BETTISWORTH NORTH
ARCHITECTS AND PLANNERS

KETCHIKAN PERFORMING ARTS CENTER

Former Fireside/Elks Lodge Building
335 Main Street
Ketchikan, Alaska

Facility Condition Survey and Concept Design Narrative

Submitted by:

BETTISWORTH NORTH ARCHITECTS AND PLANNERS INC.
212 Front Street, Fairbanks, AK 99701
P (907) 456-5780

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ACKNOWLEDGMENTS

Client

First City Players
Ketchikan, Alaska
Stephen Reeve, Project Manager

Consultant Team

Architects

Bettisworth North Architects and Planners Inc.
212 Front Street, Fairbanks AK 99701
Charles B. Bettisworth, AIA, Principal in Charge/Project Manager
Ph. (907) 456-5780

Structural Engineers

BBFM Engineers Inc.
510 L Street, Suite 200, Anchorage, AK 99501
Dennis Berry, P.E., Lead Structural

Mechanical and Electrical Engineers

Hay Zietlow and Associates LLC
113 W. Northern Lights Blvd., Ste. 240, Anchorage, AK 99503
Alec Thompson, P.E., Lead Mechanical
Bill Wessels, P.E., Lead Electrical

FACILITY CONDITION SURVEY:

General:

Purpose:

- Establish current condition of the building.
- Note specific deficiencies.
- Establish cost of deficiency upgrades.
- Establish costs of phased improvements.

Process:

- Conduct architectural, structural, and electrical site inspections.
- Prepare draft report of findings.
- Prepare draft narrative of deficiency upgrades and phased improvements.
- Prepare estimates of deficiency upgrades and improvements.
- Review findings and cost estimates with First City Players and stakeholders.

Kick Off:

- Meet with stakeholders to review condition survey and phased improvements process.

Architectural Findings:

General: As recorded in other resource documents, the building is a three story (including lower level whose floor level is at grade at the southeast corner of the building) steel frame structure, with masonry (concrete masonry units or CMU) infill at the exterior walls. Floors consist of the following:

+ Lower Level: Slab on grade with some wood framing and plywood decking over concrete.
+ Floors 2 and 3: 2 inch wood decking on edge, with plywood over in some locations.
+ There is a 4th level mezzanine along 1/3 of the north wall, west of the main entry which originally housed the buildings ventilation system. This mezzanine is contained within the envelope of the 3rd level. Access to this mezzanine is by way of a temporary wood stairway.

As currently constructed the building is classified by the IBC as Type III B, non rated construction.

The roof was replaced in 1991 and included upgrade of secondary framing, new metal deck, 4 inch wood sleepers, with galvanized zip rib roofing over.

Upgrade work completed in 1990-91 including roof replacement, interior demolition and repair and to some extent metal siding essentially saved this structure.

The building is currently heated by steam from a boiler located in the First Bank of Ketchikan, located on Dock Street.

The building has an automatic fire suppression system (sprinkler) throughout.

Specific Issues:

Building Exterior:

Roof: The roof is nearly 20 years old, however it is in good condition, and was a good choice as a replacement. Some areas of rusting are beginning to occur, and some remedial repair would be prudent to avoid further more costly repairs in the future. Specific areas include:

+ North wall flashing between parapet wall and roof.
+ Lower edges of all roofing panels.
+ Replacement of all paint coated fasteners with hot dipped galvanized fasteners. (this condition specifically exists on parapet cap flashings).
+ Would suggest contacting City of Ketchikan and request replacement of Fire Station top of furnace flue, cap flashing and top cap. Stack gases from this flue settle on Fireside building roof, and with rain create a chemical reaction which has completely corroded the roof galvanizing at the southwest corner of the Fireside roof. Sooner rather than later this section of roof will begin to fail.
+ All gutters are EPDM (rubber) roofing material, and need to be cleaned an inspected for damage.
+ Roof drain grates and bodies are fairly rusty, and should be replaced in the near future.
+ The plywood roof access hatch has significantly deteriorated. It should be replaced with a standard manufactured roof hatch.
+ A plywood cover has been installed over an old chimney flue roof penetration. This cover has deteriorated, and should be replaced with a galvanized metal cover.
+ The roof is insulated on the underside with vinyl faced 2 inch fiberglas batts screwed to the underside of the metal deck. The vinyl is not sealed at the joints, so therefore no real vapor barrier exists in this roof insulation system. This being the case it is anticipated significant condensation occurs on the underside of the metal decking above.

Fig.1 Rusty flashing at parapet base

Fig.2 Corrosion of roof metal caused by fire station stack gases

Fig.3 Deteriorated roof hatches

Fig.4 Corroded metal fasteners

Exterior Walls: The exterior walls are a combination of metal siding and stucco over masonry. The metal siding was installed with the 1991 upgrades, and covers the upper portion of the exterior wall, except at the south wall where the metal extends to grade. The metal siding is in relatively good condition, with some fading and fastener deterioration (see roofing comment above). The metal is fastened to galvanized hat channels which are fastened through to the stucco/CMU substrate. The stucco is in generally poor condition, with significant cracking across most of the exterior surface. There is also some spalling, particularly at the lower level near grade. There is no evidence of insulation or vapor barrier in the exterior wall system.

The east wall facing Main Street is articulated with vertical pilasters. Construction of these pilasters is assumed to be CMU with a stucco finish.

Fig.5 Street view from Northeast

Fig.6 West side alley and stairs

Fig.7 Main Street entrance

Fig.8 Detail of entrance

Foundation: The lower level exterior walls are partially below grade, particularly the east and north walls. The west wall abuts an alley, and a portion of the south wall abuts the City of Ketchikan Fire Station. The north wall currently and has over some time leaked water. This has deteriorated some of the columns and column bases. Water that enters the building drains across slab. There is a drain approximately 10 feet across the slab from the source of most of the water, however the space between is always wet. This condition needs to be addressed as part of any facility upgrade.

There is a wood deck at the alley, covering a portion of the lower level. This plywood deck is covered with mineral coated asphalt roofing, which has deteriorated. Further, the plywood, has been damaged, and a 3 inch by 12 inch open hole allows water to run directly into the lower level. This deck should be replaced with a permanent application.

Along the north wall, the City of Ketchikan has installed a retaining wall to support new compacted fill and paved parking area. Service access (gravel pad) is provided to the building at the west end of this parking area. The retaining wall severely restricts access to the exterior face of this north wall on the lower level.

Doors:

At the lower level, there are two doorways that provide access to grade. There are no doors, frames or hardware in these doorways. Each has a temporary closure of either plywood or metal.

