

**Overview**

This report summarizes the observations made during the site visit on December 8-9, 2011 to the Goshen Theatre located at 216 South Main Street in Goshen, Indiana 46526. The purpose of the visit was to make a visual assessment of the condition of the electrical systems for the theatre including, but not necessarily limited to, power distribution, grounding and bonding systems, interior and exterior lighting, emergency egress lighting, fire alarm, and telecommunications systems.

The observations made are limited to those areas where the existing equipment was exposed. Areas where the systems were concealed by suspended or plaster ceilings, or simply were not accessible and/or visible are not included in this assessment. During the electrical survey, the systems were evaluated for compliance with the following codes and standards:

**Building Codes, Standards and References**

- Architectural Barriers Act Accessibility Standard
- City of Goshen, Rules Regulations and Ordinances
- County of Elkhart Rules Regulations and Ordinances
- Energy Policy Act, 2005 (EPAAct 2005)
- Energy Standard for Buildings ASHRAE 90.1-2007
- Illuminating Engineering Society of North America
- Indiana Building Code, 2008
- Indiana Electrical Code, 2009
- Indiana Energy Conservation Code, 2005
- Indiana Safety Code for Elevators, 1989
- International Building Code, 2010
- International Energy Conservation Code, 2010
- Leadership in Energy and Environmental Design (LEED)
- National Electrical Code (NFPA-70), 2011
- National Fire Alarm Code (NFPA-72), 2010

Alterations to the building shall comply with the requirements of the code for new construction. Alterations shall not be made to any areas that will cause the building to be in violation of any codes. Portions of the existing building not altered and not affected by the alterations are not required to comply with the code requirements for a new structure.

**General Design Criteria**

All new electrical work shall be installed in accordance with the following general design criteria:

- Owner's specific program requirements per phase.
- Short circuit calculations based on available fault current as determined by the electric service provider.
- Voltage drop calculations per demand load, not to exceed 2% on feeder conductors, 3% on branch circuit conductors and 5% overall.
- Branch circuit ratings not less than the non-continuous load plus 125% of the continuous load.



