRUCTURAL CLEAR HEIGHT

The BMB team assessed the existing structural clearances at the second floor to determine available clear heights available particularly as related to the proposed location of the AICC. The clear heights to the bottom of the steel beams running east/west were determined to be 9'-8" at the building perimeter on the east and west sides, and 13'-5-1/2" at the ridge running north/south at the center of the building. The steel beam depth is 1'-10 ¼" so that the potential maximum clear height to the bottom of the purlins and line of the metal building roof insulation is increased by that depth between beams; however, there is a beam running through the area currently indicated for the video wall so that the top of the video wall would be limited to the bottom of the beam line.

J. RAISED FLOOR AND TRANSITIONS

A six inch high access floor system is proposed for the AEC, AICC and IT spaces at the second floor. This depth is the minimum recommended for efficient cable management. One entry/exit to each of the spaces will require a bottom landing at the entry sized to provide the required maneuvering clearances for accessibility in front of the doors and an accessible ramp. The ramp is restricted to a maximum slope of 1:12 so that the ramp length will be a minimum of six feet long. The maneuvering clearance at the door is typically a minimum of 5'-0" parallel to the door opening and 3'-6" to 5'-0" perpendicular to the door depending on the direction of approach to the door.

This raised floor has the undesired effect of further reducing the available clear height at the AICC and severely restricts viewing angles for the video wall. The orientation of the AICC room may need to be turned 180 degrees in order to place the taller clearance requirements of the video wall below and parallel to the higher ridge line clearance. Other variables are monitor size and the possibility of having duplicate monitors on more than one wall. Changing the orientation of the AICC also affects the relationship to the AEC and IT spaces. The concept as currently illustrated will undoubtedly change but is beyond the scope of this report; however, the BMB team feels that a solution can be achieved even though compromises may be required. Therefore, the cost assumptions and overall systems design assumptions included in this report have been based on the second floor conceptual plans that have been previously presented by Faith Group and Aviation.

V. MEP ASSESSMENT

A. MECHANICAL ASSESSMENT

A. ELECTRICAL

1. Emergency Power

The existing emergency power in the building consists of battery inverter units in selected 2' x 4' fluorescent parabolic fixtures and other lighting fixtures with integral battery inverter units for emergency illumination during a loss of normal power. The battery operated fixtures currently provide emergency illumination of the paths of egress in the building. It is recommended in accordance with the IACC facility repurposing to provide a diesel fueled emergency generator to serve essential equipment at the Integrated Control Center to include: 1) Control center equipment, 2) HVAC for AICC 3) Power receptacles for specific rooms, 4) Lighting in AICC, 5) IT equipment, 6) Elevator, 7) Kitchen equipment and lighting fixtures per NFPA 101 Life Safety Code throughout the building for emergency egress. A dedicated UPS is also proposed to serve the AICC workstations and IT Server room equipment at the 1st and 2nd floors. Refer to item 10 in this report with a further description of the proposed emergency power distribution system.

2. Fire Alarm System

An existing Fire alarm system in the building is proposed and recommended to be replaced and upgraded. New fire alarm system devices throughout the building will be required to be installed in accordance with the building reconfiguration for an Integrated Control Center. The latest NFPA 72 requirements for the fire alarm system will involve:

a) Manual pull stations at exit doors at first and second floors
b) Combination Audible-Visual notification and visual notification appliances located per NFPA 72 requirements and CoSA.
c) Fire Flow and tamper devices for the proposed Fire Sprinkler System.

d) Elevator first and alternate floor capture relays associated smoke detectors at elevator lobbies on each floor, Smoke and heat detector in the elevator equipment room.
e) Smoke detectors and heat detectors in locations throughout the building and specifically smoke detectors located below the raised floor, at the ceiling and above the ceiling in the Integrated Control Center.
f) Remote Annunciator Panel located in the main entrance to the building per the Airport Fire Marshall's approval.
g) New fire alarm system will require a Central Station monitoring per NFPA 72 requirements and also connection to the Airport Fire System for alerting Airport response personnel.

3. Direct Metered Service

The existing electrical service to Building 1840 is fed from a metered service and pad mount transformer with a secondary voltage of 208Y/120V, 3 ph, 4 wire, which is located at adjacent building 1845. Presently both Buildings 1840 and 1845 are metered from the single service. A Main Distribution Panelboard at Bldg. 1845 includes a 600 ampere circuit breaker and associated feeder which terminates at the Main Distribution panelboard at Bldg. 1840. The existing electrical distribution equipment at Bldg. 1845 is recommended to be removed and upgraded with new electrical equipment. CNG recommendation, per the project requirements, is to provide a separately metered electrical service. A new metered service involves disconnection of the existing feeder from Bldg. 1840's Main Distribution Panelboard. The building 1845 metered service would remain and only provide power to building 1845. A proposed metered service to repurposed Building 1840 involves the following proposed electrical work:

a) 300kVA pad mount transformer and associated meter by CPS Energy.
b) Underground electrical primary service conduits in a concrete encased ductbank from an existing primary power pole location adjacent to Building 1845. CPS Energy provides the primary cabling in ductbank. A primary easement will be required by CPS Energy.
c) Main Distribution Panelboard for power distribution to serve the elevator, IACC equipment, IT equipment and new electrical panelboards for the entire building.
d) Secondary service distribution consisting of underground electrical secondary feeders in a concrete encased ductbank to the proposed main distribution panelboard.
e) Service entrance grounding system per NEC requirements.

4. Interior Electrical System

The interior electrical power system will involve removal of all existing electrical branch circuits, wiring devices, fire alarm devices, telecommunications devices, disconnect switches, and all other electrical system components including electrical connections to HVAC and water heating equipment in the facility, which is scheduled to be replaced. Upon removal of all the existing electrical system wiring, devices and equipment, it is proposed that new electrical equipment and branch circuit wiring be provided. The following is a breakdown of components proposed for the building interior electrical system:

a) Energy efficient lighting fixtures throughout the building with associated lighting controls to satisfy the requirements of the Energy Code per CoSA adopted standards. Lighting fixtures shall consist of LED type lighting for Offices. All other areas with exception of the Conference and AICC room will be linear fluorescent recessed lighting fixtures. Lighting for paths of egress in the building will be connected to the emergency generator system.
b) Dimmable LED type energy efficient lighting to serve the AICC and Conference rooms at the 2nd floor. The conference room lighting will involve various types of fixtures: 1) Pendant mounted linear LED type over conference table, 2) Recessed LED type fixtures located around the perimeter of the room. The AICC and Conference rooms lighting will require connection to the Emergency generator system.
c) Branch circuits for proposed lighting throughout the building.
d) Branch circuits for proposed power including receptacles, office equipment and other associated loads in the facility.
e) Branch circuits for HVAC, Plumbing, and Fire Protection equipment.
f) Branch circuits for fire alarm system devices that require 120v power supply.
g) Branch circuits for special system devices that require 120v power supply. Special systems would encompass; 1) Security 2) Card Access 3) CCTV systems.

5. Interior Electrical Sub-System

The interior electrical power sub- system will involve removal of all existing electrical sub system panelboards, distribution panelboards, interior located main service equipment and all other electrical sub-system components in the facility, which is scheduled to be replaced. Upon removal of all the existing electrical sub-system components including associated wiring and equipment, it is proposed that new electrical sub-system equipment and feeders be provided. The following is a breakdown of components proposed for the building electrical sub-system:

a) Panelboards with surge protective devices for lighting and power loads at the first and second floors of the building. Dedicated electrical rooms are proposed for each floor.
b) Dry Type transformers stepping down the incoming service voltage of 480/277V, 3ph, 4 wire to the secondary voltage of 208Y/120V, 3ph, 4w for receptacle and equipment loads in the building including the IACC at the 2nd floor.
c) 480 volt, 3ph, 4 wire feeders to proposed Panelboard.
d) 480 volt, 3ph, 3 wire feeders to proposed dry type transformers.
e) 208 volt, 3ph, 4 wire feeders from transformer secondary to low voltage panelboards.
f) Branch circuit for the elevator with a main shunt trip device to the elevator power supply to initiate shut down per NFPA 72 and ANSI A17.1 Standards before a fire sprinkler operation.

g) An emergency power supply sub-system will incorporate emergency panelboards, associated feeders and distribution system, which is further defined in item 10 of this narrative report.

6. Exterior Lighting and Controls

Exterior lighting on the existing facility is to be removed and replaced with new energy efficient wall pack fixtures meeting the Energy Codes standards adopted by CoSA. Energy efficient exterior lighting mounted on the building is proposed. The exterior wall pack lighting will be proposed with a new lighting control panel with photocell and time switch for on-off operation. Exterior lighting will be turned on via the photocell and the time switch will turn off the exterior lighting and be turned off by the time switch with a setting for dusk.

Exterior lighting is also proposed for the existing parking lot lighting that is currently deficient. LED lamped energy efficient lighting for the parking lot area around Bldg. 1840 is proposed to be installed on 25 foot poles set on new concrete footings. The site lighting is recommended to be designed to satisfy requirements for the proposed CCTV system for security. Underground branch circuits shall be provided and extend to the lighting panelboard via the proposed exterior lighting control panel. Multiple branch circuits for site lighting are recommended. Each branch circuit will be placed on a separate phase on the electrical system to reduce the impact of the failure of a circuit. The exterior parking lot lighting can be placed on an emergency generator branch circuit to alleviate loss of normal power for site lighting.

7. In-Floor Power Supply

The proposed 2nd floor Conference Room, AICC space and IT rooms are to be provided with a raised floor which will allow multi-outlet floor boxes to be installed below the raised floor. The multi-outlet receptacles can be installed below each workstation to serve the computers, monitors and associated equipment at each workstation. Multi-outlet floor boxes and associated conduit and wiring will be routed below the accessible raised floor.

8. Power for ADA Gate 263

The proposed gate will be provided with dedicated emergency power supply. Empty conduits for communication cabling if required will be provided to connect to Building 1840 at the 2nd Floor IT equipment room. A voltage drop calculation will be computed to determine the correct wiring size for the branch circuit conductors due to the location of the proposed vehicle and personnel entry gate.

9. New Electrical Service

The proposed 480Y/277 Volt, 3ph, 4 wire service for the building, as outlined in item #3 in this narrative report, will provide a separate meter and electrical service for the building. An Emergency power system will also be provided to supply electrical power for the entire facility during a loss of normal CPS Energy power supply. The Emergency Power system description and detail is addressed in item #10 of this narrative report.

The proposed electrical service for the building will require extension of the existing primary power on the site (located to the north of the building 1840 and west of the northwest corner

of building 1845. Primary power will be extended in an underground ductbank with primary service cabling provided by CPS Energy. The primary will extend via a concrete encased ductbank routed through the existing parking lot and terminate at the radial feed CPS Energy pad mount transformer. A recorded CPS primary 10 width foot easement along the ductbank routing will need to be recorded and added to the property plat document. CPS Energy requires the easement along the underground primary and will also encompass approximately 3 feet all around the pad mounted transformer.

The pad mounted transformer mounted on an 8' x 10' concrete slab will be provided to comply with 2012 CPSE Standards. Current transformers will be provided in the secondary compartment of the pad mount transformer. An empty 2" pvc conduit for metering cables by CPS Energy will be provided and extend to the Meter enclosure. The pad mount transformer location is to be located per CPS Energy standards with a 3 foot clearance on all sides except the front of the transformer which requires a 6 foot clearance for access to the primary compartment of the transformer. Secondary conduits and conductors will be extended from the secondary of the transformer to a Main Distribution Panelboard located at the first floor main electrical room. The Main Distribution Panelboard will be provided with a surge protective device per IEEE recommendations for transient line and voltage surges in the electrical system.

10. Emergency Power Requirements

A proposed 300kW/375 kva standby rated diesel fueled generator with a 24 hour fuel supply double wall tank will provide emergency power supply for the entire building 1840.

The diesel fueled generator is sized for supplying power to the AICC equipment, lighting, elevator, IT equipment, and UPS equipment that is downstream of the emergency power system. The emergency generator system will be rated for the 480Y/277V, 3ph, 4 wire service. Two (2) Automatic transfer switches will be provided to transfer from normal CPS Energy power to the Emergency Generator power system. An Emergency Power Distribution Panelboard will be located in the first floor electrical room for the feeder from the emergency generator. The Emergency Power Distribution Panelboard will be provided with an electrical kirk-key interlock to connect a portable generator set as a redundancy to the permanent emergency generator. The Emergency Distribution Panelboard will feed emergency power to the Automatic Transfer Switches. The Automatic Transfer Switches will include bypass isolation switches integral for maintenance and servicing. The Emergency Distribution Panelboard will include circuit breakers to feed a Building Emergency Power Panelboard distributing power to 480/277V panelboards for equipment and lighting loads. The 208Y/120V, 3 ph, 4 wire loads will be served from panelboards that are connected to dry type transformers to step down from the 480Y/277 higher voltage to low voltage for receptacle, office equipment loads and other HVAC equipment in the building. An 80 kW UPS with a 208Y/120V, 3ph, 4 wire output will be provided for the 2nd floor to serve the following equipment:

a) AICC workstations on dedicated branch circuits for computers, monitors and printers.
b) IT/Communication server racks in the IT rooms on 1st and 2nd floors.
c) Air Conditioning Data/IT Room cooling system equipment.
d) PC and video wall in the AICC raised floor room.
e) Any other equipment necessary and pertinent to backup during a power outage.

11. Power for Telecommunications Systems

Low voltage power for the proposed telecommunications equipment will serve the following:

a) IT Server Rooms – IT equipment server racks with double cord power supply for redundancy.
b) Video Wall in the AICC room
c) Computers, Access Control and CCTV equipment
d) Computer at Workstations
e) Telecommunication phone system equipment at
f) Radio transmitting equipment for airport wide communications

The above equipment will be served from branch circuits connected to the UPS system. The UPS equipment panelboards will include surge protective devices and have a line voltage filter at the UPS equipment for true sine wave non distortion power supply.

B. MECHANICAL ASSESSMENT

1. HVAC System

a) Buildings

(1) A detailed assessment of the Building's existing HVAC systems can be found in the Phase I Assessment issued May 8, 2015. The purpose of this report is to provide an assessment of the proposed modifications to the mechanical systems as they relate to the renovation for the new AICC space and surrounding space plan changes.

(2) Based on preliminary programming of the 20,000 SF building, the estimated AICC renovation requires a nominal capacity of 60 Tons of cooling with an additional cooling capacity of 15 tons for IT designated equipment spaces. No future expansion of the building is anticipated.

b) Demolition

1) The existing HVAC systems are in poor condition and have exceeded their expected useful life, thus there is no HVAC equipment that would be suitable for re-use. All equipment and associated components shall be removed.

c) Systems

1) The proposed HVAC system is a cooling/heating variable refrigerant volume/flow (VRV/F) system. This system is a variable capacity, heat recovery, three pipe (liquid, suction, high/low pressure gas) refrigerant system with ground mounted, air-cooled condensing units, multiple indoor fan coil units, and branch selector boxes. The VRF system is a high efficiency system capable of simultaneous heating and cooling. Indoor fan-coil units would typically be of the concealed type for use with ducted air distribution systems. The maximum capacity of a single VRF system will be 20 Tons. Where possible, each system will serve zones with dissimilar load profiles to maximize heat transfer/recovery between zones during partial load periods to increase system efficiency. The AICC will require an independent system with zoning appropriate to provide independent thermostat control for multiple zones. Indoor fan coil units will be provided with pre-treated outside air to meet required ventilation rates, offset the required toilet room exhaust and maintain a positive building envelope pressure to the exterior. Ducted conditioned (55 degree F) air will be continuously provided from horizontal configuration (Aaon Manufacturer or equivalent) DX Split Systems with hot gas bypass and electric resistance heat to the indoor units. The outside air unit(s) will be located within the ceiling plenum and the outdoor unit will be ground mounted. The Building systems will require to be modeled to refine the heating and cooling load required. The existing structure should be evaluated to confirm structural reinforcement for the indoor units will not be required.

2) A new exhaust systems will be required to exhaust from restrooms, showers, and custodial closets. Exhaust will be routed through exterior wall louvered openings via galvanized sheet metal ductwork, eliminating the need for roof penetrations. Air shall be exhausted from toilet rooms, showers. janitors' closets, etc. at minimum amounts as prescribed in applicable codes. Balancing and control dampers of the exhaust system shall fail open in event of failure. Kitchen exhaust hoods shall be provided at cooking equipment, as required. Exhaust hood makeup air shall be provided from transfer air in the adjacent spaces.

3) IDF Rooms, the Elevator Equipment Room, and the UPS Room will require cooling only wall-mounted, dedicated 24 hours operational ductless split DX systems, sized to accommodate the equipment load density. Further cooling equipment redundancy will be provided where required. Outdoor condensing units will be ground mounted. See below for the Main IDF Room System requirements.

4) The air distribution systems shall be galvanized sheet metal of minimum R-6 inch external insulation. Sealing, reinforcing, and supporting should be according to SMACNA standards. Air devices shall be aluminum with factory finishes to match architectural finish requirements. Distribution systems will be designed to not exceed a maximum noise level of NC25.

d) Redundant Systems

1) The main IDF will require two (2) dedicated cooling only 24 hours operational CRAC units with under floor air distribution. The CRAC units should be Liebert type, R-407C refrigerant, direct expansion, dual refrigerant circuit, unit with two (2) scroll-type variable capacity compressors, integral humidifier, electric reheat section, 4" MERV 8 filters and condensate pump, or equivalent. System cooling capacity will be based on equipment connected, building envelope load, and an ambient condition of 115 degrees F. Manufacturer's controls shall be provided with networking capability to communicate through the owner's controls interface. The indoor unit will be floor mounted with a down-flow bottom air supply and front return. The approximate weight of each new indoor unit is 2250 lbs. The existing structure should be evaluated to confirm structural reinforcement for the unit will not be required. The outdoor unit will be located at grade, approximately 14 feet below the 2nd floor. The equipment will be installed on a reinforced concrete structural pad. Refrigerant piping will route from the outdoor unit, through the exterior wall, up within the main mechanical rooms on each level of the building, to the indoor unit.

e) Building Management System

1) The Office building should be provided with a micro-processor based direct digital control (DDC) building automation/energy management system. This system should provide energy management controls and monitoring in all spaces. The DDC system should be on the emergency power system. A personal computer shall be provided as an operator interface. The PC will store record data, provide analysis and reporting functions, and act as a graphical user interface with the networked controllers. A high level of control and functionality should be provided by an integrated building control system. The monitoring of the complete system is anticipated by the centralized facility management system providing graphical displays and analysis tools, centralized alarm reporting, real time status and custom reports, automatic system-wide emergency responses and maximized energy savings. Network communications requirements will be coordinated with the SAT Airport Facilities Management Department. The Building Automation System should utilize distributed processing for speed, stability, and system reliability. The distributed controllers will be networked to share information.

2) Consideration should be made for a system controller that is provided by the VRF equipment manufacturer, in lieu of a third party controls system.

C. PLUMBING ASSESSMENT

1. Existing Site Utilities

The existing domestic water and sanitary sewer are expected to be adequate to serve fixtures associated with the new space plan. Natural gas piping will be modified within the building to accommodate a new gas-fired domestic water heater. Natural gas

demand for the building will significantly decrease from the existing, as HVAC equipment will utilize electric resistance heat or heat pumps.

The addition of a new elevator will require a sump pit. The elevator sump pump discharge systems will be in compliance with the Texas department of Regulations and the City of Austin, TX. The elevator is anticipated to be hydraulic type and will require a hydraulic fluid interceptor.

2. Fire Protection

The Building will be provided with a new wet pipe fire sprinkler system for the building interior. The requirement of a fire pump an jockey pump system will be dependent on the fire flow test results. Fire protection pump is not anticipated. The plumbing designer will coordinate the water connection points 5 feet outside the building with the civil engineer. A backflow preventer will be provided at each building service entrance. The service to the building is expected to be (1) 6 inch fire protection line that enters the building within a new dedicated fire riser room.

An FM-200 total flooding fire suppression system complete with automatic detection and control shall be provided for the Main IDF Room on the 2nd floor. The system shall be provided with a 100% redundant gas storage system with manual transfer controls, countdown timer, and abort button. The design, equipment, installation, testing and maintenance of the FM-200 suppression system shall be in accordance with the applicable requirements set forth in the latest edition of applicable NFPA and all local codes, standards, and requirements. Connection shall be provided to local or remote fire alarm systems or listed central alarm station(s) The Main IDF room shall be constructed air tight to allow for appropriate room pressurization for the FM-200 system operation.

The AICC/AEC and non-critical IDF rooms shall be provided with a pre-action fire suppression system off of the main building wet-pipe suppression system. Where appropriate, sidewall type pre-action sprinkler heads will be provided to reduce potential for false activation of heads.

3. Plenum Piping

Existing PVC sanitary and waste vent piping shall remain, when not installed within a return air plenum. The proposed new HVAC systems are expected to be fully ducted supply and return. Therefore, existing PVC piping associated with plumbing fixtures that are to remain is not expected to be modified for code compliancy.

4. Water Heater

A new gas-fired, high efficiency, commercial grade, storage type water heater will generate hot water which will be distributed and serve all lavatories, kitchen equipment, restrooms, showers, and mop sinks in the Janitor closets. The entire building shall be served by a domestic hot water recirculation system generating in the 1st floor water heater room.

5. IT Room Needs

The new CRAC unit humidifiers will require a 1/2" domestic cold water line. Extension of cold water from the nearest adequately sized cold water line within the vicinity of the 2nd floor Main IDF will be made.

Existing plumbing located over IDF and Electrical rooms will be rerouted to avoid piping routing over IDF/Electrical spaces. New Fire protection piping and plumbing piping will not route above IDF/Electrical spaces.

6. Proposed Shower

Demolition of existing plumbing fixtures and associated component shall occur in areas of renovation. Where not required, piping will be removed and capped back to the nearest active branch take-off previously serving fixtures to be removed. Based on the quantity, type, and location of new fixtures in areas of renovation, the existing plumbing systems appear to be adequate to accommodate the plumbing modifications, including the proposed new showers.

VI. COMMUNICATION SYSTEM ASSESSMENT

The communication system assessment for Building 1840 was reviewed and developed. This communication system assessment included a budgeting effort and development of an overall communications design baseline. The design baseline development included coordination with ITSD communications infrastructure stakeholders, Airside Planning outside plant (OSP) infrastructure plans (URS Corporation), AICC Facility Recommendations (Faith Group), and the overall AICC project team. Along with these key coordination inputs, the AICC communications design baseline was also developed based on Phase I Building 1840 initial communications assessment.

The communications systems strategic design framework is summarized below by each communications element. These design assumptions serve as the basis for the budget estimate for the communications portion of the new AICC in Building 1840 and for the design phase. This section does not included technology and infrastructure elements specific to the control center (refer to Section VII for these 'special' communication system elements).

A. OSP PATHWAY AND NODE

The AICC will require outside plant (OSP) communications pathway to allow for reliable connectivity to the various supporting systems located in Terminal buildings and downtown. In the assessment process alternate pathway approaches, including aerial cables and wireless, were considered. However, because of the critical operational nature of this facility, aerial and/or wireless solutions are not recommended for the AICC except in the case of unavoidable schedule demands or as an interim secondary solution. The baseline design assumption is for underground duct bank as an extension from Airside Planning inner ring. The design assumption includes both a primary and secondary duct bank (physically separate pathways). The primary OSP pathway for the AICC assumes the Airside Planning inner ring completed from the ARFF Node up to the Engine Run Up area. The secondary OSP pathway for the AICC will be dependent on the

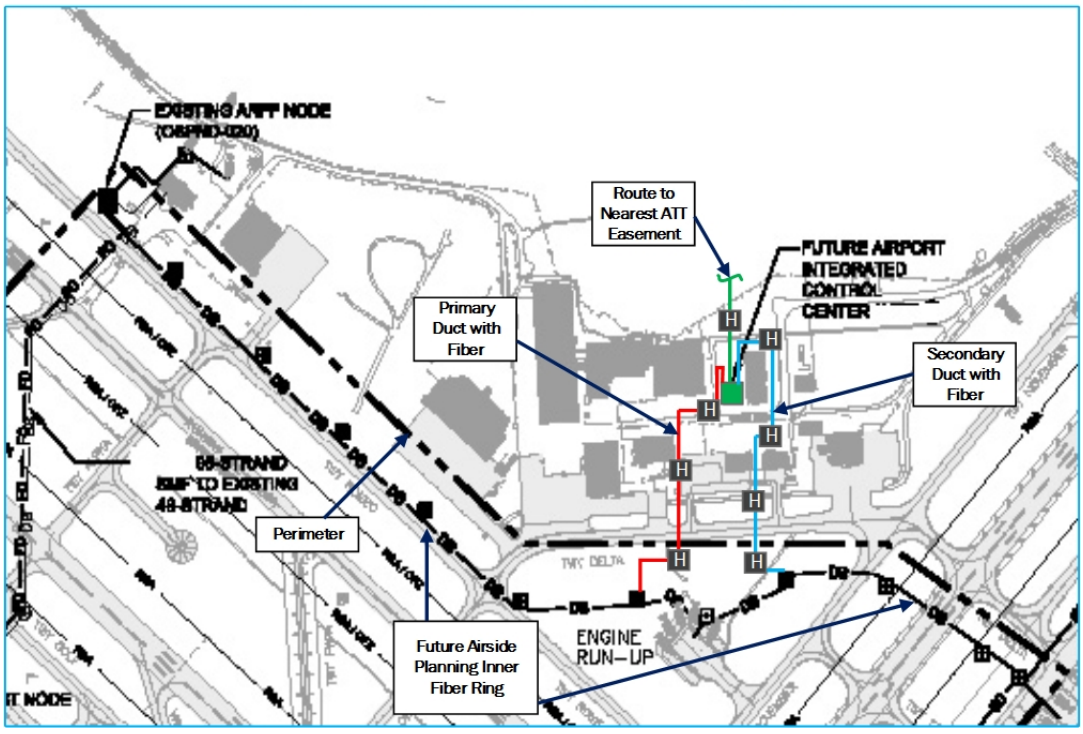
completion of overall Airside Planning inner ring to the new East Node and back to the Terminals. As a critical operational facility, this secondary pathway is strongly recommended for the AICC, though its implementation can potentially be completed in a later phase of implementation if required.

The AICC OSP communications pathway is planned to include a minimum of 4'x4'x4' hand holds installed no greater than 500' apart. The duct is assumed to be a minimum of two 4" conduits populated with Maxcell (or equivalent) inner duct. Routing will be determined during design; portions of the duct bank will require directional boring to avoid disturbing taxiways and roadways. Potential intercept point with the Airside inner ring is at hand holds near engine run up area (refer to OSP site plan conceptual diagram on the following page).

Regarding an OSP Node, the AICC project is not including a requirement for an OSP Node. The only consideration moving forward for an AICC OSP Node would be due to space limitations in Building 1840. Currently, it appears Building 1840 has sufficient space to accommodate the communications requirements within the facility. This would be revisited if required as the design develops further.

Comm Infrastructure Site Concept

Drawing is for illustrative purposes only. Routing elements TBD during design.



B. ATT DEMARCATION PLAN

The AICC will require public services to support the facility. Currently, there is a limited public services demarcation point in the adjacent building to Building 1840. However, this demarcation is in a leased facility outside of ITSD's direct control. It is recommended that Building 1840 be

provided with a separate public services demarcation. In the future, this ITSD-controlled public services demarcation could be used to service other leased facilities.

The public services demarcation will require duct bank (or other pathway) from the AICC building to the nearest ATT easement (refer to above diagram). This design work will need to be coordinated with ATT. In addition to the OSP pathway, a demarcation room will be built out in Building 1840. This room is estimated at approximately 8' x 8' for conceptual purposes. This demarc room will be separate but adjacent (or below) the Primary IDF / BDF room. The demarc room will include ATT connectivity, termination racks and blocks, in room routing cable tray, and telecomm grounding.

C. FIBER INFRASTRUCTURE

The AICC will require fiber optic connectivity both externally back to the Terminal buildings and internally in the building between communications rooms. Currently, the Airside Planning project has a 96-strand single mode (SM) fiber planned from the existing ARFF Node to the new East Node and back to the Terminals. The Airside Planning project designates 12-strands for AICC connectivity. Because of the potential of adding a third core network to the AICC, there will be an increased need for fiber cabling to the AICC. As a minimum to support the AICC, an additional 48-strand SM fiber from the ARFF node to the AICC is included in the AICC concept. This additional fiber would be to support switch routing to this third network core. Additionally, this fiber run would allow the AICC to become initially operational independent of the completion of the Airside Planning inner ring fiber installation. OSP fiber from the inner ring will terminate in the Primary IDF / BDF room.

Initially, for secondary pathway to the AICC, the 12-strand fiber provided by the Airside Planning project is sufficient. In the future a 48-strand SM fiber may be routed onward from the AICC via the new East Node and back to the Terminals to add additional strategic flexibility to the AICC facility.

In addition to the ring fiber connectivity, the AICC will also require fiber connection to ATT. This fiber run will be via the pathway provided to the ATT easement. ATT will design and install this fiber run, but the cost of this work is budgeted under this design concept. This ATT fiber will terminate in the Public Services Demarc Room within the AICC.

Within the AICC, fiber will be run between the Primary IDF / BDF and the Secondary IDF. In keeping with ITSD guidelines and standardization, this fiber will be SM and not multi-mode (MM). The installed fiber will be either 24-strand or 48-strand SM fiber.

D. NETWORK PLAN

The network concept for the AICC includes both a network core and access level network switches. Stacked 48-port PoE (power over Ethernet) access layer switches will be installed in both of the IDF rooms in the AICC. The network stack in each IDF will include 10Gbps redundant optics for connectivity back to the network core switches. The access layer switch type will be designed in keeping with ITSD network standards and requirements at the time of design. These access layer

switches will serve as network connection points for PCs, VoIP handsets, servers, and other Ethernet devices. The Primary IDF will also include a voice gateway to reduce copper connectivity requirements for the AICC.

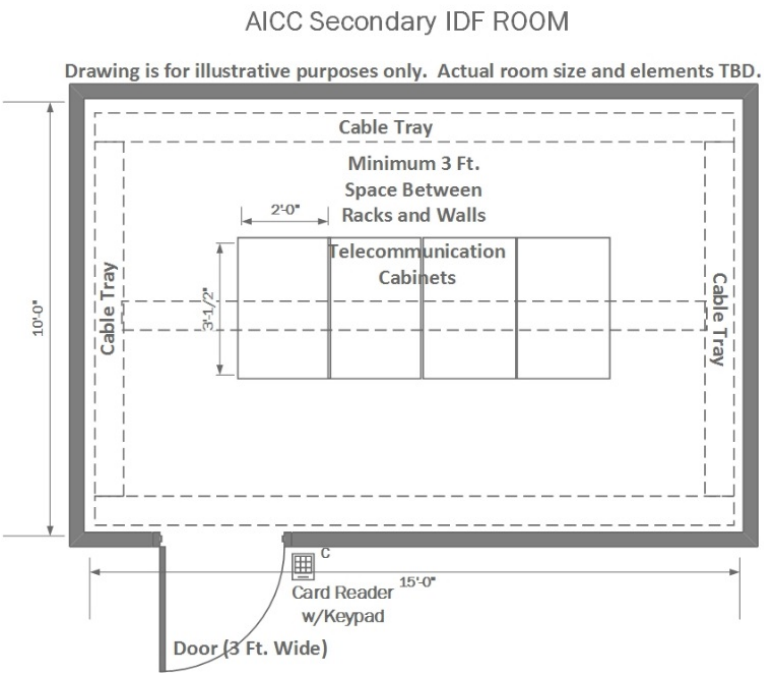
In addition to the access layer network equipment, a redundant Network Core switch pair will be implemented in the AICC. This will be third network core location at the Airport (in addition to Terminal A BDF and Terminal B MDF). This will serve as the network core connection point for the AICC access layer switches. This AICC network core will also be expandable to serve as a strategic network growth point at SAT. The AICC building will have a significant video bandwidth signature due to the number of client viewing workstations at this location. Placing a third network core at the AICC will allow for improvement management of video traffic. Additionally, the AICC network core is important for the implementation of a Video Management System (VMS) node at the AICC (refer to item J. Video Surveillance System below). The AICC network core switch pair and interconnections will be specified and developed per ITSD requirements and guidance during the design phase.

E. TECHNOLOGY ROOMS

Beyond the Public Service Demarc room described previously, the AICC will include two communications rooms. The AICC Building will have a Primary IDF room (also referred to herein as a BDF room) that will serve as the primary communications room for the AICC building and for the control center itself. The other communications room will be the Secondary IDF that will service the remainder of the AICC building based on cabling distance limitations.

The Secondary IDF will most likely be located on the first floor of the AICC and with some separation from the Primary IDF. The separation is intended to help ensure that cable routing distances for data outlets are limited. The base concept for the Secondary IDF includes 10'x15' room size, overhead in-room cable tray, four cabinets with minimum 3’ front and back clearance, telecommunications grounding, backboard on walls, and one rack mounted UPS.

Addressed under MEP design, the Secondary IDF will include pre-action fire suppression, HVAC to maintain humidity and temperature, and electrical on emergency backup. The diagram below provides a high level concept for the Secondary IDF.



In addition to the Secondary IDF, a Primary IDF room will be provided. The Primary IDF was conceptually developed based on two concepts. The first concept is for the Primary IDF with minimal strategic flexibility. The second concept for the Primary IDF is as a larger room serving as a limited BDF. The limited BDF is the recommended approach as it provides a significant improvement in flexibility for the AICC facility as a strategic communications point. Additionally it allows for implementation of more resilient solutions including room wide UPS, third network core, and a VMS node that are more in keeping with the AICC as a critical operational facility.

Elements of the Primary IDF / BDF include:

- OSP fiber terminations and crossconnects will be in the Primary IDF / BDF
- The room will serve as the termination point for the control center horizontal cable runs (end device copper cable)
- The room is planned to be located on the second floor, above or adjacent to the Public Services Demarc room
- The base requirement for the Primary IDF is 12'x17' room
- The base Primary IDF will include overhead cable tray, six cabinets, telecommunications grounding, wall backboard, redundant rack mounted UPS, and 6’ wide double door opening outward
- The recommended BDF concept is planned for an additional 60 sqft for a total of 12’x22’
- The recommended BDF concept will include additional cable tray, 3 additional cabinets, a room-wide UPS in place of rack mounted UPS, and a FM-200 or equivalent fire suppression system

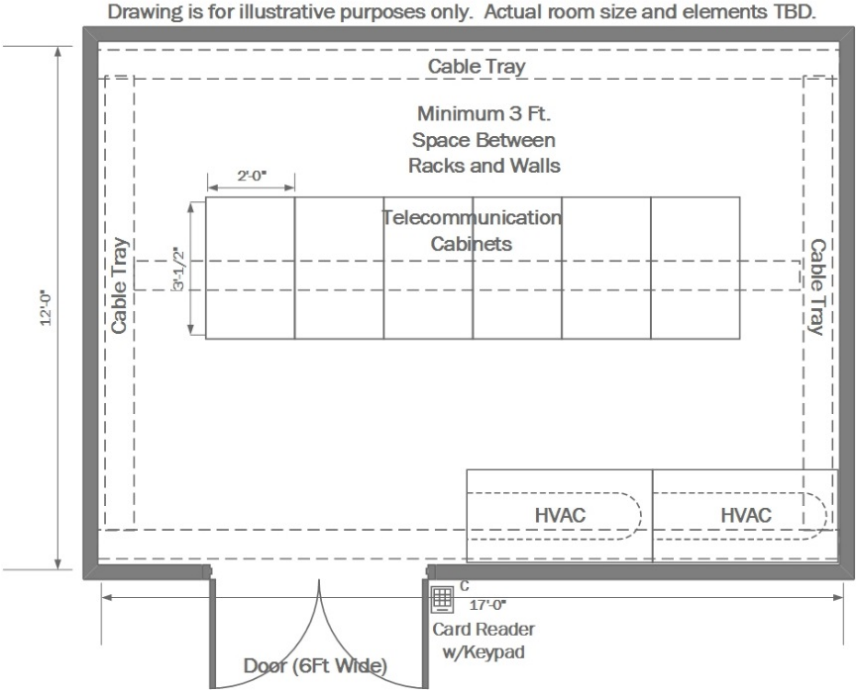
- The Primary IDF / BDF room will require emergency backup power and a redundant HVAC approach.

The diagrams on the following page show the concept for the Primary IDF and the enlarged limited BDF version. The design intention is to proceed forward with the BDF version of the primary communications room.

Primary IDF / BDF Room Concepts are shown below.

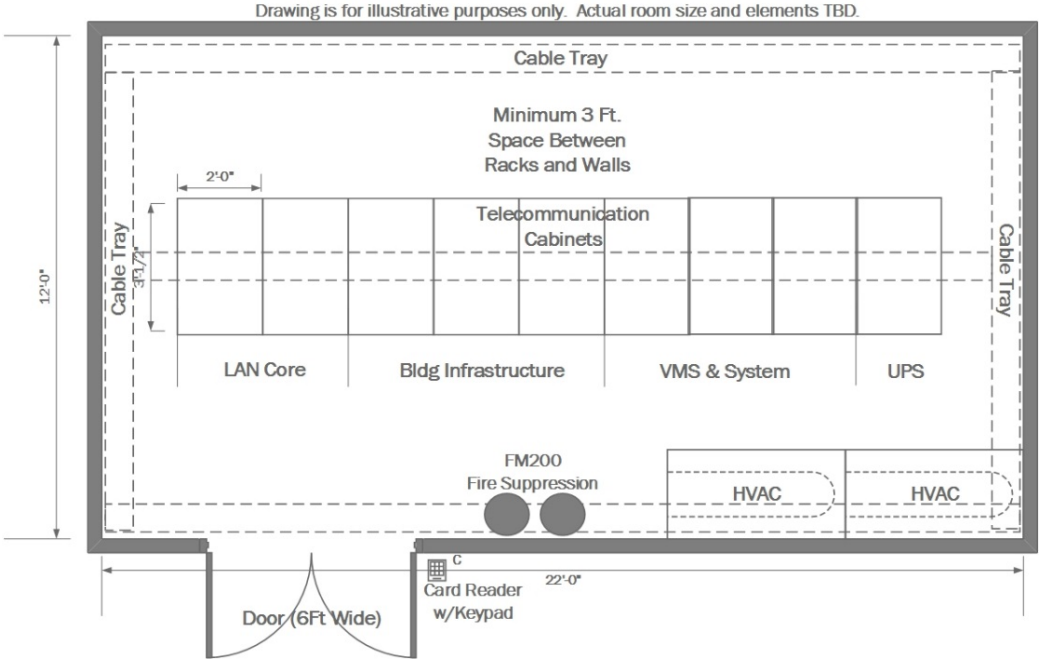
AICC Primary IDF ROOM

Drawing is for illustrative purposes only. Actual room size and elements TBD.



AICC Primary BDF ROOM (Enlarged - Recommended)

Drawing is for illustrative purposes only. Actual room size and elements TBD.



F. ISP BACKBONE

Within the AICC Building, inside plant (ISP) backbone conduits will be required. These will include pathway to interconnect the IDF and BDF rooms. This pathway is conceptually planned as three 4" conduits with Maxcell inner duct installed. These conduits will be used for fiber optic cabling, copper backbone cabling, for future interconnecting cabling as required. Additionally two 1" conduits are planned for extension of cable service and for routing of telecommunications grounding cable.

Conduit will be routed from outside the building into both the Public Services Demarc room and into the BDF. The route to the Public Services Demarc room will service ATT fiber into the AICC. The pathway to the BDF will service the OSP fiber from both the Airside Planning program and additional OSP fiber to the ARFF Node. Depending on the final location of the Demarc room and the BDF, backbone conduit will or sleeves will be routed between the two rooms.

G. HORIZONTAL PATHWAY AND CABLING

Within the AICC, end device data drops will route back to the assigned IDF room for network connectivity. These horizontal cabling runs (i.e., copper cable runs) will include pathway, data outlets, and RJ45 patch panel termination in the assigned IDF. Copper cabling, patch cables, labeling, and elements will be developed in accordance with the ITSD Infrastructure Guidelines. CAT6 UTP cable will be used for horizontal runs for both data, voice, and video.

Horizontal pathway will include the following modes:

- cable tray under the raised floor in the control center
- in-ceiling horizontal cable tray were practical (note that this horizontal cable tray may also serve as a portion of the backbone pathway)
- 1" stub up conduit to nearest in-ceiling cable tray

J-hook installation will be avoided were practical. All existing communications cabling and elements in Building 1840 will be removed as part of the project work.

H. PUBLIC ADDRESS SYSTEM

The Airport's IED overhead paging system will be extended to AICC Building from Terminal B's digital paging head end. The control center will be equipped with paging microphones for full paging functionality. The AICC will be added as an additional paging zone to the Terminal B head end. Overhead paging speakers will be wired and installed in AICC Building. A layer-2 paging network switch will be installed in the AICC BDF. Additionally, a digital amplifier may also be installed in the AICC BDF.

In addition to the Public Address System, additional systems services will be provided in the AICC Building as required. These include wireless access points (APs) and VoIP handsets as identified.

I. ACCESS CONTROL SYSTEM

The AICC Building will be equipped with access control doors to manage levels of security within the building. Access control will be included on external doors as well as required internal doors within the AICC Building. These access control doors will vary based on location and need. Access door elements may include electronic strike, emergency exit push bar, request-to-exit push button and/or motion exit, and contactless card readers on one or both sides. The access doors will be wired back to the assigned IDF room. The communications room will house the security control panel(s) with tamper switch.

The access control for the AICC will be an extension of the existing Identiv Velocity system at the Airport. The new access control doors will be added and managed within the Identiv system.

J. VIDEO SURVEILLANCE SYSTEM

The Airport's Genetec video surveillance system will be extended to support the AICC Building. The AICC will include both external and internal video cameras. The majority of these cameras will be fixed cameras, with additional pan tilt zoom (PTZ) cameras provided as required. Cameras will be IP-based cameras specified in compliance with location application and Airport and ITSD guidelines. Outdoor cameras will be equipped with required environmental protective elements. Any special application cameras including thermal or explosive resistant will be addressed during the design phase. For design concept cameras are assumed to record continuously for 24-hours a day, at 15 frames per second (fps), and stored for 30-days.

To support the AICC cameras and overall strategic requirements of the Airport, a video management system (VMS) head end is planned for the AICC Building. The VMS head end will be implemented in the AICC BDF. The AICC VMS head end will include archive servers and a video storage configuration. The AICC VMS head end will be based on Genetec Security Center 5.3. The design of the AICC VMS head end will need to be done in close conjunction with the VMS head end replacement in Terminal A and Terminal B and with ITSD. The Term A and B replacement work is currently assumed to completed under the Airside Program.

K. TSA OTA COORDINATION

Meetings were conducted with the Airside Planning program team. The TSA OTA grant work is included under the Airside Planning effort. The Airside Planning Report – Final, dated March 13, 2015, was reviewed as part of the conceptual planning for the AICC Building. The Airside Report addresses airside OSP duct bank and fiber, wireless connectivity, and security camera elements. The project lead for this work is URS Corporation. Close coordination will be required with URS during the AICC design development. The design phase for the Airside Program will be initiating most likely no later than August 2015 and prior to the AICC design phase.

There will be three fundamental coordination points that the AICC project will have with the Airside Program:

- Inner ring duct bank development from ARFF Node up to the new East Node
- 96-strand fiber design and installation in the inner fiber ring
- VMS head-end replacement in Terminal A and B

L. ITSD DESIGN STANDARDS

As part of the conceptual communications planning, the City of San Antonio's Structured Cabling Infrastructure Guidelines document was reviewed. This document will continue to serve as a key source of design guidance during the AICC design development.

The Infrastructure Guidelines includes communications design guidance such as the follow examples:

- MDF [BDF] may share space with other systems except fire alarm and building control panels
- MDF [BDF] must be serviced by dedicated [HVAC] unit that is part of the building main system
- [OSP Fiber] - provide 10ft service loop at both ends of each cable stored on the wall above or below cable runway, 20 foot service loop in each manhole or pull box
- All fiber terminations will be fusion spliced to factory provided "pig-tail" LC terminated cables
- Horizontal data cabling will be CAT 6 UTP plenum rated installed … to IDF with 10ft service loops. Terminated with T568B sequence.
- CAT 6 copper patch cables:
    - Workstations – Black
    - Audio / Visual – Violet/Purple
    - Wireless – White
    - IP Camera – Red
- All labeling shall be typed not written

VII. SPECIALIZED AICC/AEC COMMUNICATION SYSTEM ASSESSMENT

Faith Group, LLC prepared a separate report. This report is in **Appendix A**.

VIII. ENVIRONMENTAL ASSESSMENT

Medina Consulting Company, Inc. performed a Limited Asbestos Survey for Building 1840. The floor tiles and mastic does contain regulated ACM. The full report can be found in **Appendix B**.

IX. SAFETY RISK ASSESSMENT FINDINGS

- Life Safety Code
  - Sprinkler System – Providing wet and dry system
  - Fire Extinguishers – included in cost
- Severe weather
  - Shelter in place
    - Evaluate spaces for shelter – used checklist from Metropolitan Emergency Managers' Association to determine best space for shelter in place. The best location is on the first floor in the small Training room by the IT room, in the interior of the building.
- AICC/AEC continuous operation
  - Reinforce area on first floor
  - Provide redundant AICC function in shelter (1st floor only)
- Lightning protection for building – included in cost

- Public parking and street crossing paths
  - Handicap parking – included in cost
  - Lights for crosswalk – included in cost
- Building elevator accessibility – included in cost
- Emergency Generator
  - Location and Routine power up – locate at the back of building, included in the cost
  - Essential Systems Power – Identified and included in cost

See **Appendix C** for Workshop Presentation and Checklist for determining severe weather shelter areas in building

X. ENGINEER'S ESTIMATE OF PROBABLE COST

On July 7, 2015, Faith Group, LLC and Bain Medina Bain made a presentation at the Executive meeting. The estimate of probable cost for repurposing Building 1840 was presented. The cost presented was $13.5 million.

During the meeting, the discussion progressed and the project delivery method changed from an assumed Design-Bid-Build project to a CM at Risk and would be managed by TCI and the budget should be $15 million.