The main entry door off Main Street, on the 2nd level is an aluminum store front and includes a transom light over the door. All of the glass has been removed from both the door and transom. This door, frame and hardware are in poor condition. There are aluminum handrails at each side of the main entry stair.

About 15 feet north of the southwest corner of the building on the west facade, a hollow metal door and frame provides access to the alley.

On the north side, a panel of concrete block has been removed, and a plywood sliding garage door with man door insert has been installed to provide service access to the second level.

Windows:

Glass block windows are provided on the Main Street side of the building, on both the second and third levels. The glass block is set in openings in the CMU exterior wall panels. The glass block is in reasonably good condition. It does not, however, provide a view to the outside. The exterior sills for these windows are concrete/stucco with significant mold and deterioration. These sills should be replaced or at a minimum repaired.

Miscellaneous:

There is an abandoned electrical service panel and meter base directly north of the main entry. This panel and meter base is rusted and deteriorated, and should be removed.

There is a concrete stair at the main entry. At present there is a 3 foot differential between the side walk on Main Street and finish second floor. There currently is no formal access for disabled individuals to the building. Access for the disabled could be provided from Main Street to the lower level at the south corner of the building. Access could also be provided from the parking lot just north of the building, assuming the City would grant and easement and right of way for this purpose.

The exhaust for an emergency generator penetrates the CMU on the east side of the lower level, a rather inappropriate location for a public facility.

A fire hose connection is located near grade at the mid-point of the east façade.

There are several abandoned penetrations in the exterior envelop, some covered with temporary coverings, others open to the outside. Permanent closures should be installed on all of these openings.

The 4-6 foot wide alleyway along the west property boundary consists of at grade or wood frame walkways and stairs, and nominally provides egress from the building to Dock Street. The wood framing shows some signs of dry rot and deterioration. This area is utilized by a number of the adjacent property owners for garbage, and temporary storage. In the longer run, the wood framing will need to be replaced with pressure treated wood.

Lower Level:

General: The lower level is used primarily for storage, however an emergency generator was installed in the last several years that provides back up power for the banks data systems. Originally, there was a boiler room along the north wall one third of the way along this wall. This boiler has been abandoned, and remaining components need to be removed.

There is a grade level entry portal to this level at the southeast corner of the building.

A CMU extension to the floor plate exists along the west wall, which supports part of the alley walkway, and through which water enters the lower level as noted above. The 1990-91 renovation plans called for this area to be walled off with CMU along the west wall grid line.

Two sets of wood stairs provide access to this space; a primary stair along the north wall near the northeast corner of the building, and a secondary stair along the south wall and near the southwest corner.

As noted earlier, the floor is concrete slab on grade. This slab has several different levels, with some of the lower sections framed over create level storage spaces. The northwest quadrant of this level at one time was developed as a "spa" with pool sauna, restroom, changing room, and showers. The pool has been covered with wood frame construction.

The minimum floor to floor height at this level is 8'-1". The maximum floor to floor height is 10'-2". The net finish floor to underside of structure varies from approximately 6'-8" to 9'-6". There is no ceiling in this space and the structural framing is exposed. In a few locations the original second floor wood decking has been replaced by wood joists and plywood decking.

There is a hot water heater and large unit heater located in the southwest corner of this level.

A number of wood frame partitions divide off the space. CMU walls were installed to create space for the sauna noted above.

The generator is located in a separate room midway along the east wall. Construction of this room appears to be one hour, including access door, and fire dampers at vent openings.

A 6 inch water service enters the building north of the generator room. The sprinkler tree and associated valves are located south of and adjacent to the service entry.


Fig.9 Foundation water seeps


Fig.10 Corroded column base


Fig.11 Backup generator for First Bank

Second Level:

General: The second level is the primary entry level to the building. As noted above, this level also has a grade level service door on the north side of the building. This level is used by the bank as both storage, and as shop space, with several pieces of wood and metal working equipment. Support equipment includes a dust collection system as well as compressed air system. Wood frame partitions divide off space for tools and paint/cleaning supply storage. In the center of the floor plate against the south wall, there is a large room that comprises at least one third of the floor area that was not accessible to the team. Access to this space is by way of a man door in the west wall, and by way of a sliding service door on the north wall.

Stairs near the main entry access the third and first levels. Additionally there are stairs at the southwest corner that provide access to the third and first levels.

The floor has two distinct elevations. The western half of the floor plate is approximately 1.5 feet lower than the eastern half (entry level) floor plate. The transition between these floor plates is made by a ramp.

The minimum floor to floor height is 13’-0”. The maximum floor to floor height is 14’-4”. The net finish floor to underside of structure varies from approximately 11’-6” to 12’-10”. There is no ceiling on this level; the third floor structure is exposed. As with the second floor structure, portions of the original decking have been replaced by wood joists and plywood.

There is an access panel that allows for lifting material up to the third level. This panel is located directly above the sliding service door.

There is a restroom in the southwest corner of the floor plate, and another against the south wall mid way along the wall, and just off the shop area.

The wall framing either side of the main entry is wood frame and lath construction, with a stucco exterior finish. The stucco is exposed on the inside face. This system is significantly deteriorated, and needs to be replaced, along with the entry door, frame and transom light.

Third Level:

General: Primary access/egress to/from this level is provided by a set of wood stairs located near the main entry. Secondary access/egress is provided by a second set of stairs located in the southwest corner of the building.

As noted earlier, a temporary set of wood stairs provide access to fan room at mezzanine.

The minimum finish floor to top of beam is 18’-6”. The net finish floor to underside of structure is 13’-0”. There is no ceiling on this level; the roof trusses are exposed, as is the vinyl covered roof insulation.

The roof structure spans the width of the building, a total of 70 feet, providing an unobstructed clear span space on the third level.

There is what appears to be an abandoned data room on this level, as well as a rest room. An abandoned in space cooling unit is located in the data room.

Architectural Systems Code Review:

The building occupancy is classified as an assembly occupancy. This occupancy is allowed in a 3-story building of Type III B non-rated building type.

Building exits (stairs and corridors) need to be designed to provide sufficient width for the assembly occupancy.

Restroom fixtures are calculated in accordance with the International Building Code, the Uniform Building Code and the Uniform Plumbing Code. The current concept plans for the Ketchikan Performing Arts complies with these requirements.

Accessible Access:

- Option 1: Reconfigure existing entrance to provide grade level access to elevator. This is the direction currently being followed.

- Option 2: Attain permanent access easement off parking lot north of building.

Structural Condition Survey:

A condition survey was made of the facility on May 18 and 19 to evaluate the general condition of the building structure. To use in our evaluation we had as-built drawings developed by EEIS Engineers for the reroof project dated December 1990. Also, there were some structural steel shop drawings available from the original construction.