The cost summary was revised to show hard and soft costs and show the additional management and contingency cost bringing the budget to $15 million. The revised summary of cost follows:

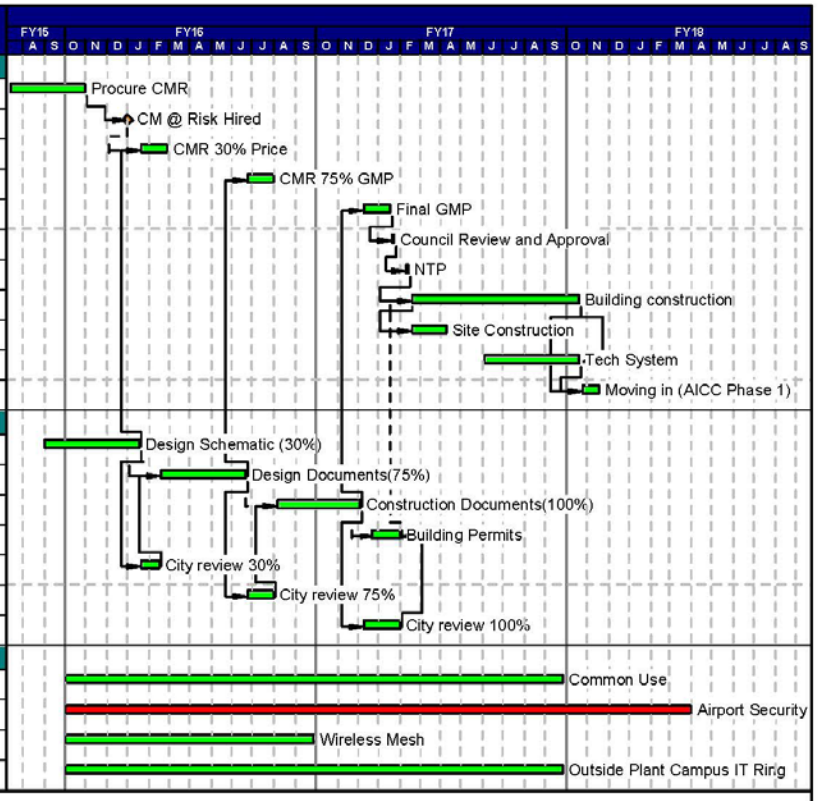
Building 1840 Repurpose Opinion of Probable cost			
July 7, 2015- Executive Meeting Recap			
Items	Budget costs	Hard Costs	Soft Costs
AICC/AEC	$ 4,125,000	$ 3,178,400	$ 121,600
Comm Infrastructure	$ 3,432,500	$ 2,746,000	
Civil/Site Work	$ 460,700	$ 300,300	
Architectural Core, Shell & Finish	$ 982,800	$ 650,600	
MEP	$ 2,176,400	$ 1,892,600	
Shelter-in-place**	$ 50,000	$ 35,000	
Furniture Fixture and Equipment*	$ 250,000		$ 250,000
Contingency (25-26%)		$ 2,302,900	
Programming (8%)	$ 918,000		$ 918,000
Design (10%)	$ 1,147,600		$ 1,147,600
Construction(3-5%)	$ 460,000		$ 460,000
TCI Management(3-5%)	$ 460,000		$ 460,000
CMR Contingency	$ 537,000		$ 537,000
Total Budget Costs	**$ 15,000,000**	**$ 11,105,800**	**$ 3,894,200**
total sq footage		**20333**	
Cost/ sq ft		$ 546.20	
* Cost provided by Airport based on quotes			
** Cost of CMU walls around restrooms and dispatch training room on first floor only			

SEE **APPENDIX D** FOR JULY 7, 2015 EXECUTIVE PRESENTATION AND ORIGINAL COST BREAKDOWN

XI. SCHEDULE

A conference call was conducted with Debbie Drew, Ryan Rocha, Faith Varwig, Heath Kolman, and Lori Dullnig-Warlen and discussed the CIP projects that are planned for the future and have a direct impact on the implementation of the AICC and AEC. A conceptual schedule was prepared. This conceptual project schedule includes the procurement of a construction manager at risk. See Schedule that follows:

Description	Orig Dur	Early Start	Early Finish
CM@ Risk			
Procure CMR	80d	14JUL15	02NOV15
CM @ Risk Hired	0	30DEC15	
CMR 30% Price	30d	21JAN16	02MAR16
CMR 75% GMP	30d	23JUN16	04AUG16
Final GMP	30d	09DEC16	19JAN17
Council Review and Approval	5d	20JAN17	26JAN17
NTP	5d	10FEB17	16FEB17
Building construction	176d	17FEB17	23OCT17
Site Construction	40d	17FEB17	13APR17
Tech System	100d	05JUN17	23OCT17
Moving in (AICC Phase 1)	20d	24OCT17	20NOV17
Design			
Design Schematic (30%)	100d	01SEP15 *	20JAN16
Design Documents(75%)	90d	18FEB16	22JUN16
Construction Documents(100%)	90d	05AUG16	08DEC16
Building Permits	30d	23DEC16	02FEB17
City review 30%	20d	21JAN16	17FEB16
City review 75%	30d	23JUN16	04AUG16
City review 100%	40d	09DEC16	02FEB17
Other CIP projects associated to project			
Common Use	518d	01OCT15 *	29SEP17
Airport Security Plan Implementation	46d7h	01OCT15 *	02APR18
Wireless Mesh	259d	01OCT15 *	30SEP16
Outside Plant Campus IT Ring	518d	01OCT15 *	29SEP17



Start date	14JUL15
Finish date	02APR18
Data date	14JUL15
Run date	24AUG15
Page number	1A
© Primavera Systems, Inc.	

SAT Airport System
DRAFT B1840 Programming Schedule
Bain Medina Bain

Early bar
Progress bar
Critical bar
Summary bar
Start milestone point
Finish milestone point

XII. CONCLUSION

In Conclusion, Building 1840 assessment found that repurposing the building into the Airport Operation and Administration Building is feasible. The building can provide a space to house the new Airport Integrated control Center (AICC), Airport Emergency Center (AEC), Training facility, operations, safety and administration offices. The building structure is a pre-engineered metal building and based on the functions to be housed in the build will be designated as a Risk Category II building according to the 2015 International Existing Building Code.

This assessment discovered a number of challenges that will be solved during the design phase. All of the issues discovered have a plausible solution that may require a compromise in equipment specification but still provide needed functionality and safety. Some of the highlighted feature required in this renovation will be an elevator, dual sprinkler system, dual HVAC system and a video wall to fit the maximum ceiling height.

The Budget for this renovation project has been estimated at $15 million. The construction delivery method has been determined to be Construction Manager at Risk (CM @ Risk) and the next steps for this project is to hire a CM @ Risk firm and proceed to the Design Phase.

XIII. EXHIBITS

A. SITE LAYOUT

B. SITE LAYOUT

C. FIRST FLOOR PLAN CONCEPT

D. SECOND FLOOR PLAN CONCEPT

E. SECOND FLOOR CEILING HEIGHT

XIII. EXHIBITS

A. Proposed Site Layout

- Parking Lot Plan for Building 1840

NE ENTRANCE ROAD

BUILDING
1845

BUILDING
1840

GENERATOR

HVAC

ELEVATOR

ELECTRICAL

DRAINAGE

MAIN ACCESS AISLE

PROPOSED SKYPLACE EXTENSION

FIRST AVENUE

NO PARKING

STOP

LEGEND:

- NEW PARKING
- RESURFACED PARKING
- NEW SIDEWALK
- RESURFACED ROADWAY
- LANDSCAPING

BAIN MEDINA BAIN, INC.
ENGINEERS & SURVEYORS
TBPE F-001712
7073 San Pedro, San Antonio, Texas, 78216
Phone: 210-494-7223 Fax: 210-490-5120 WWW.BMBI.COM

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Supervised By: MARTIN PALACIOS
P.E. Lic. No. 111619
Date: 7/29/2015

AICC REPURPOSE OF BUILDING 1840
PHASE 2

PROPOSED SITE LAYOUT

SHEET 1 OF 1 SCALE: 1"=50'

STATE	COUNTY	CITY	SHEET NO.
TEXAS	BEXAR	SAN ANTONIO	

Date and Time Plotted: 7/29/2015 10:40:27 AM

User Name: $USER$
File Name: $FILEABBREV$

XIII. EXHIBITS

B. Proposed Site Layout

- South Parking

Date and Time Plotted: 7/29/2015 10:41:24 AM

25 24 23 22 21 20 19 18 17 16 15 14 13 12

ELECTRICAL
ELEVATOR
HVAC
GENERATOR
ROOF DRAINS

BUILDING
1840

BUILDING
1845

11 10 9 8 7 6 5 4 3 2 1

STOP

1ST AVE

SD SS GAS OHE 12"W 10"SS

N

NEW PARKING
RESURFACED PARKING
NEW SIDEWALK
RESURFACED ROADWAY
LANDSCAPING

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Date: 7/29/2015

AICC REPURPOSE OF BUILDING 1840
PHASE 2

PARKING LAYOUT
PROPOSED SOUTH PARKING

SCALE: 1"=20'

SHEET OF

STATE	COUNTY	CITY	SHEET NO.
TEXAS	BEXAR	SAN ANTONIO	

User Name: $USER$
File Name: $FILEABBREV$

XIII. EXHIBITS

C. First Floor Plan Concept

Building 1840, 1st floor conceptual

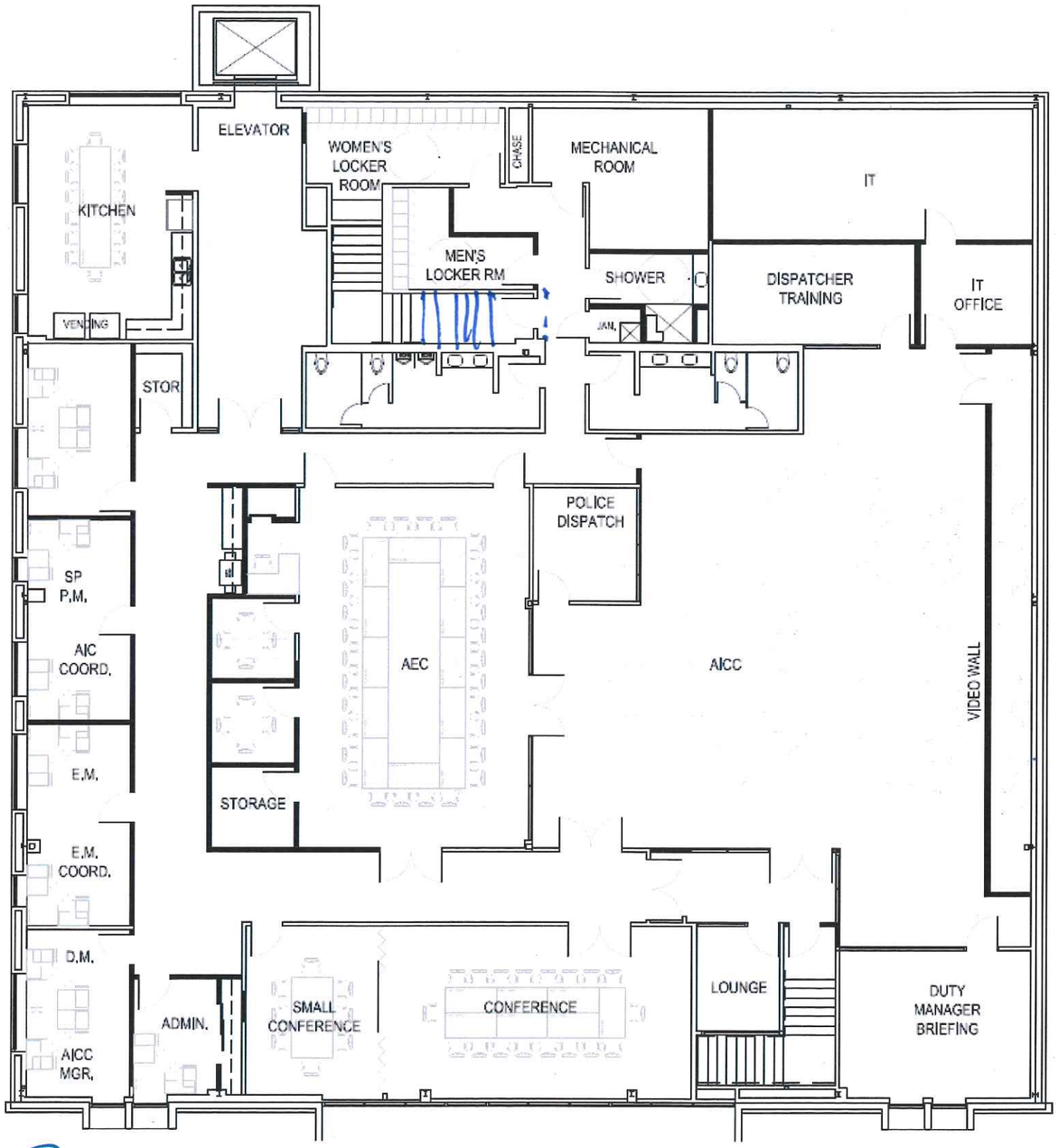
WESTEAST DESIGN GROUP ARCHITECTURE

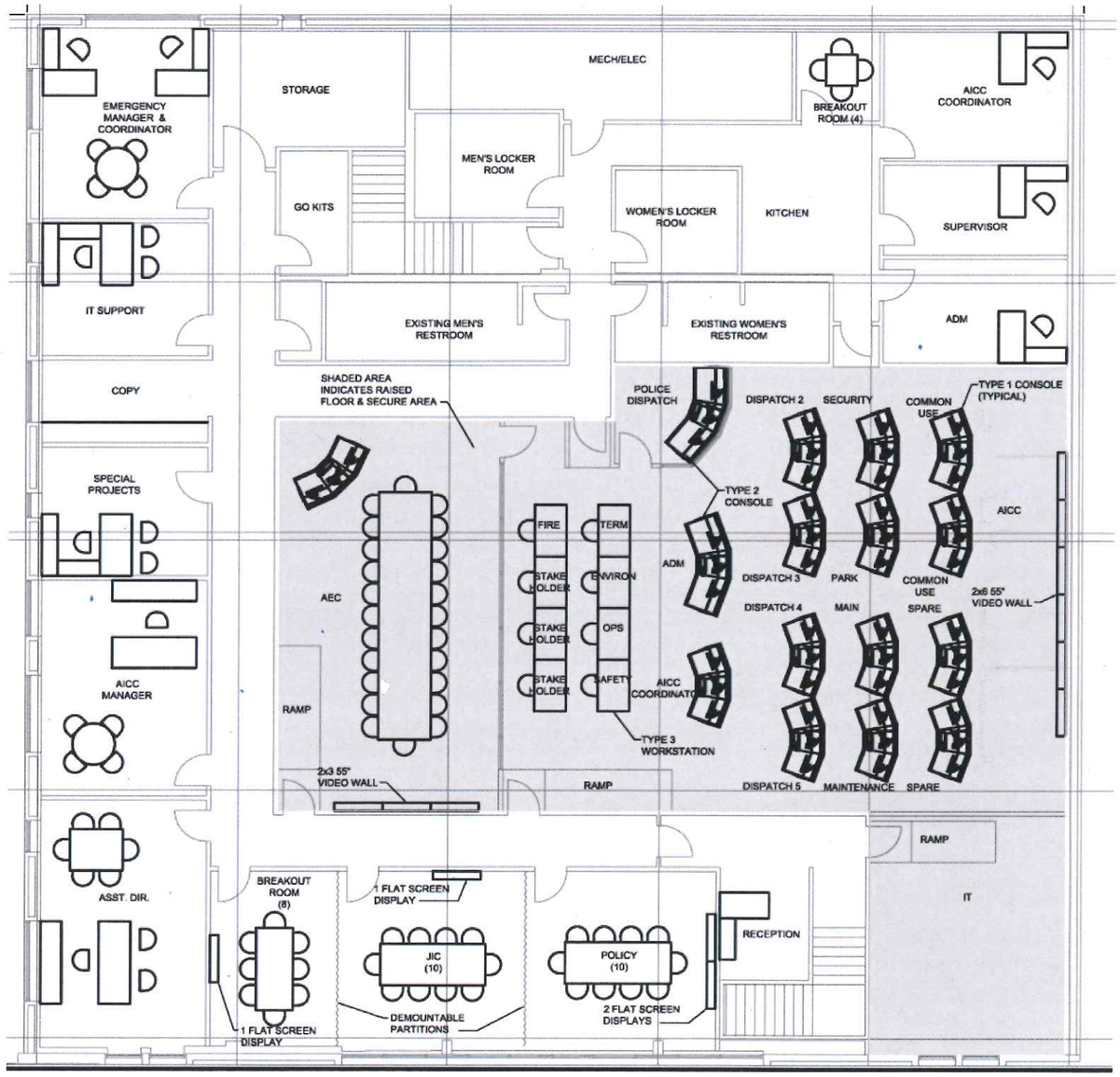
Date: July 24,2015

XIII. EXHIBITS

D. Second Floor Plan Concept

Building 1840, 2nd floor conceptual, May 26, 2015





Faith Group

XIII. EXHIBITS

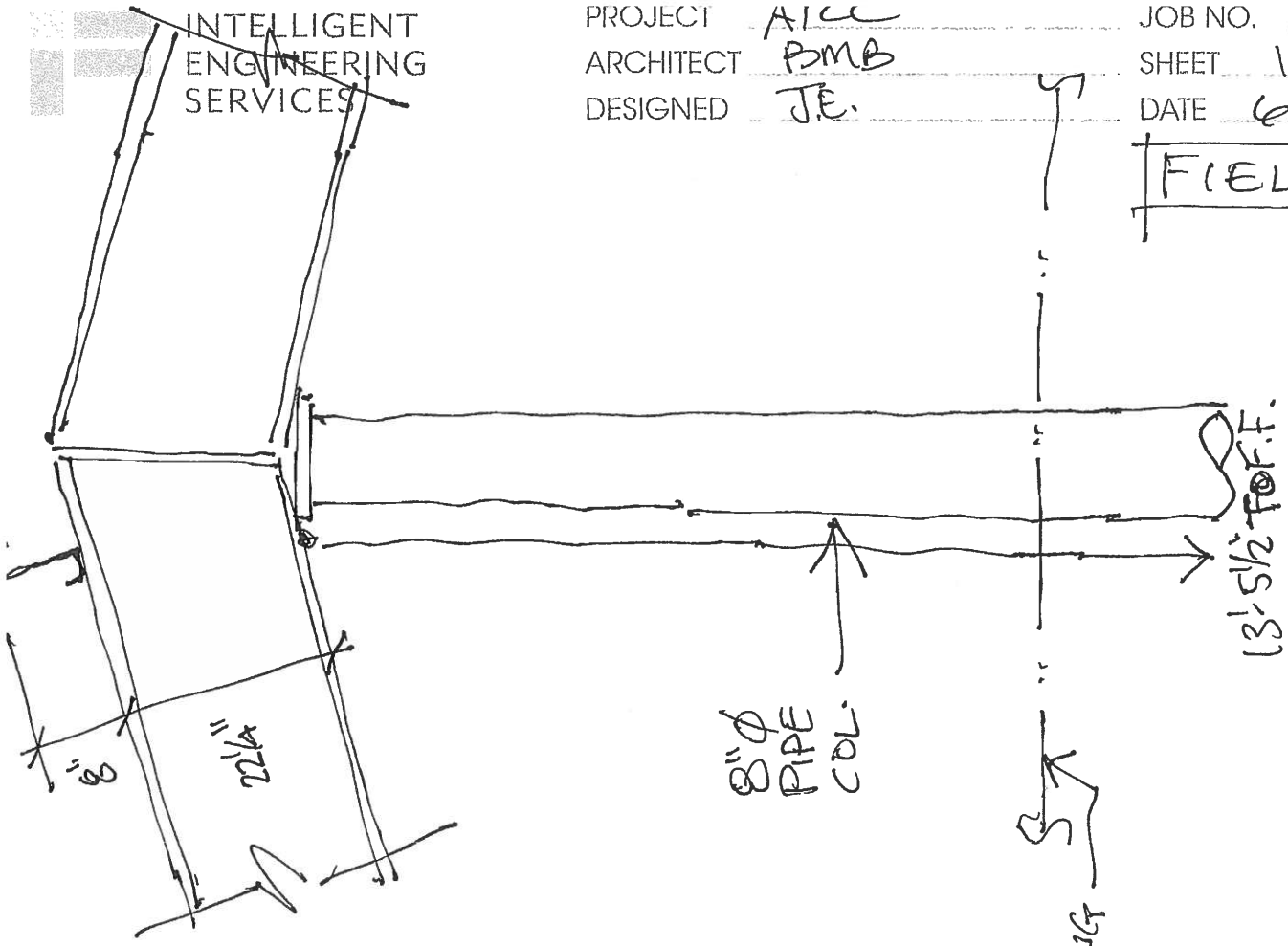
E. Second Floor Ceiling Height

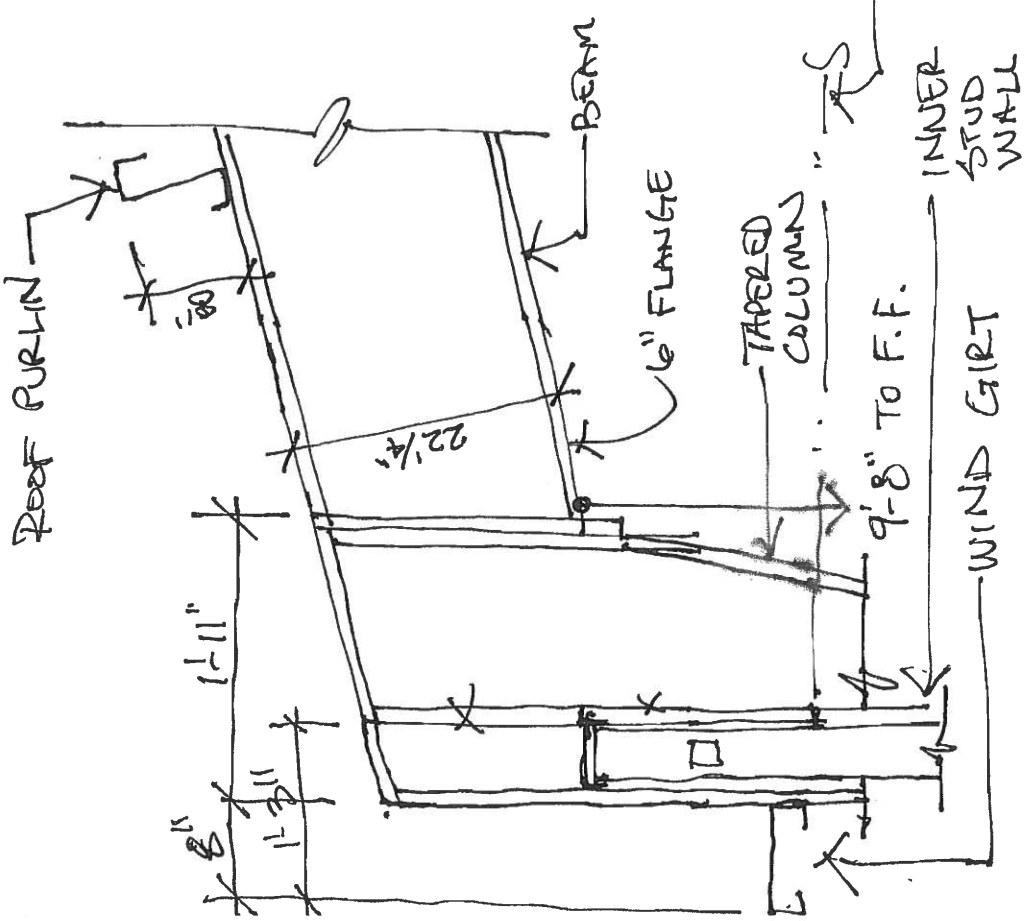
INTELLIGENT ENGINEERING SERVICES

PROJECT AICC
ARCHITECT BMB
DESIGNED J.E.

JOB NO. 2190
SHEET 1 OF 1
DATE 6/23/15

FIELD NOTES





APPENDIX

A. Specialized Communication System Assessment

(Prepared by Faith Group, LLC)

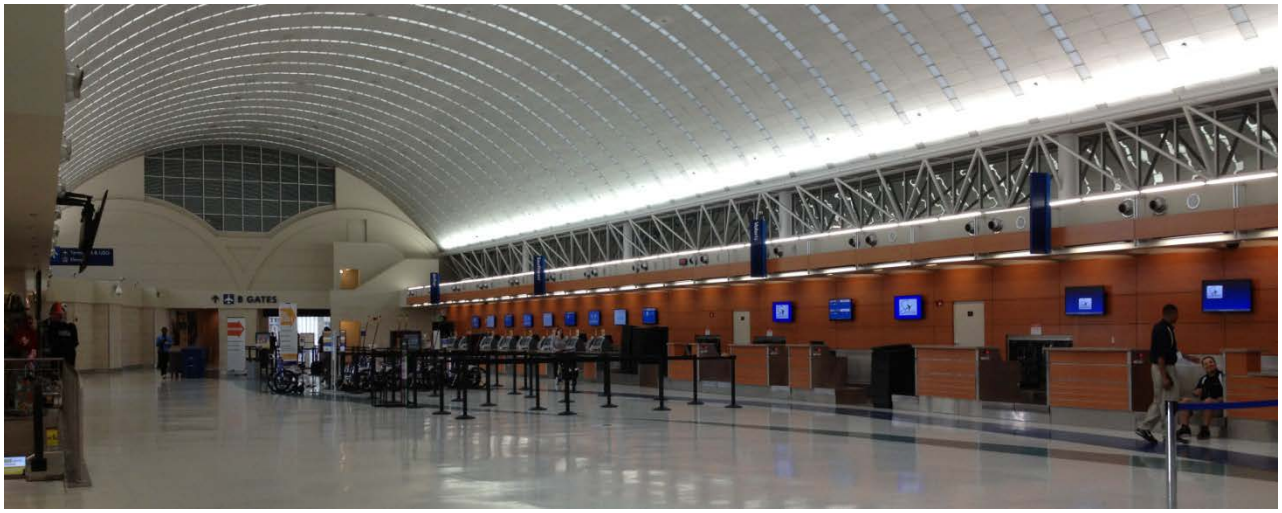
Faith Group

Airport Integrated Control Center
Task 2 – Facility Recommendations

San Antonio International Airport

July 28, 2015

SAN ANTONIO
AIRPORT SYSTEM



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Section 1 Introduction

1.1 Overview

Task 2 provides a high level planning overview of the Airport Integrated Control Center (AICC)/Airport Emergency Center (AEC) requirements and recommendations that relate to operations, space requirements, technology and supporting infrastructure for the future AICC and AEC.

The work done to date, including establishing the existing base condition for space, operations, and technology has been used to establish a set of phases for the vision of the future AICC/AEC.

The philosophy is simple: By integrating all day-to-day functions in a common location, customer service and Airport operations will experience marked improvement in work-flow efficiencies and situational awareness. Furthermore, consolidation of irregular event notification, management and remediation will realize greater improvements during stressed times.

The concept of an integrated communication/command facility is not a new one. Facilities of this type have been established in the airport environment for years and typically grow organically over time, assuming more responsibilities in order to best serve the needs of the airport. These facilities are known by a wide range of names – Airport Operation Center, Airport Command Center, Communication Center, etc. – often providing the same basic set of services: day-to-day communication and support for landside and airfield operations, public safety dispatching, security, customer service, and command and control during irregular operations (IROPS) or emergency conditions.

While the idea behind these centers is simple, the integrated approach does not necessarily come easily. Entities and organizations functioning autonomously do not always see the need or understand the benefit of close cooperation with others. This impasse is typically made more difficult by incompatible systems and procedures; staff operating near their limits; and constrained resources and budgets.

SAT is an exception to this in that employees and management embrace the concept of a range of departments and disciplines operating together in a consolidated environment. The challenges here are: space constraints; lack of common technology and system platforms to ease the sharing of information; and a sub-optimal operational concept with inadequate staffing resources to represent the various operating divisions.

This report proposes a phased operating model for the new AICC as well as the various technologies required for supporting its stated objectives. These start from a function, not too different from the existing OCC and progressing to a larger more robust operation, which reflects an all-inclusive operation with maximum seat count as requested by SAT staff during interviews. These concepts can be implemented day one with limited impact to current full time employees (FTE's) and then phased to add staff, functions and technology based on demand.

Section 2 AICC Concept of Operations Overview

2.1 AICC Operating Model

Bringing multiple disciplines with diverse operational focuses into one work area for daily operations, serves to improve the operations and efficiency of San Antonio International Airport. When divisions engage in this manner, individuals gain a better understanding of each division's responsibilities and objectives. Close communication improves situational awareness to more quickly and efficiently manage issues. The effect is similar to how the Airport utilizes the AEC during large events: Constant, close proximity interaction allowing situation and solution discussion improves communications and response during any range of events. Bringing the appropriate people and technology together also helps an organization begin to be proactive and not always reactive.

Bringing the people together is the first step. The second is to provide them with an operational plan that maximizes effectiveness and delivers the greatest value to the Airport. The final two elements are: a suitable space that provides a safe, comfortable environment with high survivability and capacity for growth and change to at least the year 2025; and deploying supporting technology that eliminates inefficiencies and provides the highest degree of situational awareness along with efficient flow of command and control to the field operations.

In order to ensure viable phases are recommended, the project team developed goals that the SAT staff may want to consider. The following discusses two primary goals and the supporting operational and technological solutions to achieve each goal.

1. **Goal #1** - Enhanced situational awareness of activities at SAT with the following enhancements:
   - Common event management system
   - Collocation of staff
   - Better face-to-face access similar to AEC operations but daily for IROPs
   - Access and display of real-time, critical information
   - Clear and logical information from field and systems
   - Dashboard viewing available from any workstation both inside and outside of the center.
2. **Goal #2** - Improve efficiency of operations and response
   - Enhanced room layout
   - Acoustically comfortable space, supportive of ease of communications. For example, dampened HVAC, acoustical floor, wall, and ceiling treatments, use of headsets, etc.
   - Good sight lines across space – e.g., good visibility of shared monitors and from position to position specifically supervisor work station access
   - Status indicators for each position (busy, free, emergency call, etc.)
   - Supportive of cabling and power installation and ease of relocation or reconfiguration of consoles and equipment with minimal disruption (raised floor/console)
   - Room for growth (2025)
   - Intelligent use of technology and integration to support efficiency

- Common computer platforms and configurations with a full suite of common software
- Reduced keyboard, mouse, and CPU counts
- Single sign-on
- Customizable dashboards
- Integration of information and systems to allow easy population of key data from one system to another automatically, i.e., eliminate redundant manual data entry
- Event Management System with built-in SOPs, decision-making and searchable software
- Support of real-time and historical events and operations
- Trending capability and report writing.

2.2 Functional Alternatives

Prior to presenting the two phases for consideration, there are four high-level points that are common to both:

1. The existing positions in the Operations Control Center (OCC) – 1 for Police dispatch, 1 for Closed Circuit TV (CCTV), 1 for Access Control System (ACS) and 2 dispatchers for call taking, triage and dispatching of security and operations – remain in place. This division of labor seems to work efficiently and effectively and does not need to be changed at this time.

2. The staffing positions shown in each of the phases represent positions requested by SAT staff and stakeholders. The phases represent a gradual stepping up of added staff and enlarging the footprint of the facility from a baseline that is judged to be the smallest increase that still delivers efficiencies (Phase 1), to the larger representing the full contingent requested (Phase 2).

3. The positions for Phase #1 are the maintenance work order, security and parking who will have a dotted line to the AICC Coordinator/Airport Duty Manager (ADM) but retain solid reporting to their respective divisions. With the addition of diverse staff in the AICC concept, it is recommended that an overall manager of the center be staffed. This position is the Airport Duty Manager (ADM). The ADM serves as the senior staff person making decisions within the AICC to ensure airport operational flow, much like the AEC Director who makes decisions during an emergency. For Phase 1, it is likely that Aviation will only have one FTE ADM hired, thus the AICC Coordinator is also shown in the reporting structure. The ADM position may be staffed day one with partial shift coverage Monday through Friday on shift 1 by the AICC Manager or designee. It is recommended that the ADM position be fully staffed along with the Common Use positions added for the migration to Phase 3.

4. For each full-time position requiring staff continuously (7/24/365), five staff are necessary to cover all shifts. At the time of this report, one ADM position is being requested as a FY16 FTE. For this reason, Phase 1 assumes existing staff with one ADM as shown in Figure 1.

Discussion of staffing and models will be covered in detail in the following sections.

2.2.1 Phase 1 Basic Function

Overview

This option is a modest change to the existing OCC with the addition of the maintenance work order function, Security and Parking. The staff will be existing FTE relocated from their respective divisions into the AICC.

The lines of authority show that Maintenance and Parking will continue to report directly to their division while a dotted line ties them to the Dispatchers and ADM/AICC Coordinator. This phase uses existing FTE's.

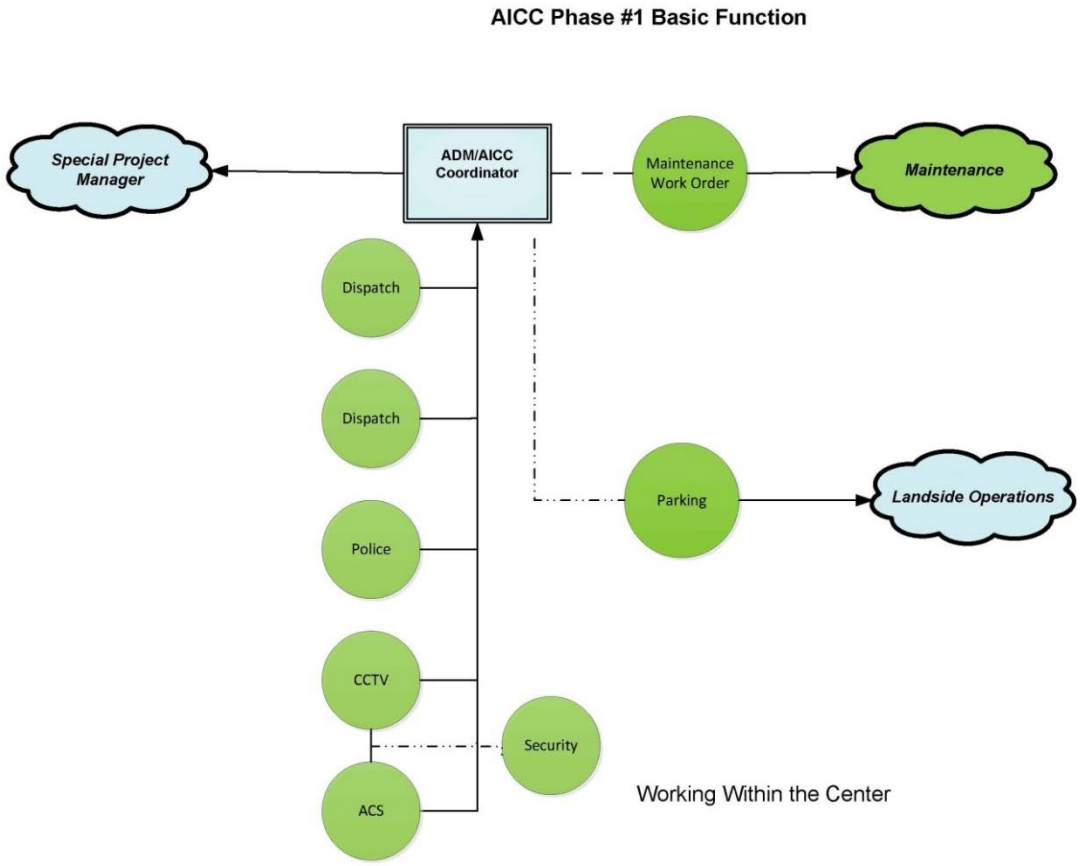

Figure 1 Phase 1

Impact on Staffing

The staffing required under Phase 1 reflects a continuation of the current set of dispatch positions, plus three functions relocated into the AICC:

- AICC Coordinator/ADM: This is a Supervisor/Manager level in the AICC. This person oversees the dispatchers and coordinates with others in the room during IROPS.
- Maintenance Work Order: receives maintenance requests, develops work orders and dispatches maintenance personnel.
- A Parking Representative: The position is called a Senior Cashier. Their role in the AICC will be to monitor and actively manage all landside operations to assure consistent

operations. This includes parking toll booths, Parking Revenue Control System (PRCS), transportation shuttle, Automated Vehicle Identification (AVI) system, oversight of traffic conditions on incoming roadways, arriving flights and taxi's. This may include some oversight of ConRAC operations as well.

- Security: Support for day-to-day monitoring of alarms. Monitoring of insider threats and focus on Employee Security. The position will manage proactively looking for security anomalies. Provides oversight and direction of operation of any breaches or irregular operations related to security issues. Works with the Duty manager to resolve security incidents.

There are no changes in current staffing for this phase.

Impact on AICC Space

In terms of space required, this phase has the least demand for increased square footage, with the relocation of two maintenance work order positions, one Security and one for Parking.

Phase 1 Basic Function	
Department	**Position Count**
Dispatch	1
Dispatch	1
Police	1
Access Control	1
CCTV	1
AICC Coordinator	1
Maintenance Work Order	1
Security	1
Parking	1
TOTAL Positions	9

Table 1 Positions - Phase 1: Basic Function

Advantages and Disadvantages

Phase 1 Basic Function	
Advantages	**Disadvantages**
▶ Smallest overall effect on footprint/space build-out requirements and cost ▶ Increase in staff interaction ▶ Space for staff to respond as needed ▶ Requires no staffing addition ▶ Allows for future growth to Phase 2 if space is reserved for future expansion	▶ Does not have an ADM at all times ▶ Does not address the total number of positions and disciplines desired for daily staff interaction and knowledge transfer between multi-disciplines ▶ Does not bring that full multi-discipline expertise into the space

Table 2 Advantages/Disadvantages – Phase 1

2.2.2 Phase 2 Fully Staffed

Overview

This phase increases the number of functions from Phase 1, with a greater increase in staffing and space required for the AICC. The staffing options for the dispatchers remain the same as Phase 1 but there are nine added workstation positions as discussed below.

- The new positions are the fully staffed ADM, a second maintenance position tied in parallel to the deployment of a new Computerized Maintenance Management System (CMMS), and as needed representatives from Operations, Terminal Services, Safety, Environmental, ARFF and three extra workstations for other stakeholders who need to be called into the AICC.
- For each full-time position requiring staff continuously (7/24/365), five staff are necessary to cover all shifts.

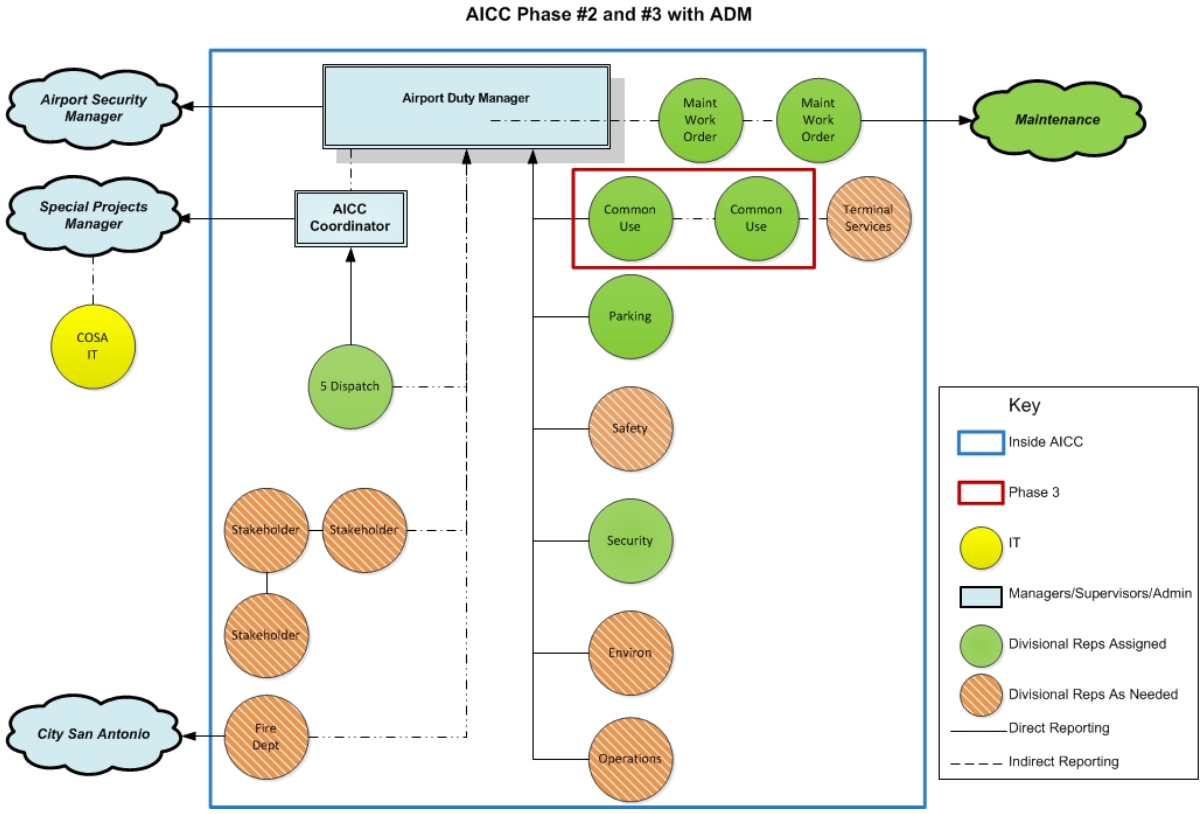

Figure 2 Phases 2 and 3

Impact on Staffing

The staffing required under Phase 2 reflects a continuation of the current set of dispatch positions, plus the addition of 1 FTE ADM budgeted in FY16, four additional ADM staff in the future and eight added as needed positions including three flex for stakeholders:

- Airport Duty Manager (ADM): This is a senior manager level in the AICC. While not all employees are direct reports they have a dotted line depicting communication flows in the center. Day one if there is only one additional FTE for the ADM, the position can be

supported by the AICC Manager on duty Monday through Friday on Shift 1. The FTE ADM will cover shift 2 and be combined with weekdays and weekends.

- Operations: Overseeing airfield/Part 139 and security issues. This position would be as needed during IROPS, VIP movements, special events, diversions and charters.
- Maintenance Work Order: receives maintenance requests, develops work orders and dispatches maintenance personnel.
- Common Use Representative: Oversees common use kiosks and gate management. Schedules common use gates.
- A Parking Representative: The position is called a Senior Cashier. Their role in the AICC will be to monitor and actively manage all landside operations to assure consistent operations. This includes parking toll booths, Parking Revenue Control System (PRCS), transportation shuttle, Automated Vehicle Identification (AVI) system, oversight of traffic conditions on incoming roadways, arriving flights and taxi's. This may include some oversight of ConRAC operations as well.
- Terminal Services: This position oversees the airline consortium who is responsible for managing a number of different functions including janitorial in public areas, hold rooms, ticketing and baggage claim, and back offices. The Consortium is made up of SAT airlines. They pick up the operations and management of BHS, jetbridge maintenance, potable water, power, and sky caps. Terminal Services does provide some janitorial support such as curbside, parking lots, mezzanine office, Police, Parking, Customs, parking garage and other SAT owned buildings. Terminal Services shifts 1 and 2 with 1 person on site overnight.
- Security – Performs day to day monitoring of alarms. They will monitor insider threats and focus on employee security. The position will manage proactively looking for security anomalies. They will provide oversight and direction of operation of any breaches or irregular operations related to security issues. They will work with the ADM to resolve security incidents.
- Safety: Representing the Safety Management System program. They monitors for proper operation of elevators, escalators, landside and ramp operations, they look for unsafe conditions to prevent slips and falls, also forensic review of video and other data.
- Environmental: Oversees all land air and water issues to maintain airport compliance, noise calls, fuel spills, deicing management. Noise calls, fuel spills, and will use this position during irregular operations to improve coordination among stakeholders.
- IT: This position is for monitoring the AICC systems, assure network security, install patches and software updates, routine maintenance and respond when needed. The roll will require the person perform a wide variety of jobs including business analyst, hardware and software technician. The position must understand the business needs of the department and be capable of developing business case scenario's, technical recommendations and support strategic planning activities. The position is located outside of the AICC floor proper. This position is critical to supporting the Phase 2

technology enhancements which will introduce an integrated IT environment. A detailed analysis of duties and support provided by ITSD is required to determine how this position is staffed during normal, evening and night shift.

- Fire Department: This position would respond as needed in the event of an IROP or special event and may help coordinate during environmental issues such as spill clean-up.
- Three open stakeholder positions for any as needed discipline such as airlines, TSA, CBP, etc.

Phase 2 Fully Staffed		Phase 3 Fully Staffed
Department	**Position Count**	**Position Count**
ADM	1	1
Dispatch	1	1
Dispatch	1	1
Police	1	1
Access Control	1	1
CCTV	1	1
AICC Coordinator	1	1
Maintenance Work Order	1	1
Maintenance Work Order	1	1
Common Use	0	1
Common Use	0	1
Parking	1	1
Safety	1	1
Environmental	1	1
Operations	1	1
Terminal Services	1	1
Fire Department	1	1
Security	1	1
Stakeholder	1	1
Stakeholder	1	1
Stakeholder	1	1
TOTAL Positions	19	21

Table 3 Staffing Impacts Phase 2 and Phase 3

The total change in staffing required under this Phase for a 7/24/365 operation would require a minimum of five persons per position to cover a particular work station. This could be staffed from existing personnel with the exception of the ADM which requires 5 total FTE. Phase 3

should correlate with the addition of the Common Use positions which have already been requested.

Impact on Command Center Space

In terms of space required, this phase requires more than doubling of the operational positions and therefore a commensurate increase in floor space and support.

2.3 Overall AICC Organization Chart

The following organization chart depicts all of the staff represented both working within the AICC as well as those with oversight. All are represented on the second floor of the building 1840 facility except the Assistant Aviation Director who will have an office on the first floor of the building but may be included on the second floor space pending.