The facility is a three story steel and wood frame structure built in 1949.

The basement level is a concrete slab on grade.

The floor framing at the second level or first floor, and the third level or second floor is 2x boards on edge supported by steel beams and girders.

The roof framing is steel trusses, steel beams and steel girders supporting wood purlins. The purlins support a 1 ½" steel roof deck that was installed as part of the metal roof installation done in 1990.
Steel wide flange columns provide the vertical support.

The foundations are concrete footings on bedrock. In the basement some of the bedrock is exposed in some of the back areas. It is my understanding that the swimming pool in the basement was excavated into bedrock as part of a remodel after the original construction. Along the west and north walls there is some seepage of water into the basement which appears to be ground water at the bedrock level.

The perimeter foundation walls are concrete walls that extended to exterior grade at the time the building was constructed. Above the concrete walls, the exterior walls are concrete masonry units (CMU) and are all unreinforced and ungrouted. The walls are built in the same plane as the exterior steel frame. The CMU walls come to the bottom of the steel beams and girders and then continue on up on top of them. At the columns mortar or concrete is placed in the webs of the columns to fill the joint between the CMU and column. These exterior CMU walls are the lateral force resisting elements for the building.

At the north wall of the building backfill has been placed up to the second level to develop a vehicle door access ramp. This backfill is placed against the CMU walls.

It is my understanding that prior to the new roof installation the building was in a state of disrepair and there was significant leakage through the old roof. In several areas it was observed that steel had been cleaned of rust and painted. However, except for the base of the some of the columns in the basement the steel is in good condition. These column bases have some significant rust but it does not appear to be extensive enough to impair the structural stability of the building. It does to be cleaned up and painted.

The exterior CMU are a significant problem. Since they are ungrouted and unreinforced they have limited ability to span vertically under wind and earthquake loads. As the vertical lateral force resisting elements unreinforced CMU walls perform poorly during major earthquakes because they are brittle elements. During an earthquake the walls will resist lateral loads to the limit of their capacity then they crack and rupture. At this point they will break apart and loose most if not all of their capacity to resist lateral loads. As the walls break apart they can fall on building occupants, people around the building, and onto adjacent buildings. If the walls were reinforced the steel reinforcement would make the walls ductile, so when they crack they do not fall apart in a brittle manner.

There are four options for these CMU walls:

1. Remove them and develop a new exterior walls system and develop a new lateral force resisting system. For this concept study we have proposed steel bracing on the four sides of the building. The bracing configuration is shown in Sketch S1. It is diagrammatic scheme for pricing purposes, and the configuration of the bracing on the east wall with the windows will need to be developed further if this option is selected.

2. Cast a concrete wall on the inside face on the CMU walls to provide reinforcing for out of plane loads such as wind loads and for in plane shear loads as a vertical lateral load resisting element. This wall would be 6 inches thick and could be a gunnite or spray applied concrete, or a cast in place will with the CMU acting as one of the forms. The CMU would be tied into the concrete wall will an array of anchors similar to a masonry veneer wall.

3. Apply a fiber reinforced polymer (FRP) mesh to both faces of the walls. This would be a glass or carbon fiber mesh applied to the wall in an epoxy gel. This mesh acts as reinforcing to give the wall strength and ductility for in plane and out of plane lateral loads. This application would require access to both sides of all walls, which will be a problem particularly on the south side against the Fire Station.

4. Another variation of Option 3 is to apply the FRP mesh only to the inside face of the wall to reinforce the wall for in plane shear loads and develop ductile behavior in the wall. For out of plane loads steel studs would be anchored to the wall and resist out of plane loads.

Another concern that would need to be addressed is providing an adequate connection between the floors and the perimeter walls for lateral loads from wind or earthquakes. In some cases no connection currently exists and in other cases the connection may need to be upgraded.

In summary, the building structure is in good shape except for major problem of the exterior CMU walls that need to be replaced or reinforced.

Mechanical Condition Survey:

General: Building heat is provided by steam generated in a boiler located in the First National Bank building on Dock Street. Steam is piped to large unit heaters located on each floor of the building. Toilet room plumbing is temporary applications, and will be abandoned. There is no ventilation system, or building controls. There is a 6 inch water service, which provides water to the building sprinkler system. The environmental report indicated that the building has a connection to the City of Ketchikan waste water system, although neither the size or condition of this connection was reported in either the environmental report or the 2006 appraisal.

Recommendations: The building requires a new mechanical system, including heating, ventilation and controls, and plumbing for public restrooms. The fire protection system will need to be modified to reflect new space configurations. Heating alternatives include oil fired boilers, electric boilers, or electric terminal units.

Since there is essentially no building mechanical system, the mechanical engineer did not survey the facility.

Electrical Condition Survey:

Introduction:

Bill Wessels P.E., an electrical engineer for Hay Zietlow & Associates performed an electrical code and condition survey of the former Fireside Building in Ketchikan, Alaska.

The following codes and standards were referenced to evaluate the existing electrical installation:

2005 NFPA 70- National Electrical Code
2006 International Fire Code
2007 NFPA 72-Fire Alarm Code
2006 NFPA 101 – Life Safety Code
28 CFR Part 36 –ADA Standard for Accessible Design

The survey considered the functional suitability, operational integrity, physical condition and compliance with codes and standards of the electrical service, building electrical distribution and electrical systems. The survey is not a comprehensive survey of every electrical system in the complex, but is instead an overview of the general condition of the building's electrical service, distribution and systems.

The existing building is a steel frame structure with concrete masonry block walls located at 335 Main Street, Ketchikan, Alaska. The building served in the past as an Elk's Lodge, health spa and restaurant, but is now essentially gutted and serves as a shop and warehouse facility for First Bank of Ketchikan.

I met with Mr. Richard Childs, maintenance manager for First Bank, who was very helpful in explaining the building's electrical distribution and the electrical connection to the First Bank Data Processing Center located in the First Bank Building located on Dock Street.

Electrical Service:

The building main electrical service is located in the basement on the West side Main Street corner of the building. A utility meter is located outside on Main Street and connected to a Utility CT enclosure located in the basement. The meter base socket enclosure is in poor condition and should be replaced during future building renovations. The service conductors enter the building in the basement and are routed to the utility current transformer enclosure then around the corner wall to a 400A, 208V, 3-phase circuit breaker main disconnect. The main power feeders are then routed back through a 400A automatic transfer switch for the 75 KW standby power rated generator and then back into a 400A, 208V, 3-phase main distribution panel located next to the utility current transformer enclosure. The 400A main distribution panel (MDP) serves a 200A 208/120V panel next to the MDP in the basement, a 200A, 208/120V panel on the second floor and a 200A 208V,3-phase disconnect located in the First Bank Building second floor Computer center located on Dock St.

Main Disconnect:

The main disconnect is a 400A, 208/120V, 3-phase Square D enclosed circuit breaker safety switch with parallel runs of # 3/0 Cu XHHW conductors from the CT enclosure located next to the MDP. The parallel

#3/0 feed continues to the Automatic Transfer Switch. The main disconnect 400A enclosed circuit breaker is in excellent condition and can be reused or salvaged in future building renovations.

Automatic Transfer Switch:

The Automatic Transfer Switch is a Generac 400A, 208V, 3-phase contactor style transfer switch that transfers power between the normal utility powers main disconnect and the 75 KW standby generators. The Standby generator serves the entire Old Fireside building electrical service load that includes the 200A feed to the First Bank computer data center on Dock St. The Automatic transfer switch is in excellent condition and can be reused or salvaged in future renovations.

Standby Generator:

The standby generator is a 75 KW, 208Y120V 3-phase standby power generator with a solid neutral. The generator is capable of producing 260A,208V,3-phase at full rated output and is protected with a 300A 3-pole generator power feed circuit broker to the #3/0 conductors routed to the automatic transfer switch. The generator appears to be in excellent condition and can be reused or salvaged in future building renovations.

Main Distribution Panel and Electrical Distribution:

The Main Distribution Panel is a 400A (42 KAIC) main breaker Square D I-line panel with four 200A/ 3-pole sub-feed circuit breakers. One breaker is a 200A/3-pole breaker serving the #3/0 200A feeder to a 200A 3-pole disconnect switch located inside the First Bank Building on Dock St. second floor computer data center . This feeder routes through conduit along the basement ceiling to an LB located in the East Alley corner of the building, then outside in rigid conduit in the alley way behind the Fire Station Building and finally into the First Bank Building second floor data center's 200A/3-pole disconnect located on the South East back wall inside the data center. Another 200A, 3-pole circuit breaker serves a #3/0 XHHW feeder to a 200A, 3-phase panel located next to the MDP. A third 200A 3-pole circuit breaker serves #3/0 Cu XHHW feeder to a 200A, 3-phase panel on the second floor and a fourth circuit breaker is left as a spare. The MDP with 400A main breaker and four 200A breakers is in excellent condition and can be reused in future building renovations.

Grounding and Bonding System:

The electrical system appears to be grounded at the utility current transformer located next to the MDP in the basement. The electrical system neutral is bonded to the equipment grounding conductors at the MDP instead of before the 400A main disconnect switch located next to the automatic transfer switch (per NEC 250.24(A)(1). The equipment grounds (green wires) and bonding appear to be installed correctly between the generator, automatic transfer switch and MDP.

I was unable to verify how the grounding electrode conductor is connected to the grounding electrodes (water pipe building steel etc.), but a #3/0 bonding jumper is visible between the CT enclosure and building structural steel.

The electrical sub-panels appear to be using the steel conduit as the equipment grounding conductors for the fault current return path to the MDP. Although this is not a code issue the addition of a separate equipment grounding conductor with the panel power conductors can improve electrical safety and reduce common mode noise in audio equipment loads and should be considered with any future building renovations.

The grounding system is complicated with the addition of an oversized what appears to be a 750 KCMIL bare copper high frequency noise reduction computer rack equipment grounding conductor that is run to the First Bank Building Data Center on Dock Street. This high frequency noise reduction equipment grounding conductor may in fact also be serving as a grounding electrode conductor and could be the source of a ground loop, if the First Bank Building data center disconnect is bonded into the electrical equipment ground system at the First Bank Building on Dock Street.

Future building renovations need to insure that the grounding electrode system and neutral are only bonded at or before the 335 Main Street Building main disconnect and verify that the grounding electrode conductor connection is at least less than 25 Ohms for safety and preferably less than 5 Ohms to reduce common mode noise in theater audio to the all the available grounding electrodes (building structural steel, water main ground rods etc.). Future building renovations should consider the addition of separate equipment grounding wires with panel feeders and branch circuits to improve fault current return path safety and help to reduce common mode noise. Running dedicated grounded conductors (neutrals) in branch circuits to future sensitive electronic and audio equipment loads can reduce differential mode noise.

Basement and Top Floor Panelboards:

The basement panel and top floor panelboards are 42 space 200A, 208/120V, 3-phase main lug only Square D NQOD panelboards. The basement panelboard serves primarily basement and first floor lighting while the second floor panel serves unidentified second floor and mechanical system loads. The lighting and appliance panelboards in the basement and on the second floor use the existing building conduit system as the equipment grounding conductor as is allowed under NEC 250, but separate copper wire equipment grounding conductors (green wire) should be installed for any future building branch circuit wiring... Separate equipment grounding wires can improve electrical safety and help reduce electrical noise issues. These panels are in fair condition and salvage and reuse could be considered in future building renovations.

Building Lighting:

The lighting system in the basement and second levels is primarily utilitarian fluorescent strip lighting in fair condition, but not worth salvaging except to provide minimal lighting for code compliance in future building renovations. The top floor lighting appears to be incandescent temporary construction lighting that should be replaced during future building renovations.

Electrical Devices and Branch Circuit Wiring:

Most of the electrical switches and receptacles in the building are in fair to poor condition and should be replaced during future building renovations. Richard Childs the First Bank Maintenance Manager mentioned that the shop receptacles may be salvaged for the carpentry shop equipment. Any unused branch circuit wiring should be demolished back to the electrical panel and associated breakers marked as spares. None of the existing electrical devices or branch circuits should be considered useable in any future renovations and a new wiring system for the entire building needs to be considered in any future renovations. Only devices, conduit and branch circuit wiring deemed serviceable after careful inspection from a licensed electrician should be reused in future renovations.

Telecommunications:

A large PVC conduit for telecom network cables runs from apparently an old computer room with a telecom equipment backboard on the first floor to the First Bank Computer Data Center on Dock St. The remaining network cabling appears to be in the process of being demolished. The existing PVC telecom conduit and fittings in good could be demolished and salvaged if possible for future use in future building renovations. An entirely new telecommunications cabling system will be needed in any future building renovations.

Summary and Conclusions:

The 400A, 208V, 3-phase, 4W main distribution panel is in excellent condition and can be reused but the following issues need to be considered before any future renovations.

1. The existing 400A service and main breaker distribution panel may not be adequate to serve all the future theatrical lighting, audio, kitchen, building heating and air conditioning equipment loads that may be needed to renovate this building into a theater. This will need to be determined based on future discussions of the building's anticipated future power needs.