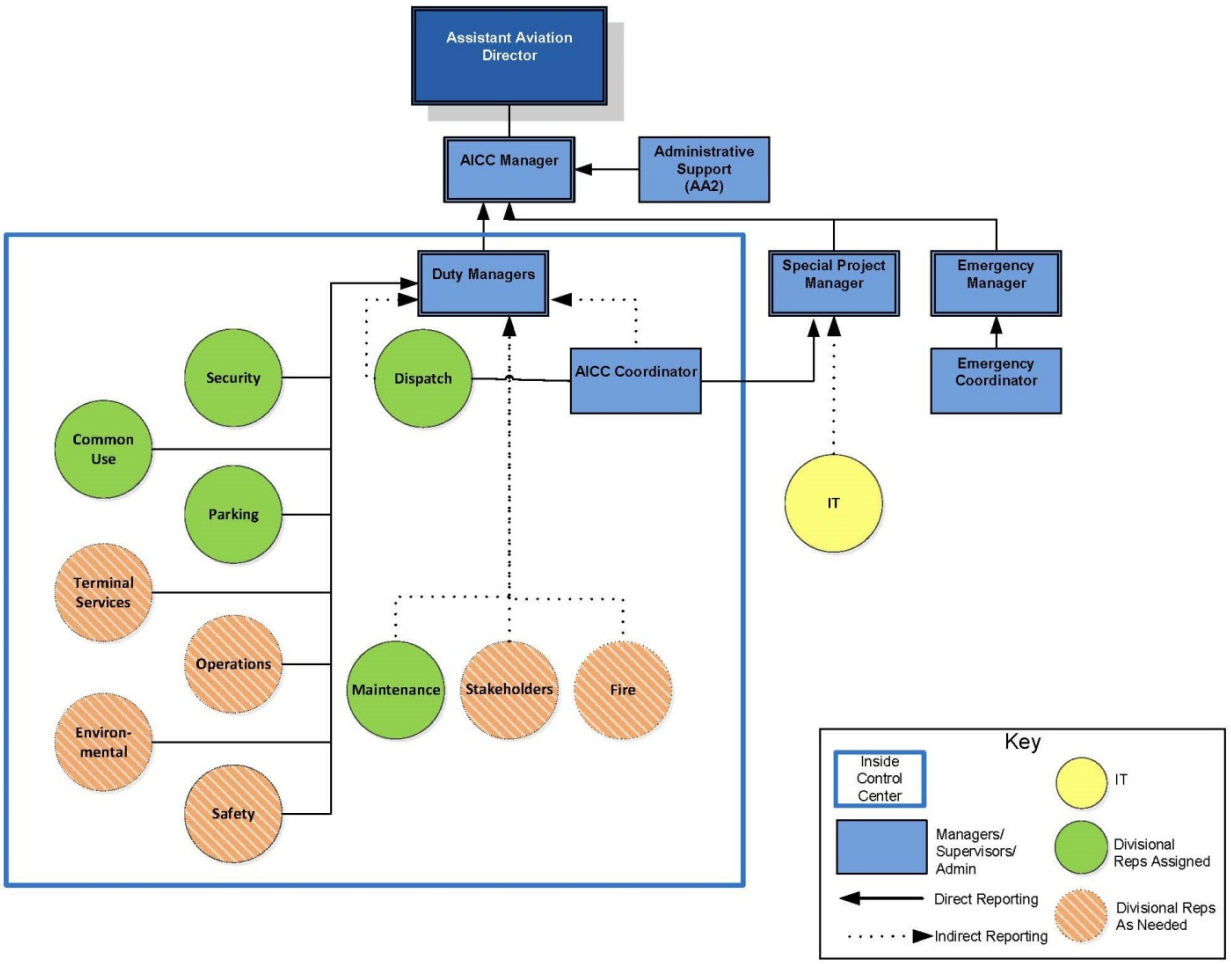

Figure 3 Fully Staffed

Section 3 AEC Concept of Operations Overview

3.1 Background

Most airports are familiar with the National Incident Management System (NIMS) and the Incident Command System (ICS). SAT incorporates the use of these tools and plans and practices all types of response management under the NIMS ICS umbrella. It is generally agreed that because airports rely upon outside resources when an incident or event outstrips their ability to manage it on their own, it makes it valuable for the Airport and their regional disaster response partners to share a similar preparedness platform. Assets such as hazardous materials response teams, bomb squads, hostage negotiation units, decontamination units, volunteer organizations, and other specialists typically are brought in from outside the airport if needed during an incident. Those assets and others exist within government structures— counties, states, or federal agencies—and those jurisdictions follow NIMS, if not by the book then very close to it. SAT works closely with a number of stakeholders outside of the City such as FBI, TSA, FAA, mutual aid, airlines and tenants to name a few. It is important that all responders utilize a common structure and terminology which ICS provides.

NIMS is an outgrowth of all-hazards planning as promoted during the late 1970's which led to FEMA's Federal Response Plan (FRP). The FRP was the first step in organizing specific emergency response functions and assigning lead and support agencies for each function, such as ESF-1Transportation, ESF-5 Emergency Management, ESF-8 Public Health and Medical Services and so forth. State and local government departments aligned themselves to their Federal counterparts in adopting the FRP for state and local emergency planning. For nearly 10 years the FRP stood as the recommended guidelines. Newer versions of the FRP eventually followed but the basic plan remains at the core of the later iterations: the National Response Plan and what is currently in place, the National Response Structure and NIMS.

Also during the last decades of the twentieth century, another related system was being developed – the Incident Command System (ICS). Originating out of the wild land firefighting sector as a solution for better resource management among multiple agencies and across state lines, The ICS is applicable to all manner of incident command situations. ICS essentially is an emergency services personnel management system for on-scene responders and staff in the Emergency Operations Center (EOC) or in the case of SAT the Airport Emergency Center (AEC) so as not to be confused with City or County EOCs, managed under the umbrella of NIMS ICS. It is a flexible system that also assigns particular positions to specific functions and can be expanded as needed depending on the demands of the situation. These assignments within the ICS structure may be made with various airport staff and is not specific to any one department. However some departments lend themselves to certain assignments by virtue of their day-to-day expertise such as Facilities as the role of Logistics Section Chief.

Federal Aviation Regulation (FAR) Part 139 certificated airports are no longer in a position to opt out, rather, FAA requires that airports reflect NIMS in their Airport Emergency Plans (AEP) and pursue ICS and NIMS training for their employees. Compliance with NIMS standards is a requirement for disaster preparedness funding, including any monies sought to support training. SAT has a good ICS program

and conducts regular training either on line or in practice during real and/or drilled events. Utilizing a good structure diminishes the length of the event as well as the loss of life and property or environmental damage. SAT has the structure and programs in place but is hampered by the geographic foot print of the space. The new AEC will provide for greater space and layout for those necessary persons to work better together during times of emergencies or events.

3.2 Operating Models

During emergencies, the major departments at the Airport – Operations, Maintenance, IT, Security, SAAPD and Parking, just to name a few – assemble in the AEC and collaborate to respond to an event bringing with them each divisions' expertise. The AEC may serve as the center of the emergency if it is a wide spread event geographically or if for whatever reason a center point for a Command Post (CP) is not practical such as during a natural widespread disaster. The AEC may also serve as support to field staff by coordinating plans and resources away from the high stress environment which the on scene command may be dealing with. The AEC oversees the big picture of the airport while helping the on-scene responders and yet trying to keep the doors open at the airport. This type of environment, with appropriate staff on hand, leads to a quicker resolution and the return of normal services. The operating models will follow the NIMS ICS structure as mandated by the FAA and reflected in section 3.5 Lines of Authority organization charts.

3.3 Recommendation

The airport currently has protocols for activating the AEC and making assignments based on the level of activity and needs of the event. Usually a high ranking manager will activate the AEC. In the absence of an ADM, this highest ranking individual today after hours may be an AICC Supervisor or Coordinator. By the time personnel are notified to respond to the airport to staff the AEC the AICC Supervisor or Coordinator may be relieved by the next level of senior management as the AEC Director position and return to their normal duties or they could be staffed in a position within the ICS structure such as Planning Section Chief or Operations Section Chief. In the case where the airport has successfully staffed an ADM in the AICC, it is recommended that this person may activate the AEC until relieved by another staff person. In this case the ADM would return to the AICC to run the day-to day operations. It is intended that the AEC would relieve the AICC from most of the event management so that the Center could concentrate on keeping airport operations running to the extent possible given impacts from the event. During emergency operations when the AEC is staffed, it is also recommended to include a dispatcher to act as liaison between the AEC and the AICC in order to synchronize the most accurate and timely information between the two centers.

SAT currently follow some of the ICS protocols but may not have fully adapted all the nomenclature for position descriptions within the NIMS ICS structure. They are currently staffing a new position, Emergency Manager, who will be responsible for training and AEC protocols. More training utilizing the ICS nomenclature is recommended. The job descriptions in this report speak to the ICS functions. Utilizing the structure in major events is a requirement by the FAA, however NIMS does not require strict ICS protocols for the management of EOC's or in this case the AEC. It is recommended that SAT meet with local emergency agencies to discuss a common structure to ensure consistent nomenclature

and titles tied to specific responsibilities for ease of communication during common events such as a hurricane when both centers may be in operation.

Shortly after the new AEC facility is opened it is further recommended that a dry run of various events including stakeholders within the airport environment and from the outside be brought into the new AEC for familiarization with both logistically finding the new AEC and familiarization with the room layout and support tools available including technology.

3.4 Staffing

The number of persons responding to the AEC will be able to be expanded from the current response given the center's larger footprint. The table on the next page indicates the positions by discipline as well as the ICS organization nomenclature such as Section Chiefs and Liaisons. The numbers represent the positions accounted for in the AEC by seats. In some cases such as the two seats shown below assigned for the AEC Director makes room for additional administrative support if needed and/or if there is an overlap at shift change provide space for briefing the oncoming Director. Every position is not necessarily staffed for every event but the space will be able to accommodate the necessary responders in a large scale emergency. Staff should only respond to the AEC when invited and given a role. A sign-in and tracking document will ensure that only persons necessary for the event are in the AEC. This is important in order to make sure staff is accounted for and persons are not freelancing activities associated with the event and especially to ensure all staff are not burned out in the first operational period. Some staff should be identified for the next operational period and relieved from work so they are ready for their shift. This is most true when a long term event is expected.

Position	Seats
AEC Director	2
Operations Section Chief	2
Logistics Section Chief	2
Planning Section Chief	2
Finance Section Chief	1
Day to Day Section Chief	1
PIO	2
IT	1
Airlines	2
Emergency Manager	1
Scribe	1
Dispatcher Liaison	1
Liaison	1
TSA	1
Police	2
Fire	2
Flex (Landside, Airside, FBI, CBP, Parking, Security)	2
Total	26

Table 4 AEC Staffing Positions

3.5 Position Descriptions

Position descriptions in the AEC are either related directly to the ICS structure or as a support role identified by SAT. ICS positions should always be thought of as roles and responsibilities not necessarily by body count. For example if an Incident Commander does not staff the Planning or Logistics Section Chief then they assume those responsibilities. The Day to Day Section Chief responsibilities may be assumed by someone in the AEC already performing tasks such as the Operations Section Chief who is often also given the Day to Day role of managing resources and responses to "keeping the doors open".

NIMS ICS uses a common set of terms that most responding agencies and mutual aid responders understand, and expect to use in emergency situations. These common terms make up the ICS organization configuration. This ICS organization chart can be compared to any business structure which displays a person's title, responsibilities, and lines of communication represented through the structure. The same holds true for an ICS configuration. Whether staff are reporting to their daily job or in the AEC, it is important to understand what their role is in the organization.

- In the Field

  Incident Commanders in the Field – This role is assigned to the lead response agency's incident commander (IC) who is responsible for the immediate tactical response. Or in the case of SAT whereby the normally utilize a Unified Command (UC) where the lead role is shared for example by Aircraft Rescue Firefighting (ARFF), Police and Operations. The IC or UC is responsible for tactical operations related to that specific event/incident.

  The IC or UC is responsible for developing and communicating an incident action plan (IAP). The IAP may be either written or verbally communicated. The IC/UC will consult with the other members of the command and general staff on actions to be taken and issues that arise and in concert with other stakeholders. The gathering point in the field is at the Command Post CP which is either the IC or someone from the UC's vehicle or staff may utilize the Airport's mobile command vehicle. Should the severity of the event need further support, a request to activate the AEC should be communicated.

- Transition to AEC Activation

  The activation of the AEC can happen through various means. The IC/UC may notify the AICC and ask for activation. Management may advise the AICC that they are responding to activate and some events will automatically trigger the activation such as an aircraft accident. During normal hours, senior management staff would respond to fill the positions needed based on event type and scale. During normal hours, persons assigned to the AICC would likely not be impacted. After hours it is likely the AICC Supervisor or Coordinator on duty would respond to activate as the AEC Director and request staff accordingly. If the airport establishes the ADM position in the AICC, the ADM may temporarily respond to activate the AEC until relief staff arrive at the airport. The concept of the AEC is to take the weight of the event off the AICC so the AICC can manage the normal activities of the airport not associated with the event. This is an ideal concept and in the real world staff that normally support the AICC may temporarily have to support the AEC.

- In the AEC

AEC Director - This is normally assigned to a senior airport manager. This role is one where a senior individual with a strong comprehensive understanding of the airport and its operations, manages support to the response, activates additional incident/event response as necessary, and provides direction on measures to continue operations on the unaffected portions of the airport. This position keeps an eye on both the event and the daily operations of the airport to lessen the impact of one to the other.

AEC Director has overall control and responsibility of the incident. Upon activation of the AEC, AEC Director can be any Operations Supervisor up to and including the Assistant Director of Operations. AEC Director establishes the ICS structure, including assignment of Section Chiefs, Liaisons and Support Officers. AEC Director's main focus is on strategic planning and the "big picture" and the impact of the incident from a broad perspective.

- Provides direction, advice and guidance to the Operation Section Chief handling tactical aspects of the incident
- Approves and continually evaluates and modifies the incident action plan (IAP) as necessary
- Maintain overall control of the communications process and information flow between AEC, Unified Command Team / Unified Command Vehicle, and other responders as necessary
- Facilitate regular verbal updates from EOC participants as to maintain situational awareness on specific responder efforts
- Insures that goals and objective of Section Chiefs are met
- Terminates incident

Operations Section Chief – This role, reporting to the IC/UC or AEC Director, is generally responsible for the tactical response to an incident/event, and depending on the scope of the event, may have a number of strike teams or branches reporting to him/her. The Operations Section Chief's responsibilities include coordination of all tactical operations at the incident/event site, coordinating with the IC/UC for status updates, processing resource requests, providing updates to/from the Staging Area Manager (if in place), overseeing the Logistics and Planning Sections, and coordinating air resources on site. Some of the subordinate staff to the Operations Section Chief may include outside stakeholders depending on the incident and their expertise, and their agency's level of involvement. The Operations Section Chief may also be staffed in the AEC as the lead coordinator for the IC/UC in the field.

Logistics Section Chief – This position is usually assigned to Airport Maintenance personnel who possess knowledge about all the potential resources available to support an incident/event response, and can acquire resources supporting the effort (including those in a staging area). A Maintenance Supervisor can usually marshal resources not organic to the emergency response organization to quickly support the response.

Planning Section Chief – The Planning Section Chief is responsible for planning actions covering a 12 to 24 hour time frame. This may be referred to as the Support Officer to the AEC Director. The responsibilities include staff schedules, establishing and updating the IAP, recording situational status and resource status and eventually designing the demobilization plan. Normally if an event warrants the staffing of the Planning Section Chief it is usually indicative that the AEC should be activated.

Finance/Administration Section Chief - A Senior Manager of Finance is best suited for this position, with additional support staff as needed. This position is also referenced as the Finance and Admin position by SAT. The purpose of the Section is to support the event/incident IC and associated staff. This position represents as much of a process as it does a person. The processes should be coordinated ahead of any event and include access to forms and an accounting system set up to track costs relative to the event. This tracking could be set up in the airport's financial system or even an Excel or Access database format. This section is responsible for tracking the incident/event in terms of procurements, use of resources from an HR standpoint, staff costs and other outside support costs that may evolve. This position is ultimately responsible for appropriate documentation in order to process claims or reimbursements from federal or state coffers. This manager will provide advice on financial issues that may arise from the incident/event and approve final resolutions on compensation and claims cases.

Day to Day Incident Commander - This position is unique to airport incidents/events, and not part of the formal FEMA ICS nomenclature. It represents the person responsible for managing the other aspects of keeping the airport open and operating during an event. Resources are needed for both the day to day management and the event management, and are best coordinated in the AEC. This person is usually an Airport Operations staff or similar employee. The duties revolve around monitoring and managing non-emergency or irregular operations responses to issues besides the incident/event at hand, and insuring to the extent possible that normal operations are not affected.

Scribe - This position provides administrative support to AEC and all AEC responders as necessary. Duties include initiating AEC activation by turning on lights, computers, and other equipment as necessary; taking notes; utilizing the CCTV system; liaison with Communications Center and IT staff. This would likely be assigned to a dispatcher on duty.

Liaison Officer – The Liaison Officer is a key resource for the AEC Director, used to coordinate with outside agency responders not physically represented in the AEC. This usually takes on the form of coordinating with federal and mutual aid responders which are not physically at the scene, but may either deploy later as needed, or are providing support or assistance in roles not directly impacting the incident/event scene; i.e. Airlines, American Red Cross or National Transportation Safety Board (NTSB).

Public Information Officer (PIO) - This is a key role in any incident/event. This position is responsible for media briefings, managing press releases, and setting up briefings and coordinating information releases, this position must gain approval of the AEC Director

before releasing any information to the public. In the case of a joint information operations center supporting a regional incident/event, the PIO will further coordinate with other agencies on information releases. The PIO will also designate a media area. This role usually needs a number of support staff so that the PIO is free to handle media while others are watching and tracking news reports and social media posts.

TSA - TSA will develop and maintain coordination with TSA Supervisory staff and provide updates to AEC staff of any TSA related issues related to equipment and overall personnel.

Police - Police will provide coordination of law enforcement activity on the Airport property and will provide at least hourly updates on any changes to AEC staff.

Fire (ARFF) - Fire will provide coordination and support to Operations Section Chief and Day-to-Day Incident Commander, and will provide at least hourly updates to AEC staff.

Flex – This position will be staffed by specific expertise when needed such as a representative from FBI, CBP, Security or Parking.

Emergency Manager – This position should help consult and coordinate the players in the AEC. The Emergency Manager serves as the Subject Matter Expert (SME) for the Airport's emergency plans.

IT – This position will provide any needed technical support in the AEC.

Airlines – They will liaison with their corporate headquarters and local staff.

3.6 Lines of Authority

For the purposes of this report, the organization focus is on the AEC. However it is important to understand the relationship to the field command staff. The IC/UC should have a direct line of communication to the AEC. The field CP should be responsible for directing tactical activities in the field. The AEC should support those activities. Often times, the IC/UC communicates through the Operations Section Chief to make requests and updates. The IC/UC could also communicate directly to the AEC Director depending on how the center is staffed. In times when there is a field command staff and the AEC is not activated, the following basic chart supports this response and lines of authority/communication are shown through the organization chart. Often times the General Staff responsibilities are retained by the IC/UC. Below is an example of the organization chart SAT currently uses in the field. It is relatively close in organization to that of chart 5 which is from the ACRP Report 13 ICS organization example.

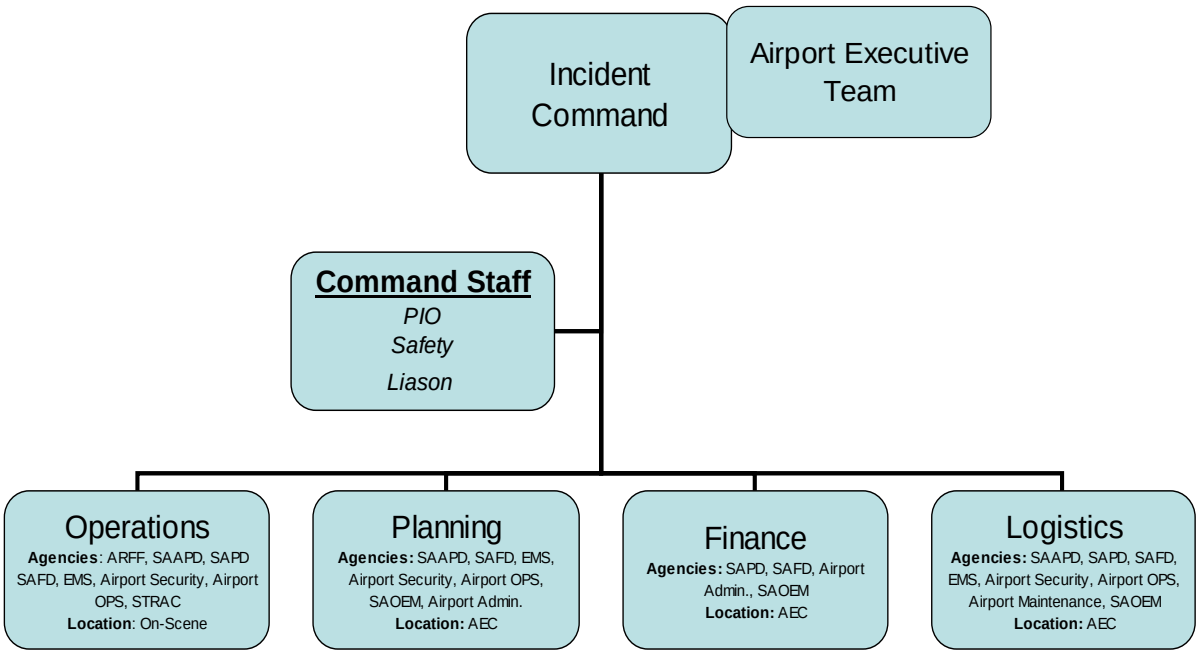

Figure 4 SAT AEP Figure I-1: Example On-Scene ICP with AEC Activated

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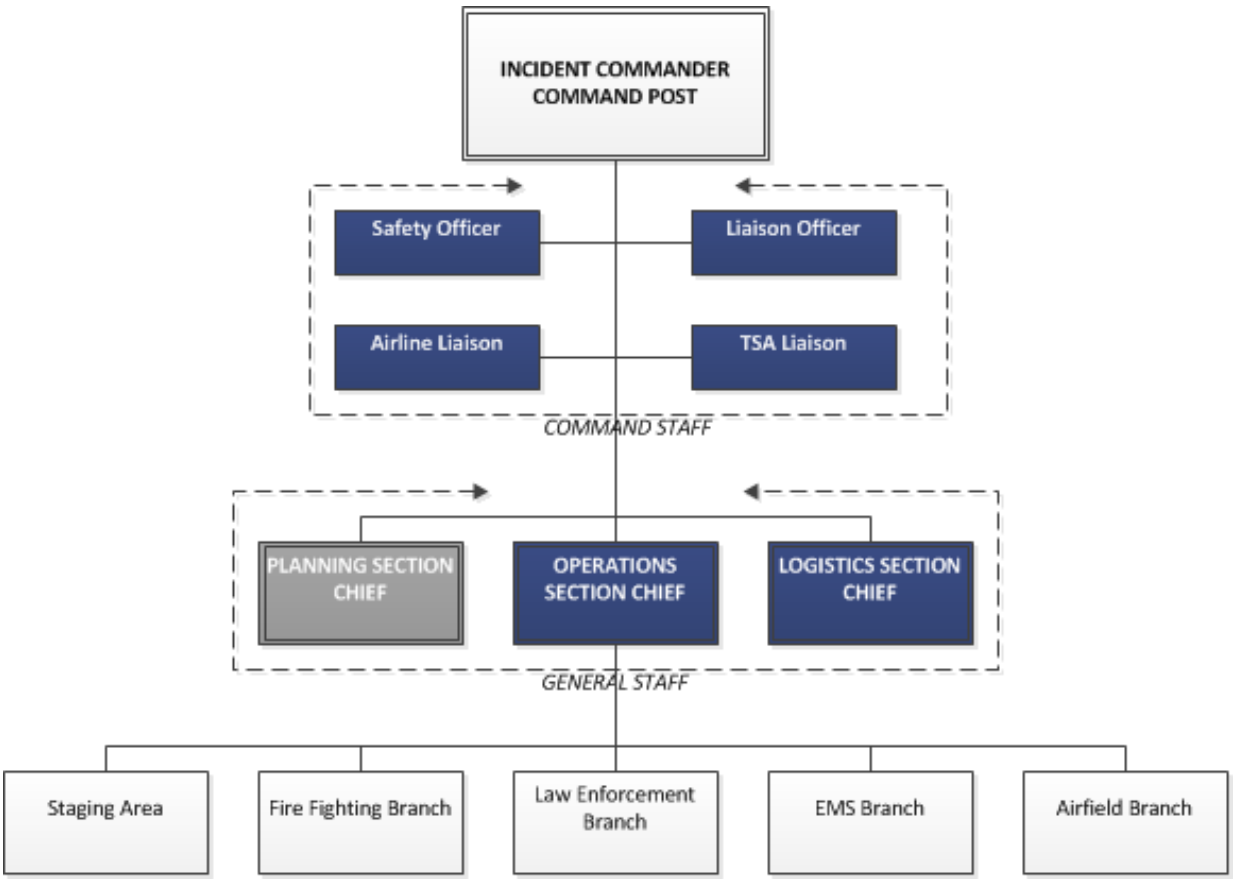


Figure 5 Line of Authority Organization Chart

When the AEC is staffed, generally the role of the section chiefs may transfer to the AEC. Each command structure is subject to the needs of the event and can be expanded or contracted as applicable.

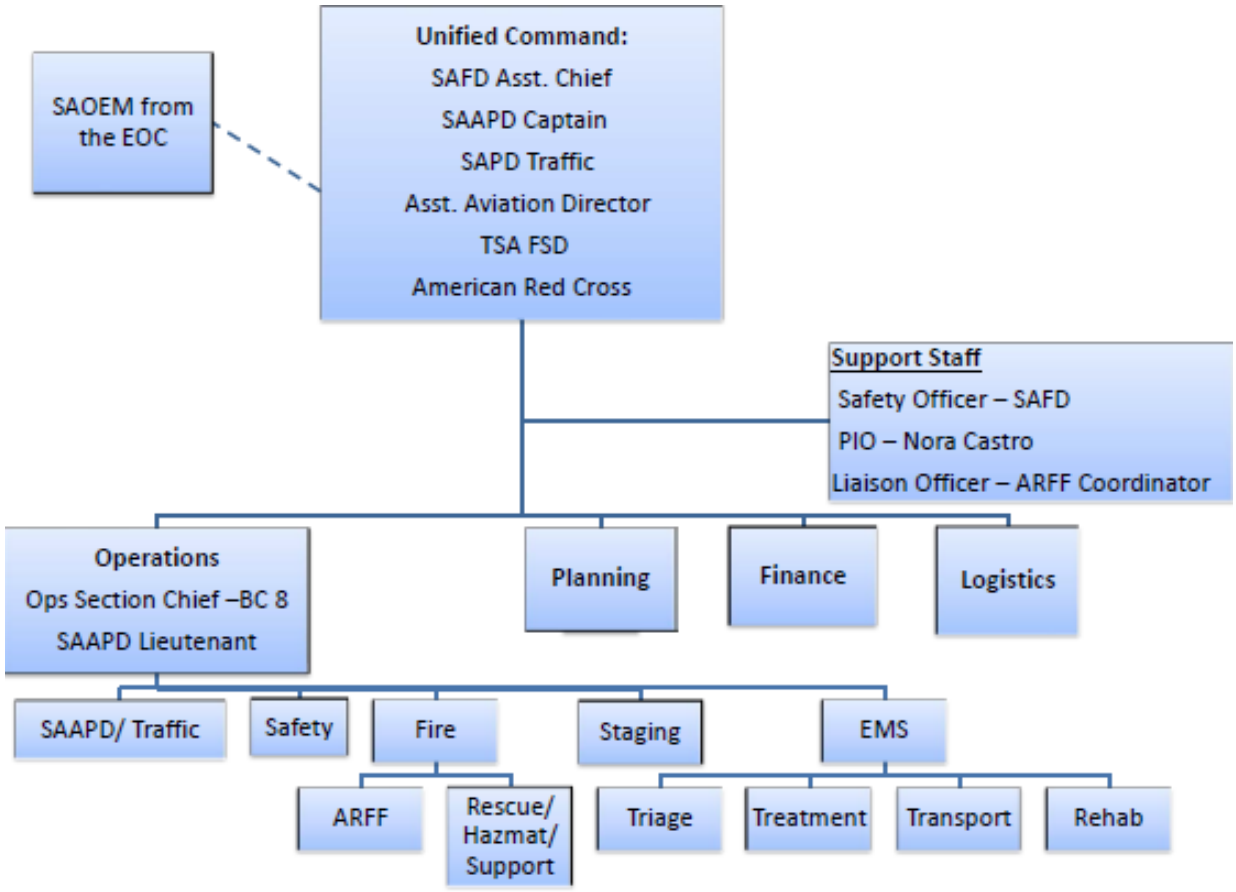


Figure 6 Basic Unified Command Structure at SAT

In the case of an aircraft accident the AEC Director is the overarching authority within the AEC. They do not necessarily have authority over the tactical command the IC/UC in the field but overarching responsibility for the entire airport campus. The following organization example from ACRP Report 13 represents an option for managing the AEC and lines of communication to the field CP. An aircraft accident is displayed and broken into three phases, one for response immediately following the accident, the next phase is for investigatory of the accident and the third is recovery getting the airport back to normal operations.

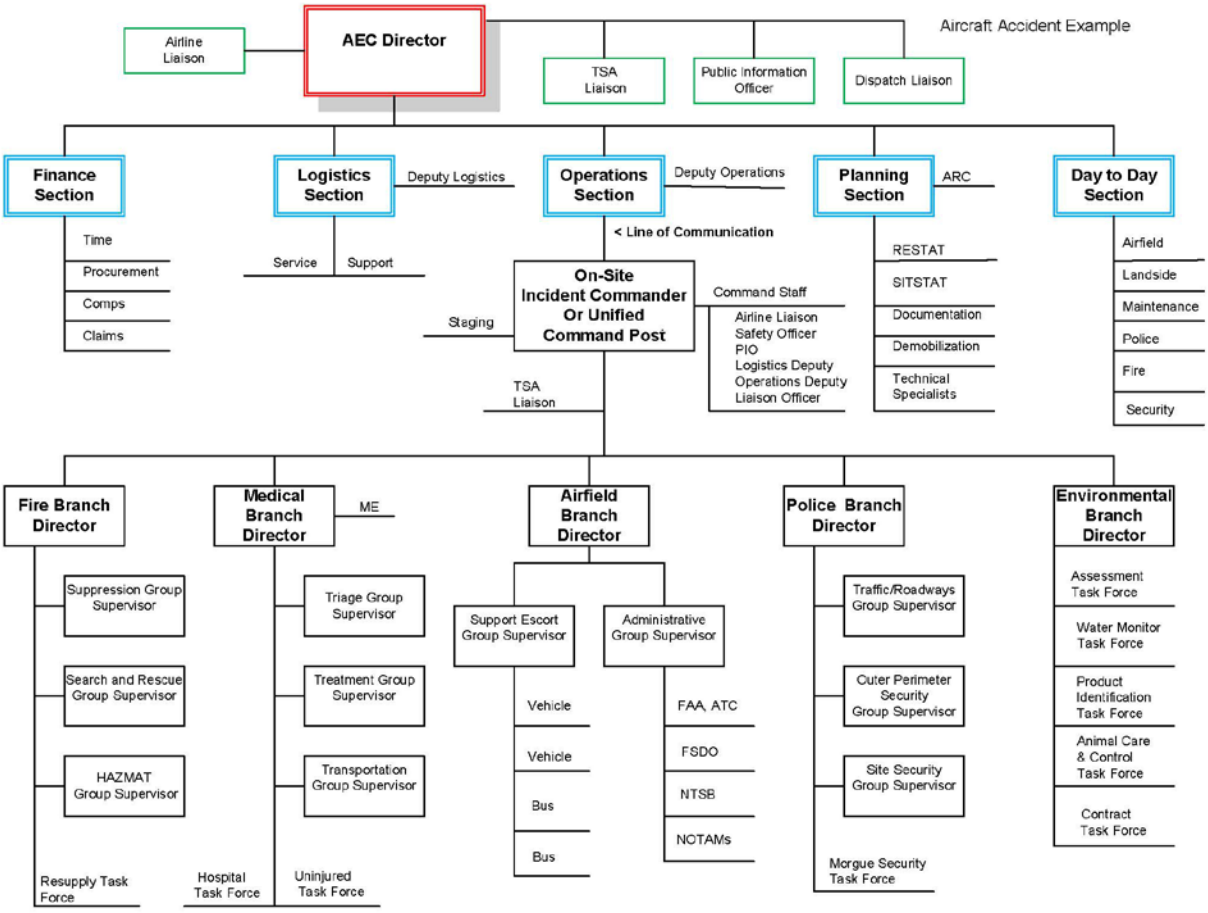


Figure 7 ACRP Report 13 Command Structure Phase 1 Response

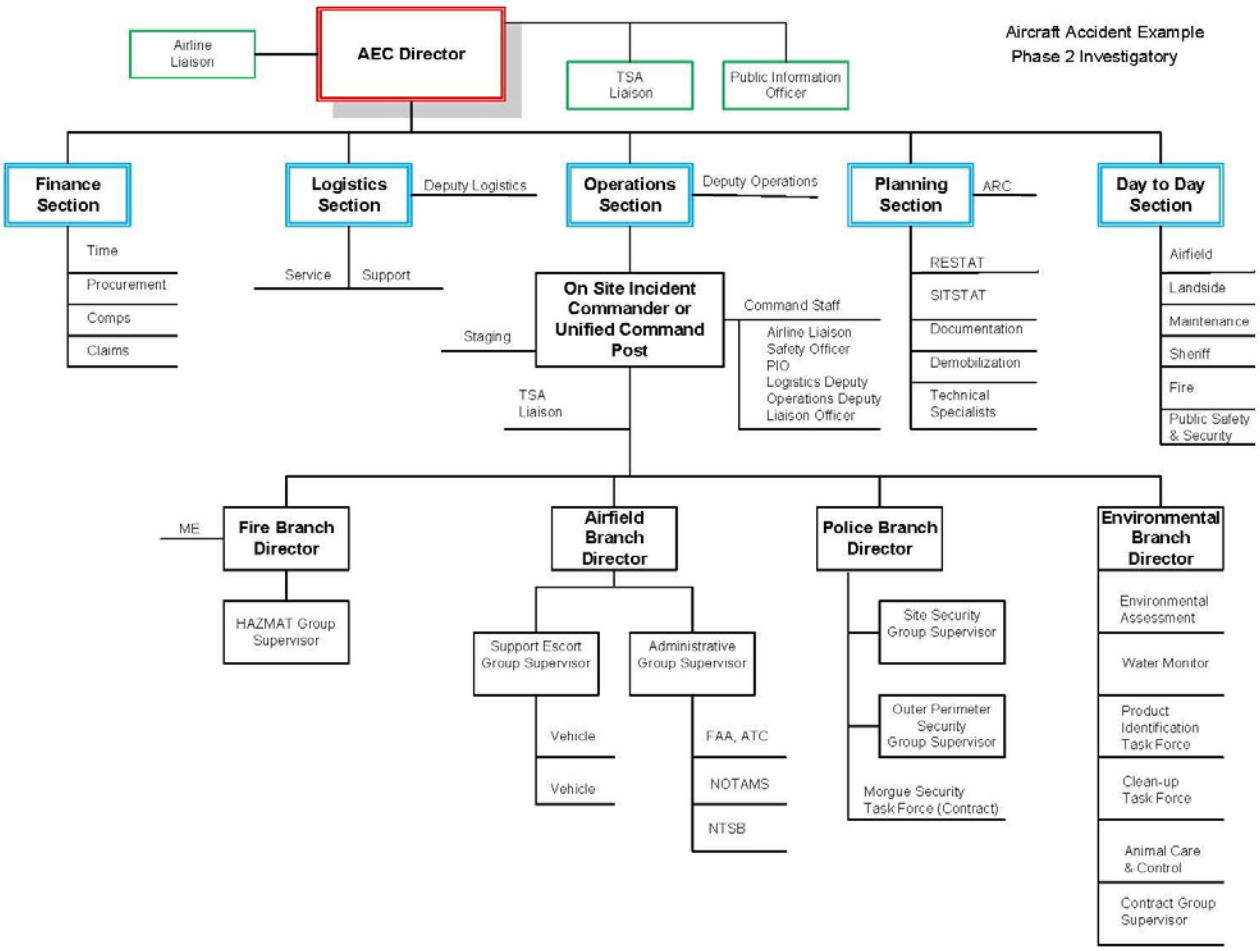


Figure 8 ACRP Report 13 Investigatory Phase 2

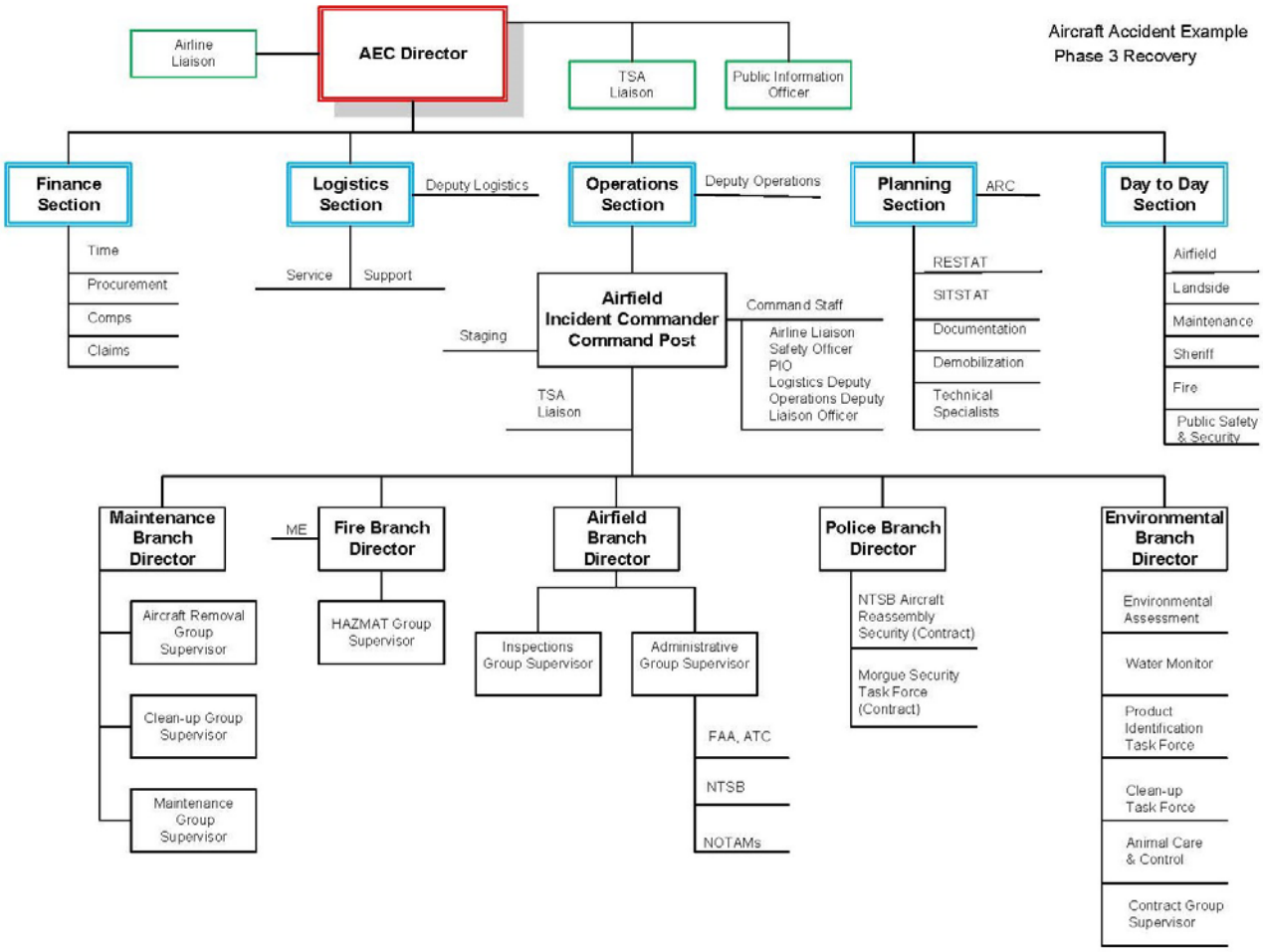


Figure 9 ACRP Report 13 Recovery Phase 2

Section 4 Space Requirements AICC/AEC and Configuration

4.1 Overview

The SAT staff's vision for the operations that will be housed in the AICC requires that the basic Airport Information Command Center (AICC) facility footprint should be sized to support both full time positions and those positions as needed. The ultimate deployment will consist of 23 positions including 3 console positions for future expansion and growth. The SAT staff's concept of operations includes individual consoles assigned to divisions and functions, with the dispatch function (ultimately requiring four positions) only dealing with transferring calls and communications and one dedicated to police dispatch. The following table provides a summary of the required positions in a full deployment.

Position	Seats	Shifts	Existing Head Count	Future Additional Head Count	Consoles
Dispatcher 1 (Police)	1	1,2,3			1
Dispatcher 2 (CCTV)	1	1,2,3			1
Dispatcher 3 (ACS)	1	1,2,3			1
Dispatcher 4	1	1,2,3			1
Dispatcher 5	1	1,2,3	13		1
Dispatcher Growth	2	1,2,3		TBD	3
AICC Coordinator	1	1	1		1
ADM (1 position FY16)	2	2/12hr		6	1
Maintenance Intake (WOC)	2	1,2	2	2	2
Security	1	1,2,3	14		1
Common Use	1	1,2			1
Common Use	1	1,2		TBD	1
Parking	1	1,2	4	1	1
IT[1]	1	1,2		5	0
Totals	**15**		**34**	**14**	**16**
As Needed Positions	**Seats**				**WS**
Terminal Services	1				1
Safety	1				1
Environmental	1				1
Fire	1				1
Operations	1				1
Stakeholders (airline, TSA etc.)	3				3
Total	**8**				**8**

[1]IT is a critical support position to the AICC/AEC function but has a separate office space adjacent to the AICC.

Table 5 Staffing and Seat Count

The City of San Antonio uses Evans Consoles at the COSA Public Safety Answering Point located at Brooks City Base. The Evans Response console is a sit-stand unit which allows users to adjust the position of the console on an individual basis. The features include individual environmental control, white noise and task lighting built into the unit. The units also include an integral cable management system. Appendix A provides technical specifications for each of the unit types noted below.

The proposed design approach includes the use of 3 different types of equipment as follows:

- Type 1 Console (13 total) – This unit has a foot print of roughly 8'x4' and is designed to support an individual user operating the console full time over multiple shifts. The unit will be equipped with 3 monitors and a 24 hour rated chair
- Type 2 Console (2 total) – This unit has a foot print of roughly 9'x4' and could support the addition of another person part time during an event or training. An option would also be to purchase a double position unit (if space allows). The unit will be equipped with 3 monitors.
- Type 3 Workstation (8 total) – This unit has a foot print of roughly 5'x3 feet and will be used by as needed divisional representatives in the AICC facility. The unit will be equipped with 2 monitors equipped with a plug-and-play for personal laptops

Figure 10 Type 1 Console

Figure 11 Type 3 Workstation

Each work position should be equipped with a "Status Indicator Light" to provide the AICC supervisor an "at-a-glance" management tool for console operator work load.

The police dispatch position requires a physical separation from the remaining AICC floor. The enclosed room will allow the officer to see the video wall but maintain privacy of verbal communications and law enforcement sensitive data.

In addition to the consoles and work stations, the space should be equipped with adequate storage space to support the needs of the operators. A large video wall should be included as well as white boards and facility maps.

The AEC space should be immediately adjacent to the AICC with direct access to both the AICC and circulation corridor. The AEC should have a view into the AICC but also include a means to block AICC view back into the AEC (shades, electronic privacy glass etc.). The space should be sized to support seating around a table for 24 people and include a workstation that duplicates the features and functions of the standard AICC work station. The room should also include sufficient video displays to meet the needs of the AEC controlled by the work station and include white boards and additional seating along wall areas. The AEC will be used to support irregular and emergency operations and should be accessible to outside stakeholders such as the FBI, TSA or other supporting agencies. The AEC can also be used during AICC daily briefings and to coordinate special operations such as VIP visits.

In addition to the core functions of the AICC and AEC there are a number of addition areas which are needed to support the operation of the facility.

- AEC Breakout Rooms – With in close proximity to the AEC there should be additional support spaces which can be used as breakout rooms during an event or combined together as a large training room. The spaces include the Joint Information Center (JIC) designed to support a minimum of 20 people, policy room designed to support a minimum of 10 people and 2 breakout rooms designed to support 4 people each. Individual spaces should include a flat screen display or high definition ceiling mounted projector and room for white boards and case work to hold miscellaneous binders and electronic equipment. The furniture should be flexible and when combined together form a large training room.
- Assistant Director – Space permitting the design should include an office for the Assistant Director of Operations. The office should include a desk and small conference table.
- AICC Manager – Office space to support the AICC Manager including a small conference table.
- Support Offices:
    - ADM - 1 office, 2 desks - Requires same floor access to the AICC near briefing rooms
    - AICC Coordinator – Requires same floor access to the AICC Floor
    - AICC Supervisors – Provide 2 work stations
    - AICC Special Projects Manager
    - Information Technology
    - Emergency Manager and Emergency Manager Coordinator (2 person space)
    - Reception Area at public access point to AEC space (Helps manage and control access to outside stakeholders during use of the AEC)
- Support Spaces:
    - Men's restroom and locker room
    - Women's restroom and locker room
    - Shower
    - Kitchen/break room
    - Storage and supply
    - Copy and printing
    - Go Kits storage room close to AICC (5'x10')
- IT Room - The primary information technology communications room must conform to COSA minimum design guidelines published by ITSD. Due to the critical nature of this facility, the room should be dedicated to the functions of the AICC/AEC and not be used to support general IT systems of the facility at large. The room must be adjacent to the AICC space and share the raised floor area.

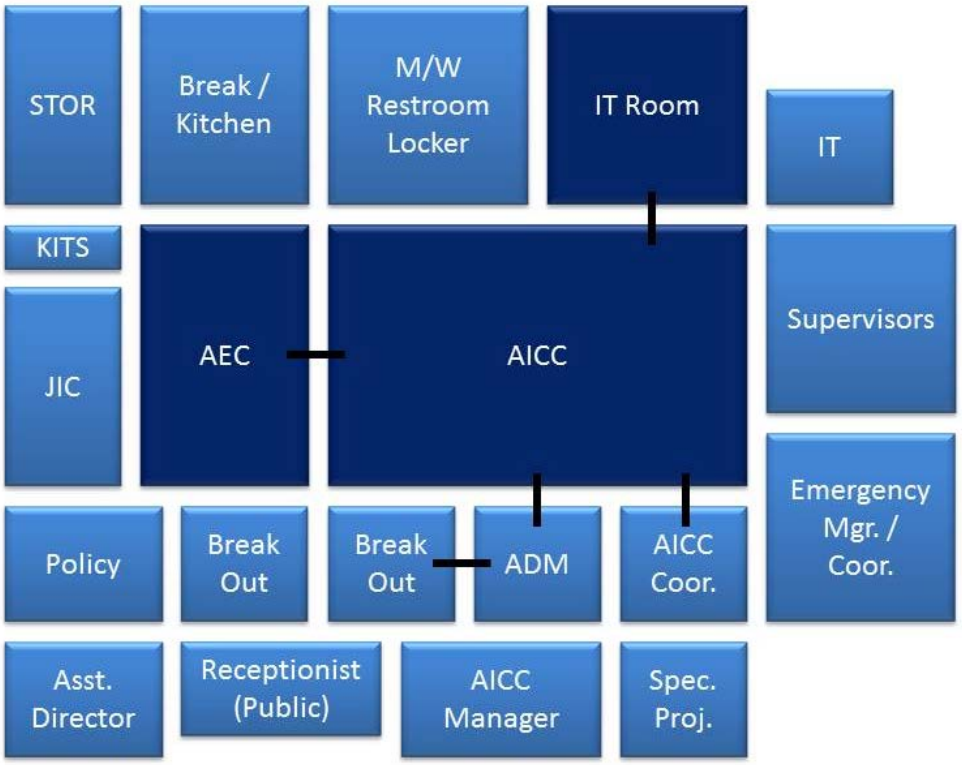


Figure 12 Block Diagram

Circulation areas should permit rapid access to work areas by creating the shortest paths between work areas that are practical. The area should be designed to maximize physical collaboration among the occupants and avoid partitions or console heights that can block lines of sight. The layout of each individual console should be identical to permit a common operational scenario regardless of where a staff member is seated. The illustrations shown below represent a concept scenario that can be used as a starting point for further studies to implement an AICC/AEC with the number of anticipated work positions. The rough concept floor plan shown in Appendix E utilizes the space available on the second floor of building 1840 and attempts to keep the stair towers and restroom infrastructure in their current position therefore some of the desired adjacencies noted above could not be accomplished. Further study of the space is required to obtain the optimal use of the space. Additional features and design requirements are found in section 6 facility considerations.