2. The existing 400A main disconnect, automatic transfer switch and generator are in excellent condition. If First Bank negotiates to keep the standby generator in the fireside building, the generator's electrical connection to the Fireside Building electrical service will need to be severed. However, if the generator stays in the Fireside Building, then the generator room will need to be upgraded to meet the fire rating for a standby generator inside a publically occupied building.

3. The 200A,208/120V,3-phase outside feeder from the main distribution panel in the Fireside Building at 335 Main Street to the First Bank Building on Dock Street cannot remain after the building changes ownership per NEC 225.30. An outside feeder to a separate building is only allowed with public utility and AHJ approval when all the buildings are under the same management and on the same property.

4. The building will need to replace existing branch circuit wiring, existing electrical devices and existing luminaires as well as provide new electrical systems for the renovation of the building into a theater.


Fig13. Existing 400A, 208V, 3-phase MDP in Excellent Condition


Fig.14: Alleyway to First Bank Building on Dock St.

Fig.15. Electrical and Telecom Feeds to First Bank on Dock St.

Fig.16: First Bank in foreground and Fireside Building in Background

Fig.17: First Bank, Dock Street Data Center on the second floor.

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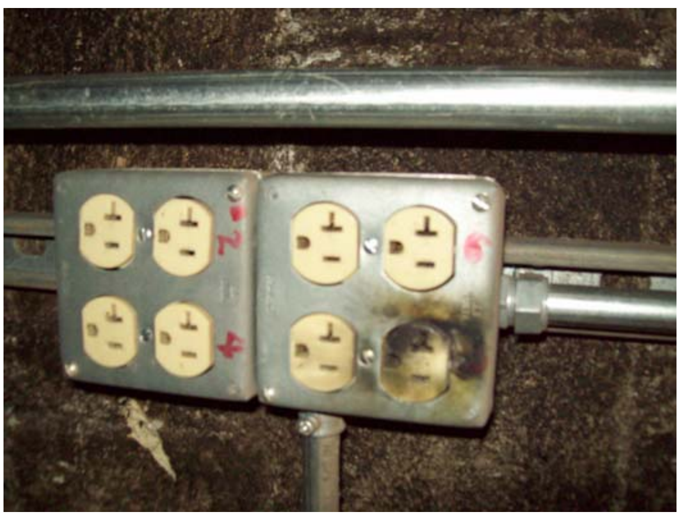

Fig18. Receptacles in Poor Condition


Fig.19: Light Switches in Poor Condition

CONCEPT DESIGN NARRATIVE

ARCHITECTURAL

General:

The proposed Ketchikan Performing Arts Center will ultimately provide space to meet the needs of First City Player and Ketchikan Theater Ballet, through a complete renovation of old "Fireside/Elks Building" in downtown Ketchikan. The Fireside was a restaurant and dance hall from the early 1970s to the late 80s, when it went out of business. It was subsequently acquired through bankruptcy by the First National Bank of Ketchikan.

Currently, the building is used as a maintenance and storage facility by First National Bank of Ketchikan. The original interior construction associated with the restaurant dance hall has been demolished and replaced with temporary partitioning serving the needs of the maintenance crew.

The building is three stories, with the first floor partially below grade, except at the southeast corner.

Upon completion of acquisition, First National Bank will remove all partitions, equipment and stored materials, leaving the building structure and exterior shell.

- The building structure consists of concrete footing and foundation walls to approximately 4 feet above the first floor level. Above 4 feet, there is a steel frame of columns and beams. The second and third floors are wood decking. The roof was replaced in 1991 and consists of a metal deck over composite trusses. The exterior walls are unreinforced CMU, placed as an infill in the steel frame. These are not tied into the steel frame, and therefore there is no lateral force restraining system in the building.

- There is no mechanical system in the building. The original boilers, heating piping, terminal units have all been removed. The ventilation system has been removed, including all ventilation fans and ducting.

- The electrical system requires an upgrade to service the new needs of the facility. Some components in the existing facility can be reused, however, it is anticipated that the emergency generator and associated switch gear will be removed.

- The building is classified as a Type B, Non Rated structure.

Due to funding limitations, the project will be developed in Phases as follows:

A) Immediate Needs:

1. Install lateral structural restraining system.
2. Install exterior wall light gage metal framing, 6 inches of batt insulation, vapor barrier, and 5/8 gypsum board, tape, no paint.
3. Demolish existing building entry, lobby, and concrete stair.
4. Install new entry store front, lobby, stairs, and elevator.
5. Generally interior construction will include basic metal wall framing, GWB and tape, no paint.

6. New 5/8 inch plywood subfloor over wood deck (assume some shimming for leveling).
7. No ceilings; structure will remain exposed throughout.
8. Provide new oil fired boiler, fuel tank, and perimeter baseboard heating on floors two and three. Install baseboard in toilet rooms on first floor. Install hydronic unit heaters in remainder of first floor.
9. Install ventilation fans and duct work to serve the second and third floors. Provide coils in AHU's for cooling; chillers and chiller water piping to be installed at later date.
10. Reconfigure sprinkler system to accommodate new room layouts.
11. Provide DDC controls for heating and ventilation.
12. Install new plumbing fixtures in first floor toilets.
13. Install new electrical service, and main distribution panel. Use existing panels as subpanels per electrical narrative.
14. Provide power distribution to second and third floors, and restrooms on first floor.
15. Provide florescent area lighting on second and third floors. Provide power rough in for theater lighting, however theater lighting will be provided by users.
16. Provide fire alarm system.
17. Provide one office on first floor, complete with power, lights, and heat.
18. Provide toilet rooms on first floor, complete with fixtures, power, heat and lights.
19. Install new exit door at southeast corner.
20. At second floor, install dance studios, including subflooring, lighting, soundproofing between studios and mirrors on walls; men's and women's dressing rooms, and toilet. Users will install dance floor flooring. Movable partitions will be installed in later phases.
21. At third floor, rough in back stage theater construction with GWB and tape. No other interior finishes, theater risers, or seating. Sound system will be portable by user.

B) Project completion:

1. Complete building exterior upgrades.
2. Complete interior finishes, including theater stage, risers and seating, and first floor art studios and shops, and all other interior work. Floor and ceiling structure will remain exposed on the third floor.
3. Provide movable partitions for dance studios.
4. Complete mechanical and electrical system installations, including lighting controls, sound system and controls.
5. Install freight elevator.

MECHANICAL

General:

This narrative has been prepared to assist the A/E/Owner team in understanding the mechanical system concepts that are being considered for the Main Street Theater building project in Ketchikan, Alaska.