Figure 13 Concept Diagram AICC/AEC

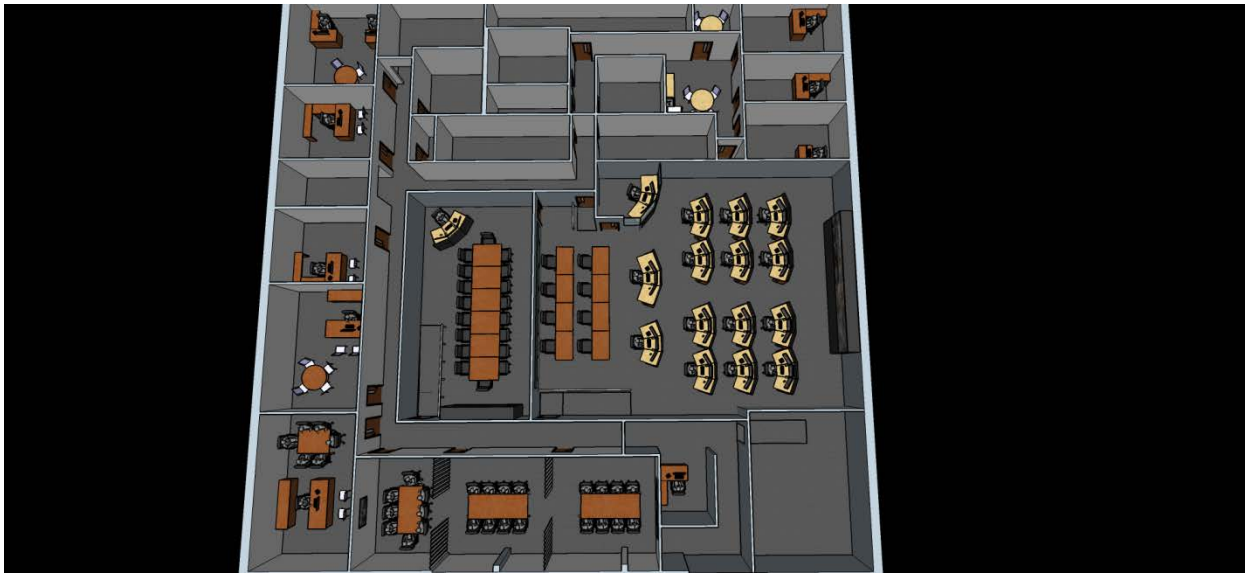


Figure 14 Concept 2nd Floor Layout Building 1840

Section 5 Facility Considerations

5.1 Architect and Environment

The preferred approach includes the use of a raised floor in the AICC, AEC and IT room at a minimum. The use of a raised floor facilitates the installation of technology infrastructure to consoles and other technology equipment. The floor should be carpeted for sound attenuation and static resistant.

Extensive use of passive acoustic material on walls, floors and ceilings to absorb ambient sound will be necessary to permit acoustical isolation for dispatchers. Isolation partitions are discouraged as they may block visual lines of sight to video wall and other AICC operator consoles. If partitions are used, they should incorporate windows to maintain line of site. Active electronic noise masking will be included as an additional feature with the procurement of the consoles.

Operator consoles should be designed with ergonomics taken into account. Seating at the consoles should be of the type designed for continuous occupancy, with hygienic surfaces that inhibit bacteria growth and are easily cleaned. All exposed surfaces should be easily cleaned of residual adhesive from post-it notes. Maintaining visual sight lines between the console operators is important to assist with developing a common operating picture. The sight lines to the video wall are equally important. Placement of consoles utilizing a standing operator position should be carefully considered to account for their impact on these lines of site. In addition there should be some visual continuity by providing a window between the AEC and the AICC to allow a common operating picture to be developed on a local level. The window should be provided with shades to allow the AEC occupants to elect for some privacy if the situation dictates as noted in the previous section.

5.2 Physical Security

The AICC/AEC facility provides critical operations support to the Airport and therefore must be adequately protected from security threats. Security threats can originate from both internal and external sources. The physical security of facilities requires the use of concentric levels of control and protection to provide progressively enhanced levels of security to deter, prevent, detect, delay, and respond to threats in the protection of assets. The concept of concentric levels of control is to protect the central asset (AICC/AEC) behind layers of security measures such that it is least exposed to the threats. Where a single line of defense might be easily breached, the concentric levels approach offers redundancy in lines of defense that is less likely to be breached.

The first point of control, or the outermost level, should be at the perimeter of the property consisting of fences and other barriers with one or two points of entry through gates controlled by an automated gate which can be accessed using the SAT credential. Public access and public parking should be limited and provided with video monitoring and controlled access. Public parking should not be allowed directly adjacent to the building with a standoff distance of 50 feet recommended.

The second point of control should be at the building perimeter consisting of doors and other openings equipped with card readers and video equipment to observe entrance and egress to the building. A

controlled vestibule at the public entrance should be considered which allows the public to access the vestibule and then granted access remotely once the purpose of the visit has been validated. It will be necessary to have both public access and secure areas in the building where the AICC is located. Lobby areas where visitors are greeted, media are staged and initial entry of crisis management team members is necessarily a public area. This public must be segregated from general support functions found within the building where the AICC/AEC is housed using electronic access control.

The third point of control should be the use of card readers and video surveillance to limit access to the AICC/AEC and IT Support areas. Beyond this, separation of the public from the general support function areas, the AICC itself should be segregated further using electronic access control to insure only those with official business necessitating access to the AICC have valid entry credentials. The primary entrance of the AICC should utilize a “sally-port” arrangement such that the two doors forming the sally port are interlocked so they cannot both be open at the same time. Final location and layout of controlled building areas will be finalized during the design phase of the project.

A video surveillance system capable of observing perimeter approaches to the building and parking areas is important is developing a secure perimeter for the building. A combination of fixed and Pan-Tilt-Zoom cameras would be applied, with fixed cameras dedicated to secure entry points and PTZ cameras capable of observing the entire perimeter as needed. Interior video surveillance using fixed cameras to observe secure entry points will provide documentation of who is entering and leaving the facility. These cameras would all be available for viewing within the AICC/AEC facility. Site lighting should be designed to support the surveillance system with illumination levels and color that assists in proper identification. Lighting should be coordinated with cameras to enhance surveillance and prevent interference.

Crime Prevention Through Environmental Design (CPTED) includes elements of natural surveillance, natural access control, and natural territorial reinforcement. CPTED promotes the principles that proper design and effective use of the built environment can discourage, reduce, or remove potential risks. CPTED should be used to evaluate the building 1840 site and building designs to create and enhance the concentric circles or layers of security protection.

Procedures for production, storage, transmission and disposal of both physical and electronic information should be developed and monitored by management. Systems should be duplicated across multiple facilities (i.e. no single point of failure). Backup media should be removed immediately and stored in an external, secure, environmentally controlled facility. Networks and infrastructure should preferably have two separate pathways to the AICC/AEC facility.

5.3 Mechanical

The AICC should be served by an independent and zoned HVAC system. The system should provide heating, cooling, dehumidification and filtration. The system will provide a space temperature of 72 degrees F in cooling mode at ambient conditions of 100 degrees DB and 75 degrees WB. The system will provide a space temperature of 70 degrees F in heating mode at an ambient temperature of 30 degrees. Humidity should be limited to 60%. Equipment should include MERV 8 filters.

The system will operate 24 hours a day and 7 days a week and will be divided into multiple zones, each with individual thermostats. One zone will serve the office areas, one zone should be for the AICC and AEC and its associated meeting rooms, one zone will serve the break room and one zone will serve the general work area, lockers and restroom with the option to provide individual climate control at each workstation via floor level air distribution.

There should be exhaust from the lockers, the restrooms and the break room. Ventilation should be provided per code and ASHRAE standard 62.1, and should exceed the amount of exhaust to ensure the space is at a positive pressure.

Air distribution should be achieved using sheet metal ducts and architectural style plaque diffusers. Flexible duct to diffusers should be limited to a maximum length of five feet. It is recommended that the noise levels should be kept to a maximum of 25 NC. The return air should also be ducted. Controls should be DDC and should be tied into the building HVAC management system.

The IDF is required to be served by two redundant computer room air conditioning units to allow for failure of a single unit to not impact the operation of the facility. It is recommended that these units be a DX type, and independent of any other AICC HVAC systems. The system needs to provide heating, cooling, humidification, dehumidification and filtration. The system also must be able to provide a space temperature of 68 degrees F in cooling mode at ambient conditions of 115 degrees DB and 85 degrees WB. The system must be capable of providing a space temperature of 65 degrees F in heating mode at an ambient temperature of 30 degrees. Maximum humidity should be limited to 55%. The minimum humidity should be 30%. It is recommended that the equipment include MERV 8 filters.

The system should be capable of operating 24 hours a day and 7 days a week. The system controller should be capable of operating in a lead lag configuration. It is recommended that the system controller be DDC and should be tied into the AICC building management and alarm system.

The total estimate load based on the size and layout of the equipment noted in this report has been summarized at the end of this section.

5.4 Electrical

5.4.1 General

The AICC is a mission-critical facility required to ensure the safety, security and efficient operations of the entire airport. As such, the electrical distribution system for this facility must be designed to an appropriate reliability level. Parallel redundant feeders to Building 1840 would provide a high-level of utility redundancy but may not be achievable depending on current services and conditions. The next level of redundancy would be at the distribution level within the AICC and more specifically the emergency generator and uninterruptible power supply (UPS) providing emergency and back-up power to the AICC. An emergency generator

does not currently exist at Building 1840 and will be a necessity to support emergency loads at the AICC. A dedicated UPS needs to be provided to support all mission critical equipment, such as consoles, workstations, equipment cabinets, video walls, AV equipment, etc.

Estimated loads for the AICC and surrounding offices and support spaces have been summarized at the end of this section.

5.4.2 Normal Power

Normal power loads will be served from Building 1840 electrical distribution system. Normal power loads will consist of HVAC equipment, electric water heating, and outlets for general purpose use, such as for copiers, printers, fax machines, cleaning equipment, refrigerators, microwaves, etc.

Branch circuit panel boards to serve the normal power loads need to be located inside a dedicated Electrical Room serving the AICC. Panel board feeders will be connected to the main electrical distribution system.

General purpose non-emergency convenience receptacles need to be located throughout the entire operations center and where required to serve specific equipment (such as refrigerators, microwaves, coffee, etc.). Recessed floor receptacles will also be necessary in all conference rooms, AEC and AICC.

5.4.3 Emergency Power

Requirement for emergency power backup is based on criticality of the AICC and the need for it to remain operational after a power failure or event. When required, only essential systems should be placed on the emergency system with a generator being the primary emergency power source. Essential systems for the AICC, which may include HVAC and lighting, should be automatically restored to operation within 10 seconds after interruption of the normal source. In addition, voice, data and communications systems should be placed on UPS power. Battery run-time for UPS should be 15 minutes, at a minimum and designed to an N+1 redundancy level.

Each equipment cabinet in the IDF Room should be provided with dedicated branch circuits from dedicated UPS panelboards to support dual corded equipment. Each AICC console and workstation will be provided with a dedicated UPS branch circuit. Consoles and workstations grouped together will be served from separate UPS panelboards to avoid a single point of failure to the entire area. TVSS protection needs to be provided on all panelboards supplying power to equipment in this area.

The Main Operations Center (Security, Parking, MX Intake, ADM, Common Use, and Workstations 1-5) and all Meeting Rooms (NIMS, AEC, NIMS JIC, Policy and Training) will need to have a minimum of one general purpose emergency receptacle on each wall. All A/V and

security equipment will need to be connected to the emergency generator. Each office will need a minimum of one emergency receptacle to serve a personal computer.

5.4.4 Lighting

Lighting levels in the AICC should be generally subdued to improve the contrast from the LCD monitors associated with each work area. Care should be given to avoid positioning light fixtures around the video wall to prevent glare off the surface of the screens. Task lighting focused on the console work surfaces should be sufficient to facilitate handwriting and approximate the minimum lighting levels required by local code. General illumination of the AICC from troffer fixtures should be provided which can be switched on for cleaning of the room. All other lighting should be zoned to align with work areas or circulation areas and be dimmable, not exceeding the minimum required by regulation.

Interior lighting requirements will vary throughout the AICC based on the type of operations and on whether the AICC is under normal or full operating conditions. All lighting in critical areas should be served by the emergency power system to allow continuous operation of the AICC in the event of a power outage. Consider dimmable indirect lighting systems in operations rooms, conference rooms and areas with large format video display to minimize direct source glare. Provide battery powered emergency lights at all IDF equipment rooms and console positions as well as areas required by NFPA 101 Life Safety Code.

Independently adjusted task lighting will be provided at each console.

- **Lighting System Descriptions**

The AICC needs to be provided with recessed high efficiency LED lighting fixtures. These light fixtures need to be connected to an emergency generator.

All Meeting Rooms areas need to be provided with a combination of pendant mounted linear LED lighting fixtures over the conference table and recessed LED downlights around the perimeter. These light fixtures need to be connected to an emergency generator.

Enclosed offices will need recessed high efficiency LED lighting fixtures (similar to the RT LED series).

Corridors, Kitchen, and Locker area will need recessed prismatic troffers with T-8 lamps.
All exit signs need to be LED with die cast housings.

All LED lighting fixtures need to be equipped with 0-10V dimmable drivers.

- **Means of Egress Illumination**

Means of egress normal lighting needs to be provided in accordance with the NFPA 101 requirements. The minimum illumination for floors and walking surfaces should comply with NFPA 101 and IES recommendations.

Means of egress emergency lighting will need to be provided for not less than 3 hours in the event of failure of the normal lighting. Emergency lighting will be arranged to provide initial illumination in compliance with NFPA 101.

- **Lighting Control**

An architectural dimming system consisting of architectural dimmer modules and dimmer cabinets will provide automatic control of lighting fixtures in the main operations center, corridors, conference rooms and training room. The lighting control system should comply with applicable energy codes and ASHRAE 90.1.

The dimming system needs to include an interface to the AV system.

Low voltage wall stations and wall mount touch screens will provide manual control and override capability of lighting control in the main operations center, all conference rooms and the training room.

Occupancy sensors will provide automatic control of lighting fixtures in enclosed offices, locker room, and kitchen.

Light fixtures located adjacent to video walls should be controlled/dimmed separately from the rest of the room.

5.4.5 Grounding

All equipment and raceways inside the IDF Room will need to be grounded per EIA/TIA-607. Telecommunication ground bars (TGB) need to be provided in the room for grounding connections. In addition to providing ground connections to equipment inside the room a telecomm grounding backbone will need to be provided from the TGB to the Telecomm Main Ground Bar (TMGB) located in the Main IDF Room in Building 1840.

5.4.6 IDF Room

A dedicated Telecomm Room needs to be provided to support passive and active equipment racks/cabinets to support systems required in the AICC. The IDF must be located so as not to allow the length of Category 6 horizontal station cables to exceed 290ft (90m). For this project, it is expected that one (1) Primary IDF will be required to provide coverage of the AICC. The preliminary size for the IDF needs to be large enough to support a minimum of five (5) full size equipment cabinets with space for two (2) future cabinets and a centralized cabinet-type UPS.

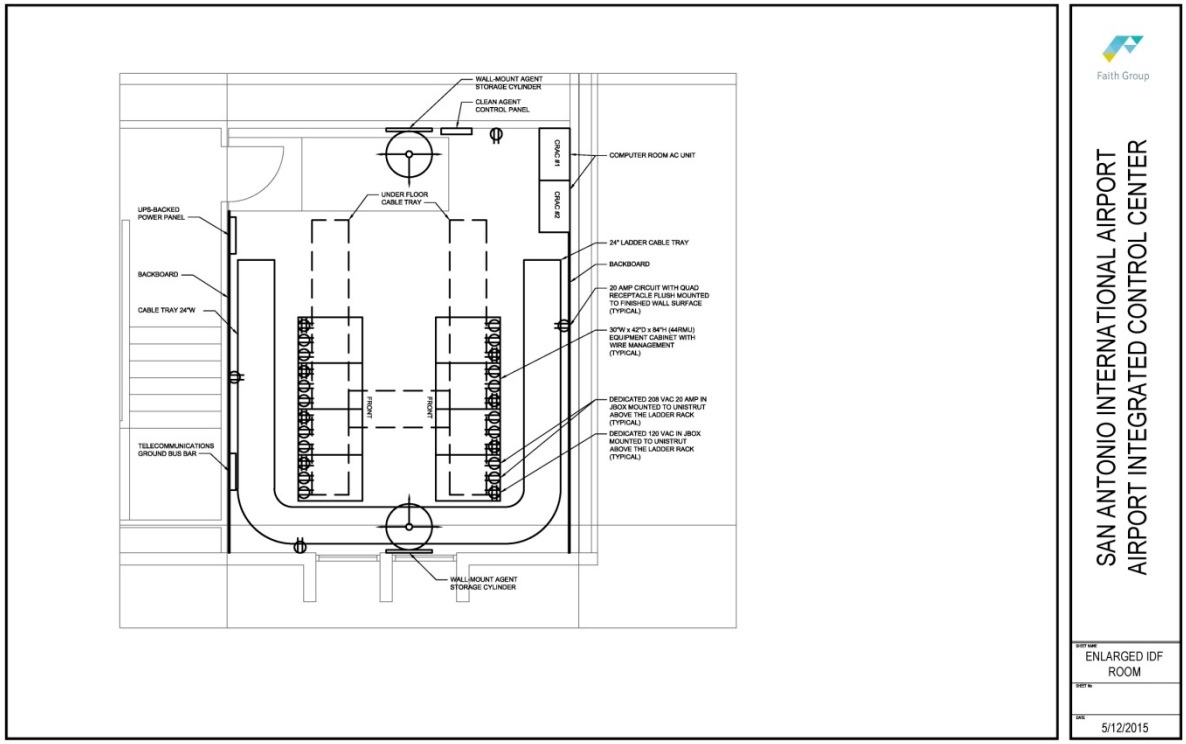


Figure 15 IDF Room

IDF's may be located next to Electrical Rooms if it is desired to keep support rooms within the same area. The IDF should be on a raised floor and located adjacent to the AICC for easy cable installation. Basic architectural requirements for the IDF include:

1. Doors: 3-foot wide by 7-foot tall minimum, out swinging (where allowed). Sealed doorsills and frames to support clean-agent fire protection system. Doors should be equipped with electric strike or lever set and card reader for access control.
2. Flooring should be non-carpeted static resistant flooring if floor tiles are to be installed they must be Static Dissipative Tile (SDT), and a proper ground strap should be installed under the floor tile and grounded to the Telecommunication Ground Busbar (TGB).
3. Ceiling height should be a minimum of 10-foot, 0-inches (clear of obstructions) above finished floor (A.F.F.). A suspended ceiling should not be provided. A finished ceiling should not be required. If a ceiling finish is applied, the finish should minimize dust and be light in color for additional brightness in the room. If fire proofing materials are present, proper sealing techniques should be used to prevent material falling from the ceiling.
4. Walls of the IDF should be full height partition (slab-to-slab) construction and have a one-hour fire rating. Joints should be sealed properly at floor and ceiling to support the clean-agent fire protection system. No windows should be located in walls or doors. Walls should be covered with fire rated backboard painted white with fire retardant paint on all sides. Backboard should start 12" above finished floor and extend eight feet high, minimum.

5.4.7 Estimated Electrical and Heat Loads

Room Description	Qty	Elec Load (W)	Total (W)	Heat Load (BTU)	Total (BTU)	Notes
AICC						
Console #1 (Police)						
Monitor (22" LED)	4	50	200	150	600	
PC	2	300	600	350	700	
Console #2						
Monitor (22" LED)	4	50	200	150	600	
PC	2	300	600	350	700	
Console #3						
Monitor (22" LED)	4	50	200	150	600	
PC	2	300	600	350	700	
Console #4						
Monitor (22" LED)	4	50	200	150	600	
PC	2	300	600	350	700	
Console #5						
Monitor (22" LED)	4	50	200	150	600	
PC	2	300	600	350	700	
Main Console #1						
Monitor (22" LED)	4	50	200	150	600	
PC	2	300	600	350	700	
Main Console #2						
Monitor (22" LED)	4	50	200	150	600	
PC	2	300	600	350	700	
Common Use Console #1						
Monitor (22" LED)	4	50	200	150	600	
PC	2	300	600	350	700	
Common Use Console #2						
Monitor (22" LED)	4	50	200	150	600	
PC	2	300	600	350	700	
Spare Console #1						
Monitor (22" LED)	4	50	200	150	600	
PC	2	300	600	350	700	
Spare Console #2						
Monitor (22" LED)	4	50	200	150	600	
PC	2	300	600	350	700	
Parking Console						
Monitor (22" LED)	4	50	200	150	600	
PC	2	300	600	350	700	
ADM Console						
Monitor (22" LED)	4	50	200	150	600	

Room Description	Qty	Elec Load (W)	Total (W)	Heat Load (BTU)	Total (BTU)	Notes
PC	2	300	600	350	700	
AICC Coord Console						
Monitor (22" LED)	4	50	200	150	600	
PC	2	300	600	350	700	
Stakeholder Workstation (8 Total)						
Monitor (22" LED, 2 per)	16	50	800	150	2400	
PC (1 per)	8	300	2400	350	2800	
Video Wall						
Monitor (55" LED)	30	230	6900	780	23400	
PC for Video Wall	30	300	9000	350	10500	
AICC Misc.						
Printers/Copier	2	800	1600	1400	2800	
AICC Total			**31900**		**60100**	
AEC						
Console #1						
Monitor (22" LED)	4	50	200	150	600	
PC	2	300	600	350	700	
Video Wall						
Monitor (55" LED)	6	150	900	500	3000	
PC for Video Wall	6	300	1800	350	2100	
Monitor (22" LED)	4	50	200	150	600	
AEC Total			**3500**		**6400**	
Training Room #1						
Monitor (55" LED)	1	150	150	500	500	
PC for Video Wall	1	300	300	350	350	
Training Room #1 Total			**450**		**850**	
Training Room #2						
Monitor (55" LED)	1	150	150	500	500	
PC for Video Wall	1	300	300	350	350	
Training Room #2 Total			**450**		**850**	
Training Room #3						
Monitor (55" LED)	6	150	900	500	3000	
PC for Video Wall	6	300	1800	350	2100	
A/V Rack (For all Train Rms)	1	3000	3000	9500	9500	
Training Room #3 Total			**2700**		**5100**	

Room Description	Qty	Elec Load (W)	Total (W)	Heat Load (BTU)	Total (BTU)	Notes
Offices						
Monitor (22" LED, 2 per)	12	75	900	150	1800	Includes a total of (6) offices: AICC Coord., AICC Super, ADM, Asst. AP Dir, AICC Mgr., Spec Proj.
PC (1 per)	6	400	2400	350	2100	
Printers/Copier	1	800	800	1400	1400	
Office Total			**4100**		**5300**	
Emergency Mang. Office						
Monitor (22" LED)	4	75	300	150	600	
PC (1 per)	2	400	800	350	700	
Printer	1	150	150	350	350	
Emergency Mang. Office Total			**1250**		**1650**	
IT Mang. Office						
Monitor (22" LED)	3	75	225	150	450	
PC (1 per)	3	400	1200	350	1050	
Printer	1	150	150	350	350	
IT Mang. Office Total			**1425**		**1500**	
Telecomm Room						
Cabling Rack	1	0	0			
LAN Rack	2	3500	7000	5000	10000	
Server Rack	1	4500	4500	15000	15000	
Radio/Comm Rack	1	3500	3500	5000	5000	
Spare Comm Rack	1	3500	3500	5000	5000	
Total TR			**18500**		**35000**	
TOTAL AICC, AEC, OFFICE, TR			**64275**		**116750**	
General Power						
UPS	1			23000	23000	*Located in Elec Room*
Lighting	2	7000	14000			
General Purpose Recept.	1	7000	7000			
Refrigerator/Micro/Coffee	1	4500	4500			
Kitchen Water Heater	1	2000	2000			
General Power Total			**27500**		**23000**	
OVERALL TOTAL			**91775**		**139750**	

*The 55-inch LCD screens were compared with 60-inch and 70-inch LED projection screens. The heat load from the 55-inch screens represent the worst case scenario.

Table 6 Electrical & Heat Loads

5.5 Plumbing/Fire Protection

Each IDF Room (IDF) should be protected with a gaseous clean-agent fire suppression system (HFC-227, HFC-125 or hybrid water/nitrogen mist). Each system should be complete with clean agent tank located within the IDF, tank-mounted distribution nozzle, control panel, manual discharge station with manual discharge switch and abort switch, visual and audible alarms, and required detectors. The IDF spaces are small enough to be served by a stand-alone system (floor mounted tank, with overhead piping and ceiling mounted nozzles, are used by some manufacturers). Entire Clean Agent fire suppression system, components, and accessories should be by a single manufacturer. Any fire protection system shall be incorporated into an existing airport fire alarm system.

Any room protected by a clean-agent fire suppression system should be separated from adjacent spaces with partition walls up to the deck above and all penetrations need to be sealed air-tight. Room pressure testing is advised to insure the air-tight integrity of the room. All future penetrations for cabling should be sealed. The operation of a clean-agent system requires the protected space to be sealed. This allows the clean agent to be dispersed at the proper concentration. Any openings in the envelope of the protected room could allow the clean-agent to escape and render the system ineffective in suppressing a fire. All testing should be in accordance with NFPA 2001.

Section 6 Infrastructure and Technology Systems

6.1 Overview

Electronic systems are an integral part of all aspects of Airport operations and security. The new AICC/AEC is a mission critical center and thus will require new systems in addition to expansion and relocation of some of the existing systems from the current OCC and AEC. In order to produce this report, the project team evaluated the existing electronic systems that will be associated with or affected by the proposed AICC/AEC. These system evaluations are based on high-level analysis and subsequent details will be identified during the design phase of the project to refine the AICC/AEC concept and further develop its requested and required systems for optimal operation.

Since the new center will be a centralized facility comprised of both an AICC in addition to an AEC, it must be capable of supporting not only the day-to-day operations and functions of the stakeholders, but also coordinated responses to incidents. Each stakeholder located within the AICC/AEC will therefore require access to a myriad of Airport systems, technologies and communications facilities in order to support their operations and functions from within the AICC/AEC. This includes being able to monitor, control and maintain various systems, having access to vital information and being able to dispatch and communicate with Airport departments, agencies and the general public, if necessary. Some of these systems will be unique to the department or agency, while other systems will be more common and provide the opportunity for integration.

The AICC/AEC will also need to facilitate communications and coordination both within the facility between the departments and agencies, and with outside entities such as mutual aid agencies, other governmental agencies and the media. Thus, various communications systems and incident management tools should be made available within the AICC/AEC to enhance the timely response and decision-making processes during Airport incidents and events.

A majority of the electronic systems can be extended over the existing Airport communications networks into the AICC/AEC. Some systems required within the AICC/AEC may be stand-alone or legacy systems such as fire alarm that cannot be transported or are not planned to be transported over these high-speed networks. These systems will need to be evaluated on a case-by-case basis to determine the best method of incorporating them into the AICC/AEC.

The mission critical nature of the AICC/AEC requires systems to remain operational not only during daily operations, but also more importantly, during emergencies at the Airport. These systems must therefore be transported over reliable, fault-tolerant networks that employ redundant network equipment and path diversity in the infrastructure for routing of backbones cables into the AICC/AEC. The following table represents the proposed systems that should be available at each for each phase of the project.

Technology Phasing					
Department	Position Count	Technology Systems Required			Comments
		Phase 1	Phase 2	Phase 3	
ADM	1	COSA Network, ACS, CCTV, CAD, Radio, Public Address, Internet Access, Fire Alarm, Intelex, SeMS, MUFIDS Input, RAP, BHS Monitoring, Telephone, Fire Alarm	PSIM, Status Dashboard (system outages, runway closures, special events, etc.) Operational Log, Common Use Software, Queue Wait Time, Resource Management. MUFIDS	SCADA	Console Positions
Airport Dispatch	4	COSA Network, ACS, CCTV, CAD, Radio, Public Address, Internet Access, Fire Alarm, Telephone	MUFIDS		
Police Dispatch	1	COSA Network, ACS, CCTV, CAD, Radio, Public Address, Internet Access, Fire Alarm, Telephone, Wants/Warrants Computer, Fire Alarm	PSIM		
Security	1	COSA Network, ACS, CCTV, Radio, Telephone, Public Address, CAD, Network, Fire Alarm	Identity Management, PSIM		
Spare	2			COSA Network, Radio, ACS, CCTV, CAD, Telephone, Public Address, Internet Access, Fire Alarm PSIM	
AICC Coordinator	1	COSA Network, ACS, CCTV, CAD, Radio, Public Address, Internet Access, Fire Alarm, Intelex, SeMS, MUFIDS Input, Telephone	PSIM, Status Dashboard (system outages, runway closures, special events, etc.), Operational Log		

Technology Phasing					
Department	Position Count	Technology Systems Required			Comments
		Phase 1	Phase 2	Phase 3	
Maintenance Work Order	2	COSA Network, CCTV, Radio, RAP BHS Monitoring, Telephone	CMMS	SCADA	
Common Use	2			COSA Network, Radio, CCTV, Common Use Software, Queue Wait Time, Resource Management, MUFIDS	
Parking	1	COSA Network, Radio, CCTV, PRCS, AVI, Telephone	Variable Message Boards, Traffic Monitoring		
Safety	1	COSA Network, CCTV, Intellex, Telephone			Workstation Positions
Environmental	1	COSA Network, CCTV Noise Complaints, Telephone			
Operations	1	COSA Network, CCTV, Eagle, Telephone, Queue Management, MUFIDS			
Terminal Services	1	COSA Network, CCTV, BHS Monitoring, RAP, Telephone, Queue Management, MUFIDS	CMMS		
Fire Department	1	COSA Network, CCTV, Fire Alarm, Telephone			
Stakeholder	3	COSA Network, CCTV, Internet Access, Telephone			
TOTAL Positions	23				

Table 7 Technology Phasing

- Radio Systems – Requires dedicated radio console and user license
- CCTV Systems – Requires multi-monitor workstation, network connection to airport security VLAN and User license
- ACS Systems – Requires multi-monitor workstation, network connection to airport security VLAN and User license

- Public Address System – Requires a separate network connection/switch (not on VLAN) to the Layer 2 public address network and dedicated digital paging microphones, monitor speakers, amplifiers.
- Telephone System – Requires multi-line phone instrument and connection to voice network.
- CAD System – Requires multi-monitor workstation, network connection to SAPD VLAN and User license
- Fire Alarm/Life Safety Systems – Requires multiple strands of dedicated single-mode fiber optic cable between workstation and Fire Alarm Control Panels (cannot be on network), dedicated fire alarm workstations
- Parking Revenue Control System (PRCS) – Requires dedicated workstation, monitor and network connection (due to PCI data).
- Automated Vehicle Identification (AVI) – Requires workstation, software and monitor with network connection (VLAN) to AVI system
- Variable Message Boards (VMB) – Requires workstation, software and monitor with network connection to VMB system.
- Baggage Handling System (BHS) – Requires workstation, software and monitor with network access to the BHS network (not part of the airport network)
- Report A Problem (RAP) – workstation and monitor with access to the Internet
- Computerized Maintenance Management System (CMMS) – workstation, monitor, license and software with access to the airport Intranet
- Common Use Systems – workstation, monitor, software, license with access to the airport Intranet
- Intellex Safety Management System – workstation , monitor, license and access to the Internet
- Queue Wait Time – workstation and monitor with access to the airport Intranet
- Multi-User Flight Information Display System (MUFIDS) – workstation, monitor, software, license and access to the MUFIDS VLAN.
- Noise Management – Workstation, monitor, software and license with access to the noise management network.
- Supervisory Control and Data Acquisition (SCADA) – workstation, monitor, software and license with access to the SCADA VLAN.
- Identity Management – workstation, monitor, software and license with access to the security VLAN.
- Safety and Environmental Management System (SeMS) – workstation, monitor and license with access to the airport Intranet.
- Physical Security Information Management System (PSIM) – multi-monitor workstation with software, license and access to the airport Intranet.

The technology that exists in the current OCC must be made available to the AICC. Access to the public address system and fire alarm/life safety systems for the terminal must be preserved in the new facility with the ability to interact with these systems expanded to all console operator positions. Additionally, the CCTV and Access Control systems must be expanded so as to be available to multiple console operator positions. Consideration for access to the CAD system should be evaluated such that either

more console operators are certified to properly utilize it or limit access to the CAD software via sign-on authorization, even though it may be available at more than the Police console positions. As duties are increased for AICC staff, additional access to software programs may be required. The 4 monitors planned for each multi-function console (1 row of 4 monitors) would have to be able to multi-task displaying these programs. Virtualizing work spaces using remote servers and dumb terminals has become a popular way of providing this flexibility, however the display of high resolution full motion video as is required by CCTV is often impeded by such virtualization schemes. Care should be taken when considering this option to insure the integrity of the video quality is not impacted.

Radio consoles will require a dedicated monitor interface as they utilize a touch screen and other operator controls that are unique to the radio system. Audio recording of telephones and radio frequencies from all console positions is required with access to the recordings available to the supervisor in their office. Fire alarm monitoring will require the use of dedicated hardware due to restriction on hardware by the manufacturer to maintain their approval by the Authority Having Jurisdiction (AHJ).

6.2 Workstation Configuration

It is important to streamline the physical layout of the technology used at each console so that the work surfaces do not become a jumble of keyboards and mice for each system they are required to operate. There are several approaches to achieving this goal. The least desirable way is to utilize software based Keyboard/Video/Mouse switch to allow switching between several machines using a single keyboard/monitor and mouse. This arrangement does not allow the sharing of information among various systems. A more practical low cost solution is to employ a single powerful workstation running the necessary application simultaneously with a multi-output video card to leverage the ability of Windows to expand the desktop to multiple monitors. Each application can be running on an individual window sized to match the monitor viewing area. With this approach information can be cut and pasted between applications to avoid re-typing information.

While both of the approaches listed above reduce the number of keyboards the operator has to deal with, they really do not address fully leveraging the automated information sharing that PSIM software can provide. Physical Security Information Management software operates similar to incident command software in that it assembles multiple pieces of information from different sources relevant to an incident into a cohesive actionable plan. The software allows for automation of common tasks and uses a check list format to insure all steps of standard operating procedures are followed. The software also can provide a forensic analysis of an event as a learning tool to improve response processes. Some enhanced capabilities available on a few PSIM platforms can scan events from various systems and look for patterns and abnormalities which can indicate a potential security issue. It is recommended that a PSIM be part of the development of an AICC Phase 2 Technology Enhancement Project. In addition to the workstation, telephones and radio equipment, each with their own interface not capable of being integrated with other systems would be required at each position

6.3 Audio/Video Systems

In order to develop a common operating picture for all occupants of the AICC, a video wall is necessary. The video walls should provide for display of any visual information required by the AICC/AEC. This could include video surveillance, broadcast television, weather radar, flight data and video conferencing information. Currently only broadcast TV and CCTV image are viewable on large format monitors in the OCC, with flight information and weather available on each workstation via a web browser. In order to bring these multiple sources to the display system it is necessary to have a video wall controller. This device transforms each video source into a format that can be displayed on the video wall. It also allows images to span across several monitor elements.

According to the Society of Motion Picture and Television Engineers (SMPTE) standards, for an ergonomically correct configuration, the vertical viewing angle at which an operator should be is 30 degrees. Although the layout is subject to minor changes, the current layout includes a maximum viewing distance of 45 feet for the furthest workspace (Stakeholder and Fire Workstations). In order to achieve the minimum viewing angle of 30 degrees, the minimum width of the video wall is approximately 290 inches, using monitors with a 16:9 (widescreen format used on today's HD monitors) contrast ratio.

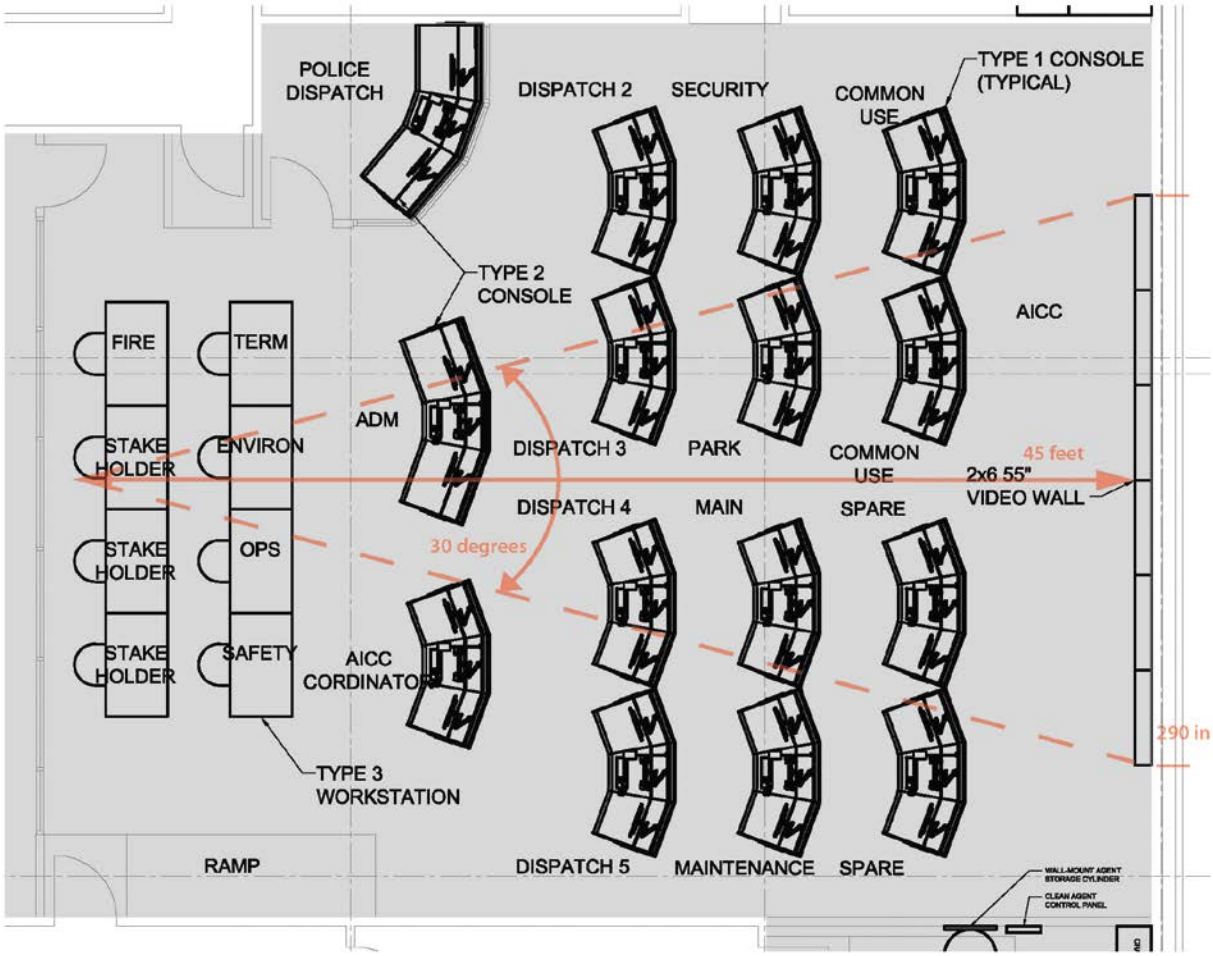


Figure 16 Video Wall Line of Sight

Industry's best practice for video walls in an interior space with lighting controls call for ultra-thin bezel (3.5 mm or less) LED backlit LCD monitors. The displays provide sufficient brightness which range from 500 candela per square meter (NIT) to 700 NIT and sufficient contrast ratios for the types of images being displayed paired with the ambient light expected in the room and the varied light levels expected for each type of media presented. These monitors also allow for a full range of video inputs, including HDMI, DVI and RGB. Using this technology, the largest monitor in production today is a 55 inch screen. This provides approximately a 54.5 inch diagonal and 48 inch wide picture. In order to achieve the 290 inch minimum width, a six (6) panel wide by two (2) panel tall video wall is required. At this time, SAT has requested a 40' (480") wide by 8' tall video wall to accommodate its user's needs. Using this technology, a ten (10) panel wide by (3) panel tall would accomplish this sizing requirement.

The SAT staff has determined the second floor of building 1840 would be the desired location for the AICC and AEC functions. That will allow the removal of the false ceiling and provide more vertical space in order to facilitate a taller video wall. The image must also be located at a height to provide good sight lines for viewers. In general, for rooms with flat floors the bottom of the screen should be at a height above the floor so persons sitting in front of the viewer do not block the image. In as large of a room such as the AICC, the image bottom should high enough to compensate for the larger number of viewers that potentially block the image.

Console placement in proximity to the video wall is strategic in relation to the function of the user. For example, functions needing constant viewing of the video wall such as video surveillance monitoring, would be located in closer proximity rather than a common use function that has no need for video wall interaction. Further, all the video surveillance monitoring can begin on the left side of the video wall and progress to the right. Toward the middle of the video wall is information with FIDS, flight tracking and other similar feeds. Thus, console placement can be strategic within the AICC. Thin bezel, large format flat panel displays are the lowest cost method of building a video wall. The disadvantage is that if part of a panel malfunctions, the entire panel must be replaced. If it has been several years since the original installation, it may be difficult finding an exact replacement as manufacturers are always updating their models.

An alternative to flat panel LCD monitors is large format rear projection monitors. The disadvantage with these units is their weight and the fact that they require internal LED illumination units, increasing their footprint. However, they have extremely long life spans and are easily serviced without replacing the entire unit. A newer version of these rear projection screens has been popularized by some manufacturers that utilize LED light engines, providing a much brighter screen, weigh less and consume less energy; however, the life expectancy of these units is less than that of traditional rear projection units.

To summarize, the three options available when it comes to display systems in a command and control center environment are:

- Narrow Chassis LCD LED-backlit displays
- Rear-projection DLP displays with LED Light Engine

- Rear-projection DLP displays with LED Illumination Unit

Pros and cons exist with each option and are outlined in the table below:

TECHNOLOGY	LCD LED-backlit	DLP – LED Light Engine	DLP – LED Illumination
Life Expectancy	5 years	6 years	9 years
Bezel Size	3.5 mm	2 mm	2 mm
Diagonal Screen Size	55”	60”	70”
Chassis Depth	3.5”	20.5”	37.8”
Weight	51 lbs.	132 lbs.	247 lbs.
Pixels Per Square Inch	1440	1335	991
Brightness	700 NIT	1100 NIT	320 NIT
Service	Replace Entire Unit	Front Access – Replace LED Light Engine	Front Access – Replace LED Illumination Unit
Power Consumption	230W	96W	174W
Display Cost	$6,500	$14,000	$40,000
STD Hardware Warranty	3 year	2 year	2 year

Figure 17 LG 55” LCD LED-backlit Video Wall

Figure 18 Mitsubishi 70" DLP – LED Illumination Video Wall

Below is a cost summary for implementing a 40' wide by 8' tall video wall.

	LCD LED-backlit	DLP – LED Light Engine	DLP – LED Illumination
Number of Displays	30 (10x3)	27 (9x3)	24 (8x3)
Total Display Cost	$195,000	$378,000	$960,000
Infrastructure	$50,000	$45,000	$40,000
Input Hardware	$75,000	$75,000	$75,000
Installation	$50,000	$100,000	$100,000
TOTAL INSTALLATION	**$370,000**	**$598,000**	**$1,175,000**

During the design phase, an evaluation of the space and environmental elements will need to be conducted to determine the appropriate technology that provides the AICC the greatest return on investment.

Better design and placement of video screens to show common or key, time-sensitive information in a manner that is easily visible and can be controlled with a simple, intuitive control and switching system

(such as a Crestron or AMX touch-screen controller, both of which are commonly used for this application in similar installations) will allow video information to be of greater use to the staff.

6.4 Telecommunication Systems

Telecommunications infrastructure is critical for the operation of the AICC. Data communication circuits, telephone communication circuits and radio communication equipment must be protected from inadvertent damage to the greatest extent possible. In practice these circuits should enter the building underground from diverse pathways on opposite sides of the building and proceed directly to the AICC communications room. The Airport currently has plans to develop an Outside Plant ring (OSP). Accommodations in this design to allow it to be extended to the AICC location need to be accounted for. The OSP conceptual design calls for a twelve strand in-and-out loop to be part of the ring with an additional 12 strand point-to-point fiber to the terminal BDF. This arrangement should be sufficient for the AICC network communications. If the initial development of the OSP ring can only bring a single connection to the AICC due to construction phasing or financial limitations, considerations for an alternate means of pathway resiliency needs to be evaluated. Leased lines may be able to provide this resiliency until the OSP ring can be completed to bring the AICC into the full OSP ring, but only on a temporary basis due to the expense of leased lines. A preliminary investigation conducted by AT&T indicated that there are overhead fiber optic cables on telephone poles in the adjacent block that would allow access to high speed data circuits of the type required to support the facility. They indicated that they could be extended to the 1840 building via overhead means and that they would not provide the conduits to get into the building nor would they be able to construct a fiber optic demark in the existing cable entrance – a new demark facility would have to be constructed in the building by the airport. An alternate to leased lines is a point-to-point wireless link between the Aircraft Rescue and Fire Fighting (ARFF) facility. A line–of-site pathway for a radio link to the ARFF was confirmed if a tower were constructed adjacent to the facility. Other communication circuits used in other parts of the building should be routed to a separate communication room to avoid mixing critical AICC circuits with standard circuits. In addition to the diverse physical routing, the communication network protocols should support self-healing to allow signals to be automatically routed around any single cable fault.

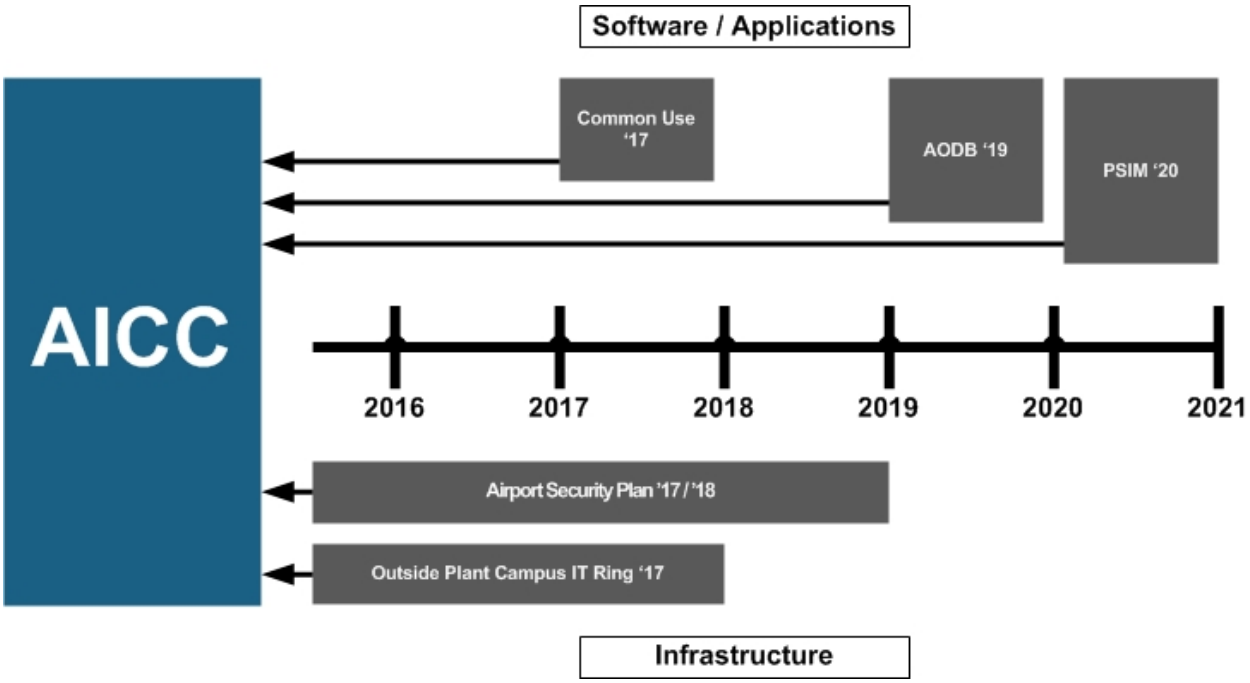
6.5 Ongoing and Future Technology Systems

SAT is currently in the planning and design phases of upgrading some of its electronic systems, communications networks and telecommunications infrastructures. The Airport also has several significant capital improvement projects in design or under construction. These system upgrades and related projects must be coordinated with the needs and schedule for the AICC since many are required to support the facility.

Based on a review of the FY 2016-FY 2021 the following system upgrades and related capital improvement projects have some level of impact on the AICC/AEC facility:

1. Outside Plant Campus IT Ring
2. CMMS Implementation
3. Common Use Implementation
4. Airport Security Plan Implementation

5. Wireless Mesh
6. Network Infrastructure Replacement
7. Airside Security Program
8. Systems Integration Project – AODB
9. Physical Information Security Management (PSIM)



As discussed in previous sections a robust connection to the airports core network is required to support seamless operation and phasing of the new facilities. The desired operational date for the AICC is FY 17. Critical infrastructure support projects such as Outside Plan Campus IT Ring and Airport Security Plan Implementation, both scheduled for FY 17/18 contain infrastructure elements that would benefit and support the AICC facilities. During coordination meetings with SAT staff related to the Capital Improvements Plan schedule it was noted that typically budgets cannot be moved from one project to another making coordination of project delivery schedules critical. The schematic design phase will required a detailed analysis of related project schedules to determine if critical infrastructure elements can be completed to support the desired operation date of the AICC facility.

The scheduled start date for the PSIM project is currently FY 20. As identified in the IT Master Plan there is a lack of integration between technology systems used by Security, Operations and Safety. These silos of information make it difficult to relate events and analyze information needed to maintain situational awareness. While co-location of different departments and staff will greatly improve the flow of information between the critical operations and security staff there will still be a lack of common tools used by each party during normal and irregular operations. PSIM software acts as a data fusion engine to bring together events from multiple security and operational systems into an environment where a set of rules can be applied to analyze the data and provide improved domain awareness during an event based on the fusion of the data. The PSIM implementation will include integration elements

that have been identified as a benefit to the AICC/AEC environment. Integration elements may include video, access control, PIDS (if implemented), Standard Operating Procedures (SOP), GIS, CMMS, fire alarm system and other systems as identified. While it is not recommended that the PSIM be implemented immediately for opening day operations it is desirable that the process of implementing the PSIM be started no later than 2018 to while will allow the facility to continually improved their performance through the use of advanced technology tools.

Further analysis of other technology impacts should be included in the early design phases of the AICC project.

Section 7 Cost Estimates

7.1 AICC Console and Technology Cost Estimates

The estimated costs listed here are an engineer's estimate of probable construction costs. They are based on the experience of the engineer in market situations similar to San Antonio from past bid projects. Estimated Probable Cost for technology in the AICC/AEC:

AICC/AEC		
	Consoles and Equipment	$ 1,600,000
	Audio/Visual Systems	$ 1,400,000
	Infrastructure/Network	$ 300,000
	SUBTOTAL	$ 3,300,000
	Contingency & Soft Costs (25%)	$ 825,000
	TOTAL AICC/AEC	$ 4,125,000

		PHASE 1				PHASE 2		PHASE 3		
	POSITION	CONSOLE TYPE	QUAN	COST	TOTAL	COST	TOTAL	COST	TOTAL	COMMENTS
	ADM	2	1	$124,350	$ 124,350	$0	$ -	$0	$ -	
	Airport Dispatch	1	4	$114,050	$ 456,200	$2,000	$ 8,000	$0	$ -	
	Police Dispatch	2	1	$122,350	$ 122,350	$0	$ -	$0	$ -	
	Security	1	1	$114,050	$ 114,050	$0	$ -	$0	$ -	
	AICC Coordinator	1	1	$116,050	$ 116,050	$0	$ -	$0	$ -	
	Maintenance	1	2	$85,050	$ 170,100	$0	$ -	$0	$ -	
	Common Use	1	2	$15,550	$ 31,100	$0	$ -	$0	$ -	
	Parking	1	1	$85,250	$ 85,250	$0	$ -	$0	$ -	
	Sub-Total				$ 1,219,450		$ 8,000		$ -	
	Safety Workstation	3	1	$10,400	$ 10,400	$0	$ -	$0	$ -	
	Environ Workstation	3	1	$10,400	$ 10,400	$0	$ -	$0	$ -	
	Oper Workstation	3	1	$10,600	$ 10,600	$0	$ -	$0	$ -	
	Term Srvc Workstation	3	1	$12,600	$ 12,600	$0	$ -	$0	$ -	
	Fire Dept Workstation	3	1	$35,400	$ 35,400	$0	$ -	$0	$ -	
	Stakeholder Workstation	3	3	$10,400	$ 31,200	$0	$ -	$0	$ -	
	Sub-Total				$ 110,600		$ -		$ -	
TECHNOLOGY	PDS		1	$75,000	$ 75,000					Horizontal Cabling to IDF Room
	LAN		1	$50,000	$ 50,000					
	AICC Video Wall		1	$50,000	$ 50,000					
	AEC Video Wall		1	$30,000	$ 30,000					
	Policy Audio Visual		1	$5,000	$ 5,000					
	JIC Flat Screen & PC		1	$5,000	$ 5,000					
	Breakout Room Flat Screen & PC		1	$5,000	$ 5,000					
	Radios									
	Radio Systems									
	CCTV Systems		x	airport security VLAN						
	ACS Systems		x	airport security VLAN						
	Public Address System		1	$25,000	$ 25,000					Amplifiers, DSP, Speakers (Mics included above)
	Telephone System									
	CAD System		x	SAPD VLAN						
	Fire Alarm/Life Safety Systems		1	$5,000	$ 5,000					Workstations included above. This costs assume connection to existing FACP SLC Network inside Building 1840
	Parking Revenue Control Systems (PRCS)			(VLAN) to AVI system						
	Automated Vehicle Identification (AVI)	x		(VLAN) to AVI system						
	Variable Message Boards (VMB)	x		(VLAN) to AVI system						
	Baggage Handling System (BHS)	x		BHS network (not part of the airport network)						
	Report A Problem (RAP)			internet						
	Computerized Maintenance Management System (CMMS)	x	x	airport internet						
	Common Use Systems	x	x	airport internet						
	Intellex Safety Management System	x	x	internet						
	Queue Wait Time			airport internet						
	Multi-User Flight Information Display System (MUFIDS)	x	x	MUFIDS VLAN						
	Noise Management	x	x	noise management						
	Supervisory Control and Data Acquisition (SCADA)	x	x	SCADA VLAN						
	Identity Management	x	x	security VLAN						
	Safety and Environmental Management System (SeMS)	x	x	airport internet						
	Physical Security Information Management System (PSIM)	x	x	airport internet						
					TOTALS					

PHASE 1

ADM	Quan	Cost	Total	Remarks
SCADA	1	$0	$0	
TOTAL ADM			**$0**	

SPARE	Quan	Cost	Total	Remarks
Type 1 Console	1	$15,000	$15,000	

Workstation	2	$1,550	$3,100	
24" Monitors	4	$250	$1,000	
VoiP Telephone	1	$550	$550	Cost per handset
CAD	1	$2,000	$2,000	License only
ACS	1	$1,000	$1,000	S/W & License
CCTV	1	$1,000	$1,000	S/W & License
Radio	1	$65,000	$65,000	MaestroIP
PA	1	$1,000	$1,000	S/W & License
FA	1	$25,000	$25,000	Workstation & S/W
PSIM	1	$0	$0	
TOTAL AP DISPATCH			**$114,650**	

MAINTENANCE	**Quan**	**Cost**	**Total**	**Remarks**
SCADA	1	$0	$0	
TOTAL MAINT			**$0**	

PHASE 2

ADM	**Quan**	**Cost**	**Total**	**Remarks**
PSIM	1	$0	$0	
Status Dashboard	1	$0	$0	
Operational Log	1	$0	$0	
Common Use s/w	1	$0	$0	
Queue Wait Time	1	$0	$0	
Resource Management	1	$0	$0	
TOTAL ADM			**$0**	

AIRPORT DISPATCH	**Quan**	**Cost**	**Total**	**Remarks**
MUFIDS	1	$5,000	$5,000	S/W & License
TOTAL AP DISPATCH			**$5,000**	

POLICE DISPATCH	**Quan**	**Cost**	**Total**	**Remarks**
PSIM	1	$0	$0	
TOTAL POLICE			**$0**	

SECURITY	**Quan**	**Cost**	**Total**	**Remarks**
Identity Management	1	$0	$0	
PSIM	1	$0	$0	
TOTAL SECURITY			**$0**	

AICC COORDINATOR	**Quan**	**Cost**	**Total**	**Remarks**
PSIM	1	$0	$0	

Status Dashboard	1	$0	$0	
Operational Log	1	$0	$0	
TOTAL AICC COORD			**$0**	

MAINTENANCE	Quan	Cost	Total	Remarks
CMMS	1	$0	$0	
TOTAL MAINT			**$0**	

COMMON USE	Quan	Cost	Total	Remarks
Type 1 Console	1	$15,000	$15,000	
Workstation	2	$1,550	$3,100	
24" Monitors	3	$250	$750	
VoiP Telephone	1	$550	$550	Cost per handset
Common Use	1	$0	$0	S/W & License
CCTV	1	$1,000	$1,000	S/W & License
Radio	1	$65,000	$65,000	MaestroIP
Queue Management	1	$200	$200	License only
Resource Management	0	$0	$0	
MUFIDS	1	$5,000	$5,000	S/W & License
TOTAL CU			**$90,600**	
PARKING	**Quan**	**Cost**	**Total**	**Remarks**
VMS Boards	1	$0	$0	
Traffic Monitoring	2	$0	$0	
TOTAL Parking			**$0**	

Terminal Srvcs Workstation	Quan	Cost	Total	Remarks
CMMS	1	$0	$0	
TOTAL Terminal Srvcs			**$0**	

PHASE 3

ADM	Quan	Cost	Total	Remarks
Type 2 Console	1	$23,100	$23,100	
Workstation	2	$1,550	$3,100	
24" Monitors	4	$250	$1,000	
VoiP Telephone	1	$550	$550	Cost per handset
CAD	1	$2,000	$2,000	License only
ACS	1	$1,000	$1,000	S/W & License
CCTV	1	$1,000	$1,000	S/W & License
Intelex	1	$0	$0	Web access
SeMS	1	$0	$0	Web access

MuFIDS	1	$5,000	$5,000	S/W & License
RAP	1	$0	$0	Web access
BHS	1	$1,000	$1,000	S/W & License
Radio	1	$65,000	$65,000	MaestroIP
PA	1	$1,000	$1,000	S/W & License
FA	1	$25,000	$25,000	Workstation & S/W
TOTAL ADM			**$128,750**	

AIRPORT DISPATCH	**Quan**	**Cost**	**Total**	**Remarks**
Type 1 Console	1	$15,000	$15,000	
Workstation	2	$1,550	$3,100	
24" Monitors	4	$250	$1,000	
VoiP Telephone	1	$550	$550	Cost per handset
CAD	1	$2,000	$2,000	License only
ACS	1	$1,000	$1,000	S/W & License
CCTV	1	$1,000	$1,000	S/W & License
Radio	1	$65,000	$65,000	MaestroIP
PA	1	$1,000	$1,000	S/W & License
FA	1	$25,000	$25,000	Workstation & S/W
TOTAL AP DISPATCH			**$114,650**	
POLICE DISPATCH	**Quan**	**Cost**	**Total**	**Remarks**
Type 2 Console	1	$23,100	$23,100	
Workstation	2	$1,550	$3,100	
24" Monitors	4	$250	$1,000	
VoiP Telephone	1	$550	$550	Cost per handset
CAD	1	$2,000	$2,000	License only
ACS	1	$1,000	$1,000	S/W & License
CCTV	1	$1,000	$1,000	S/W & License
Wants/Warrants	1	$500	$500	License only
Radio	1	$65,000	$65,000	MaestroIP
PA	1	$1,000	$1,000	S/W & License
FA	1	$25,000	$25,000	Workstation & s/w
TOTAL POLICE			**$123,250**	
SECURITY	**Quan**	**Cost**	**Total**	**Remarks**
Type 1 Console	1	$15,000	$15,000	
Workstation	2	$1,550	$3,100	
24" Monitors	4	$250	$1,000	
VoiP Telephone	1	$550	$550	Cost per handset
CAD	1	$2,000	$2,000	License only

ACS	1	$1,000	$1,000	S/W & License
CCTV	1	$1,000	$1,000	S/W & License
Radio	1	$65,000	$65,000	MaestroIP
PA	1	$1,000	$1,000	S/W & License
FA	1	$25,000	$25,000	Workstation & s/w
TOTAL SECURITY			**$114,650**	

AICC COORDINATOR	**Quan**	**Cost**	**Total**	**Remarks**
Type 1 Console	1	$15,000	$15,000	
Workstation	2	$1,550	$3,100	
24" Monitors	4	$250	$1,000	
VoiP Telephone	1	$550	$550	Cost per handset
CAD	1	$2,000	$2,000	License only
ACS	1	$1,000	$1,000	S/W & License
CCTV	1	$1,000	$1,000	S/W & License
Radio	1	$65,000	$65,000	MaestroIP
PA	1	$1,000	$1,000	S/W & License
FA	1	$25,000	$25,000	Workstation & s/w
Intelex	1	$0	$0	Web access
SeMS	1	$0	$0	Web access
MuFIDS	1	$5,000	$5,000	S/W & License
TOTAL AICC COORD			**$119,650**	

MAINTENANCE	**Quan**	**Cost**	**Total**	**Remarks**
Type 1 Console	1	$15,000	$15,000	
Workstation	2	$1,550	$3,100	
24" Monitors	4	$250	$1,000	
VoiP Telephone	1	$550	$550	Cost per handset
CCTV	1	$1,000	$1,000	S/W & License
Radio	1	$65,000	$65,000	MaestroIP
RAP	1	$0	$0	Web access
BHS	1	$1,000	$1,000	S/W & License
TOTAL MAINT			**$86,650**	
COMMON USE	**Quan**	**Cost**	**Total**	**Remarks**
Type 1 Console	1	$15,000	$15,000	
Workstation	0	$1,550	$0	
24" Monitors	0	$250	$0	
VoiP Telephone	1	$550	$550	Cost per handset
CCTV	0	$1,000	$0	S/W & License
Radio	0	$65,000	$0	MaestroIP
RAP	0	$0	$0	Web access

BHS	0	$1,000	$0	S/W & License
TOTAL CU			**$15,550**	

PARKING	**Quan**	**Cost**	**Total**	**Remarks**
Type 1 Console	1	$15,000	$15,000	
Workstation	2	$1,550	$3,100	
24" Monitors	4	$250	$1,000	
VoiP Telephone	1	$550	$550	Cost per handset
CCTV	1	$1,000	$1,000	S/W & License
Radio	1	$65,000	$65,000	MaestroIP
PRCS	1	$500	$500	License only
AVI	1	$500	$500	License only
TOTAL CU			**$86,650**	
Safety Workstation	**Quan**	**Cost**	**Total**	**Remarks**
Desk	1	$7,600	$7,600	
Workstation	1	$1,550	$1,550	
24" Monitors	2	$250	$500	
VoiP Telephone	1	$550	$550	Cost per handset
CCTV	1	$1,000	$1,000	S/W & License
Intelex	1	$0	$0	Web Access
TOTAL Safety			**$11,200**	

Environ Workstation	**Quan**	**Cost**	**Total**	**Remarks**
Desk	1	$7,600	$7,600	
Workstation	1	$1,550	$1,550	
24" Monitors	2	$250	$500	
VoiP Telephone	1	$550	$550	Cost per handset
CCTV	1	$1,000	$1,000	S/W & License
Noise Complaints	1	$0	$0	Web Access
TOTAL Environ			**$11,200**	
Operations Workstation	**Quan**	**Cost**	**Total**	**Remarks**
Desk	1	$7,600	$7,600	
Workstation	1	$1,550	$1,550	
24" Monitors	2	$250	$500	
VoiP Telephone	1	$550	$550	Cost per handset
CCTV	1	$1,000	$1,000	S/W & License
Eagle	1	$0	$0	Web Access
Queue Mang	1	$500	$500	License only
TOTAL Ops			**$11,700**	
Terminal Srvcs Workstation	**Quan**	**Cost**	**Total**	**Remarks**

Desk	1	$7,600	$7,600	
Workstation	1	$1,550	$1,550	
24" Monitors	2	$250	$500	
VoiP Telephone	1	$550	$550	Cost per handset
CCTV	1	$1,000	$1,000	S/W & License
BHS	1	$1,000	$1,000	S/W & License
Queue Mang	1	$500	$500	License only
RAP	1	$0	$0	Web Access
MUFIDS Input	1	$5,000	$5,000	S/W & License
TOTAL Terminal Srvcs			**$17,700**	
Terminal Fire Dept Work	**Quan**	**Cost**	**Total**	**Remarks**
Desk	1	$7,600	$7,600	
Workstation	1	$1,550	$1,550	
24" Monitors	2	$250	$500	
VoiP Telephone	1	$550	$550	Cost per handset
CCTV	1	$1,000	$1,000	S/W & License
FA	1	$25,000	$25,000	Workstation & s/w
TOTAL Fire Dept			**$36,200**	
Stakeholder Workstation	**Quan**	**Cost**	**Total**	**Remarks**
Desk	1	$7,600	$7,600	
Workstation	1	$1,550	$1,550	
24" Monitors	2	$250	$500	
VoiP Telephone	1	$550	$550	Cost per handset
CCTV	1	$1,000	$1,000	S/W & License
TOTAL Stakeholder			**$11,200**	

Table 8 Estimated Costs

Appendix A Consoles

EVANS CONSOLES

450, 1577 Spring Hill Road | Vienna, VA | USA 22182
ph +1.403.291.4444 | fx +1.403.250.6549 | www.evansonline.com

PRICE QUOTATION

Quotation Number:	U15-5283-C	**Date:**	May 6, 2015
Project Name:	San Antonio Airport	**Proposal By:**	Anthony Mancuso
Project Location:	San Antonio, Texas, United States	**Revision:**	C

RESPONSE™

ITEM	PART NUMBER	DESCRIPTION	QTY	UNIT PRICE	VALUE (USD)
Supr 1					
OUTER MODULES					
Response Outer Modules - Reduced Depth					
1	RE-DT-RD-OM-24	24" (610mm) wide Reduced Depth Desktop Module w/Front and Rear Hinged Panels	2		
INNER MODULES					
Response Inner Modules - Reduced Depth					
2	RE-DT-RD-IM-30	30" (762mm) wide Reduced Depth Desktop Module w/Front and Rear Hinged Panels	1		
CORNER MODULES					
Response Corners					
3	RE-DT-FD-CM-22	22 1/2" Desktop Short Corner Module	2		
SLATWALL / PANELING SYSTEM					
Slatwall / Paneling System Sub-Structure					
4	SPS-ST-12	12" High Slatwall / Paneling System Sub-Structure - Includes Sheetmetal Rear Cover (per linear ft.)	10		
Slatwall / Paneling System Front Cover Kits - 1st Tier					
5	SPS-FC-1T-SWEXT-6	6" Tier Front Slatwall Extrusion Kit (per linear ft.)	10		
Slatwall / Paneling System Front Cover Kits - 2nd Tier					
6	SPS-FC-2T-SWEXT-6	6" Tier Front Slatwall Extrusion Kit (per linear ft.)	10		
END TREATMENTS					
7	RE-RD-CL-SA-EPAN-LH	Reduced Depth End Panel, Left Hand (with accent)	1		
8	RE-RD-CL-SA-EPAN-RH	Reduced Depth End Panel, Right Hand (with accent)	1		
WORKSURFACES					
Worksurface Options					
9	RE-WS-F-ADJUSTSPWS-C	Cockpit style, Monitor Platform Full Lift, Single Piece Worksurface. Comes standard with 1.5" rubber ergonomic nosing.	1		
LIFT COLUMNS					
Lift Options					
10	CM-SSW	Enhanced contact safety option (per module; mandatory)	3		
11	LC-2-HD	Two heavy duty Lift Columns with control equipment - Main Platform	1		
STANDARD FINISHES					
12	STANDARD FINISH	High Pressure Laminate Finish			
ACCESSORIES					
13	FLR-ANCHOR	Floor Anchor Bracket Kit (per module); NOTE: Bracket supplied by Evans, fastening to floor by others	3		
Electrical Features					
14	DT-TSKL-LED-S	Tasklight by Koncept, Mosso Model. Includes weighted base.	1		
15	EL-ECS	EnviroLinc environmental control system	1		
16	EL-FPNL-FAH	EnviroLinc compatible - Front Panel Mounted Forced Air Heater	1		
17	PB-NA-6-15	North America Power Bar with mounting bracket; 120V/15A, 6 outlets, 15' power cord, CSA/UL	1		
18	PB-NA-6-6	North America Power Bar with mounting bracket; 120V/15A, 6 outlets, 6' power cord, CSA/UL	1		
E-Arms					
19	E-ARM-G2-SW-SH	Single High Articulating Monitor Arm with nominal 21" (534mm) Extension, 12" (305mm) Pole Height. Includes Slatwall Mount and VESA adapter Plate(75mm and 100mm). Accommodates monitor weighing up to 40lb (18kg).	3		

Page 1 of 10

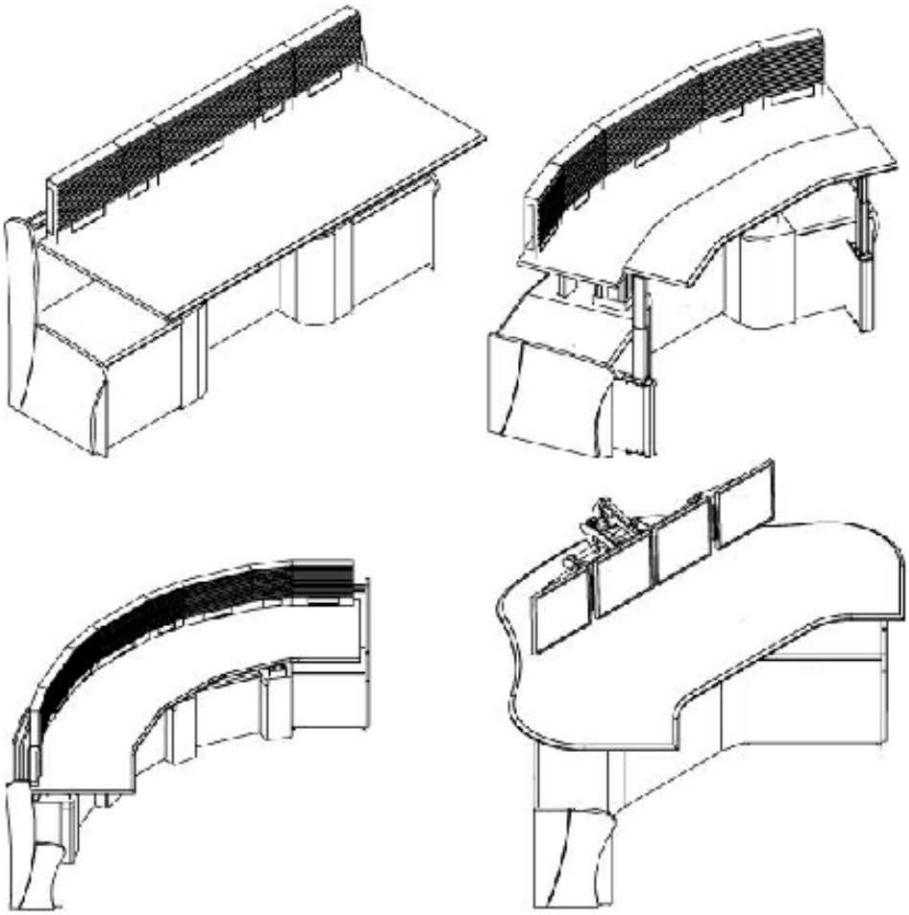
Double click to open full file.

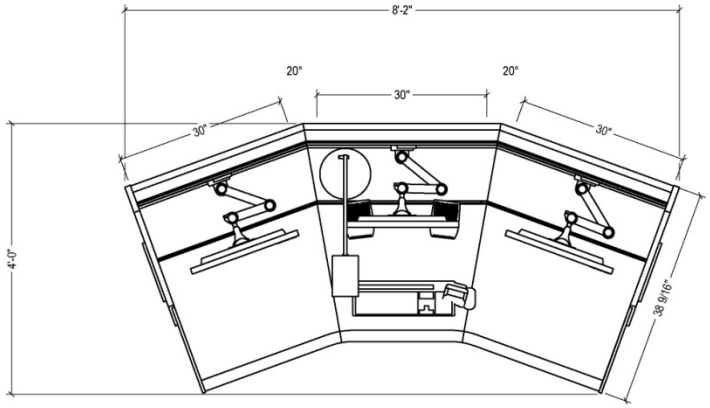
EVANS CONSOLES

Product Specification Document
Date Published: March 2011
Version Control: EC-PS-RS–V1.12

1. RESPONSE CONSOLE OVERVIEW

The ultimate solution for the 24/7 command and control room operation, the Evans Response console provides a unique ergonomic approach for this demanding environment. Response combines an automated sit-stand option using motorized Linak actuators with a modular, durable steel frame, unparalleled cable management and many functional rear panel options to ensure the most efficient and functional work environment for its operators.





PLAN VIEW

EQUIPMENT	
DESCRIPTION (UNITS: INCHES)	QTY
DESKTOP MOSSO TASKLIGHT BY KONCEPT	1
ENVIROLINC COMPATIBLE FORCED AIR HEATER	1
ENVIROLINC CONTROL SYSTEM	1
SLATWALL SINGLE TIER MONITOR ARM MAX EQ: 40LBS	3

NOTE: LOCATION OF ALL WORKSURFACE SUPPORT ARMS, CONSOLE SUPPORT FEET AND WORKSURFACE SEAMS WILL BE DETERMINED UPON DETAILED DESIGN AND FABRICATION.

3D VIEW, QTY: 9

SKELETAL VIEW

GREENGUARD
PRODUCT CERTIFIED FOR LOW CHEMICAL EMISSIONS UL.COM/GG UL 2818

REGISTERED TO ISO 9001:2008

ISO 11064 ERGONOMIC DESIGN OF CONTROL CENTERS

www.evansonline.com

EVANS CONSOLES

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CLIENT AUTHORIZATION FOR PRODUCTION

SIGNATURE / DATE

CLIENT / PROJECT

SAN ANTONIO AIRPORT

LOCATION: SAN ANTONIO, TEXAS

DRAWING

Type 1

PRODUCT: Strategy

FINISH

DATE: MAY 6, 2015

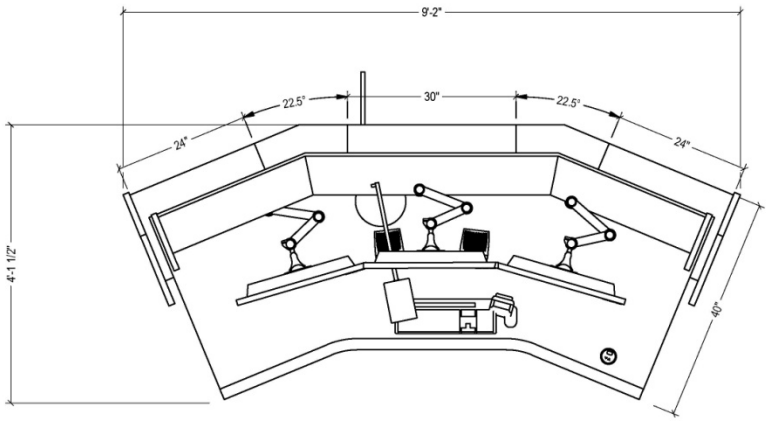
DRAWING NUMBER: 3 OF 10

REV: B

SCALE: NOT TO SCALE

EVANS PROJECT NUMBER

U15-5283

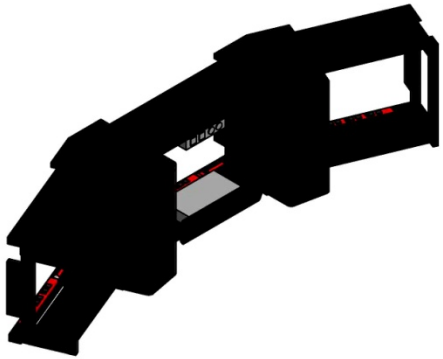


PLAN VIEW

EQUIPMENT	
DESCRIPTION (UNITS: INCHES)	QTY
10' POWERLINC STARTER/WHIP (3L 3N 2G)	1
DESKTOP MOSSO TASKLIGHT BY KONCEPT	1
ENVIROLINC COMPATIBLE FORCED AIR HEATER	1
ENVIROLINC CONTROL SYSTEM	1
FLOOR ANCHOR BRACKET KIT	3
NORTH AMERICA POWER BAR; 120V/15A, 6 OUTLETS, 15' POWER CORD	1
NORTH AMERICA POWER BAR; 120V/15A, 6 OUTLETS, 6' POWER CORD	1
POWERLINC HUB, 3CCT X 2, 5-20R	3
POWERLINC SPLITTER - 1 IN, 3 OUT	1
SLATWALL SINGLE TIER MONITOR ARM MAX EQ: 40LBS	3

NOTE: LOCATION OF ALL WORKSURFACE SUPPORT ARMS, CONSOLE SUPPORT FEET AND WORKSURFACE SEAMS WILL BE DETERMINED UPON DETAILED DESIGN AND FABRICATION.

3D VIEW, QTY: 2



SKELETAL VIEW

GREENGUARD
PRODUCT CERTIFIED FOR LOW CHEMICAL EMISSIONS UL.COM/GG
UL 2818

REGISTERED TO ISO 9001:2008

ISO 11064
ERGONOMIC DESIGN OF CONTROL CENTERS

E
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SIGNATURE / DATE

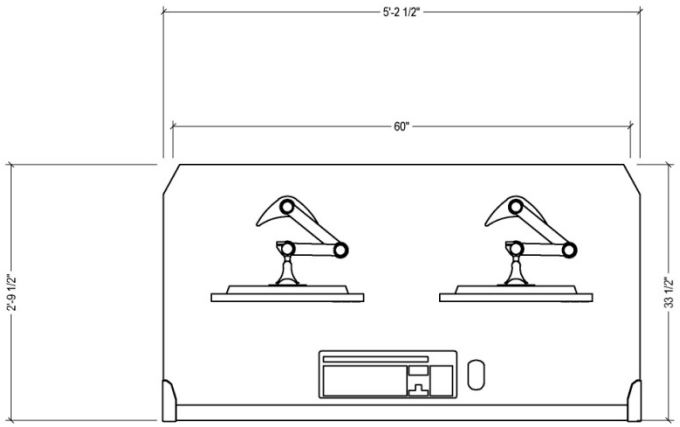
CLIENT / PROJECT
SAN ANTONIO AIRPORT
LOCATION: SAN ANTONIO, TEXAS

DRAWING
Type 2

PRODUCT: Response
FINISH:
DATE: MAY 6, 2015
DRAWING NUMBER: 4 OF 10
REV: B
SCALE: NOT TO SCALE
EVANS PROJECT NUMBER
U15-5283

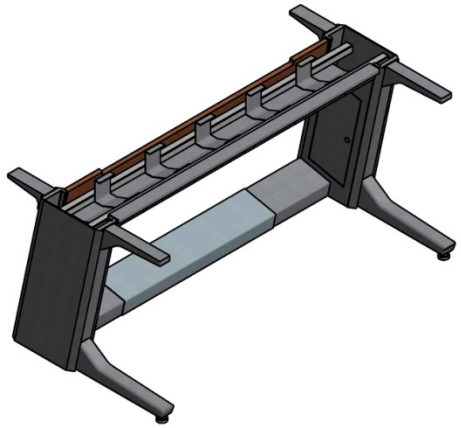
EQUIPMENT	
DESCRIPTION (UNITS: INCHES)	QTY
DESKTOP SINGLE TIER MONITOR ARM MAX EQ: 40LBS	2

NOTE: LOCATION OF ALL WORKSURFACE SUPPORT ARMS, CONSOLE SUPPORT FEET AND WORKSURFACE SEAMS WILL BE DETERMINED UPON DETAILED DESIGN AND FABRICATION.



PLAN VIEW

3D VIEW, QTY: 8



SKELETAL VIEW

GREENGUARD
PRODUCT CERTIFIED FOR LOW CHEMICAL EMISSIONS UL.COM/GG UL 2818

REGISTERED TO ISO 9001:2008

ISO 11064 ERGONOMIC DESIGN OF CONTROL CENTERS

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EVANS CONSOLES

CLIENT AUTHORIZATION FOR PRODUCTION

SIGNATURE / DATE

CLIENT / PROJECT

SAN ANTONIO AIRPORT

LOCATION: SAN ANTONIO, TEXAS

DRAWING

Type 3

PRODUCT: Strategy Air

FINISH

DATE: MAY 6, 2015

DRAWING NUMBER: 5 OF 10

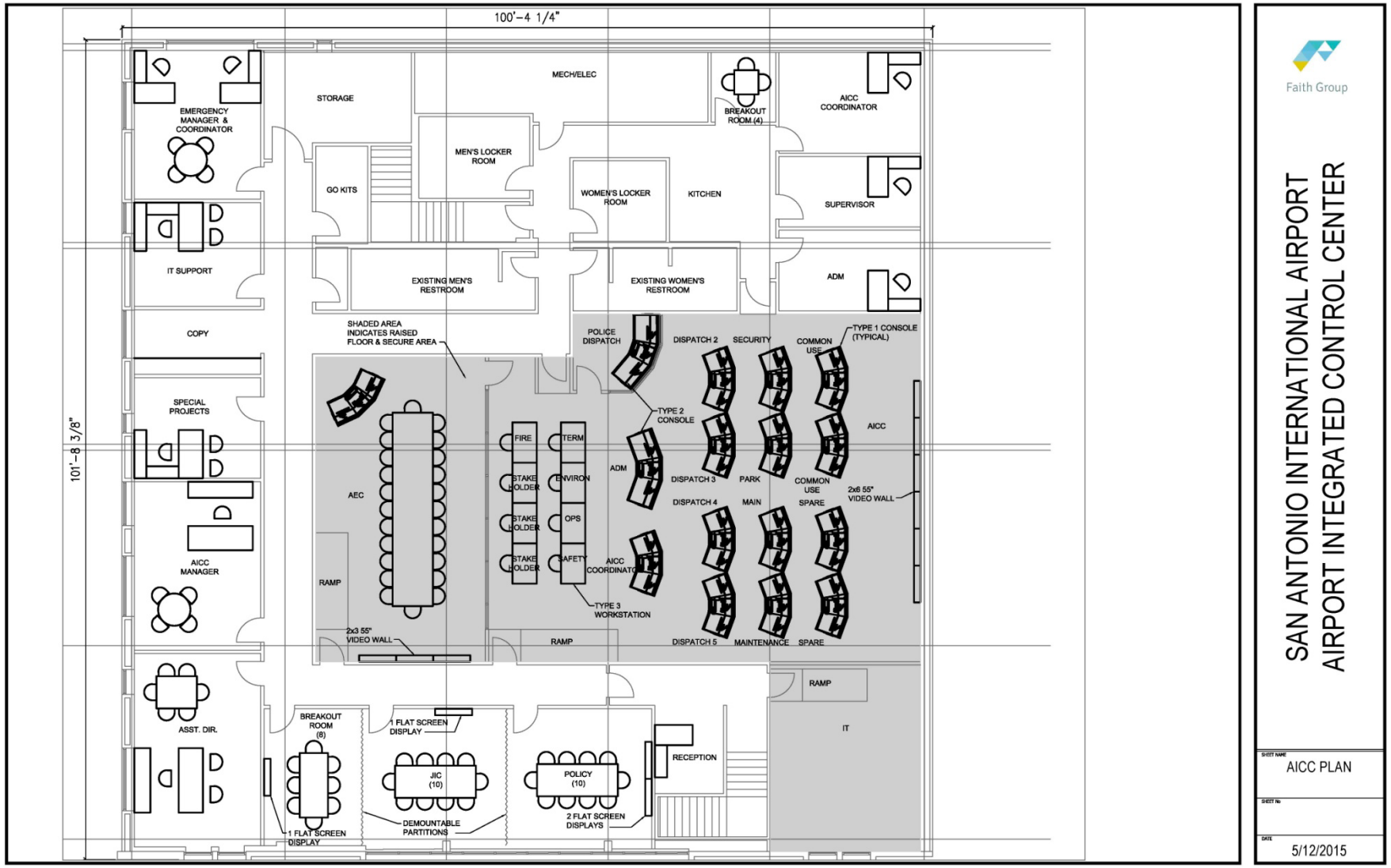
REV: B

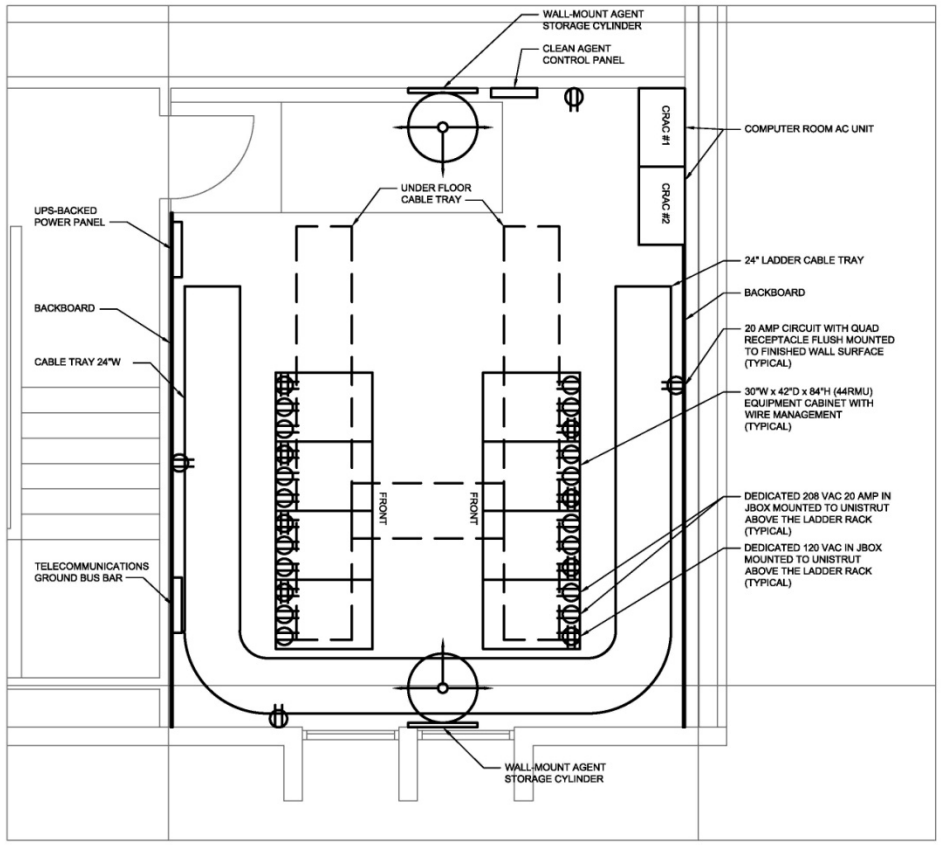
SCALE: NOT TO SCALE

EVANS PROJECT NUMBER

U15-5283

Appendix B Concept Plans and Renderings





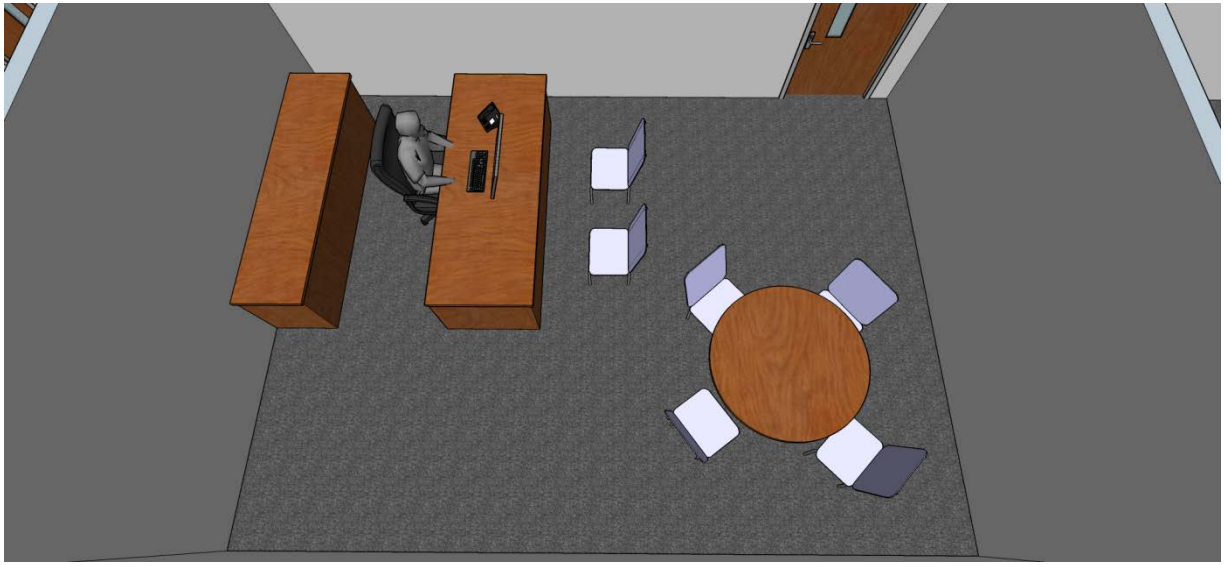
Faith Group

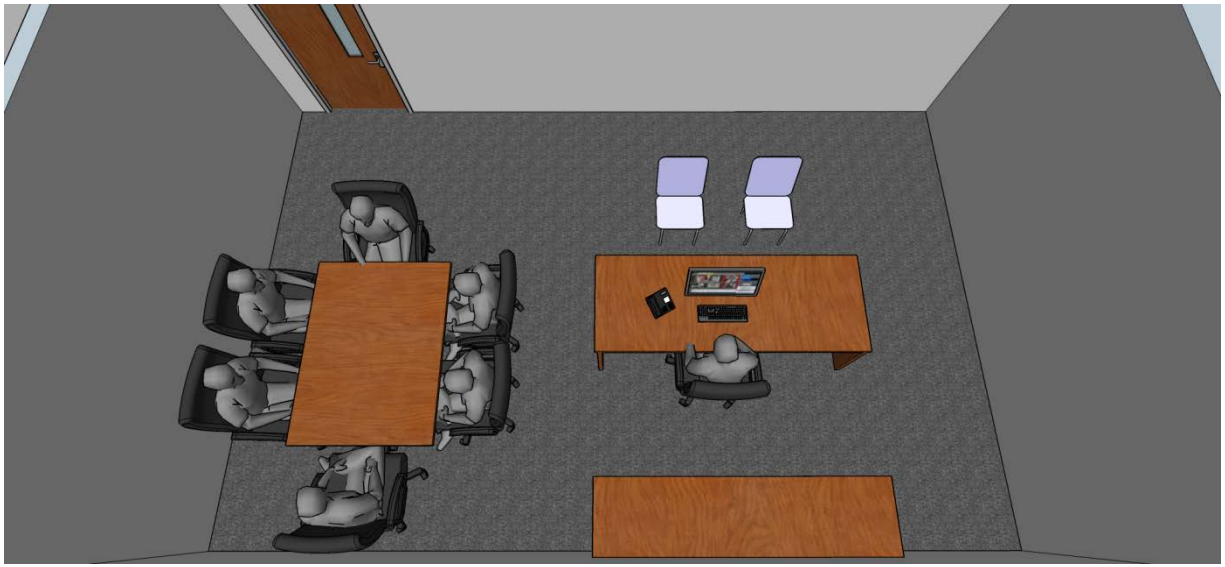
SAN ANTONIO INTERNATIONAL AIRPORT
AIRPORT INTEGRATED CONTROL CENTER

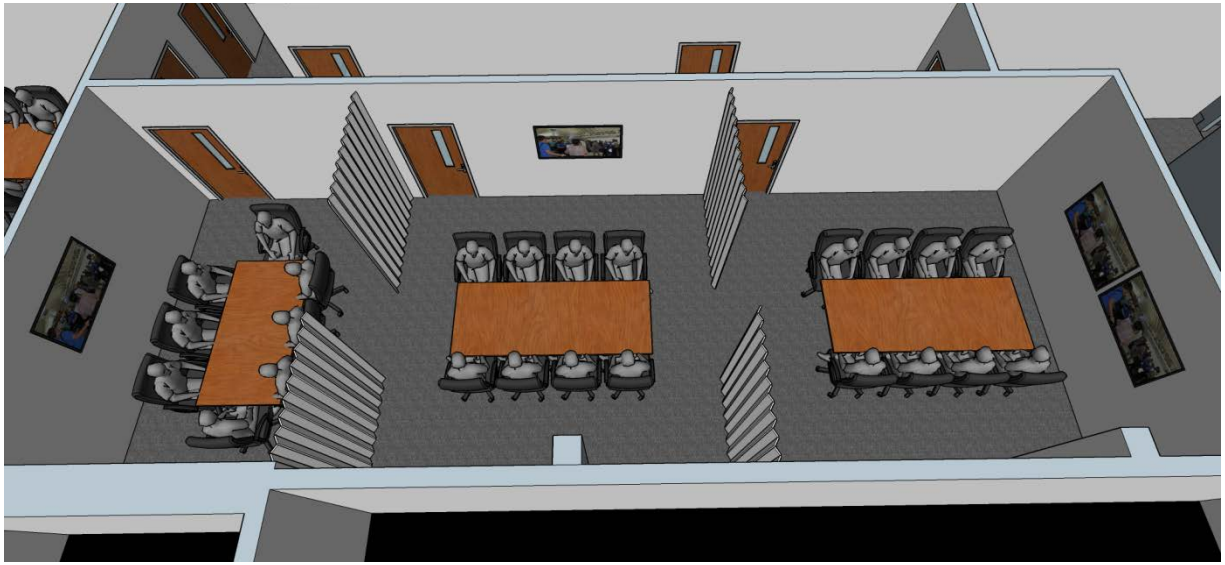
SHEET NAME
ENLARGED IDF ROOM

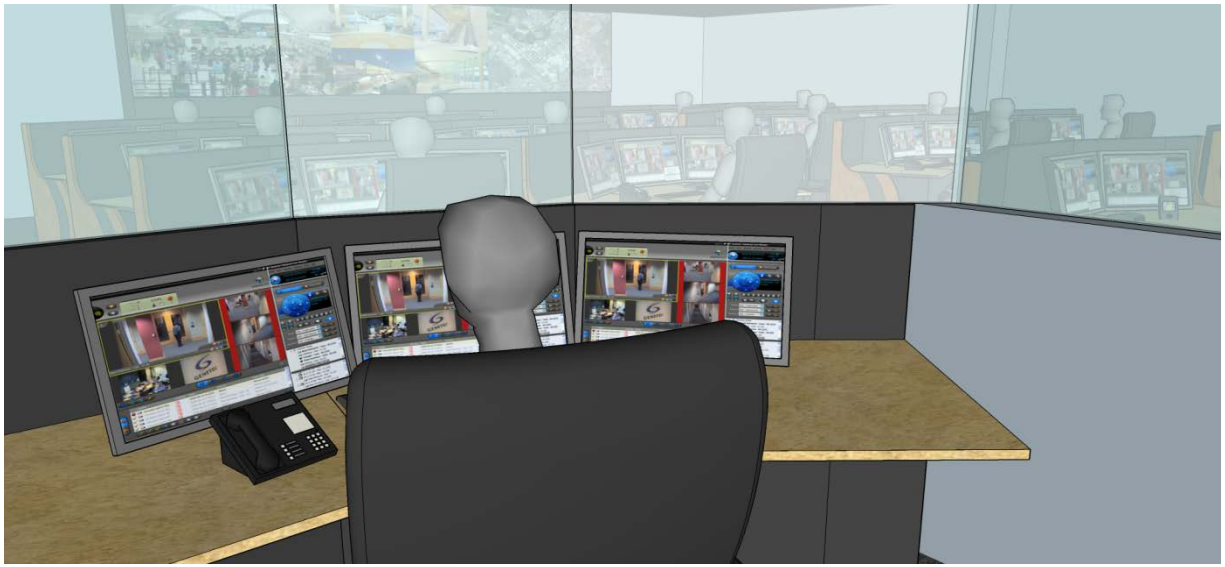
SHEET No

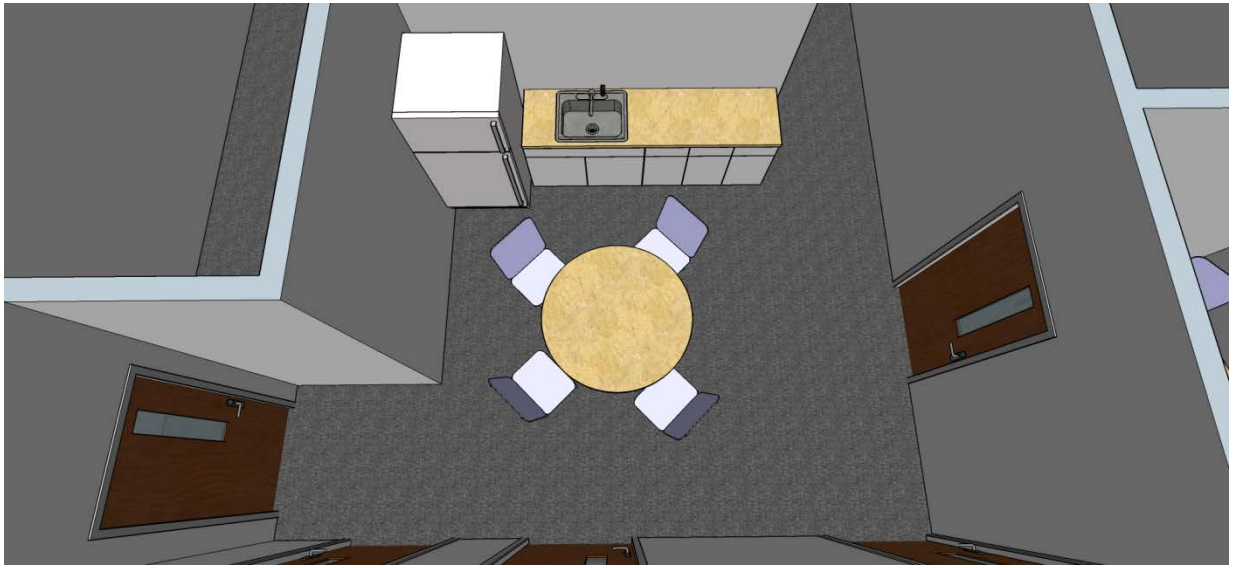
DATE
5/12/2015











The Narrowest Bezel LG Video Wall

Super-Narrow 3.5mm Bezel Premium Display

- 55LV75A-7B
- 55LV77A-7B

55" class (54.64" measured diagonally)

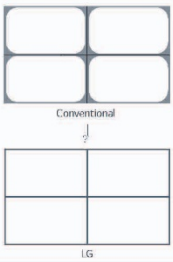
Display

SUPER NARROW BEZEL

47" super narrow bezel 4.9mm and 55" super narrow bezel 3.5mm video wall displays create visually stunning digital wall that are easily installed, maintained and managed.