Overview:

The scope of this project is to renovate an existing 22,600 sq. ft. (approximate) three story building located in Ketchikan, Alaska into a performing arts building. Base on site observation from design team members the building will have to be provided with completely new heating, ventilation, air conditioning and plumbing systems.

Professional Design Services:

Mechanical systems will be designed in accordance with appropriate codes, references and practical engineering methods for southeast costal Alaskan environments including, but not limited to: the 2006 International Building Code, the 2006 International Mechanical Code, the 2006 Uniform Plumbing Code, the 2006 International Fuel Gas Code, the 2006 International Fire Code, NFPA and local code amendments. Design services will be performed by a Professional Mechanical Engineer registered for practice in the State of Alaska.

The Main Street Theater project will include, but not limited to, the following mechanical systems:

- Domestic cold water distribution.
- Domestic hot water generation and distribution.
- Sanitary sewer and vent systems.
- Storm drainage systems.
- Fuel oil storage and distribution.
- Heating generation and distribution.
- Variable air volume air handling units and distribution.
- Cooling generation.
- Spot cooling systems.
- General and specialty exhaust systems.
- Elevator machine room and boiler room ventilation.
- Automatic fire sprinkler systems.
- Direct digital building automation controls systems.

Design Conditions:

General: Design conditions for determining building loads and equipment sizing will be in accordance with climatic conditions as outlined in the Alaska Climate Summaries and ASHRAE weather data from the 2005 Fundamentals Handbook, the Engineering Weather Data AFM 88-29, 1978 and the Uniform Plumbing Code, Appendix D.

Outdoor Design Conditions:

The following design conditions for Ketchikan, Alaska will be used to establish building heating and cooling loads and air flow requirements.

- Latitude: 55.37° North
- Longitude: 131.72° West
- Elevation: 75 feet above sea level.
- Winter Design Temperature: 12°F dry bulb
- Summer Design Temperatures: 68°F dry bulb; 59°F wet bulb
- Heating Degree Days: 7,165

- Design Rainfall Rate: 4.0 in/Hr.

Indoor Design Conditions:

Building	Heating	Cooling	Relative Humidity
Theater Spaces:	68°F	75°F	N/A
Office Type Spaces:	68°F	75°F	N/A
Workshop Type Spaces:	68°F	75°F	N/A
Shop Type Spaces:	68°F	75°F	N/A
Common Spaces:	68°F	75°F	N/A
Normally Unoccupied Spaces:	68°F	N/A	N/A
Computer Rooms	65°F	75°F	30% - 50%

Mechanical Concepts:

Plumbing:

Primary water service will be from a buried utility main and serving the building as a combined potable and fire water supply. At the building water service entrance, the primary supply will be split into a potable water service and fire water service. Potable water service will be provided with appropriate isolation valves, strainer, water meter and backflow prevention device. Fire water service will be provided with appropriate indicating type isolation valves and backflow prevention device.

Plumbing fixtures and trim shall be of commercial quality including vitreous china lavatories, urinals and wall mounted water closets, stainless steel bar sinks, acrylic one piece showers, molded stone mop sinks and floor drains. Where required, fixture mounting will be in accordance with ADAAG requirements.

Potable cold water shall be distributed throughout the building by a copper pipe distribution system to applicable plumbing fixtures. Hot water will be generated by hot water generators utilizing boiler heat sized in accordance with ASHRAE recommendations. The hot water will be distributed throughout the building by a copper pipe distribution system to applicable plumbing fixtures. The hot water piping system will be circulated to maintain hot water temperature at the most remote fixture. One each cold water hose bibbs with vacuum breakers will be located at the north and east sides of the building. The hot and cold potable hot water piping systems will also be provided with appropriate drains, unions, and isolation valves to facilitate maintenance and system draining.

Sanitary waste and vent piping systems shall be cast iron. Sanitary piping systems will be gravity type through the buildings and to the buried exterior sanitary sewer system. Sanitary piping systems shall be sized and vented in accordance with Uniform Plumbing Code requirements.

The existing roof drainage system shall be reconfigured within the building as required for the new interior layout.

Fuel Oil: The proposed fuel oil system consists of a double wall, above ground, storage tank serving the building heating system. The tank shall be UL 142, welded steel with support saddles or skids. The tank will be sized to operate the building for a one week period.

Heating:

Primary heat generation will be by means of two mid efficiency, low or medium mass oil fired heating boilers. Each boiler will be sized for 60% of the total building's peak load. The boilers will operate at 180°F with a 20°F - 30°F temperature drop at the heating equipment. Boilers will serve a hydronic piping system utilizing a 50% water/propylene glycol solution by means of a primary/secondary piping and pumping arrangement. As an alternative to oil fired boilers electric boiler may be used if economic analysis proves electricity to be the least expensive fuel source.

The hydronic heating piping systems will be welded steel for 4" and larger piping and copper piping for less than 4" piping. The hydronic heating piping system will consist of a two pipe, reverse return type piping loop, served by a primary and backup pump. The hydronic piping system will be provided with makeup through a glycol mix tank and manually operated, electric glycol pump with adjustable PRV. Isolation valves and balance valves will be provided at all terminal heating units.

The hydronic heating piping systems will be provided with appropriate expansion/contraction control by means of "Z" bends, expansion loops, expansion compensators, guides and similar devices as applicable for specific requirements.

The primary terminal heating unit for this building will be a baseboard along perimeter zones and coils in the ventilation system. Other terminal heating units will consist of cabinet unit heaters, unit heaters, air handling unit coils and VAV reheat coils. All exterior entryways/vestibules shall be provided with hydronic cabinet unit heaters for supplemental heat.

Cooling:

All air handling units shall have mechanical cooling capability sized to maintain the building at 72°F or less during the cooling season.

Theater control rooms will have a dedicated computer room air conditioner as required. Heat will be rejected to an exterior mounted glycol dry cooler.

Ventilation:

The building will have multiple supplies and exhaust systems dependent upon space usage and occupancy requirements. Each floor of the building will be provided with its own variable air volume air handling units with a ducted medium pressure supply air distribution system to all occupied spaces. Each air handling unit system will have a ducted return air system. Air handling units will be located on a dedicated mezzanine. Space should be allocated for shafts through the building.

Toilet rooms will be provided with general space exhaust systems.

Specialized exhaust system will be provided in shop areas as required by the shop activities.

The boiler room will be provided with appropriate combustion air ductwork systems and cooling ventilation fans systems.

The elevator equipment room shall be provided with an independent ventilation system that maintains the space at 90°F or less.

Duct Design Criteria:

Duct velocities will not exceed the following design criteria:

Medium pressure supply air mains	2,250 feet per minute
Low pressure supply air mains	1,250 feet per minute
Low pressure supply air branches	700 – 1,000 feet per minute
Return and exhaust air mains	1,250 feet per minute
Return and exhaust air branches	700 – 1,000 feet per minute
Return air ceiling plenums	450 feet per minute

Ductwork systems will be galvanized steel and constructed in accordance with SMACNA Standards.

Air inlets and outlets at the exterior of the building will be provided louvers. Air inlets will be sized for low entrance velocities to prevent entrainment of rain and snow into the air intake assembly.

Mechanical Equipment Access: Appropriate access will be provided to all mechanical equipment. Equipment access will be in accordance with International Mechanical Code requirements.

Piping, Ductwork and Equipment Support: Mechanical piping, ductwork, and equipment will be supported in accordance with prudent engineering practice.

Vibration Isolation: Rotating equipment will be provided with appropriate vibration isolation devices. Where applicable, vibration isolation will be integral to packaged equipment.

Seismic Protection: Mechanical equipment, piping and ductwork systems will be seismically restrained in accordance with the International Building Code, SMACNA Guidelines for Seismic Restraint and prudent engineering practice.

Mechanical Systems Identification: Mechanical piping, valves, ductwork and equipment will be provided with identification systems in accordance with general industry standard.

Mechanical Systems Insulation:

General: Mechanical systems including piping, ductwork and equipment will be provided with thermal insulation systems in accordance with prudent engineering practice.

Plumbing: Domestic cold water, hot water, hot water circulating and roof drainage piping will be insulated with one inch fiberglass piping insulation with plastic fitting covers. Plumbing vent through roof assemblies will be insulated from a point 3 feet within the thermal envelope to termination above roof.

Hydronic: Hydronic water/propylene glycol supply and return piping will be insulated with one inch thick fiberglass piping insulation with plastic fitting covers.

Ventilation: All supply air and exhaust air ductwork will be insulated with not less than 2 inch fiberglass ductwork insulation with factory applied vapor barrier FSK jacketing. All outside air ductwork and plenums will be insulated with not less than 2 inch rigid fiberglass insulation with canvas jacket and lagging adhesive coating. Air handling unit casings and similar pre-manufactured equipment will be factory insulated.

Equipment: Hot water storage tanks, roof drain bodies, heat exchangers and similar equipment not provided with factory insulation systems will be field insulated with appropriate equipment insulation systems and jacketing.

Controls:

A microprocessor based, direct digital control system will be provided for mechanical equipment control. The system will be performance specified by the engineer with system requirements and an equipment sequence of operation by the engineer to provide stable comfort control and optimize energy conservation. The system will be designed and installed by the Contractor.

Automatic Fire Sprinkler System:

An existing fire service with backflow prevention and sprinkler riser is located at the building's water service entrance and serves an existing wet pipe sprinkler system. The existing system will be reconfigured for the new floor plan and proposed use of the building. If needed a dry pipe sprinkler system will be provided in areas subject to freezing. The existing sprinkler system will be reused to the extent possible. The building shall have a complete fire protection system in accordance with NFPA 13 requirements. The sprinkler system will be performance specified by the engineer with system requirements. The sprinkler system will be designed and installed by the Contractor.

Testing and Balancing:

Building HVAC, plumbing and piping systems will be tested in accordance with applicable codes and prudent engineering methods. Systems will be adjusted and balanced by an independent balancing agency in accordance with AABC or NEBB requirements.

ELECTRICAL

General

*Professional Design Services**:*** Electrical systems shall be designed in accordance with the latest adopted editions of the National Electrical Code (NEC), the Americans with Disabilities Act (ADA), applicable chapters of the NFPA Codes, EIA/TIA standards, the International Fire Code (IFC), the International Building Code (IBC), the Illuminating Engineering Society of North America (IESNA) standards and all applicable Federal, State and local codes. Design services shall be performed by a Professional Electrical Engineer currently licensed for practice in the State of Alaska.

General Design Conditions: The building electrical plans and specifications for power, lighting, signal and telecommunications systems will be based on architectural specification grade equipment suitable for a theater building.

Electrical Service and Distribution

Electrical Service and Distribution: The electrical service is anticipated to be a new 1000A; 208Y/120V 3-phase CT metered service from a new service entrance meeting City of Ketchikan Utility standards. The service will be sized to accommodate the anticipated building lighting, heating, air-conditioning, elevator, theatrical lighting, audio system and other building loads determined during design. The new electrical service will feed a switchboard style service entrance enclosure to include a meter and utility current transformer section with a 1000A, 3-pole shunt trip operated main circuit breaker section and a power distribution section. The switchboard style service entrance can be located either exterior to the building or in the basement in a location acceptable to the City of Ketchikan Utility standards.

The existing 400A main disconnect, automatic transfer switch and 75KW(max 260A,208V) generator are not anticipated to be used for the renovated building loads and are anticipated to be demolished and can be salvaged for use by the First Bank of Ketchikan.

The existing 400A Main breaker panel board with four 200A distribution circuit breakers is suitable for reuse for two building elevator, mechanical and possibly theatrical dimmer rack power feeders as determined during design. This panel may be moved to accommodate the new switchboard style service equipment to a more convenient location.

Power Systems

General: Electrical power will be designed to accommodate the architectural layout of the spaces and the mechanical, elevator, theatrical and specialty electrical power needs of the building. Additional electrical distribution to panels for lighting and power will be distributed to each floor of the building in convenient locations as well as electrical feeders to panels located for elevators, mechanical equipment and a dimmer rack or company switch with overcurrent protection in the theater back stage. Panelboard and feeder capacities will be sized as required to accommodate the connected demand loads including an allowance for spare capacity and circuit space.

Power: Studio spaces will be provided with the number of wall and ceiling outlets with consideration for distribution to portable theatrical diming and audio systems as coordinated with user requirements.

The theater electrical distribution will include power distribution from the dimmer rack to ceiling mounted connector strips for theatrical lighting instruments as well as theatrical dimmer rack power to stage floor pockets, border light and other stage lighting outlets.

Offices will have at least one duplex receptacle per wall with additional receptacles as required for office equipment, at desk locations. Outlets in hallways and other common areas will be spaced at least 16 feet for floor cleaning equipment and other equipment. Every attempt will be made to avoid the necessity to use extension cords to provide routine power needs for common areas. Special purpose receptacles will be provided as required to supply all special equipment and appliances as identified. Connections with appropriate disconnect and controlling means shall be provided for all facility mechanical system equipment. All building wiring will be installed in a metallic conduit or metal clad cable system.