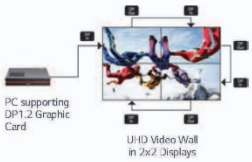
HIGHER BRIGHTNESS UNIFORMITY

Brightness uniformity 90% ensures high-quality image delivered across displays.



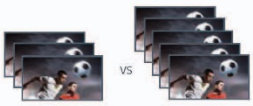
EVOLVED DAISY-CHAIN PERFORMANCE

DisplayPort1.2 connectors enable UHD content playback on 4K Video Wall in a 2x2 configuration. (available on LV75A/ LV77A)



VIVID IMAGERY VIEWING

TruMotion™ 60Hz Refresh Rate drastically reduces motion blur and judder ensuring vivid image details.



Software

SUPERSIGN VS FOR DYNAMIC LAYOUT

- Use included templates to easily configure content layout
- Rotate, cut and edit content according to a defined layout
- Flexible editing of content to match various layouts is possible
- Scheduled-based content playback based on time and day
- Distribute content to media players as well


SuperSign V Editor


SuperSign V

FREE SUPERSIGN C FOR ADVANCED COLOR ADJUSTMENT

- Intuitive GUI in SuperSign C S/W allows to measure and adjust color and brightness instantly on display
- Automatic white balancing of a video-wall display using a sensor


SuperSign C

FREE SUPERSIGN C FOR REMOTE MONITOR AND CONTROL

Intuitive GUI-based Remote Monitoring & Control via the networks and RS232 connection feature in SuperSign C S/W.


SuperSign C

SHINE-OUT (55LV77A)

Perfect fit for window display by reflecting away ambient light for best image visibility and clearer display in bright lighting environment.

LG
Life's Good
LGsolutions.com

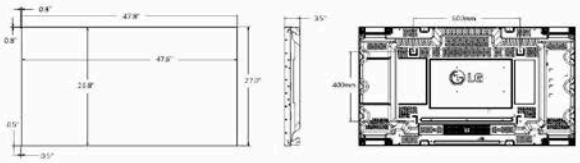
The Narrowest Bezel LG Video Wall

Super-Narrow 3.5mm Bezel Premium Display

- 55LV75A-7B
- 55LV77A-7B

55" class (54.64" measured diagonally)

Dimensions



Rear Jack Panel

PANEL	Model	55LV75A-7B	55LV77A-7B
	Panel Size	55" class (54.64" measured diagonally)	
	Panel Type	IPS	
	Aspect Ratio	16:9	
	Native Resolution	1920 x 1080 (FHD)	
	Pixels(H x V x 3)	6220800	
	Brightness	500 cd/m²	700 cd/m²
	Contrast Ratio (Typ.)	1,400:1	
	Dynamic CR (DCR)	500,000:1	
	Color Gamut	72%	
	Viewing Angle	178°/178°	
	Color Depth	1.06 Billion	
	Response Time	12ms (G to G)	
	Surface Treatment	Hard coating(3H), Anti-glare treatment of the front polarizer (Haze 10%)	
	Orientation	Portrait & Landscape	
VIDEO (PC)	Max Input Resolution	1920 X 1080@ 60Hz(RGB, HDMI, DVI-D, Display Port)	
	Recommended Resolution	1920 X 1080@ 60Hz(RGB, HDMI, DVI-D, Display Port)	
	H-Scanning Frequency	30 _ 83 kHz (RGB, HDMI, DVI-D, Display Port)	
	V-Scanning Frequency	56Hz _ 75Hz (RGB), 56Hz _ 60Hz (HDMI, DVI-D, Display Port)	
	Pixel Frequency	148.5MHz (RGB, HDMI, DVI-D, Display Port)	
	Sync Compatability	Separate / Composite / Digital	
	Video Input	RGB, HDMI, DVI-D, Display Port, AV, Component	
	Picture Mode	Vivid, Standard, Cinema, Sports, Game	
	Color Temperature	Warm, Medium, Cool	
SIGNAL (INPUT)	Digital	DVI-D (1), HDMI (1), Display Port (1) with HDCP for all input	
	Analog	RGB (1), Shared Component (1), AV (1)	
	Audio	PC Audio In (1)	
	External Control	RS232C (1), RJ45 (1), IR Receiver (1)	
	USB	USB (1)	
SIGNAL (OUTPUT)	Digital	Display Port (1)	
	Audio	Audio Out (1)	
	External Control	RS232C (1)	

CABINET	Model	55LV75A-7B	55LV77A-7B
	Color	Black	
	Bezel Width	2.25mm (left/top) / 1.25mm(right/bottom)	
	Monitor Dimensions (W x H x D)	47.8" x 27.0" x 3.5"	
	Weight (head)	50.7 lbs	51.1 lbs
	Carton Dimensions (W x H x D)	53.3" x 33.5" x 10.0"	
	Packed Weight	66.8 lbs	67.2 lbs
	Handle	Yes	
	VESA™ Standard Mount Interface	600mm x 400mm	
SPECIAL FEATURES	Temperature Sensor	Yes	
	Tile Mode	Yes, Up to 15 x 15 (Natural mode)	
	Source Selection	RGB / DVI-D / HDMI / Component / AV / Display Port / USB	
	Brightness/Contrast/ Backlight	Yes	
	Position/Size	Yes	
	Auto Config/Phase	Yes	
	ISM Method	Normal, Orbiter, inversion, White wash	
	Advanced	Dynamic Contrast, Dynamic Color, Clear White, Skin Color, Noise Reduction, Digital Noise Reduction, Gamma, Black Level	
	Time	Clock, On/off Time, Sleep Timer, Power on Delay, Auto off(Automatic standby	
	Information	Model/Type, S/W Version, Serial Number, IP Address, Mac address, Homepage	
	Input Label	Yes	
	Auto Power/Source Memory	Yes	
	DPM Select	Yes	
	Energy Saving	Yes, Off / Minimum / Medium / Maximum / Screen Off	
	Smart Energy Saving	Yes	
	File Play with USB	Yes	
	PIP/PBP	Yes	
ENVIRONMENT CONDITIONS	Operation Temperature	0°C_40°C	
	Operation Humidity	10%_80%	
POWER	Power Supply	100~240V_ 50/60Hz	
	Power Type	Built-in Power	
	Power Consumption		
	Normal On (Typ.)	160W	230W
	Power Save/Sleep Mode (Max)	90W	120W
	DPM	0.7W	
	Power Off	0.5W	
STANDARD CERTIFICATIONS	Safety	UL / cUL / CB / TUV / KC	
	EMC	FCC Class "B" / CE / KCC	
	ErP / Energy Star	Yes / Yes(Energy Star 6.0)	
WARRANTY		3-Year Limited Warranty (Parts/Labor/Backlight)	
UPC		7 19192 19516 5	7 19192 19517 2
MEDIA PLAYER COMPATIBILITY	External Media Player Attatchable	Yes	
SOFTWARE COMPATIBILITY	SuperSign Elite-w lite	Yes, Editing, Scheduling, Distribution & Play Control	
	SuperSign Elite-c	Yes*	
ACCESSORIES	Remote Controller, Power Cable, DP Cable, Manual, IR Receiver, RS-232C Cable,Tiling Guide, Screw		

* SuperSign software is available at: http://www.lg.com/us/commercial/video-walls

LG Life's Good

LGsolutions.com

LG Electronics U.S.A., Inc.
HE B2B Division
2000 Millbrook Drive
Lincolnshire, IL 60069

Customer Service: 888.865.3026
www.LGsolutions.com/support

Contact your LG Regional Sales Representative:
Channel: 800.897.8871
Hospitality: 800.228.1235
E-mail: info@LGsolutions.com

SPEC_LV77A_LV75A_071415_PR1

Printed in the USA. November 2014

MITSUBISHI ELECTRIC
Changes for the Better

Ver. 2.1

Display Wall Configurator

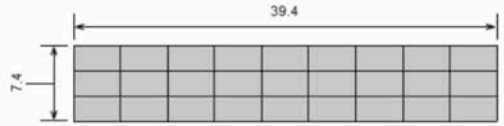
Native resolution : Full HD (1,920 x 1,080) Service access : Front Wall space : Width: 40feet x Height: 10feet Available area : 400ft²

16:9 60inch | 60HEF120 | 16:9 60inch | 60HEF78 | 16:9 60inch | 60HS12U | 16:9 70inch | 70HEF78 | 16:9 70inch | 70HEF120

Unit W: 9unit × H: 3unit

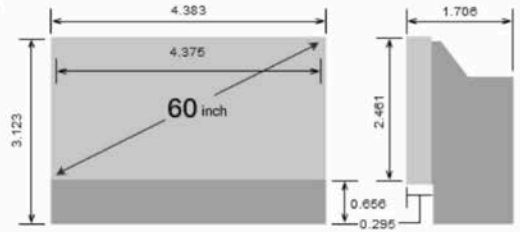
Top view

Front view



(feet)

Size



(feet)

Specification

Model name	60HS12U		
Overall Display Wall	Total # of Screens		27
	# of Screen WIDE		9
	# of Screen HIGH		3
	Width	feet	39.4
	Height (w/o Base Portion)	feet	7.4
	Total Screen Diagonal	feet	40.1
	Total Screen Area	ft²	290.7
	Horizontal Pixels		17,280
	Vertical Pixels		3,240
	Total Pixels		55,987,200
	Pixels / Inch²		1,335
	Pixel Size	feet	0.002
	Optimal Visual Acuity*	feet	7.8
	Weight	kg	1,620
		lbs	3,564
	Power Consumption *Normal Mode	W	2,592
	Thermal Dissipation *Normal Mode	BTU/h	8,856
		Kcal/h	2,230.2
Signal Input Terminal	DVI-I		1
Display Consists of:	Engine		
	Cabinet		
	Screen		
	Lighting Unit		
Data per Screen	Size	inch	60
	Horizontal Pixels		1,920
	Vertical Pixels		1,080
	Actual Pixels		2,073,600
	Width	feet	4.383
	Height (w/o Base Portion)	feet	2.461
	Weight	kg	60
		lbs	132
	Power Consumption *Normal Mode	W	96
	Thermal Dissipation *Normal Mode	BTU/h	328
		Kcal/h	82.6

page 2 of 2

MITSUBISHI ELECTRIC
Changes for the Better

Ver. 2.1

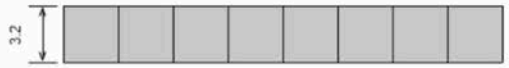
Display Wall Configurator

Native resolution : Full HD (1,920 x 1,080) **Service access** : Front **Wall space** : Width: 41feet x Height: 10feet **Available area** : 410ft²

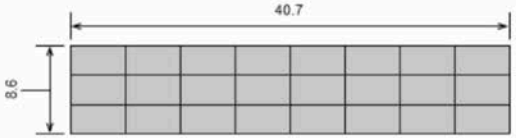
16:9 **60**inch | 60HEF120 | 16:9 **60**inch | 60HEF78 | 16:9 **60**inch | 60HS12U | 16:9 **70**inch | 70HEF78 | 16:9 **70**inch | 70HEF120

Unit W: 8unit × H: 3unit

Top view

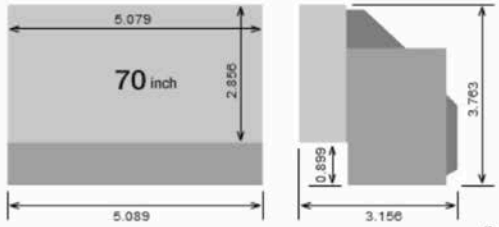


Front view



(feet)

Size



(feet)

Specification

Model name	70HEF78		
Overall Display Wall	Total # of Screens		24
	# of Screen WIDE		8
	# of Screen HIGH		3
	Width	feet	40.7
	Height (w/o Base Portion)	feet	8.6
	Total Screen Diagonal	feet	41.5
	Total Screen Area	ft²	348.1
	Horizontal Pixels		15,360
	Vertical Pixels		3,240
	Total Pixels		49,766,400
	Pixels / Inch²		991
	Pixel Size	feet	0.003
	Optimal Visual Acuity*	feet	9.1
	Weight	kg	2,688
		lbs	5,928
	Power Consumption *Normal Mode	W	4,176
	Thermal Dissipation *Normal Mode	BTU/h	14,256
		Kcal/h	3,590.4
Overall Input Board	Total # of Input Board		24
	Slot A		VC-B70D2
	Slot B		
	Slot C		
Display Consists of:	Engine		VS-WE78UA
	Cabinet		S-70HE75CAF
	Screen		SC-70HE75UF
	Lighting Unit		S-78LEA
Data per Screen	Size	inch	70
	Horizontal Pixels		1,920
	Vertical Pixels		1,080
	Actual Pixels		2,073,600
	Width	feet	5.089
	Height (w/o Base Portion)	feet	2.856
	Weight	kg	112
		lbs	247
	Power Consumption *Normal Mode	W	174
	Thermal Dissipation *Normal Mode	BTU/h	594
		Kcal/h	149.6

page 2 of 2

EVANS
CONSOLES

ENVIROLINC

THE NEXT LEVEL IN OPERATOR COMFORT

c UL us LISTED

EVANS ENVIROLINC SYSTEMIS UL LISTED & CSA CERTIFIED

The new EnviroLinc (Environmental Control Unit) is customizable comfort at your fingertips. Fully integrated into the console, the ECU allows the operator to control many different features including the fan speed, temperature and more.

The EnviroLinc eliminates the need to extra fans or heaters, leaving the workspace clear. This revolutionary system has changed the future of operator comfort.

THE EVANS ECU ADVANTAGE

Clears the **Work Space**	Eliminates the need for **external components** allowing for a clear workspace
UL Certification	All **EnviroLinc** components and the system are UL listed
All in **ONE**	The system allows for easy control of many different features including **auxiliary inputs** for music devices
True **Multitasking**	With the **USB** port on the back, the operator can control the comfort options while charging a cell phone
Future **Options**	The list of options are not limited to today's options. The system is **scalable** and can accomodate other features as they become available

evansonline.com

APPENDIX

B. Environmental Assessment

(Prepared by Medina Consulting Company, Inc.)

Medina Consulting Company, Inc.

June 30, 2015

Ms. Lori Dullnig-Warlen, P.E., Sr. Project Manager
Bain Medina Bain, Inc.
7073 San Pedro Avenue, San Antonio, Texas 78216
Phone: (210) 494.7223 ext. 233
Email: LDullnig@bmbi.com

Re: Airport Integrated Control Center (AICC)
Phase 2: Assessment for Repurposing Building 1840B
Limited Asbestos Survey for the SAIA Building B1840B
1964 1st Avenue, San Antonio, Bexar County, Texas
MCC Project No. 075-5003

Dear Ms. Dullnig-Warlen:

Medina Consulting Company, Inc. (MCC) is pleased to submit this *Limited Asbestos Survey* for Building 1840B located at 1964 1st Avenue at the San Antonio International Airport (SAIA). The services were provided by MCC and our subconsultant, Argus Environmental Consultants, LLC.

Our services were provided under the Aviation On-Call SBEDA contract between Bain Medina Bain, Inc. and the City of San Antonio for the San Antonio Airport System. The services were part of the AICC Phase 2: Assessment of Repurposing Building B1840 Task Order No. 2. The information collected for this project is confidential and will not be released to anyone other than Bain Medina Bain, LLC, its subcontractors under the contract, and the SAIA Airport System without your authorization.

If you have any questions, please do not hesitate to contact us. We appreciate the opportunity to perform this service for you.

Very Truly Yours,
Medina Consulting Company, Inc.

Douglas A. McGookey, P.G.
Principal Geologist

Attachment: *Limited Asbestos Survey for the SAIA Building B1840 Located at 1964 1st Avenue in San Antonio, Texas*, provided by Argus Environmental Consultants, LLC

Argus Environmental Consultants, LLC

June 30, 2015

Project No: 1506177ARG

Mr. Doug McGookey
Vice President/Geologist
Medina Consulting Company
6391 DeZavala, Ste. 113A
San Antonio, Texas 78249

Phone: 210.694.4545
Fax: 210.694.4577

RE: LIMITED ASBESTOS SURVEY FOR THE SAN ANTONIO INTERNATION AIRPORT BUILDING B1840 LOCATED AT 1964 1ST AVENUE IN SAN ANTONIO, TEXAS

Dear Mr. McGookey:

Argus Environmental Consultants, LLC was contacted to perform a limited asbestos survey of the interior materials with the San Antonio International Airport Building B1840 located at 1964 1st Avenue in San Antonio, Texas.

The Scope of Services included in the limited Asbestos Survey consisted of the following:

- Visual evaluation of the interior finish materials present within the structure at the time of the survey.
- Identification of suspect asbestos containing materials (ACM) into homogeneous areas based upon the guidelines in the United States Environmental Protection Agency's (EPA) 40 Code of Federal Regulations (CFR) Part 763 Subpart E.
- Random non-destructive collection of bulk samples from building materials that potentially contain asbestos.
- Laboratory analysis of building material samples by a third party lab licensed by the Texas Department of State Health Services (DSHS).
- Analysis by Polarized Light Microscopy (PLM) using EPA Method 600.

Argus Environmental Consultant, LLC's entire liability pertaining to this report and all work associated with it is limited to the INVOICED amount defined within the Scope of Services.

The asbestos survey was performed on June 24, 2015 by Elizabeth Aguilar, Texas DSHS Asbestos Inspector License #603203.

Bulk Samples:

Ninety-six samples were collected from inside Building B1840.

The following homogenous areas were identified and bulk samples collected:

Homogenous Area	Description	Sample IDs
1	2x2 Hole Ceiling Tile	H1ABC
2	Gypsum Board	H2ABC
3	Joint Compound	H3ABC
4	Wall Texture	H4ABC
5	Brown/Green Carpet, Yellow Mastic	H5ABC
6	Grey Wavy Wallpaper	H6ABC
7	Blue w/ Specks Carpet, Yellow/Green Mastic	H7ABC
8	Brown Cove Base, Brown Mastic	H8ABC
9	Tan Canvas Wallpaper	H9ABC
10	Grey w/ Blue Marbled Floor Tile & Yellow Mastic	H10ABC
11	White Heating, Ventilating and Air Conditioning (HVAC) Mastic	H11ABC
12	2x4 Ceiling Tile	H12ABC
13	Black Vibration Damper	H13ABC
14	Cream Pipe Mastic	H14ABC
15	White w/ Black Specks Floor Tile and Black Mastic	H15ABC
16	2x2 Fissure and Hole Ceiling Tile	H16ABC
17	White Ceramic Tile Grout	H17ABC
18	Grey Ceramic Tile Grout	H18ABC
19	Grey Decorative Wallpaper	H19ABC
20	Restroom Caulk	H20ABC
21	Blue Carpet, Yellow Mastic	H21ABC
22	Tan Carpet, Yellow Mastic	H22ABC
23	Tan Wavy Wallpaper	H23ABC
24	Counter Caulk	H24ABC
25	Tan Linoleum	H25ABC
26	Stippled Wall Texture	H26ABC
27	Tan Decorative Wallpaper	H27ABC
28	Cream w/ Tan Floor Tile and Black Mastic	H28ABC
29	Yellow Stair Mastic	H29ABC
30	Cove Base, Brown Mastic	H30ABC
31	Grey Sink Undercoat	H31ABC

Homogenous Area (continued)	Description (continued)	Sample IDs (continued)
32	Grey Duct Mastic	H320ABC

Conclusions:

Within the ninety-six collected bulk samples, ninety-nine separate construction material layers were subjected to PLM laboratory analysis.

Homogeneous Area	Description/ Location	Sample ID	Percent (%) Asbestos	Quantity	Condition	Friable/ Non-friable
15	12x12" White w/ Black Specks Floor Tile and Black Mastic; 1st Floor Control Room Closet & 2nd Floor Control Room	H15ABC	2% Chrysotile & 3% Chrysotile	~ 60 Square Feet	Damaged	Non-friable
28	Black Mastic below non-ACM 12x12" Cream w/ Tan Floor Tile; 2nd Floor Hot Water Room	H28ABC	2% Chrysotile	~35 Square Feet	Damaged	Non-friable

Based on the appropriate laboratory analysis, asbestos was not identified in any other sample layer.

Recommendations:

Inform contractors involved with any construction, demolition, renovation or related activities that regulated ACM was identified in the floor tile and mastic.

Floor tile and mastic ACM may be removed using typical wet methods within a full negative air pressure enclosure or Resilient Floor Covering Institute (RFCI) methods by a Texas DSHS licensed Abatement Contractor.

If the regulated ACM are involved in any renovation, abate ACM in accordance with the Texas DSHS regulations as required. This will involve the submittal of a Texas DSHS Notification Form no less than 10 days prior to the commencement of work. ACM may be removed using typical wet methods within a glove bag enclosure by a Texas DSHS licensed abatement contractor.

Abatement projects involving 160 square feet of ACM will require a written Scope of Work known as an Asbestos Abatement Design Specification written by an Asbestos Consultant licensed by Texas DSHS.

All abatement projects, except Resilient Floor Covering Institute (RFCI), will require air monitoring and project management onsite by a Texas DSHS licensed Air Monitoring Technician/Project Manager (AMT/PM). Final work area clearance and a written report by a Texas DSHS licensed Consultant appointed AMT/PM will serve to complete abatement activities.

Due to the limited nature of this survey, Argus Environmental Consultants, LLC does not warrant the existence or non-existence of ACM in areas not sampled. For example, destructive sampling, evaluation in any inaccessible areas, or any areas of the building outside the proposed evaluation has not been done. Therefore, any suspect materials hidden in or behind walls, under the flooring or other inaccessible areas are not included in this report. Argus Environmental Consultants, LLC only warrants the existence or non-existence of asbestos in those materials actually sampled.

During all future renovation, demolition or construction activities, any material(s) suspected to contain asbestos that has not been previously sampled should be evaluated and bulk samples collected for appropriate laboratory analysis prior to disturbance/removal.

This report has been prepared for the exclusive use of Medina Consulting and their assigned agents. It and all contents, findings, conclusions and recommendations expressed herein are not intended for any other purpose than that stated nor is intended to be used by any other party.

For Argus Environmental Consultants, LLC

Elizabeth Aguilar
Texas DSHS Asbestos Inspector License #603203 (Exp. 12/12/2016)

Robert W. Miller, CIH
Texas DSHS Asbestos Consultant License #105237 (Exp. 8/19/2015)

Attachments: 1) EMSL Analytical, Inc.'s EPA 600 PLM Test Report 6/30/2015
2) Bulk Sample Diagrams

EMSL Analytical, Inc.
2001 East 52nd St., Indianapolis, IN 46205
Phone/Fax: (317) 803-2997 / (317) 803-3047
http://www.EMSL.com indianapolislab@emsl.com

EMSL Order:	161510386
CustomerID:	ARGU52
CustomerPO:	
ProjectID:	

Attn: **Sarah Akeroyd**
Argus Environmental
10004 Wurzbach Road
Suite 247
San Antonio, TX 78230-2214

Phone:	(210) 493-2560
Fax:	(210) 342-9027
Received:	06/25/15 10:05 AM
Analysis Date:	6/30/2015
Collected:	6/24/2015

Project: **1506177ARG / SAIA - BLDG. B1840**

Test Report: Asbestos Analysis of Bulk Materials via EPA 600/R-93/116 Method using Polarized Light Microscopy

			Non-Asbestos		Asbestos
Sample	**Description**	**Appearance**	**% Fibrous**	**% Non-Fibrous**	**% Type**
H1A *161510386-0001*	Rm 31 CT 2x2-Hole - White	Gray/White Fibrous Homogeneous	50% Cellulose 30% Min. Wool	15% Perlite 5% Non-fibrous (other)	**None Detected**
H1B *161510386-0002*	Rm 18 CT 2x2-Hole - White	Gray/White Fibrous Homogeneous	50% Cellulose 30% Min. Wool	15% Perlite 5% Non-fibrous (other)	**None Detected**
H1C *161510386-0003*	Rm 1 CT 2x2-Hole - White	Gray/White Fibrous Homogeneous	50% Cellulose 30% Min. Wool	15% Perlite 5% Non-fibrous (other)	**None Detected**
H2A *161510386-0004*	Rm 31 Gypsum Board - White	White Non-Fibrous Homogeneous	5% Glass	90% Gypsum 5% Non-fibrous (other)	**None Detected**
H2B *161510386-0005*	Rm 18 Gypsum Board - White	White Non-Fibrous Homogeneous	5% Glass	90% Gypsum 5% Non-fibrous (other)	**None Detected**
H2C *161510386-0006*	Rm 1 Gypsum Board - White	White Non-Fibrous Homogeneous	5% Cellulose 2% Glass	85% Gypsum 8% Non-fibrous (other)	**None Detected**
H3A *161510386-0007*	Rm 31 Joint Compound - White	White Non-Fibrous Homogeneous		100% Non-fibrous (other)	**None Detected**
H3B *161510386-0008*	Rm 18 Joint Compound - White	White Non-Fibrous Homogeneous		100% Non-fibrous (other)	**None Detected**

Analyst(s)
Melissa Newkirk (32)
Ross Matlock (67)

Richard Harding, Laboratory Manager
or other approved signatory

Initial report from 06/30/2015 09:53:30

EMSL Analytical, Inc.
2001 East 52nd St., Indianapolis, IN 46205
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			Non-Asbestos		Asbestos
Sample	**Description**	**Appearance**	**% Fibrous**	**% Non-Fibrous**	**% Type**
H3C *161510386-0009*	Rm 1 Joint Compound - White	White Non-Fibrous Homogeneous		100% Non-fibrous (other)	**None Detected**
H4A *161510386-0010*	Rm 31 Texture Wall - White	White Non-Fibrous Homogeneous		100% Non-fibrous (other)	**None Detected**
			Inseparable paint / coating layer included in analysis		
H4B *161510386-0011*	Rm 18 Texture Wall - White	White Non-Fibrous Homogeneous		100% Non-fibrous (other)	**None Detected**
			Inseparable paint / coating layer included in analysis		
H4C *161510386-0012*	Rm 1 Texture Wall - White	White Non-Fibrous Homogeneous		100% Non-fibrous (other)	**None Detected**
			Inseparable paint / coating layer included in analysis		
H5A *161510386-0013*	Entry Brown/Green Carpet - Yellow Mastic	Yellow Non-Fibrous Homogeneous		100% Non-fibrous (other)	**None Detected**
H5B *161510386-0014*	Entry Brown/Green Carpet - Yellow Mastic	Yellow Non-Fibrous Homogeneous		100% Non-fibrous (other)	**None Detected**
H5C *161510386-0015*	1st Fl Conf. Rm Brown/Green Carpet - Yellow Mastic	Yellow Non-Fibrous Homogeneous		100% Non-fibrous (other)	**None Detected**
H6A *161510386-0016*	1st Fl. Conf. Rm Wallpaper Wavy - Grey	Gray/White Fibrous Homogeneous	95% Cellulose	5% Non-fibrous (other)	**None Detected**

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Collected:	6/24/2015

Project: **1506177ARG / SAIA - BLDG. B1840**

Test Report: Asbestos Analysis of Bulk Materials via EPA 600/R-93/116 Method using Polarized Light Microscopy

			Non-Asbestos		Asbestos
Sample	Description	Appearance	% Fibrous	% Non-Fibrous	% Type
H6B *161510386-0017*	1st Fl. Conf. Rm Wallpaper Wavy - Grey	Gray/White Fibrous Homogeneous	95% Cellulose	5% Non-fibrous (other)	**None Detected**
H6C *161510386-0018*	1st Fl. Conf. Rm Wallpaper Wavy - Grey	Gray/White Fibrous Homogeneous	95% Cellulose	5% Non-fibrous (other)	**None Detected**
H7A *161510386-0019*	Rm 31 Blue w/Speck Carpet - Yellow Mastic	Yellow Non-Fibrous Homogeneous		100% Non-fibrous (other)	**None Detected**
H7B *161510386-0020*	Rm 18 Blue w/Speck Carpet - Yellow Mastic	Yellow Non-Fibrous Homogeneous		100% Non-fibrous (other)	**None Detected**
H7C *161510386-0021*	Rm 1 Blue w/Speck Carpet - Yellow Mastic	Beige Non-Fibrous Homogeneous		100% Non-fibrous (other)	**None Detected**
H8A *161510386-0022*	Rm 31 Brown Cove Base - Cream Mastic	Beige Non-Fibrous Homogeneous		100% Non-fibrous (other)	**None Detected**
H8B *161510386-0023*	Rm 18 Brown Cove Base - Cream Mastic	Beige Non-Fibrous Homogeneous		100% Non-fibrous (other)	**None Detected**
H8C *161510386-0024*	Rm 1 Brown Cove Base - Cream Mastic	Beige Non-Fibrous Homogeneous		100% Non-fibrous (other)	**None Detected**

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Received:	06/25/15 10:05 AM
Analysis Date:	6/30/2015
Collected:	6/24/2015

Project: **1506177ARG / SAIA - BLDG. B1840**

Test Report: Asbestos Analysis of Bulk Materials via EPA 600/R-93/116 Method using Polarized Light Microscopy

			Non-Asbestos		Asbestos
Sample	**Description**	**Appearance**	**% Fibrous**	**% Non-Fibrous**	**% Type**
H9A *161510386-0025*	2nd Fl. Conf Rm Canvas Tan Wallpaper	White Fibrous Homogeneous	90% Synthetic	10% Non-fibrous (other)	**None Detected**
H9B *161510386-0026*	2nd Fl. Conf Rm Canvas Tan Wallpaper	White Fibrous Homogeneous	90% Synthetic	10% Non-fibrous (other)	**None Detected**
H9C *161510386-0027*	1st Fl. Conf Rm Canvas Tan Wallpaper	White Fibrous Homogeneous	85% Synthetic 5% Glass	10% Non-fibrous (other)	**None Detected**
H10A-Floor Tile *161510386-0028*	1st Fl Kitchen 12x12 FT & Mastic - Grey w/Blue Marbled & Yellow	Gray/Blue Non-Fibrous Homogeneous		100% Non-fibrous (other)	**None Detected**
H10A-Mastic *161510386-0028A*	1st Fl Kitchen 12x12 FT & Mastic - Grey w/Blue Marbled & Yellow	Brown/Yellow Non-Fibrous Homogeneous		100% Non-fibrous (other)	**None Detected**
H10B-Floor Tile *161510386-0029*	1st Fl Locker Room 12x12 FT & Mastic - Grey w/Blue Marbled & Yellow	Gray/Blue Non-Fibrous Homogeneous		100% Non-fibrous (other)	**None Detected**
H10B-Mastic *161510386-0029A*	1st Fl Locker Room 12x12 FT & Mastic - Grey w/Blue Marbled & Yellow	Brown/Yellow Non-Fibrous Homogeneous		100% Non-fibrous (other)	**None Detected**

Analyst(s)
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Ross Matlock (67)

Richard Harding, Laboratory Manager
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Initial report from 06/30/2015 09:53:30

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Suite 247
San Antonio, TX 78230-2214

Phone:	(210) 493-2560
Fax:	(210) 342-9027
Received:	06/25/15 10:05 AM
Analysis Date:	6/30/2015
Collected:	6/24/2015

Project: **1506177ARG / SAIA - BLDG. B1840**

Test Report: Asbestos Analysis of Bulk Materials via EPA 600/R-93/116 Method using Polarized Light Microscopy

			Non-Asbestos		Asbestos
Sample	**Description**	**Appearance**	**% Fibrous**	**% Non-Fibrous**	**% Type**
H10C-Floor Tile *161510386-0030*	2nd Fl HVAC Room 12x12 FT & Mastic - Grey w/Blue Marbled & Yellow	Gray Non-Fibrous Homogeneous		100% Non-fibrous (other)	**None Detected**
H10C-Mastic *161510386-0030A*	2nd Fl HVAC Room 12x12 FT & Mastic - Grey w/Blue Marbled & Yellow	Gray/Yellow Non-Fibrous Homogeneous		100% Non-fibrous (other)	**None Detected**
H11A *161510386-0031*	1st Fl HVAC Rm HVAC White Mastic	White Non-Fibrous Homogeneous		100% Non-fibrous (other)	**None Detected**
H11B *161510386-0032*	1st Fl HVAC Rm HVAC White Mastic	White Non-Fibrous Homogeneous		100% Non-fibrous (other)	**None Detected**
H11C *161510386-0033*	2nd Fl HVAC Rm HVAC White Mastic	White Non-Fibrous Homogeneous		100% Non-fibrous (other)	**None Detected**
H12A *161510386-0034*	1st Fl HVAC Rm 2x4 White CT	Gray/White Fibrous Homogeneous	40% Cellulose 40% Min. Wool	15% Perlite 5% Non-fibrous (other)	**None Detected**
H12B *161510386-0035*	2nd Fl HVAC Rm 2x4 White CT	Gray/White Fibrous Homogeneous	40% Cellulose 40% Min. Wool	15% Perlite 5% Non-fibrous (other)	**None Detected**
H12C *161510386-0036*	2nd Fl HVAC Rm 2x4 White CT	Gray/White Fibrous Homogeneous	40% Cellulose 40% Min. Wool	15% Perlite 5% Non-fibrous (other)	**None Detected**

Analyst(s)

Melissa Newkirk (32)
Ross Matlock (67)

Richard K. Harding

Richard Harding, Laboratory Manager
or other approved signatory

Initial report from 06/30/2015 09:53:30

EMSL Analytical, Inc.
2001 East 52nd St., Indianapolis, IN 46205
Phone/Fax: (317) 803-2997 / (317) 803-3047
http://www.EMSL.com indianapolislab@emsl.com

EMSL Order:	161510386
CustomerID:	ARGU52
CustomerPO:	
ProjectID:	

Attn: **Sarah Akeroyd**
Argus Environmental
10004 Wurzbach Road
Suite 247
San Antonio, TX 78230-2214

Phone:	(210) 493-2560
Fax:	(210) 342-9027
Received:	06/25/15 10:05 AM
Analysis Date:	6/30/2015
Collected:	6/24/2015

Project: **1506177ARG / SAIA - BLDG. B1840**

Test Report: Asbestos Analysis of Bulk Materials via EPA 600/R-93/116 Method using Polarized Light Microscopy

			Non-Asbestos		Asbestos
Sample	**Description**	**Appearance**	**% Fibrous**	**% Non-Fibrous**	**% Type**
H13A *161510386-0037*	1st Fl HVAC Rm Black Vibration Damper	Black Fibrous Homogeneous	60% Glass	40% Non-fibrous (other)	**None Detected**
H13B *161510386-0038*	1st Fl HVAC Rm Black Vibration Damper	Black Fibrous Homogeneous	60% Glass	40% Non-fibrous (other)	**None Detected**
H13C *161510386-0039*	1st Fl HVAC Rm Black Vibration Damper	Black Fibrous Homogeneous	60% Glass	40% Non-fibrous (other)	**None Detected**
H14A *161510386-0040*	1st Fl HVAC Rm Pipe Cream Mastic	Beige Non-Fibrous Homogeneous		100% Non-fibrous (other)	**None Detected**
H14B *161510386-0041*	2nd Fl HVAC Rm Pipe Cream Mastic	Beige Non-Fibrous Homogeneous		100% Non-fibrous (other)	**None Detected**
H14C *161510386-0042*	2nd Fl HVAC Rm Pipe Cream Mastic	Beige Non-Fibrous Homogeneous		100% Non-fibrous (other)	**None Detected**
H15A-Floor Tile *161510386-0043*	Control Rm Closet 12x12 FT & Mastic - White w/Black Specks & Black	White Non-Fibrous Homogeneous		98% Non-fibrous (other)	**2% Chrysotile**
H15A-Mastic *161510386-0043A*	Control Rm Closet 12x12 FT & Mastic - White w/Black Specks & Black	Black Non-Fibrous Homogeneous		97% Non-fibrous (other)	**3% Chrysotile**

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Project: **1506177ARG / SAIA - BLDG. B1840**

Test Report: Asbestos Analysis of Bulk Materials via EPA 600/R-93/116 Method using Polarized Light Microscopy

			Non-Asbestos		Asbestos
Sample	Description	Appearance	% Fibrous	% Non-Fibrous	% Type
H15B *161510386-0044*	Control Rm Closet 12x12 FT & Mastic - White w/Black Specks & Black				**Stop Positive (Not Analyzed)**
H15C *161510386-0045*	2nd Fl Control Rm 12x12 FT & Mastic - White w/Black Specks & Black				**Stop Positive (Not Analyzed)**
H16A *161510386-0046*	Rm 11 2x2 Fissure & Hole White CT	Gray/White Fibrous Homogeneous	50% Cellulose 30% Min. Wool	15% Perlite 5% Non-fibrous (other)	**None Detected**
H16B *161510386-0047*	Rm 13 2x2 Fissure & Hole White CT	Gray/White Fibrous Homogeneous	50% Cellulose 30% Min. Wool	15% Perlite 5% Non-fibrous (other)	**None Detected**
H16C *161510386-0048*	1st Fl Conf Rm 2x2 Fissure & Hole White CT	Gray/White Fibrous Homogeneous	50% Cellulose 30% Min. Wool	15% Perlite 5% Non-fibrous (other)	**None Detected**
H17A *161510386-0049*	1st Fl WRR Ceramic Tile White Grout	White Non-Fibrous Homogeneous		100% Non-fibrous (other)	**None Detected**
H17B *161510386-0050*	1st Fl MRR Ceramic Tile White Grout	White Non-Fibrous Homogeneous		100% Non-fibrous (other)	**None Detected**
H17C *161510386-0051*	2nd Fl WRR Ceramic Tile White Grout	White Non-Fibrous Homogeneous		100% Non-fibrous (other)	**None Detected**

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Project: **1506177ARG / SAIA - BLDG. B1840**

Test Report: Asbestos Analysis of Bulk Materials via EPA 600/R-93/116 Method using Polarized Light Microscopy

			Non-Asbestos		Asbestos
Sample	Description	Appearance	% Fibrous	% Non-Fibrous	% Type
H18A *161510386-0052*	1st Fl WRR Ceramic Tile Grey Grout	Gray Non-Fibrous Homogeneous		10% Quartz 90% Non-fibrous (other)	**None Detected**
H18B *161510386-0053*	1st Fl MRR Ceramic Tile Grey Grout	Gray Non-Fibrous Homogeneous		10% Quartz 90% Non-fibrous (other)	**None Detected**
H18C *161510386-0054*	2nd Fl WRR Ceramic Tile Grey Grout	Gray Non-Fibrous Homogeneous		5% Quartz 95% Non-fibrous (other)	**None Detected**
H19A *161510386-0055*	1st Fl WRR Decorative Grey Wallpaper	Gray/White Fibrous Homogeneous	95% Cellulose	5% Non-fibrous (other)	**None Detected**
H19B *161510386-0056*	1st Fl MRR Decorative Grey Wallpaper	Gray/White Fibrous Homogeneous	95% Cellulose	5% Non-fibrous (other)	**None Detected**
H19C *161510386-0057*	2nd Fl WRR Decorative Grey Wallpaper	Gray/White Fibrous Homogeneous	85% Cellulose	15% Non-fibrous (other)	**None Detected**
H20A *161510386-0058*	1st fl WRR Restroom White Caulk	White Non-Fibrous Homogeneous		100% Non-fibrous (other)	**None Detected**
H20B *161510386-0059*	1st Fl MRR Restroom White Caulk	White Non-Fibrous Homogeneous		100% Non-fibrous (other)	**None Detected**

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Test Report: Asbestos Analysis of Bulk Materials via EPA 600/R-93/116 Method using Polarized Light Microscopy

			Non-Asbestos		Asbestos
Sample	Description	Appearance	% Fibrous	% Non-Fibrous	% Type
H20C *161510386-0060*	2nd Fl WRR Restroom White Caulk	White Non-Fibrous Homogeneous		100% Non-fibrous (other)	**None Detected**
H21A *161510386-0061*	Rm 23 Blue Carpet Yellow Mastic	Yellow Non-Fibrous Homogeneous		100% Non-fibrous (other)	**None Detected**
H21B *161510386-0062*	Rm 23 Blue Carpet Yellow Mastic	Yellow Non-Fibrous Homogeneous		100% Non-fibrous (other)	**None Detected**
H21C *161510386-0063*	Rm 23 Blue Carpet Yellow Mastic	Yellow Non-Fibrous Homogeneous		100% Non-fibrous (other)	**None Detected**
H22A *161510386-0064*	Rm C2 Tan Carpet Yellow Mastic	Yellow Non-Fibrous Homogeneous		100% Non-fibrous (other)	**None Detected**
H22B *161510386-0065*	Rm 22 Tan Carpet Yellow Mastic	Yellow Non-Fibrous Homogeneous		100% Non-fibrous (other)	**None Detected**
H22C *161510386-0066*	2nd Fl Conf Rm Tan Carpet Yellow Mastic	Yellow Non-Fibrous Homogeneous		100% Non-fibrous (other)	**None Detected**
H23A *161510386-0067*	2nd Fl Kitchen Wavy Grey Wallpaper	White Fibrous Homogeneous	95% Synthetic	5% Non-fibrous (other)	**None Detected**

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Project: **1506177ARG / SAIA - BLDG. B1840**

Test Report: Asbestos Analysis of Bulk Materials via EPA 600/R-93/116 Method using Polarized Light Microscopy

			Non-Asbestos		Asbestos
Sample	**Description**	**Appearance**	**% Fibrous**	**% Non-Fibrous**	**% Type**
H23B *161510386-0068*	2nd Fl Kitchen Wavy Grey Wallpaper	White Fibrous Homogeneous	95% Synthetic	5% Non-fibrous (other)	**None Detected**
H23C *161510386-0069*	2nd Fl Kitchen Wavy Grey Wallpaper	White Fibrous Homogeneous	90% Synthetic	10% Non-fibrous (other)	**None Detected**
H24A *161510386-0070*	2nd Fl Kitchen Counter White Caulk	Beige Non-Fibrous Homogeneous		100% Non-fibrous (other)	**None Detected**
H24B *161510386-0071*	2nd Fl Kitchen Counter White Caulk	Beige Non-Fibrous Homogeneous		100% Non-fibrous (other)	**None Detected**
H24C *161510386-0072*	2nd Fl Kitchen Counter White Caulk	Beige Non-Fibrous Homogeneous		100% Non-fibrous (other)	**None Detected**
H25A *161510386-0073*	2nd Fl Kitchen Rolled Tan Linoleum	Tan Non-Fibrous Homogeneous		100% Non-fibrous (other)	**None Detected**
H25B *161510386-0074*	2nd Fl Kitchen Rolled Tan Linoleum	Tan Non-Fibrous Homogeneous		100% Non-fibrous (other)	**None Detected**
H25C *161510386-0075*	2nd Fl Kitchen Rolled Tan Linoleum	Tan Non-Fibrous Homogeneous	5% Cellulose	95% Non-fibrous (other)	**None Detected**

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Test Report: Asbestos Analysis of Bulk Materials via EPA 600/R-93/116 Method using Polarized Light Microscopy

			Non-Asbestos		Asbestos
Sample	**Description**	**Appearance**	**% Fibrous**	**% Non-Fibrous**	**% Type**
H26A *161510386-0076*	2nd Fl Control Rm Stippled White Texture	White Non-Fibrous Homogeneous		100% Non-fibrous (other)	**None Detected**
			Inseparable paint / coating layer included in analysis		
H26B *161510386-0077*	2nd Fl Control Rm Stippled White Texture	White Non-Fibrous Homogeneous		100% Non-fibrous (other)	**None Detected**
			Inseparable paint / coating layer included in analysis		
H26C *161510386-0078*	2nd Fl Control Rm Stippled White Texture	White Non-Fibrous Homogeneous		100% Non-fibrous (other)	**None Detected**
			Inseparable paint / coating layer included in analysis		
H27A *161510386-0079*	Rm 24 Decorative Tan Wallpaper	Tan/White Fibrous Homogeneous	95% Cellulose	5% Non-fibrous (other)	**None Detected**
H27B *161510386-0080*	Rm 37 Decorative Tan Wallpaper	Tan/White Fibrous Homogeneous	95% Cellulose	5% Non-fibrous (other)	**None Detected**
H27C *161510386-0081*	2nd Fl Hall Decorative Tan Wallpaper	Tan/White Fibrous Homogeneous	85% Cellulose	15% Non-fibrous (other)	**None Detected**
H28A-Floor Tile *161510386-0082*	2nd Fl Hot Water Rm 12x12 FT & Mastic - Cream w/Tan & Black	Tan/White Non-Fibrous Homogeneous		100% Non-fibrous (other)	**None Detected**

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Project: **1506177ARG / SAIA - BLDG. B1840**

Test Report: Asbestos Analysis of Bulk Materials via EPA 600/R-93/116 Method using Polarized Light Microscopy

			Non-Asbestos		Asbestos
Sample	**Description**	**Appearance**	**% Fibrous**	**% Non-Fibrous**	**% Type**
H28A-Mastic *161510386-0082A*	2nd Fl Hot Water Rm 12x12 FT & Mastic - Cream w/Tan & Black	Black Non-Fibrous Homogeneous		98% Non-fibrous (other)	**2% Chrysotile**
H28B-Floor Tile *161510386-0083*	2nd Fl Hot Water Rm 12x12 FT & Mastic - Cream w/Tan & Black	Tan/White Non-Fibrous Homogeneous		100% Non-fibrous (other)	**None Detected**
H28B-Mastic *161510386-0083A*	2nd Fl Hot Water Rm 12x12 FT & Mastic - Cream w/Tan & Black				**Stop Positive (Not Analyzed)**
H28C-Floor Tile *161510386-0084*	2nd Fl Hot Water Rm 12x12 FT & Mastic - Cream w/Tan & Black	Tan Non-Fibrous Homogeneous		100% Non-fibrous (other)	**None Detected**
H28C-Mastic *161510386-0084A*	2nd Fl Hot Water Rm 12x12 FT & Mastic - Cream w/Tan & Black				**Stop Positive (Not Analyzed)**
H29A *161510386-0085*	Back Stairs Stair Yellow Mastic	Yellow Non-Fibrous Homogeneous		100% Non-fibrous (other)	**None Detected**
H29B *161510386-0086*	Back Stairs Stair Yellow Mastic	Yellow Non-Fibrous Homogeneous		100% Non-fibrous (other)	**None Detected**
H29C *161510386-0087*	Back Stairs Stair Yellow Mastic	Yellow Non-Fibrous Homogeneous		100% Non-fibrous (other)	**None Detected**

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Test Report: Asbestos Analysis of Bulk Materials via EPA 600/R-93/116 Method using Polarized Light Microscopy

			Non-Asbestos		Asbestos
Sample	**Description**	**Appearance**	**% Fibrous**	**% Non-Fibrous**	**% Type**
H30A *161510386-0088*	Control Rm Closet Cove Base Brown Mastic	Brown Non-Fibrous Homogeneous		100% Non-fibrous (other)	**None Detected**
H30B *161510386-0089*	Control Rm Closet Cove Base Brown Mastic	Brown Non-Fibrous Homogeneous		100% Non-fibrous (other)	**None Detected**
H30C *161510386-0090*	Control Rm Closet Cove Base Brown Mastic	Brown Non-Fibrous Homogeneous		100% Non-fibrous (other)	**None Detected**
H31A *161510386-0091*	2nd Fl Kitchen Sink Grey Undercoat	Gray Non-Fibrous Homogeneous		100% Non-fibrous (other)	**None Detected**
H31B *161510386-0092*	2nd Fl Kitchen Sink Grey Undercoat	Gray Non-Fibrous Homogeneous		100% Non-fibrous (other)	**None Detected**
H31C *161510386-0093*	2nd Fl Kitchen Sink Grey Undercoat	Gray Non-Fibrous Homogeneous		100% Non-fibrous (other)	**None Detected**
H32A *161510386-0094*	1st Fl Conf. Rm Duct Grey Mastic	Gray Non-Fibrous Homogeneous		100% Non-fibrous (other)	**None Detected**
H32B *161510386-0095*	1st Fl Conf. Rm Duct Grey Mastic	Gray Non-Fibrous Homogeneous		100% Non-fibrous (other)	**None Detected**

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Test Report: Asbestos Analysis of Bulk Materials via EPA 600/R-93/116 Method using Polarized Light Microscopy

			Non-Asbestos		Asbestos
Sample	**Description**	**Appearance**	**% Fibrous**	**% Non-Fibrous**	**% Type**
H32C *161510386-0096*	1st Fl Conf. Rm Duct Grey Mastic	Gray Non-Fibrous Homogeneous		100% Non-fibrous (other)	**None Detected**

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1615 10386

EMSL Analytical, Inc.
2001 E 52nd Street
Indianapolis, IN 46205
Phone: (317) 803-2997
Fax. (317) 803- 3047

CHAIN OF CUSTODY

Polarized Light Microscopy (PLM)
EPA method 600 R/NOM
*Positive Stop Count

Argus Environmental
10004 Wurzbach Rd., #247
San Antonio, Texas 78230
Phone (210) 493-2560
Fax (210) 342-9027
sarah@argusenvironmental.com
beth@argusenvironmental.com

Turn around time. 72 hours		Project name. SAIA – Bldg B1840	Job number 1506177ARG		Date of collection: 6/24/2015
Sample number	*Sample location*		*Material description*		
	Building or Room number	Other description, material is *in good condition* unless otherwise noted	Size	Color	Type of material
H1A	Room 31	2x2 - Hole		White	Ceiling Tile
H1B*	Room 18	2x2 – Hole		White	Ceiling Tile
H1C*	Room 1	2x2 – Hole		White	Ceiling Tile
H2A	Room 31			White	Gypsum Board
H2B*	Room 18			White	Gypsum Board
H2C*	Room 1			White	Gypsum Board
H3A	Room 31			White	Joint Compound
H3B*	Room 18			White	Joint Compound
H3C*	Room 1			White	Joint Compound
H4A	Room 31	Wall		White	Texture
Sample relinquished by.			Sample received by		
Print name: Elizabeth Aguilar		Date: 6/24/2015	Print name: J Braun		Date: 6.25.15
Signature: Elizabeth Aguilar		Time 2:21pm	Signature: J Braun		Time 1005

- *Email all sample results*

96

10386

EMSL Analytical, Inc.
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CHAIN OF CUSTODY

Polarized Light Microscopy (PLM)
EPA method 600
*Positive Stop Count

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Phone (210) 493-2560
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sarah@argusenvironmental com
beth@argusenvironmental.com

Turn around time: 72 hours	Project name: SAIA – Bldg. B1840	Job number: 1506177ARG	Date of collection: 6/24/2015

Sample number	*Sample location*		*Material description*		
	Building or Room number	Other description, material is *in good condition* unless otherwise noted	Size	Color	Type of material
H4B*	Room 18	Wall		White	Texture
H4C*	Room 1	Wall		White	Texture
H5A	Entry	Brown/Green Carpet		Yellow	Mastic
H5B*	Entry	Brown/Green Carpet		Yellow	Mastic
H5C*	1st Fl Conf. Room	Brown/Green Carpet		Yellow	Mastic
H6A	1st Fl Conf. Room	Wavy		Grey	Wallpaper
H6B*	1st Fl. Conf Room	Wavy		Grey	Wallpaper
H6C*	1st Fl. Conf Room	Wavy		Grey	Wallpaper
H7A	Room 31	Blue w/ Speck Carpet		Yellow	Mastic
H7B*	Room 18	Blue w/ Speck Carpet		Yellow	Mastic

Sample relinquished by·		Sample received by:	
Print name: Elizabeth Aguilar	Date: 6/24/2015	Print name. S BRAUN	Date: 6.25.15
Signature: Elizabeth Aguilar	Time: 2 21pm	Signature: S Braun	Time: 1005

- ***Email all sample results***

103586

EMSL Analytical, Inc.
2001 E 52nd Street
Indianapolis, IN 46205
Phone (317) 803-2997
Fax (317) 803-3047

CHAIN OF CUSTODY

Polarized Light Microscopy (PLM)
EPA method 600
*Positive Stop Count

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Phone (210) 493-2560
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Turn around time: 72 hours		Project name SAIA – Bldg B1840		Job number 1506177ARG	Date of collection: 6/24/2015
Sample number	*Sample location*		*Material description*		
	Building or Room number	Other description, material is *in good condition* unless otherwise noted	Size	Color	Type of material
H7C*	Room 1	Blue w/ Speck Carpet		Yellow/Green	Mastic
H8A	Room 1	Brown Cove Base		Cream	Mastic
H8B*	Room 31	Brown Cove Base		Cream	Mastic
H8C*	Room 18	Brown Cove Base		Cream	Mastic
H9A	2nd Fl. Conf. Room	Canvas		Tan	Wallpaper
H9B*	2nd Fl Conf. Room	Canvas		Tan	Wallpaper
H9C*	1st Fl. Conf. Room	Canvas		Tan	Wallpaper
H10A	1st Fl. Kitchen	12x12		Grey w/ Blue Marbled and Yellow	Floor Tile and Mastic
H10B*	1st Fl. Locker Room	12x12		Grey w/ Blue Marbled and Yellow	Floor Tile and Mastic
H10C*	2nd Fl HVAC Room	12x12		Grey w/ Blue Marbled and Yellow	Floor Tile and Mastic
Sample relinquished by:			Sample received by:		
Print name: Elizabeth Aguilar		Date: 6/24/2015	Print name: S Braun		Date: 6-25-15
Signature: Elizabeth Aguilar		Time 2:21pm	Signature: S Braun		Time 1605

- *Email all sample results*

10386

EMSL Analytical, Inc.
2001 E 52nd Street
Indianapolis, IN 46205
Phone: (317) 803-2997
Fax: (317) 803- 3047

CHAIN OF CUSTODY

Polarized Light Microscopy (PLM)
EPA method 600
*Positive Stop Count

Argus Environmental
10004 Wurzbach Rd , #247
San Antonio, Texas 78230
Phone (210) 493-2560
Fax (210) 342-9027
sarah@argusenvironmental com
beth@argusenvironmental com

Turn around time*	Project name*	Job number.	Date of collection
72 hours	SAIA – Bldg. B1840	1506177ARG	6/24/2015

Sample number	*Sample location*		*Material description*		
	Building or Room number	Other description, material is *in good condition* unless otherwise noted	Size	Color	Type of material
H11A	1st Floor HVAC Room	HVAC		White	Mastic
H11B*	1st Floor HVAC Room	HVAC		White	Mastic
H11C*	2nd Floor HVAC Room	HVAC		White	Mastic
H12A	1st Floor HVAC Room	2x4		White	Ceiling Tile
H12B*	2nd Floor HVAC Room	2x4		White	Ceiling Tile
H12C*	2nd Floor HVAC Room	2x4		White	Ceiling Tile
H13A	1st Floor HVAC Room			Black	Vibration Damper
H13B*	1st Floor HVAC Room			Black	Vibration Damper
H13C*	1st Floor HVAC Room			Black	Vibratino Damper
H14A	1st Floor HVAC Room	Pipe		Cream	Mastic

Sample relinquished by:		Sample received by:	
Print name: Elizabeth Aguilar	Date: 6/24/2015	Print name S Braun	Date. 6-25-15
Signature: Elizabeth Aguilar	Time* 2.21pm	Signature: S Braun	Time: 1005

- *Email all sample results*

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Phone (210) 493-2560
Fax (210) 342-9027
sarah@argusenvironmental.com
beth@argusenvironmental.com

Turn around time: 72 hours	Project name: SAIA – Bldg. B1840	Job number: 1506177ARG	Date of collection: 6/24/2015

Sample number	*Sample location*		*Material description*		
	Building or Room number	Other description, material is *in good condition* unless otherwise noted	Size	Color	Type of material
H14B*	2nd Floor HVAC Room	Pipe		Cream	Mastic
H14C*	2nd Floor HVAC Room	Pipe		Cream	Mastic
H15A	Control Room Closet	12x12		White w/ Black Specks and Black	Floor Tile and Mastic
H15B*	Control Room Closet	12x12		White w/ Black Specks and Black	Floor Tile and Mastic
H15C*	2nd Floor Control Room	12x12		White w/ Black Specks and Black	Floor Tile and Mastic
H16A	Room 11	2x2 Fissure and Hole		White	Ceiling Tile
H16B*	Room 13	2x2 Fissure and Hole		White	Ceiling Tile
H16C*	1st Floor Conf Room	2x2 Fissure and Hole		White	Ceiling Tile
H17A	1st Floor WRR	Ceramic Tile		White	Grout
H17B*	1st Floor MRR	Ceramic Tile		White	Grout

Sample relinquished by:		Sample received by:	
Print name: Elizabeth Aguilar	Date: 6/24/2015	Print name: S Brauer	Date: 6.25.15
Signature: Elizabeth Aguilar	Time 2:21pm	Signature: S Brauer	Time: 1005

- *Email all sample results*

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Argus Environmental
10004 Wurzbach Rd , #247
San Antonio, Texas 78230
Phone (210) 493-2580
Fax (210) 342-9027
sarah@argusenvironmental.com
beth@argusenvironmental com

Turn around time: 72 hours	Project name: SAIA – Bldg. B1840	Job number: 1506177ARG	Date of collection: 6/24/2015

Sample number	*Sample location*		*Material description*		
	Building or Room number	Other description, material is *in good condition* unless otherwise noted	Size	Color	Type of material
H21A	Room 23	Blue Carpet		Yellow	Mastic
H21B*	Room 23	Blue Carpet		Yellow	Mastic
H21C*	Room 23	Blue Carpet		Yellow	Mastic
H22A	Room C2	Tan Carpet		Yellow	Mastic
H22B*	Room 22	Tan Carpet		Yellow	Mastic
H22C*	2nd Floor Conf. Room	Tan Carpet		Yellow	Mastic
H23A	2nd Floor Kitchen	Wavy		Grey	Wallpaper
H23B*	2nd Floor Kitchen	Wavy		Grey	Wallpaper
H23C*	2nd Floor Kitchen	Wavy		Grey	Wallpaper
H24A	2nd Floor Kitchen	Counter		White	Caulk

Sample relinquished by:		Sample received by:	
Print name. Elizabeth Aguilar	Date: 6/24/2015	Print name S Brown	Date 6.25.15
Signature: Elizabeth Aguilar	Time 2:21pm	Signature: S Brown	Time. 1005

* *Email all sample results*

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San Antonio, Texas 78230
Phone (210) 493-2560
Fax (210) 342-9027
sarah@argusenvironmental.com
beth@argusenvironmental.com

Turn around time	Project name*	Job number*	Date of collection.
72 hours	SAIA – Bldg B1840	1506177ARG	6/24/2015

Sample number	*Sample location*		*Material description*		
	Building or Room number	Other description, material is *in good condition* unless otherwise noted	Size	Color	Type of material
H24B*	2nd Floor Kitchen	Counter		White	Caulk
H24C*	2nd Floor Kitchen	Counter		White	Caulk
H25A	2nd Floor Kitchen	Rolled		Tan	Linoleum
H25B*	2nd Floor Kitchen	Rolled		Tan	Linoleum
H25C*	2nd Floor Kitchen	Rolled		Tan	Linoleum
H26A	2nd Floor Control Room	Stippled		White	Texture
H26B*	2nd Floor Control Room	Stippled		White	Texture
H26C*	2nd Floor Control Room	Stippled		White	Texture
H27A	Room 24	Decorative		Tan	Wallpaper
H27B*	Room 37	Decorative		Tan	Wallpaper

Sample relinquished by		Sample received by:	
Print name: Elizabeth Aguilar	Date: 6/24/2015	Print name: S Braun	Date. 6-25-15
Signature. Elizabeth Aguilar	Time 2:21pm	Signature S Braun	Time: 1005

- *Email all sample results*

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beth@argusenvironmental.com

Turn around time: 72 hours	Project name: SAIA – Bldg. B1840	Job number: 1506177ARG	Date of collection: 6/24/2015

Sample number	*Sample location*		*Material description*		
	Building or Room number	Other description, material is *in good condition* unless otherwise noted	Size	Color	Type of material
H27C*	2nd Floor Hall	Decorative		Tan	Wallpaper
H28A	2nd Floor Hot Water Room	12x12		Cream w/ Tan and Black	Floor Tile and Mastic
H28B*	2nd Floor Hot Water Room	12x12		Cream w/ Tan and Black	Floor Tile and Mastic
H28C*	2nd Floor Hot Water Room	12x12		Cream w/ Tan and Black	Floor Tile and Mastic
H29A	Back Stairs	Stair		Yellow	Mastic
H29B*	Back Stairs	Stair		Yellow	Mastic
H29C*	Back Stairs	Stair		Yellow	Mastic
H30A	Control Room Closet	Cove Base		Brown	Mastic
H30B*	Control Room Closet	Cove Base		Brown	Mastic
H30C*	Control Room Closet	Cove Base		Brown	Mastic

Sample relinquished by:		Sample received by:	
Print name: Elizabeth Aguilar	Date: 6/24/2015	Print name: S Braun	Date 6-25-15
Signature: Elizabeth Aguilar	Time: 2.21pm	Signature: S Braun	Time. 1005

- ***Email all sample results***

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beth@argusenvironmental com

Turn around time: 72 hours	Project name: SAIA – Bldg. B1840	Job number: 1506177ARG	Date of collection: 6/24/2015

Sample number	Sample location		Material description		
	Building or Room number	Other description, material is *in good condition* unless otherwise noted	Size	Color	Type of material
H31A	2nd Floor Kitchen	Sink		Grey	Undercoat
H31B*	2nd Floor Kitchen	Sink		Grey	Undercoat
H31C*	2nd Floor Kitchen	Sink		Grey	Undercoat
H32A	1st Floor Conf. Room	Duct		Grey	Mastic
H32B*	1st Floor Conf Room	Duct		Grey	Mastic
H32C*	1st Floor Conf Room	Duct		Grey	Mastic

Sample relinquished by.	Sample received by.
Print name: Elizabeth Aguilar Date 6/24/2015	Print name: J Braar Date 62515
Signature: Elizabeth Aguilar Time: 2:21pm	Signature: Time: 1015

- ***Email all sample results***

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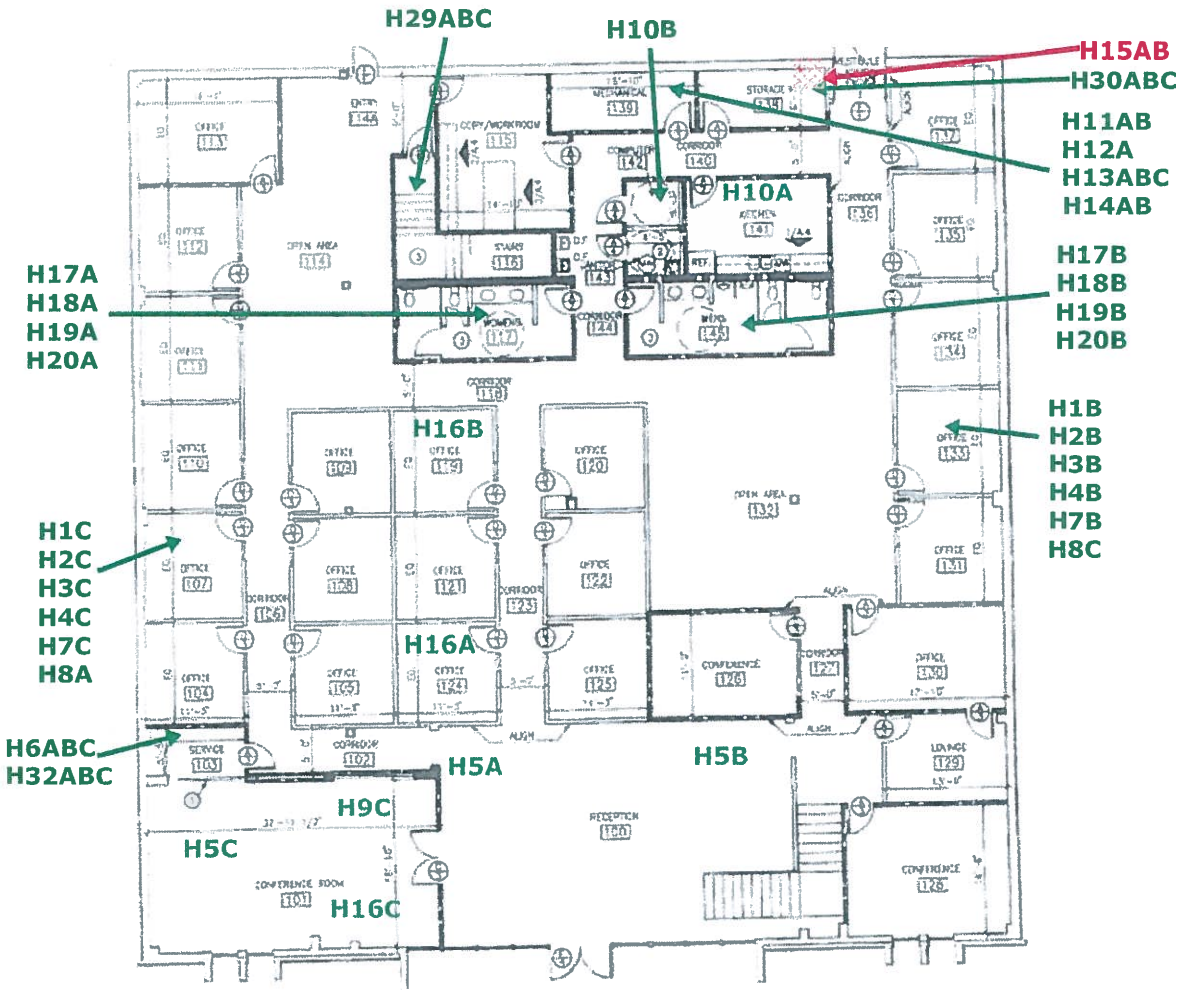
sarah@argusenvironmental com
beth@argusenvironmental.com

Turn around time. 72 hours		Project name SAIA – Bldg B1840		Job number* 1506177ARG		Date of collection. 6/24/2015
Sample number	*Sample location*		*Material description*			
	Building or Room number	Other description, material is *in good condition* unless otherwise noted	Size	Color	Type of material	
H17C*	2nd Floor WRR	Ceramic Tile		White	Grout	
H18A	1st Floor WRR	Ceramic Tile		Grey	Grout	
H18B*	1st Floor MRR	Ceramic Tile		Grey	Grout	
H18C*	2nd Floor WRR	Ceramic Tile		Grey	Grout	
H19A	1st Floor WRR	Decorative		Grey	Wallpaper	
H19B*	1st Floor MRR	Decorative		Grey	Wallpaper	
H19C*	2nd Floor WRR	Decorative		Grey	Wallpaper	
H20A	1st Floor WRR	Restroom		White	Caulk	
H20B*	1st Floor MRR	Restroom		White	Caulk	
H20C*	2nd Floor WRR	Restroom		White	Caulk	
Sample relinquished by:			Sample received by*			
Print name: Elizabeth Aguilar		Date: 6/24/2015	Print name: S Braun		Date. 6.25.15	
Signature: Elizabeth Aguilar		Time: 2:21pm	Signature: S Braun		Time* 1005	

- ***Email all sample results***

Building B1840 (First Floor) - Bulk Sample Diagram



Legend

Green - Non-Asbestos Sample Locations

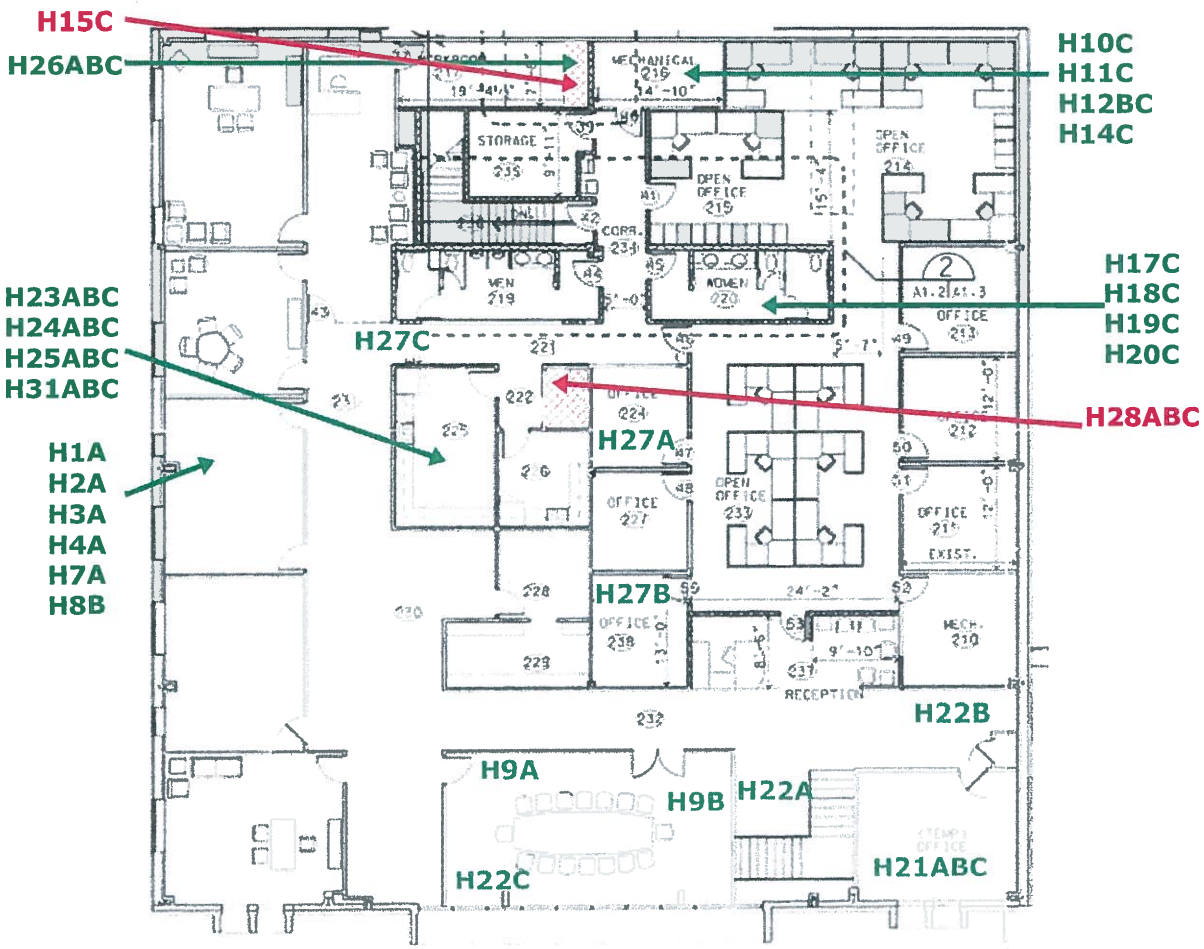
Red - Asbestos Sample Locations

- ACM Floor Tile and Mastic

Environmental Consultants
10004 Wurzbach Road, Ste. 247
San Antonio, Texas 78230

Date: 6/30/2015

Building B1840 (Second Floor) - Bulk Sample Diagram



Legend

Green - Non-Asbestos Sample Locations

Red - Asbestos Sample Locations

- ACM Floor Tile and Mastic

Environmental Consultants
10004 Wurzbach Road, Ste. 247
San Antonio, Texas 78230

Date: 6/30/2015

APPENDIX

C. Safety Risk Assessment Findings

Workshop held on June 11, 2015

and

Checklist for Determining Severe Weather Shelter Areas in Building

Welcome to San Antonio Airport System
Safety Risk Assessment # 9
for
Airport Integrated Control Center (Bldg 1840)

SAN ANTONIO AIRPORT SYSTEM

22 May 2014

AICC - BLDG 1840

- **Occupancy Classification IFC - 2012**
  - **Business Group B – Occupancy includes, among others, the use of a building or structure, or a portion thereof, for office, professional or service-type transactions, including storage of records and accounts. Business occupancies shall include, but not limited to, the following**
    - Airport - Air Traffic Control Tower
    - Civic Administration
    - Electronic data processing
    - Training and skill development not within a school or academic program.

SAN ANTONIO AIRPORT SYSTEM

22 April 2015

AICC - BLDG 1840

- Issues in reference to this SRA
  - Life Safety Code
    - Sprinkler System
    - Fire Extinguishers
  - Severe Weather
    - Shelter in Place
    - AICC / AEC continuous operation
    - Lighting Protection for building
  - Public parking and street crossing paths
    - Handicap Parking IAW American Disability Act
  - Building elevator accessibility

AICC - BLDG 1840

- Issues in reference to this SRA continued
  - Emergency Generator
    - Location and Routine Power up
    - Essential Systems Power

Safety Codes

- **Requirements:**
  - **International Fire Code – 2012 includes International Building Codes and COSA SAFD Additions/Deletions**
  - **NFPA 101 – Life Safety Code**
  - **NFPA 10 – Fire Extinguishers**
  - **NFPA 13 – Standard for Installation of Sprinkler Systems**
  - **NFPA 110 – Emergency and Standby Power Systems**
  - **OSHA 3256-07N – 2006 – Fire Service Features of Building and Fire Protection Systems**

International Fire Code 2012

- **IFC 2012**
  - **A201.4 Terms not defined – where terms are not defined through the methods authorized by this section, such terms shall have ordinarily accepted meanings such as the context implies.**
    - Webster defines "Obstruction" as – something that obstructs, blocks, or closes up with an obstacle or obstacles; obstacle or hindrance: obstructions to navigation.
  - **912.3 Access. Immediate access to fire department connections shall be maintained at all times and without *obstruction* by fences, bushes, trees, walls or *any other fixed or moveable object.***

Fire Extinguisher – Class A, B, C

- IFC 2015
  - Section 906.1 "Where required "– Portable fire extinguishers shall be installed in the following locations.
    - Occupancy Classification "B" – In New and existing facilities
  - Section 906.2 – Fire Extinguishers IAW NFPA 10
  - Section 906.6 – Fire Extinguishers must be Unobstructed and Unobscured
- NFPA 10 – Recommends Class A, B, C Fire Extinguishers – Woods, Fuels, and electrical
  - Travel Distance
    - Rating 10 = MAX 75 feet between extinguishers

7 22 May 2013

Risk Management

- What is Risk Management?
  - The identification, analysis and elimination, and/or mitigation to an acceptable level of risks that threatens the capabilities of an organization.
- What is the objective of Risk Management?
  - Aims at a balanced allocation of resources to address all risks and viable risk control and mitigation.

8 15 Oct 2009

Definitions

- **Risk** – The assessment, expressed in terms of predicted **probability** and **severity,** of the consequences of a hazard taking as reference the worst foreseeable situation.
- **Probability** – The likelihood that an unsafe event or condition might occur.
  - Questions - For assessing the probability of an occurrence:
    - Is there a history of occurrences like the one being assessed, or is the occurrence an isolated event?
    - What other equipment, or similar type components, might have similar defects?
    - What number of operating or maintenance personnel must follow the procedure (s) in question?
    - How frequently is the equipment or procedure under assessment used?

Definitions continued

- **Severity** – The possible consequences of an unsafe event or condition, taking as reference the **worst foreseeable situation.**
  - Define the severity in terms of consequences for:
    - People
    - Assets (Finance, Property & Liability)
    - Environment
    - Reputation (Image & Public confidence)

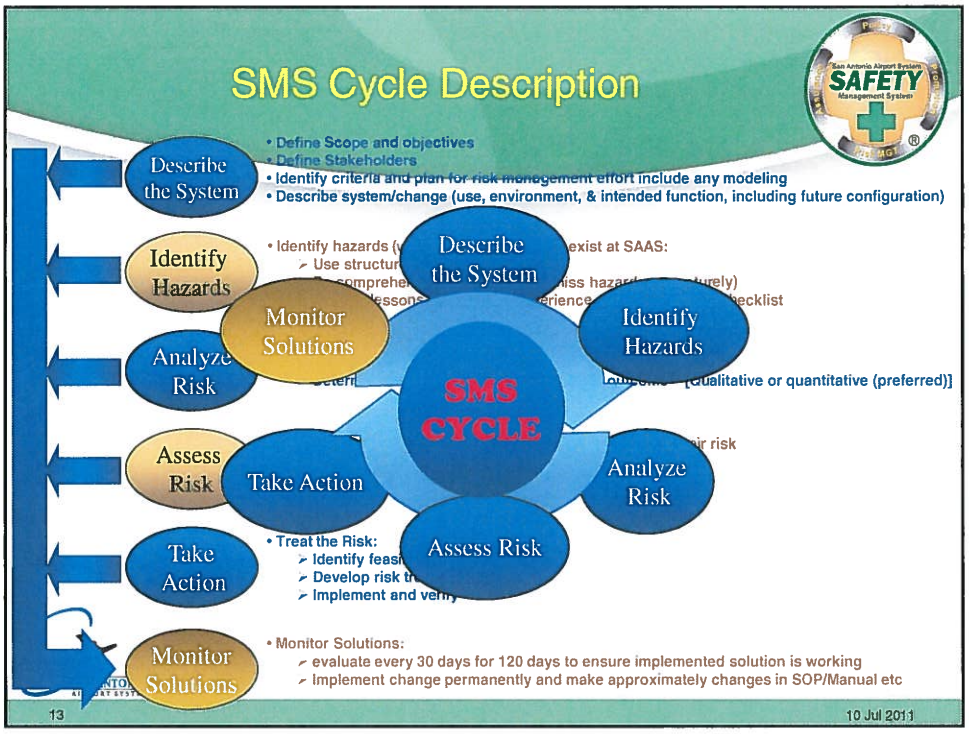
Definitions continued

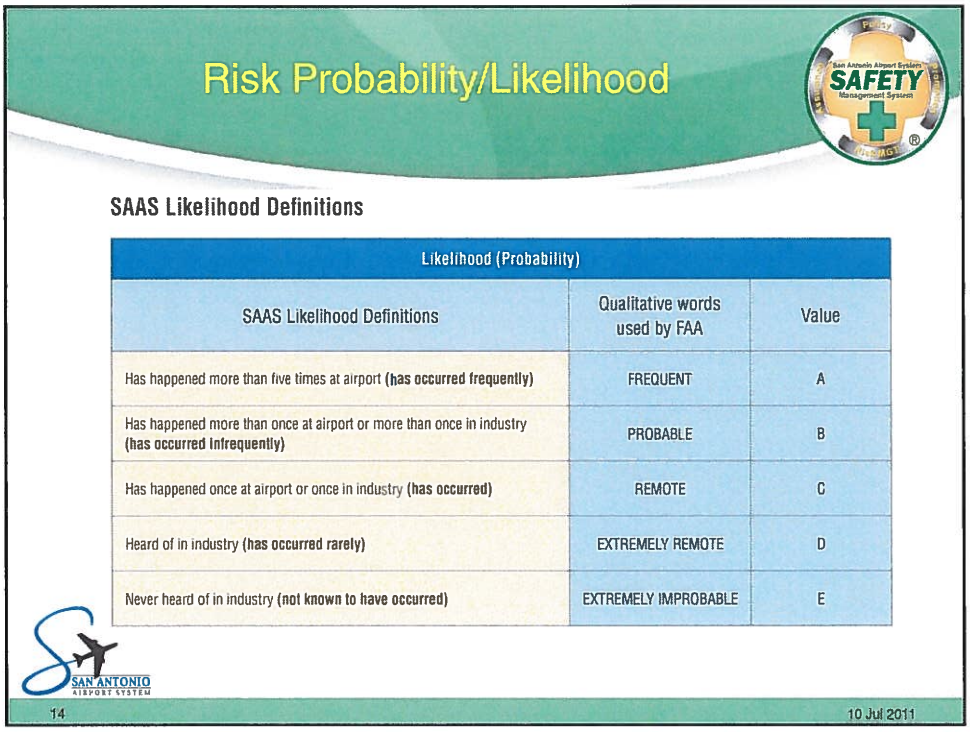
- **Questions** for assessing the severity of an occurrence:
  - What is the impact to **People**
    - Loss of Life
    - Damage to possessions
  - What is the **Environmental Impact?**
    - Spill of fuel or other hazardous product
    - Physical disruption of natural habitat
  - What is the **Reputation Impact**
    - Are there **organizational, management or regulatory implications** that might generate larger threats to public safety?
    - What are the likely **political implications** and/or **media interest?**

Definitions continued

- **Mitigation** – Measures to address the potential hazard or to reduce the risk probability or severity.
  - Risk mitigation = Risk control

(Mitigate – To make milder, less severe or less harsh)


SMS Cycle Description
Describe the System
Identify Hazards
Analyze Risk
Assess Risk
Take Action
Monitor Solutions
SMS CYCLE
• Define Scope and objectives
• Define Stakeholders
• Identify criteria and plan for risk management effort include any modeling
• Describe system/change (use, environment, & intended function, including future configuration)
• Identify hazards
exist at SAAS:
Use structur
Identify Hazards
Analyze Risk
Assess Risk
Take Action
Monitor Solutions
[qualitative or quantitative (preferred)]
• Treat the Risk:
Identify feas
Develop risk t
Implement and ver
• Monitor Solutions:
evaluate every 30 days for 120 days to ensure implemented solution is working
Implement change permanently and make approximately changes in SOP/Manual etc
13
10 Jul 2011


Risk Probability/Likelihood
SAAS Likelihood Definitions
Likelihood (Probability)
SAAS Likelihood Definitions
Qualitative words used by FAA
Value
Has happened more than five times at airport (has occurred frequently)
FREQUENT
A
Has happened more than once at airport or more than once in industry (has occurred infrequently)
PROBABLE
B
Has happened once at airport or once in industry (has occurred)
REMOTE
C
Heard of in industry (has occurred rarely)
EXTREMELY REMOTE
D
Never heard of in industry (not known to have occurred)
EXTREMELY IMPROBABLE
E
SAN ANTONIO AIRPORT SYSTEM
14
10 Jul 2011

Risk Severity

SAAS Severity Definitions

SEVERITY	Consequence: People	Assets	Environment	Reputation
5 = Negligible	• No injuries	• No damage • Minor technical delay	• No impact	• No loss of public confidence
4 = Minor	• First Aid injury or • No disability or lost time	• Technical delay or • Ground equipment inoperable or • Aircraft (ACFT) grounded causing Operator to incur relatively minimal costs	• Release - Contained	• May be lowered, but public finds situation acceptable
3 = Moderate	• Lost time injury or • Passenger injured (broken bones) • No disability	• Technical delay or • Ground equipment inoperable or • Ground equipment damaged ACFT or • ACFT grounded causing Operator to incur substantial costs	• Small (< 50 Gallons) release - Uncontained	• Significantly lowered with high profile media coverage
2 = Major	• Disability or • Severe injuries	• Major technical delay or • Ground equipment inoperable or • Ground equipment caused major damage to ACFT causing delays to return ACFT to service or • ACFT grounded causing Operator to incur substantial costs	• Moderate (> 50 Gallons but < 100 Gallons) release - Uncontained	• Shaken to the point where significant numbers of the public will not fly on a particular aircraft or airline
1 = Catastrophic	• Fatal injuries to personnel or passenger • Public exposed to life threatening hazard	• Loss of ACFT • Loss of equipment	• Large (> 100 Gallons) release - Uncontained	• Shaken to the point where significant numbers of the public will not use SAAS

SAN ANTONIO AIRPORT SYSTEM

Risk Assessment Matrix

SAAS Risk Matrix

Risk Assessment Matrix

Consequence: People	Assets	Environment	Reputation	Likelihood		Severity 5 Negligible	4 Minor	3 Moderate	2 Major	1 Catastrophic
No Injury or Health Effects	No Damage	No Effects	No Impact	A	Frequent (Has happened more than five times at airport)	L5	M13	H20	H22	H25
Minor Inquiry or Health Effects	Minor Damage	Minor Effects	Minor Impact	B	Probable (Has happened more than once at airport or in industry)	L4	M12	M15	H21	H24
Moderate Injury or Health Effects	Moderate Damage	Moderate Effects	Moderate Impact	C	Remote (Has happened once at airport or once in industry)	L3	L8	M14	M17	H23
Major Injury or *PTD	Major Damage	Major Effects	Major Impact	D	Extremely Remote (Heard of in industry)	L2	L7	L10	M16	M19
Fatalities	Catastrophic Damage	Catastrophic Effects	Catastrophic Impact	E	Extremely Improbable (Never heard of in industry)	L1	L6	L9	L11	M18

*PTD = Permanent Total Disability

Low Risk: Acceptable Risk | Medium Risk: Acceptable Risk | High Risk: Unacceptable Risk

High Risk: Unacceptable Risk
- Change cannot be implemented unless hazard's associated risk mitigated so that risk reduced to medium or low level
- Tracking, monitoring and management required

Medium Risk: Acceptable risk
- Minimum acceptable safety objective
- Change may be implemented, but tracking, monitoring, and management required

Low Risk: Acceptable risk
- Acceptable without restriction or limitation
- Hazards must be documented

15 16

SAN ANTONIO AIRPORT SYSTEM

Second Issue for Discussion

- **American Society of Civil Engineers (ASCE) - 7 - *Minimum Design Loads for Buildings and Other Structures***
  - ***CAT – IV Building*** **- Designated emergency-preparedness, communication, and operation centers and other facilities required for emergency response**

SAN ANTONIO AIRPORT SYSTEM

18 22 May 2013

ASCE 7
TABLE 1-1 OCCUPANCY CATEGORY OF BUILDINGS AND OTHER STRUCTURES

Occupancy Category	Nature of Occupancy
I	Building and other structures that represent a low hazard to human life in the event of failure, including agricultural, temporary, and minor storage facilities.
II	All other structures that aren't in categories I, III, or IV.
III	Building and other structures that represent a substantial hazard to human life in the event of failure including: • Covered structures the primary occupancy of which is public assembly with an occupant load of 300. • Buildings and other structures with elementary-school, secondary-school, or day-care facilities with an occupant load greater than 250. • Buildings and other structures with elementary-school, secondary-school, or day-care facilities with an occupant load greater than 500 for colleges or adult-education facilities. • Health-Care facilities with an occupant load of 50 or more resident patients without surgery or emergency-treatment facilities. • Jails and detention facilities. • Any structure with an occupant load greater than 5,000. • Power-generating stations, water-treatment facilities for portable water, waste-water-treatment facilities, and other public-utility facilities not included in Occupancy Category IV. • Buildings and other structures not included in Occupancy Category IV containing sufficient quantities of toxic or explosive substances that would be dangerous to the

9 22 May 2013

ASCE 7
TABLE 1-1 OCCUPANCY CATEGORY OF BUILDINGS AND OTHER STRUCTURES continued

Occupancy Category	Nature of Occupancy
IV	Buildings and other structures designated as essential facilities, including: • Hospitals and other health-care facilities with surgery or emergency-treatment facilities. • Fire, rescue, and police stations and emergency-vehicle garages. • Designated earthquake, hurricane, or other emergency shelters. • Designated emergency-preparedness, communication, and operation centers and other facilities required for emergency response. • Power-generating stations and other public-utility facilities required as emergency-backup facilities for Occupancy Category IV structures. • Structures containing highly toxic materials as defined in Section 307 of the 2006 International Building Code. • Aviation control towers, air-traffic control centers, and emergency-aircraft hangers. • Buildings and other structures with critical national-defense functions. • Water-treatment facilities required to maintain water pressure for fire suppression.

SAN ANTONIO AIRPORT SYSTEM

20 22 May 2013

Determining Severe Weather Shelter Areas in Buildings

from the

Metropolitan Emergency Managers' Association

BEST AREAS

- Basements
- Rooms constructed of reinforced concrete, brick or block with no windows and a heavy concrete floor or roof system overhead
- Small interior rooms with no windows such as locker rooms and lavatories
- Hallways, away from doors and windows and not open to direction of tornado
- Any protected area away from doors and windows

WORST AREAS

- Gymnasiums and auditoriums
- Rooms with large windows and doors
- Hallways exposed to direction of tornado
- Rooms with chimneys or beneath large, heave roof-mounted equipment
- Mobile homes are not considered to be "buildings." They are considered to be dangerous in any severe wind storm and occupants are urged to take shelter in designated shelter areas.

These factors were used in making up the checklist that follows. To use the checklist, simply select an area based on the above factors that you wish to check as a possible shelter area. Assign the point values indicated and total them. The highest total point value of any area evaluated would indicate the best location within the building.

Remember, you are simply trying to locate the safest area in your building. Even if point totals are relatively low, the area with the highest total in your building would still be much safer than being in a car, a mobile home or outside.

These guidelines should be used with considerable caution and judgement to establish only the relatively better severe weather shelter areas. It may be noted that a severe weather shelter in the absolute sense may not exist in an existing building unless there are areas designed for that specific purpose.

SUMMARY

The factors covered by the checklist (located on the back of this page) are considered to be of major importance but in no way are intended to be a complete list. There are other additional factors which could affect the final choice of a shelter area. Among these are concern over the direction of the windstorm or tornado, age of occupants, required floor space per person, "two ways out," and many others.