Lighting Systems

General: Lighting systems will be designed in accordance with the recommendations of the IESNA Lighting Handbook, 9th Edition and RP-3 standards for educational facility lighting. F28/T5, F32/T8 and F54/T5HO 3500K, +80 CRI, fluorescent lamps and program or rapid start 10% THD electronic ballasts are the basic tubular fluorescent lamp/ballast combinations. The 4-pin compact fluorescent 3500K, +80 CRI lamps and electronic ballast will be used in interior recessed down lights and other interior luminaires. Theater house lighting will use 1% architectural electronic dimming ballasts. Exterior luminaires will use pulse start metal halide lamps and ballasts, suitable for starting at minus 40 degrees F or C.

Theatrical Dimming System: The theatrical dimming system will include the performance specification of a 24 module dimmer rack with quad 1.84KW dimmer modules (96 dimmers circuits) with an anticipated 200A.208V 3-phase feed determined considering load diversity as allowed under NEC 520. The dimmer rack will include a 200A main breaker with integral theatrical dimmer branch circuit breakers. The dimmer modules will be specified with chokes to filter 60HZ lamp hum and audio noise with solid state IGBT or SCR dimmers using industry standard DMX512 protocol for theatrical lighting control boards. Theatrical lighting branch circuits will be distributed to ceiling mounted connector strips for house beam, 1st electric beam, and 2nd electric beam as determined during design. The connector strips will be specified with pipe battens and electrical SO cord whips with theatrical style lighting instrument connectors. Additional theatrical dimming circuits will be distributed to foot light, border light, back light, and stage floor pocket locations as determined during design. The theatrical dimming system will be provided and installed according to approved manufacturer shop drawings and equipment submittals with dimming system commissioning from factory trained technicians.

Theatrical Dimmer Control: Theatrical dimmer control will be provided from a DMX512 control console with at least 96 channel faders, 48 sub master faders, LCD video monitor display and disk drive. Building pathways will be provided for additional theatrical dimmer control cable outlets on the stage for connection to portable control consoles or stage director's hand held remotes. An interface module will be specified to control electronic dimming ballasts for fluorescent house lights from DMX512 theatrical dimming control consoles.

Theatrical Lighting Instruments: Our design does not include the specification, selection, installation or aiming instructions for theatrical lighting instruments to include ellipsoidal spotlights, Fresnel floodlights, border-lights, footlights etc. A theatrical lighting instrument package schedule can be incorporated into the electrical plan set as recommended from the manufacture's typical recommendations for theaters of this size, but the lighting instrument schedule is to be as selected or approved by the owner's designated theatrical lighting representative.

Lighting Control: Basic general area lighting control will be provided by standard snap switches for zone control. Occupancy sensor control will be specified for additional energy savings as determined during design. Dimming control theater entry stations and wall preset control stations will be specified for dimmed theater house lighting. Dimmed house lighting will be interfaced to DMX512 master control from the theatrical dimming consol. A relay and contactor lighting control panel will be considered to accommodate energy management and distributed lighting control systems for additional energy savings in consideration of ANSI 90.1 standards. Exterior lighting control will be designed for time clock and photocell zone lighting control for security/night lighting, and exterior building lighting.

General Lighting: General office studio and dressing room lighting will be provided from high efficiency widespread volumetric recessed or suspended indirect/direct fluorescent luminaires that provide an overall perception of a bright and cheerful environment while reducing eye strain and mitigating the effects of shadows and veiling reflections. The uniformity and overall room luminance will be based on the recommendations of IESNA standards.

Dressing rooms will be provided with additional compact fluorescent down lighting and facial mirror lighting for make-up. Practice studios will be provided with power outlets in ceilings or walls for owner furnished portable theatrical lighting system connections.

Lighting in other interior spaces will use recessed fluorescent direct/indirect or acrylic lens grid troffers, downlights or surface fluorescent acrylic lens or strip luminaires with wiregaurds depending on the use of the space.

Exterior lighting shall use pulse start (-40 deg) metal halide luminaires with IESNA cutoff optics.

Emergency Egress Lighting: Integral fluorescent emergency ballasts will be specified in public spaces and primary paths of egress. Emergency unit equipment with integral solid state chargers and battery will be used in mechanical rooms and back of house areas. Exit signage will be specified with LED illuminated signs with integral solid state chargers and battery.

Audio Systems: A theater audio system to include sound control mixer board, amplifiers, media players and other audio equipment will be performance specified with audio racks located in the light and sound room. Speaker and microphone jack locations will be schematically laid out from manufacturer recommendations on the electrical plans to show rough-in for audio outlets and raceways for concealed audio cables to the audio rack location. The theatrical audio system will be provided and installed according to approved manufacturer shop drawings and equipment submittals with audio system commissioning from factory trained technicians.

Fire Alarm: A complete fire alarm will be performance specified to IFC, NFPA 72, ANSI 117.1 and ADA requirements with a manual intelligent addressable fire alarm system with automatic fire and smoke detection in zones as determined. Class A signaling line circuits (SLC) and a DACT for off-site central station supervision will also be specified. A remote annunciator (alarm zone indicator panel) will be shown at the main entrance of the facility. In addition to the audio-visual signaling devices required by the design codes, an exterior, weather protected horn/strobe will be specified on the exterior of the building.

Activation of a sprinkler tamper switch will activate a trouble signal at the fire alarm control panel. Water flow will trigger a general alarm. All air handlers which operate at 2000 cfm or greater will have duct detection and will be shut down at the detection of products of combustion. An exterior mounted sprinkler gong will be hard wired to the main sprinkler valve and will be initiated upon opening of the sprinkler valve.

Telecommunications

General: Satellite and telecommunication equipment racks shall be specified for owner furnished head end equipment including receivers, transmitters, multiplexers, modulators, amplifiers, telephone switches, servers etc. as coordinated with the serving telecommunications providers. Provisions will be made to install owner furnished satellite and other antennas on the building exterior.

Telecommunications: Voice and data cabling and auxiliary support systems will be designed in accordance with the specific requirements identified by the owner. A structured CAT 6 network cabling system using star topology to TIA/EIA-568-B 'Commercial Building and Telecommunication Cabling Standards" will be performance specified with telecom room layout, schematic riser/elevation diagram, typical telecom outlet configurations for voice and data, and a schematic telecom outlet rough-in plan coordinated with the room requirements.

Television: An RG11 trunk cable shall be pulled from the telecommunication equipment rack or backboard mounted splitter to cable distribution splitters distributed throughout the facility spaces for RG6 cables to television outlets as located on plans.

END OF NARRATIVE