If you feel the need for professional assistance in a making a "Severe Weather" shelter decision, please contact your local Emergency Management Office.

CHECKLIST FOR DETERMINING SEVERE WEATHER SHELTER AREAS IN BUILDINGS

1.	Lowest Level in Building	Points	
	A. Basement (below grade) with 2 exits	40	
	B. Basement (below grade) with 1 exit	30	
	C. First floor (at grade level)	4	4
NOTE: If point value is 30 points or more after this first evaluation, you may disregard all the following factors. Basements (A or B above) will be the preferred location.			
2.	Interior location within building or number of walls to outside	Points	
	A. Three or more walls - including outside wall	3	3
	B. Two walls - including outside wall	2	
	C. Hallways with turns or other baffle walls	1	
	D. Outside wall only	Avoid	
3.	Glass area of walls in selected room	Points	
	A. No glass	10	10
	B. Up to 4% reinforced glass or glass block	2	
	C. Over 5% glass	Avoid	
4.	Inside wall construction of selected area within building	Points	
	A. Concrete block	3	3
	B. Stud wall with sheetrock	2	
5.	Ceiling span between supporting walls in selected room	Points	
	A. Less than 15 feet	5	5
	B. Over 15 feet but less than 25 feet	2	
	C. Over 25 feet	Avoid	

6. Ceiling construction in selected room	Points	
A. Pre-cast concrete	5	5
B. Standard wood joists with sheetrock	2	
C. Standard wood joists with ceiling tile	Avoid	
Disregard the next two items if construction of roof or outside walls is the same throughout entire structure.		
7. Roof construction of building	Points	
A. Pre-cast concrete	5	
B. Standard corrugated steel, insulation, tar, gravel	3	
C. Wood frame, shingles	1	
8. Outside wall construction of building	Points	
A. Reinforced concrete	10	
B. Pre-cast concrete	5	
C. Concrete block and/or brick	3	
D. Wood frame	1	
Total		30

APPENDIX

D. July 7, 2015 Executive Presentation and Original Cost Breakdown

Building 1840 Repurposing

EXECUTIVE MEETING

JULY 7, 2015

1

Goals and Objectives

Goal #1 - Enhanced situational awareness of activities at SAT with the following enhancements:

- Common event management system
- Collocation of staff
- Better face-to-face access similar to AEC operations but daily for IROPs
- Access and display of real-time, critical information
- Clear and logical information from field and systems
- Dashboard viewing available from any workstation both inside and outside of the center.

2

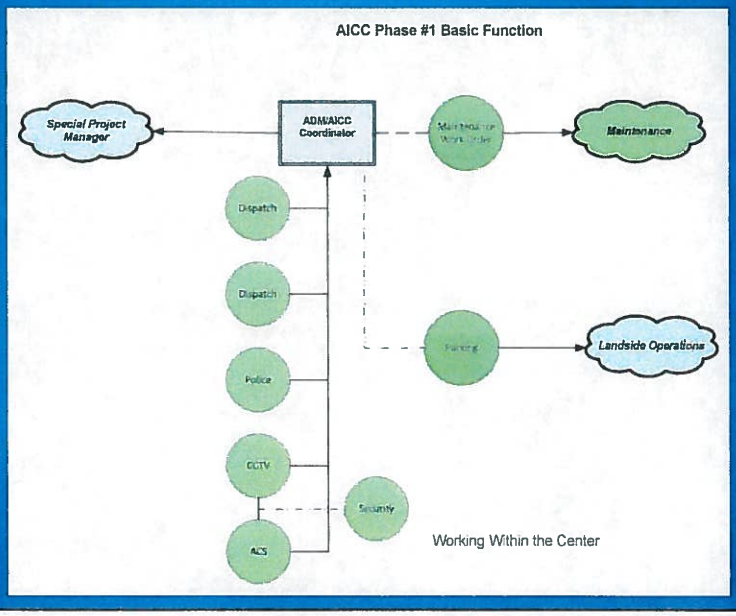
Goals and Objectives

Goal #2 - Improve efficiency of operations and response

- Enhanced room layout
- Acoustically comfortable space, supportive of ease of communications. For example, dampened HVAC, acoustical floor, wall, and ceiling treatments, use of headsets, etc.
- Good sight lines across space – e.g., good visibility of shared monitors and from position to position specifically supervisor work station access
- Status indicators for each position (busy, free, emergency call, etc.)
- Supportive of cabling and power installation and ease of relocation or reconfiguration of consoles and equipment with minimal disruption (raised floor/console)
- Room for growth (2025)
- Intelligent use of technology and integration to support efficiency
  - Common computer platforms and configurations with a full suite of common software
  - Reduced keyboard, mouse, and CPU counts
  - Single sign-on
  - Customizable dashboards
  - Integration of information and systems to allow easy population of key data from one system to another automatically, i.e., eliminate redundant manual data entry
  - Event Management System with built-in SOPs, decision-making and searchable software
  - Support of real-time and historical events and operations
  - Trending capability and report writing

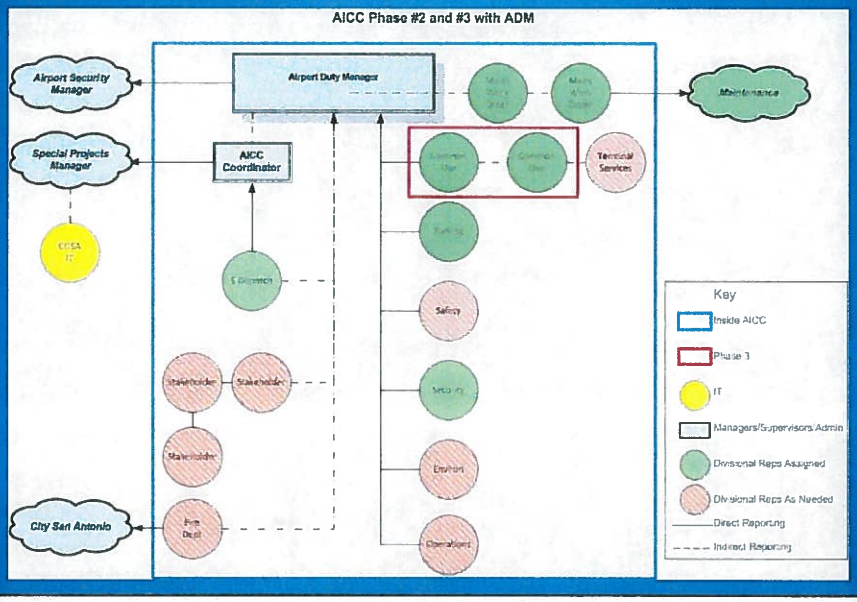
3

Con Ops



4

Con Ops



5

Staffing

	Phase 2 Fully Staffed	Phase 3 Fully Staffed
Department	Position Count	Position Count
ADM	1	1
Dispatch	1	1
Dispatch	1	1
Police	1	1
Access Control	1	1
CCTV	1	1
AICC Coordinator	1	1
Maintenance Work Order	1	1
Maintenance Work Order	1	1
Common Use	0	1
Common Use	0	1
Parking	1	1
Safety	1	1
Environmental	1	1
Operations	1	1
Terminal Services	1	1
Fire Department	1	1
Security	1	1
Stakeholder	1	1
Stakeholder	1	1
Stakeholder	1	1
TOTAL Positions	19	21

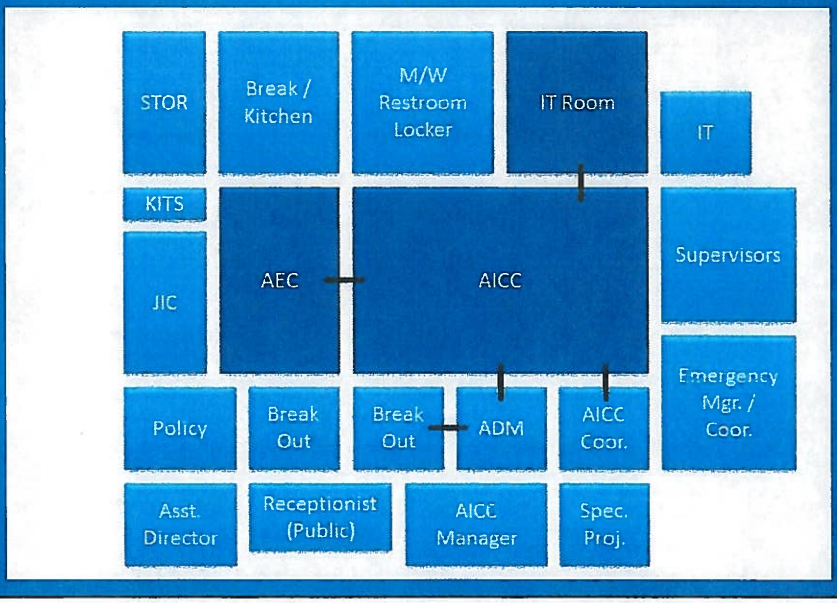
6

Space Relationships

Position	Seats	Shifts	Existing Head Count	Future Additional Head Count	Consoles
Dispatcher 1 (Police)	1	1,2,3			1
Dispatcher 2 (CCTV)	1	1,2,3			1
Dispatcher 3 (ACS)	1	1,2,3			1
Dispatcher 4	1	1,2,3			1
Dispatcher 5	1	1,2,3	13		1
Dispatcher Growth	2	1,2,3		TBD	3
AICC Coordinator	1	1	1		1
ADM (1 position FY16)	2	2/12hr		6	1
Maintenance Intake (WOC)	2	1,2	2	2	2
Security	1	1,2,3	14		1
Common Use	1	1,2			1
Common Use	1	1,2		TBD	1
Parking	1	1,2	4	1	1
IT[1]	1	1,2		5	0
Totals	**15**		**34**	**14**	**16**
As Needed Positions	**Seats**				**WS**
Terminal Services	1				1
Safety	1				1
Environmental	1				1
Fire	1				1
Operations	1				1
Stakeholders (airline, TSA etc.)	3				3
Total	**8**				**8**

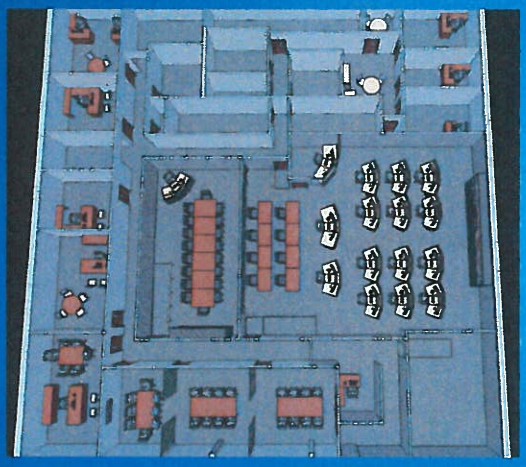
7

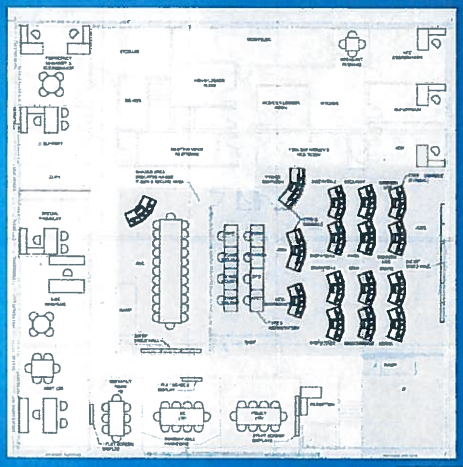
Space Relationships



8

2nd Floor Plan





9

First Floor Conceptual

1. Operations requirements
   a. 1 office with 2 desks
   b. Dedicated exit with equipment room
   c. 8 cubicles
   d. Lockers
2. Multi-purpose conference room
   a. Training for 50 people
3. Safety requirements
   a. 1 office
   b. 1 office with 2 desks
   c. Lockers

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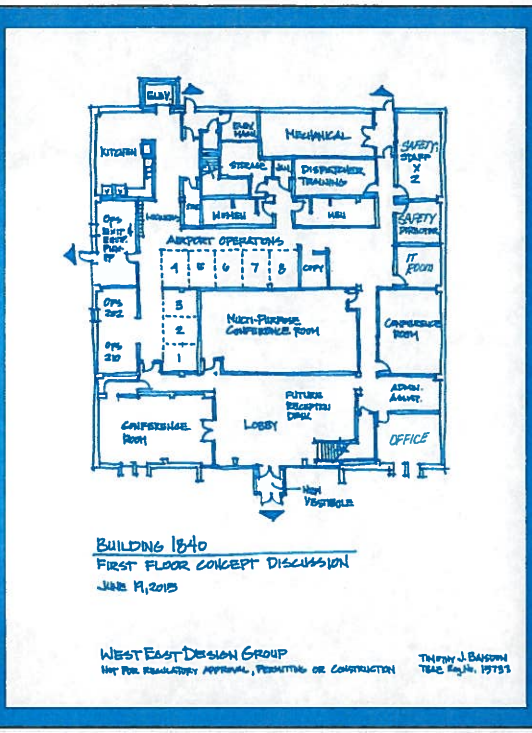
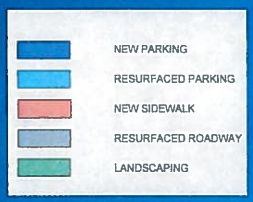
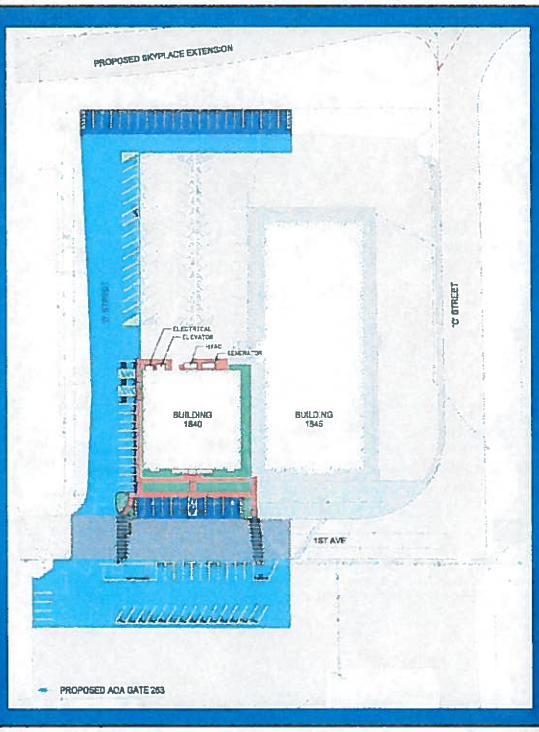
1st Floor Concept



11

Site Plan





Parking space requirements

Code Requires	68
ADA Code Required	4
B1840 Requires	90
Existing spaces	54
Added spaces	31
Added ADA spaces	5
Total spaces	90

12

Issues from Phase 1 Assessment

- **Asbestos testing-** Samples were taken through out the building. Regulated ACM was identified in the floor tile and mastic.
  - Recommendations: Inform contractors involved with any construction, demolition, renovation or related activities that regulated ACM was identified in the floor tile and mastic.
  - Floor tile and mastic ACM may be removed using typical wet methods within a full negative air pressure enclosure or Resilient Floor Covering Institute (RFCI) methods by a Texas DSHS licensed Abatement Contractor
- **Roof replacement**
- **HVAC replacement**
- **ADA access improvements**
- **Electrical and Telecom upgrades**

13

Safety Risk Assessment Issues

Meeting held 6/11/15

- Life Safety Code
  - Sprinkler System- Providing wet and dry system
  - Fire Extinguishers- Included in cost
- Severe weather
  - Shelter in place
    - Evaluate spaces for shelter
  - AICC/AEC continuous operation
    - Reinforce area on First floor
    - Provide redundant AICC function in shelter (1st floor only)
  - Lighting protection for building- included in cost

14

Safety Risk Assessment Issues

Meeting held 6/11/15

- Public parking and street crossing paths
  - Handicap parking – included in cost
  - Lighting for crosswalk – included in cost
- Building elevator accessibility- included in cost
- Emergency Generator
  - Location and Routine power up – back of building
  - Essential Systems Power – included in cost

15

Costs: AICC/AEC

AICC/AEC

Consoles and Equipment $ 1,600,000

Audio/Visual Systems $ 1,400,000

Infrastructure/Network $ 300,000

SUBTOTAL	$ 3,300,000
Contingency & Soft Costs (25%)	$ 825,000
TOTAL AICC/AEC	$ 4,125,000

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Total Building 1840 Repurposed Opinion of Probable Cost

Item	Budget Costs	
AICC/AEC	$	4,125,000
Network	$	3,432,500
Civil/Site Work	$	460,700
Architectural Core, Shell & Finish	$	982,800
MEP	$	2,176,400
Shelter-in-Place	$	50,000
Furniture, fixture & equipment	$	250,000
Programming (8%)	$	918,200
Design (10%)	$	1,147,700
Total Budget Cost	**$**	**13,543,300**

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Building 1840 Repurpose Opinion of Probable cost

July 7, 2015- Executive Meeting

Items	Budget costs	
AICC/AEC	$ 4,125,000	
Comm Infrastructure	$ 3,432,500	
Civil/Site Work	$ 460,700	
Architectural Core, Shell & Finish	$ 982,800	
MEP	$ 2,176,400	
Furniture Fixture and Equipment	$ 250,000	*
Shelter-in-place	$ 50,000	**
Programming (8%)	$ 918,200	
Design (10%)	$ 1,147,700	
Total Budget	**$ 13,543,300**	

* Cost provided by Airport based on quotes

** Cost of CMU walls around restrooms and dispatch training room on first floor only

		PHASE 1				PHASE 2		PHASE 3		
	POSITION	CONSOLE TYPE	QUAN	COST	TOTAL	COST	TOTAL	COST	TOTAL	COMMENTS
CONSOLES	ADM	2	1	$128,750	$ 128,750	$0	$ -	$0	$ -	
	Airport Dispatch	1	4	$114,650	$ 458,600	$5,000	$ 20,000	$0	$ -	
	Police Dispatch	2	1	$128,750	$ 128,750	$0	$ -	$0	$ -	
	Security	1	1	$114,650	$ 114,650	$0	$ -	$0	$ -	
	AICC Coordinator	1	1	$119,650	$ 119,650	$0	$ -	$0	$ -	
	Maintenance	1	2	$86,650	$ 173,300	$0	$ -	$0	$ -	
	Common Use	1	2	$15,550	$ 31,100	$0	$ -	$15,550	$ 31,100	
	Parking	1	1	$86,650	$ 86,650	$0	$ -	$0	$ -	
	AEC Console	2	1	$128,750	$ 128,750					
	Spare	1	2					$15,000	$ 30,000	
	Sub-Total				$ 1,370,200		$ 20,000		$ 61,100	
WORKSTATIONS	Safety Workstation	3	1	$11,200	$ 11,200	$0	$ -	$0	$ -	
	Environ Workstation	3	1	$11,200	$ 11,200	$0	$ -	$0	$ -	
	Oper Workstation	3	1	$11,700	$ 11,700	$0	$ -	$0	$ -	
	Term Srvc Workstation	3	1	$17,700	$ 17,700	$0	$ -	$0	$ -	
	Fire Dept Workstation	3	1	$36,200	$ 36,200	$0	$ -	$0	$ -	
	Stakeholder Workstation	3	3	$11,200	$ 33,600	$0	$ -	$0	$ -	
					$ -	$0	$ -	$0	$ -	
					$ -	$0	$ -	$0	$ -	
					$ -	$0	$ -	$0	$ -	
					$ -	$0	$ -	$0	$ -	
	Sub-Total				$ 121,600		$ -		$ -	
TECHNOLOGY	PDS		1	$50,000	$ 50,000					Horizontal Cabling to IDF Room
	OSP		1	$100,000	$ 100,000					Extension of backbone cabling and provision of data services
	IDF Room		1	$45,000	$ 45,000					Cabinets, Cable Tray, Backboard, Terminations, TC Grounding
	LAN		1	$40,000	$ 40,000					
	AICC Video Wall		1	$1,345,000	$ 1,345,000					8x3 of 70" HD 78 Series Cubes- 4-55 monitor and video
	AEC Video Wall		1	$150,000	$ 150,000					
	Policy Audio Visual		1	$10,000	$ 10,000					55" Monitor, Mount & PC
	JIC Flat Screen & PC		1	$10,000	$ 10,000					55" Monitor, Mount & PC
	Breakout Room Flat Screen & PC		1	$6,500	$ 6,500					55" Monitor, Mount & PC
	Radios									Radio Consoles included in Console cost above. Need to add handsets?
	Radio Systems									
	CCTV Systems									Workstation and software inlcuded in Console cost above.
	ACS Systems									Workstation and software inlcuded in Console cost above.
	Public Address System		1	$45,000	$ 45,000					Amplifiers, DSP, Speakers and Mics
	Telephone System									Telephone handsets included in Console cost above. Need to add VoIP equipment in IDF?
	CAD System									
	Fire Alarm/Life Safety Systems		1	$6,000	$ 6,000					Workstations and software included above. This costs includes connection to existing FACP SLC Network inside Building 1840
	Parking Revenue Control Systems (PRCS)									
	Automated Vehicle Identification (AVI)									
	Variable Message Boards (VMB)									
	Baggage Handling System (BHS)									
	Report A Problem (RAP)									

	Computerized Maintenance Management System (CMMS)									
	Common Use Systems									Need to include liscense fee's for work stations
	Intellex Safety Management System									
	Queue Wait Time									
	Multi-User Flight Information Display System (MUFIDS)									Need to include liscense fee's for work stations.
	Noise Management									
	Supervisory Control and Data Acquisition (SCADA)									
	Identity Management									
	Safety and Environmental Management System (SeMS)									
	Physical Security Information Management System (PSIM)									
	Tech Sub-Total				$ 1,807,500					
	TOTAL				$ 3,300,000					
	Contingency (25%)				$ 825,000					
	Total AICC/AEC				$ 4,125,000					

Item #	Category	Description	Extended Budget	Notes
Base Requirements				*All budgets are ROM and include equipment, materials and installation in estimate. Comm Infrastructure does not included Control Center technology and infrastructure costs.
1	OSP	Primary Duct Bank Pathway	$ 259,000	This is a duct bank extension from Airside Planning inner ring to the AICC including Handholes. This assumes the Airside Planning inner ring completed to the Engine Run Up area
2	OSP	Primary Fiber Run	$ 37,000	This is additional 96-strand fiber length from inner ring to AICC including termination and testing
3	OSP	Public Service Pathway	$ 136,000	This is a pathway for Public Services (e.g., ATT) from public service easement to AICC
4	LAN	Network Services	$ 177,000	These include access layer switches with 10G redundant optics for end device and server connections, voice gateway and firewall. Network integration services included in this estimate
5	IDF	Primary IDF	$ 117,000	This is the base requirement for the Primary IDF that services the second floor including the AICC - 12'x17', cable tray, 6 cabinets, grounding, backboard, (2) 5KVA UPS. This does not include fire suppression, HVAC, structural, or electrical
6	IDF	Secondary IDF	$ 79,000	This is the base requirement for the Primary IDF that services the second floor including the AICC - 10'x15', cable tray, 4 cabinets, grounding, backboard, (1) 5KVA UPS. This does not include fire suppression, HVAC, structural, or electrical
7	IDF	Public Service Demarc and Connectivity	$ 108,000	This is ATT demarc room and includes ATT connectivity charge and demarc room cable tray, grounding
8	ISP	In Building Backbone Pathway	$ 46,000	Backbone conduits including innerduct and grounding conduit between IDFs, Building Entrance Pathway; Horizontal Cable Tray
9	ISP	In Building Fiber/Copper Backbone	$ 15,000	48 Strand SM between IDFs, termination, patch cables
10	ISP	Horizontal data/voice runs/drops	$ 171,000	CAT6 cable, 1" conduit to tray, RJ45 Termination, patch cables
11	System	Door Access Control	$ 168,000	Access control for building, both levels and exterior doors including door hardware, electronics, main controller, and ACS integration
12	System	Video Cameras	$ 145,000	Video cameras for building, both interior and exterior including fixed and PTZ, additional storage and archive server, VMS integration
13	System	Overhead Paging	$ 71,000	Overhead paging for building including speakers, switch and additional headend components and integration
14	System	Unidentified System Elements	$ 120,000	Additional allowance for TBD IT systems elements in building
		BASE COMM SUBTOTAL	**$ 1,649,000**	
Recommended Requirements for Critical Operations Facility				
15	OSP	Secondary Duct Bank Pathway with Secondary Fiber Run	$ 287,000	This is a redundant duct bank extension from second location on Airside Planning inner ring to the AICC and includes OSP fiber. This assumes inner ring completed back to Terminal. As a critical operational facility, this secondary pathway is strongly recommended for the AICC, though could be completed in a later phase of work

16	LAN	3rd Airport Network Core	$ 393,000	Redundant Network Core switches; this is the 3rd location at the airport; includes network integration services and limited switch migration. This is recommended to support increase video volume at airport and to further strengthen the AICC as a critical operational facility
17	IDF	Enlarged Primary IDF	$ 123,000	This is the additional cost for an enlarged Primary IDF that services the second floor including the AICC and serves as a small BDF - 12'x22', additional cable tray, 3 additional cabinets, grounding, backboard, (1) 25 KVA UPS in place of (2) 5 KVA. This does not include fire suppression, HVAC, structural, or electrical. This enlarged facility is required to support the additional network and video management recommendations
18	System	3rd VMS Head End	$ 294,000	Third VMS head end location including archive servers and Hitachi storage. This is recommended at the airport to support the increasing number of cameras at the airport; the AICC is a potential logical location for this additional VMS head end
		RECOMMENDED COMM OPTIONS SUBTOTAL	**$ 1,097,000**	
		COMM INFRASTRUCTURE TOTAL	**$ 2,746,000**	
		Contingency 25%	$ 686,500	
		TOTAL COMM INFRASTRUCTURE	**$ 3,432,500**	

SITE CIVIL ESTIMATE

ITEM	DESCRIPTION	UNIT	UNIT PRICE	QUANTITY	EXTENSION
103.1	REMOVE CONCRETE CURB	LF	$3.30	180	$594.0(
103.3	REMOVE CONCRETE SIDEWALKS & DRIVEWAYS	SF	$2.40	1620	$3,888.0(
104.1	STREET EXCAVATION	CY	$20.00	300	$6,000.0(
109.1	CEMENT TREATED SUBGRADE (6" COMP DEPTH)	SY	$8.25	878	$7,243.5(
109.2	CEMENT	TON	$190.00	12	$2,280.0(
200.1	FLEXIBLE BASE (8" COMPACTED DEPTH)	SY	$9.50	878	$8,341.0(
202.1	PRIME COAT	GAL	$3.75	264	$990.0(
204.1	ONE COURSE SURFACE TREAT	SY	$3.50	1050	$3,675.0(
207.1	SINGLE COURSE BITUMINOUS SLURRY SEAL	SY	$10.00	5880	$58,800.0(
307.1	CONCRETE STRUCTURE (MISCELLANEOUS)	CY	$525.00	2	$1,050.0(
401.1	REINFORCED CONC PIPE (CLASS III)(18" DIA)	LF	$60.00	120	$7,200.0(
403.13	INLET (GRATE)	EA	$2,800.00	2	$5,600.0(
404.1	CORRUGATED METAL PIPE (12")	LF	$30.00	200	$6,000.0(
407.4	CONCRETE COLLARS	CY	$330.00	2	$660.0(
500.1	CONCRETE CURBING	LF	$15.00	120	$1,800.0(
500.2	CONCRETE RIBBON CURB	LF	$12.00	267	$3,204.0(
500.4	CONCRETE SIDEWALKS	SY	$55.00	340	$18,700.0(
500.1	ADA CURB RAMPS	EA	$1,500.00	3	$4,500.0(
511.1	REPLACING WITH FLEXIBLE BASE & PAVEMENT (8" COMP)	SY	$25.00	55	$1,375.0(
516.1	BERMUDA SODDING	SY	$5.00	165	$825.0(
531.86	ADA PARKING SIGN (R7-8T)	EA	$95.00	5	$475.0(
531.87	ADA PARKING SIGN VAN ACCESS PLAC (R7-8P)	EA	$91.00	5	$455.0(
535.1	4 INCH WIDE YELLOW LINE	LF	$1.00	3953	$3,953.0(
535.5	12 WIDE WHITE LINE	LF	$5.00	210	$1,050.0(
535.22	ADA SYMBOL (BLUE BACKGROUND)	EA	$260.00	5	$1,300.0(
535.23	WORD "NO PARKING"	EA	$165.00	2	$330.0(
535.24	WORD "STOP"	EA	$160.00	1	$160.0(
540.1	CURB INLET GRAVEL FILTERS	LF	$10.00	20	$200.0(
552.1	REMOVING AND RELOCATING IRRIGATION SYSTEM	LF	$26.00	100	$2,600.0(
1000.1	CONCRETE WHEEL STOPS (RELOCATE)	EA	$62.00	14	$868.0(
1000.2	CONCRETE WHEEL STOPS (FURNISH & INSTALL)	EA	$50.00	72	$3,600.0(
2000.1	LANELIGHT IN-PAVEMENT WARNING SYSTEM (W/SIGNS & PUSH BUTTONS)	LS	$25,000.00	1	$25,000.0(
3000.1	V-MAG GATE FOR AOA GATE 263	LS	$45,000.00	1	$45,000.0(
3000.2	GROUND BOX W/APRON	EA	$40.00	1	$760.0(
3000.3	CONDUIT (PVC)(2")(SCHD 40)	LF	$12.00	500	$6,000.0(
3000.4	ELEC CONDUCTOR (BARE)	LF	$3.50	500	$1,750.0(
3000.5	ELEC CONDUCTOR (INSULATED)	LF	$4.00	1000	$4,000.0(
4000.1	SIGNAGE & LANDSCAPING	LS	$60,056.63	1	$60,056.6:
	SUB-TOTAL				**$300,283.1:**
	MOBILIZATION & PREP ROW (15%)	LS			$45,042.4:
	INSURANCE & BOND (3%)	LS			$9,008.4:
	SITE TOTAL before contingency				**$354,334.0:**
	30% Contingency				$106,300.2:
	SITE TOTAL				**$460,70(**

ARCHITECTURAL - Opinion of Probable Cost

Quantity	Description	Labor Hours	Unit	Ext. Total O&P
36	Deconstruction of millwork and trim, cabinets, wood, up to 2 stories, excludes handling, packaging or disposal costs	0.4	L.F.	$ 714.24
80	Deconstruction of millwork and trim, countertops, up to 2 stories, excludes handling, packaging or disposal costs	0.16	L.F.	$ 629.60
63	Deconstruction of building doors and windows, deconstruction of doors & wrap, interior, single, up to 2 stories, excludes handling, packaging or disposal costs, no closers	0.76	Ea.	$ 2,670.57
1	Asbestos remediation, plans and methods, lead abatement remediation plan	0	Ea.	$ 1,000.00
1	Asbestos abatement equipment & supplies, buy, air filtration device, 2,000 CFM	0	Ea.	$ 1,050.00
1	Asbestos abatement equipment, HEPA vacuum for work area, min	0	Ea.	$ 335.00
25	Asbestos abatement equipment, disposable polyethylene bags, 6 mil, 3 CF	0	Ea.	$ 22.50
225	Preparation of asbestos containment area, separation barrier, 2" x 4" @ 16", 1/2" plywood each side, 8' high	0.04	S.F.	$ 1,264.50
796	Bulk asbestos removal, remove VAT and mastic from floor by hand, includes disposable tools & 2 suits & 1 respirator filter/day/worker	0.03	S.F.	$ 1,209.92
2	OSHA testing, industrial hygienist, max	0	Day	$ 900.00
25	Asbestos waste packaging, handling & disposal, collect and bag bulk material, by hand, 3 CF	0.16	Ea.	$ 238.50
1	Structural concrete, in place, equipment pad (3000 psi), 10' x 10' x 12", includes forms(4 uses), Grade 60 rebar, concrete (Portland cement Type I), placing and finishing	9.6	Ea.	$ 1,113.92
13	Structural concrete, in place, gravity retaining wall (3000 psi), 4' high, includes forms(4 uses), Grade 60 rebar, concrete (Portland cement Type I), placing and finishing	3.02	C.Y.	$ 4,033.12
400	Concrete finishing, floor, granolithic topping on fresh or cured concrete, machine trowel finish, 1" thick, 1:1:1-1/2 mix	0.07	S.F.	$ 1,524.00
8	Column, structural tubing, square, 8" x 8" x 3/8" x 14'-0", incl shop primer, cap & base plate, bolts	1.12	Ea.	$ 8,025.52
1	Columns, structural steel, 1 to 2 story building, shop fabricated, for projects 2 to 9 tons, add	0	All	$ 5,710.00

80	Column, structural, 2-tier, W8x67, A992 steel, incl shop primer, splice plates, bolts	0.06	L.F.	$ 9,474.40
1	Columns, structural steel, 1 to 2 story building, shop fabricated, for projects 2 to 9 tons, add	0	All	$ 6,947.80
20	Column, structural, 2-tier, W10x68, A992 steel, incl shop primer, splice plates, bolts	0.06	L.F.	$ 2,411.00
1	Columns, structural steel, 1 to 2 story building, shop fabricated, for projects 2 to 9 tons, add	0	All	$ 1,768.75
480	Partition, galvanized LB studs, 14 ga x 6" W studs 24" O.C. x 20' H, incl galvanized top & bottom track, excl openings, headers, beams, bracing & bridging	0.28	L.F.	$ 19,425.60
30	Railings, custom design, architectural grade, hardwood, max	0.27	L.F.	$ 2,452.80
10168	Selective demolition, thermal and moisture protection, insulation, batts or blankets	0.01	C.F.	$ 2,338.64
10168	Selective demolition, thermal and moisture protection, roofing, sheet metal	0.02	S.F.	$ 7,727.68
10168	Blanket insulation for floors/ceilings, fiberglass, paper or foil backing, 1 side, 12" thick, R38, incl. spring type wire fasteners	0.02	S.F.	$ 19,420.88
1600	Sprayed insulation, fibrous/cementitious, attic, 5.2" thick, R19	0.01	S.F.	$ 1,888.00
600	Polymer based exterior insulation and finish system, field applied, 3" EPS insulation	0.1	S.F.	$ 4,452.00
500	Steel roofing panels, on steel frame, corrugated or ribbed, galvanized, 24 gauge	0.03	S.F.	$ 2,400.00
10168	Steel roofing panels, on steel frame, flat profile, standard finish, 1-3/4" standing seams, 12" wide, 24 gauge	0.03	S.F.	$ 70,565.92
100	Steel roofing panels, on steel frame, ridge, galvanized, 20" wide	0.04	L.F.	$ 654.00
44	Frames, steel, wrap around, 16 ga., 6-1/4" x 7'-0" x 3'-0" wide	1.07	Ea.	$ 10,665.60
44	Door, wood, architectural, flush, interior, 5 ply particle core, birch face, 1-3/8", 3'-0" x 7'-0"	1.23	Ea.	$ 8,594.08
45	Storefront systems, aluminum frame, commercial grade, clear 3/8" plate glass, 3' x 7' door with hardware, 400 SF max wall, wall height to 12' high	0	S.F.	$ 1,336.50
50	Storefront systems, aluminum frame, commercial grade, clear 3/8" plate glass, 3' x 7' door with hardware, 400 SF max wall, wall height to 12' high	0.11	S.F.	$ 1,499.50
44	Door hardware, mortise lockset, commercial, wrought knobs and full escutcheon trim, non-keyed, passage, grade 3	0.89	Ea.	$ 9,177.52

20000	Ceiling demolition, suspended ceiling, mineral fiber, on suspension system, remove	0.01	S.F.	$ 9,600.00
17202	Flooring demolition, carpet, bonded, includes surface scraping	0.01	S.F.	$ 4,816.56
3770	Flooring demolition, vinyl or rubber cove base, straight section	0.01	L.F.	$ 1,055.60
796	Flooring demolition, vinyl composition tile, 12" x 12"	0.02	S.F.	$ 453.72
651	Flooring demolition, tile, ceramic, thin set	0.02	S.F.	$ 553.35
400	Flooring demolition, tile, ceramic, mud set	0.03	S.F.	$ 368.00
851	Flooring demolition, wood, block, on end	0.02	S.F.	$ 757.39
8940	Walls and partitions demolition, metal or wood studs, finish two sides, plasterboard (drywall)	0.05	S.F.	$ 15,019.20
2592	Walls and partitions demolition, tile, ceramic, on walls, thin set	0.03	S.F.	$ 2,462.40
256	Walls and partitions demolition, wallcovering, vinyl with release agent	0.01	S.F.	$ 112.64
3392	Gypsum wallboard, on walls, standard, taped & finished (level 4 finish), 5/8" thick	0.02	S.F.	$ 3,900.80
796	Ceramic tile, floors, glazed, thin set, color group 1, 12" x 12"	0.06	S.F.	$ 7,203.80
2592	Ceramic tile, for floors, specialty type, decorator finish, 4-1/4" x 4-1/4"x 1/2"	0.09	S.F.	$ 38,517.12
20333	Complete suspended ceilings, mineral fiber, lay-in board, 2' x 2' x 3/4", on 15/16" T bar suspension, include standard suspension system, excl. 1-1/2" carrier channels	0.02	S.F.	$ 84,178.62
675	Flooring, vinyl composition tile, solid, 12" x 12" x 1/16"	0.02	S.F.	$ 2,740.50
1651	Carpet tile, tufted nylon, 35 oz., 18" x 18" or 24" x 24"	0.1	S.Y.	$ 75,070.97
3505	Access floors, particle board or steel floor panels, for carpet covering, add	0	S.F.	$ 36,066.45
10000	Surface preparation, exterior, doors, per side, power wash, based on 2500 lb operating pressure, metal, flush, excl. frames or trim	0	S.F.	$ 6,900.00
10000	Paints & coatings, siding, exterior, alkyd (oil base), paint 2 coats, spray	0.01	S.F.	$ 24,100.00
62	Paints & coatings, interior, alkyd (oil base), flush door w/frame, 2 coats, brushwork, 3' x 7'	1.33	Ea.	$ 3,007.00
525	Paints & coatings, floors, interior, concrete, latex, roller, 2nd coat	0	S.F.	$ 120.75
42408	Painting walls, complete, on drywall or plaster, primer and 2 finish coats, with roller, including surface preparation	0.03	S.F.	$ 43,680.24
8	Specialties demolition, toilet cubicles, remove	2	Ea.	$ 810.80
2	Urinal screen, remove	0.67	Ea.	$ 67.56

8	Partitions toilet cubicles, floor anchored, headrail braced, powder coated steel	2.67	Ea.	$	4,526.48
4	Partitions toilet cubicles, floor anchored, headrail braced, partitions, install, incl. 52" grab bars, for handicap units, add	0	Ea.	$	1,513.72
2	Entrance screens, toilet, urinal screen, ceiling braced, powder coated steel, 18" w	2.6	Ea.	$	757.88
13	Custom cabinets, kitchen base cabinets, hardwood, prefinished, 1 top drawer, 1 door below, 24" deep, 35" high, 24" wide, excl. countertops	0.72	Ea.	$	5,388.76
13	Custom cabinets, kitchen wall cabinets, hardwood, prefinished, 1 door, 12" deep, 30" high, 24" wide	0.79	Ea.	$	4,727.71
26	Countertops, stock, plastic laminate, 24" wide, includes backsplash, maximum	0.32	L.F.	$	1,436.76
26	Countertops, plastic laminate, postformed backsplash, add to above, maximum	0.08	L.F.	$	387.92
1	Hydraulic passenger elevators, base unit, standard finish, 1500 lb, 100 fpm, 2 stop	160	Ea.	$	53,785.80
1	Hydraulic passenger elevators, for 2500 lb capacity, add	0	Ea.	$	2,861.30

Total	**SUB-TOTAL CONSTRUCTION COST**	**$**	**650,591.86**
Architectural Design and Construction Administration Fees		**$**	**204,000.00**
TOTAL ARCHITECTURAL COST		**$**	**854,591.86**
15% Contingency		$	128,188.78
TOTAL ARCHITECTURAL COST w/ Contingency		**$**	**982,800.00**

PROJECT NAME: SAT AICC PHASE 2
CNG NO. 0015-15

ROUGH ORDER OF MAGNITUDE COSTS - MEP

DISCIPLINE	ITEM NO.	ITEM DESCRIPTION	UNIT OF MEASURE	APPROX. QUANTITIES	ROUGH COSTS	AMOUNT
Division 26						
	1	Electrical mobilization	LS	1	$12,000.00	$12,000.00
	2	Electrical Demolition - Lighting and Power Distribution	LS	1	$25,000.00	$25,000.00
	3	Electrical Demoliton - Building U.G. Feeder from B/1845	LS	1	$4,000.00	$4,000.00
	4	CPSE Pad mount transformer - CPSE Charges	LS	1	$5,000.00	$5,000.00
	5	Concrete Slabs - Generator & Transformer, Housekeeping pads for interior transformers	LS	1	$20,000.00	$20,000.00
	6	U.G. Primary ductbank (2) 4" conc. Encased ductbank	LF	110	$60.00	$6,600.00
	7	U.G. Secondary feeder (w/conc. encasement) from Transformer	LF	40	$180.00	$7,200.00
	8	Main Distribution Panelboard "MDPA"	EA	1	$15,000.00	$15,000.00
	9	Main Distribution Panelboard "MDPB" (Normal power)	EA	1	$8,000.00	$8,000.00
	10	Surge Protective System Devices	LS	1	$15,000.00	$15,000.00
	11	Electrical Distribution - Feeders	LS	1	$35,000.00	$35,000.00
	12	Electrical Distribution 480V Panelboards	EA	4	$3,850.00	$15,400.00
	13	Electrical: Dry Type Transformers (150, 75 Kva, and 15 kVA)	LOT	1	$15,000.00	$15,000.00
	14	Electrical Distribution 208V Panelboards	EA	8	$2,500.00	$20,000.00
	15	Emergency Power Distribution Panelboard "EDPA"	EA	1	$15,000.00	$15,000.00
	16	Emergency Power Distribution Panelboard "EDPB"	EA	1	$5,500.00	$5,500.00
	17	Elevator Power Supply: 25 hp Feeder, Disconnect Switch w/shunt trip connections	LS	1	$8,500.00	$8,500.00
	18	300 kW Diesel Generator, skid mounted fuel tank with integral loadbank and weatherproof protective enclosure - Material FOB jobsite	LS	1	$200,000.00	$200,000.00
	19	Generator, ATS, portable connection Installation	LS	1	$22,000.00	$22,000.00
	20	Trenching/ UG Ductbank from Generator to Building	LF	75	$120.00	$9,000.00
	21	ATS - Life Safety w/ bypass isolation	EA	1	$6,500.00	$6,500.00
	22	ATS - Emergency Power Distribution w/bypaas isolation	EA	1	$15,000.00	$15,000.00
	23	Portable Generator Connection	EA	1	$7,500.00	$7,500.00
	24	Ductbank - Portable Generator connection to building	LF	50	$100.00	$5,000.00
	25	Life Safety System: Dry Type transformer	EA	1	$2,400.00	$2,400.00
	26	Life Safety 480V Panelboards	EA	2	$3,850.00	$7,700.00
	27	Life Safety 208V Panelboards	EA	1	$2,800.00	$2,800.00
	28	UPS Installation/Testing/Setup	EA	1	$5,000.00	$5,000.00
	29	80 kVA UPS with 30 min. battery supply/Main cabinet and battery cabinet/Output CBs.	EA	1	$172,500.00	$172,500.00
	30	Site Lighting: Pole Area Lighting (LED) and concrete footing	EA	4	$3,500.00	$14,000.00
	31	U.G. Site Lighting trenching/conduit/branch circuits	LF	250	$25.00	$6,250.00

PROJECT NAME: SAT AICC PHASE 2
CNG NO. 0015-15

	32	HVAC equipment branch circuits/disconnect switches	LS	1	$0.55	$0.55
	33	Electrical branch circuits & wiring devices	SF	20,000	$7.00	$140,000.00
	34	SAICC - Lighting & Dimming Controls	LS	3,000	$10.00	$30,000.00
	35	Lighting Fixtures (LED) & Controls	SF	17,000	$8.00	$136,000.00
	36	Fire Alarm System 1st and 2nd Flrs	SF	20,000	$2.00	$40,000.00
	37	Shop Drawing submittals	LS	1	$9,000.00	$9,000.00
	38	Punch Lists, project Closeout	LS	1	$18,000.00	$18,000.00
	39	Warranty Phase callbacks	LS	1	$6,000.00	$6,000.00
		Division 23 Total				$1,086,850.55
Division 23						
	1	Mechanical Demolition- Removal of existing split systems, ductwork, and accessories	LS	1	$25,000.00	$25,000.00
	2	CRAC Unit (15 Tons)	EA	2	$53,300.00	$106,600.00
	3	Ductwork Accessories	LS	1	$15,000.00	$15,000.00
	4	VRV System (Estimated 60 Tons including OA Split System and Manufacturer's Cntrls)	PER TON	60	$5,000.00	$300,000.00
	5	Controls	LS	1	$2,000.00	$2,000.00
	6	T&B	SQFT	20000	$2.50	$50,000.00
	7	Concrete slab (Outdoor Unit)	EA	4	$2,500.00	$10,000.00
	8	Commissioning	LS	1	$20,000.00	$20,000.00
	9	Range Hood	LS	2	$1,500.00	$3,000.00
	10	Exhaust Fans	EA	2	$900.00	$1,800.00
	11	Unit Heater	EA	1	$900.00	$900.00
Add Alternate	*12*	*HVAC Instrumentation and Controls*	*SQFT*	*20000*	*$2.50*	*$50,000.00*
		Division 23 Total				$584,300.00
Division 22						
	1	Piping to CRAC Unit	LS	1	$1,200.00	$1,200.00
	2	Plumbing Demolition- Removal of all existing fixtures and minor piping demolition	LS	1	$27,000.00	$27,000.00
	3	Plumbing Modifications	LS	1	$9,000.00	$9,000.00
	4	Elevator Sump Pump, 50 GPM	LS	1	$6,500.00	$6,500.00
	5	Plumbing Fixtures	LS	1	$28,700.00	$28,700.00
	6	Sanitary Waste Interceptors (Grease and Sand/Oil)	EA	2	$3,000.00	$6,000.00
	7	Domestic Water Recirculating	LS	1	$3,000.00	$3,000.00
	8	Domestic Water Heater (Gas)	LS	1	$10,000.00	$10,000.00
		Division 22 Total				$91,400.00
Division 21						

PROJECT NAME: SAT AICC PHASE 2
CNG NO. 0015-15

	1	FM 200 System	LS	3	$20,000.00	$60,000.00
	2	Wet-Pipe System (Pre-Action in IDFs and AICC/AEC Spaces included)	SQFT	20000	$3.50	$70,000.00
		Division 21 Total				$130,000.00
		Contingency 15%				$283,882.58

Total ROM Amount: $2,176,433.13

7073 San Pedro Avenue, San Antonio, Texas 78216 | (210) 494-7223 | www.bmbi.com