Goshen Theatre Marquee



National Electrical Code



Typical PVC and EMT Raceway

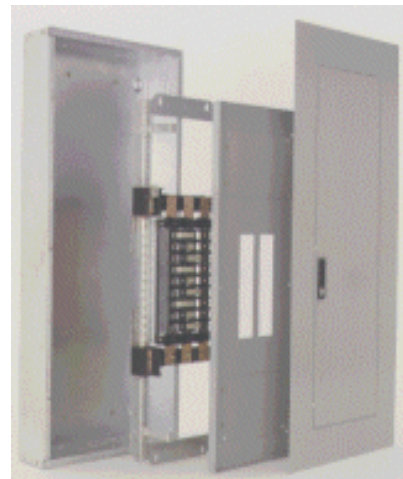


Stranded Copper Conductors

- Maximum of six (6) general convenience receptacles per 20 ampere branch circuit.
- Dedicated circuits for larger power consumption equipment, i.e., copiers, printers, microwave ovens, refrigerators, etc.
- New equipment specified as Underwriters Laboratories (UL) labeled and listed.
- Specification grade wiring devices with stainless steel cover plates.
- Motors less than 1/2 horsepower connected to either 120V-1Ø or 208V-1Ø service.
- Motors 1/2 horsepower and larger connected to 208V-3Ø or 480V-3Ø service.
- Flexible conduit, minimum 1/2" trade size and 6' length used for all motor connections.
- Intermediate metal conduit (IMC) with threaded couplings and fittings used in slabs, in exterior walls, and for exposed surface applications to a height of 8 feet above finished floor.
- Electrical metallic tubing (EMT) with compression type couplings and fittings used generally for concealed applications, interior partition walls and above the 8 foot demarcation as noted above.
- Schedule 40 polyvinyl chloride (PVC), minimum 1" trade size with cemented couplings and fittings, and cover requirements per NEC used for underground raceways on site.
- Underground cables of any classification installed in raceway systems, sized to allow for future growth.
- Raceways penetrating exterior building walls with internal and external seals to resist moisture.
- Minimum size of raceways 1/2" trade size for power and 1/2" trade size for control and auxiliary systems.
- Power and control wiring utilizing single insulated conductors installed in raceway systems.
- Copper conductors with sizes stated in American Wire Gauge (AWG) notation.
- Minimum conductor sizes #12 AWG for power and lighting circuits, #10 AWG for all dimming circuits, #14 AWG for mechanical control circuits, and #16 AWG for auxiliary systems or as recommended by system manufacturers.
- Conductor insulation code grade type THHN/XHHW/THWN, rated 90 degrees Celsius.
- NEMA1, branch circuit panelboards for general loads as manufactured by Cutler-Hammer Products/ Eaton Corporation, GE Electrical Distribution & Control, Siemens Energy & Automation, or Square D.
- NEMA1, branch circuit panelboards with controllable breakers as manufactured by Cutler-Hammer Products/ Eaton Corporation, GE Electrical Distribution & Control, Intelligent Lighting Controls, Inc., LC&D Lighting Controls, Siemens Energy & Automation, Square D or Watt Stopper.
- Branch circuit panelboards main lug only, 42-pole with hinged-covers, fully rated copper busing, bolt-on type circuit breakers, 100%-rated neutral bus, equipment ground bus, isolated ground bus (if required).
- Distribution equipment with adequate fault interrupting ratings for present and future utility requirements.
- Receptacles located in bathrooms, kitchens/concessions and outdoors shall be protected by ground-fault circuit-interrupter



Typical Service Switchboard



Typical Branch Circuit Panelboard



Theatrical Wiring Devices

- protection for personnel.
- All exterior receptacles shall also have weatherproof covers.

### Theatre Design Criteria

All new electrical work related to theatre equipment shall be installed in accordance with the following design criteria:

- Company switches furnished with shunt-trip main circuit breakers, female cam-lock load-side connectors, hinged-cover doors, integral micro-switches to trip shunt-trip main circuit breaker if door is opened while energized. Company switches shall be as manufactured by Electronic Theater Controls, Lex Products, SSRC, Stagecraft Industries, or Union Connector.
- Power and wiring for dressing room receptacles. A minimum of one (1) receptacle shall be installed at each dressing table seat location. Each dressing table receptacle shall be connected to a dedicated, 20A circuit.
- Power and wiring for one (1) dedicated lighting circuit to serve every three (3) dressing table seat locations.
- All lights and receptacles adjacent to mirrors and above dressing table counters controlled by wall switches installed in dressing rooms.
- Each switch controlling receptacles adjacent to mirrors and above dressing table counters provided with a pilot light located outside dressing room, adjacent to door to indicate when receptacles are energized.
- Power and wiring for receptacles for automated lighting located at box boom locations, catwalks, fly floors, orchestra pit and stage.
- Power feeders, branch circuit wiring, raceway accommodations, and labor to install various theatre technical and production facilities and equipment described elsewhere.
- Theatre facilities includes theatrical wiring devices (surface, flush and pipe mounted plug boxes), powered rigging hoists, and floor pockets.

### Mechanical Design Criteria

All new electrical work related to mechanical equipment shall be installed in accordance with the following design criteria:

- Both 208V-3Ø-3W and 480V-3Ø-3W, feeders and branch circuits for mechanical HVAC and plumbing equipment, including 3-pole, heavy-duty, fusible safety switches and all associated connections.
- Combination heavy-duty, 3-pole, heavy-duty, fusible safety switches, and FVNR magnetic motor controllers for all pump motors and air-handlers as required.
- All motor-controllers shall be furnished with 120V control voltage transformers and H-O-A selector switches. Units installed indoors shall have NEMA 1 enclosures. Units installed outdoors shall have NEMA 3R enclosures.
- All 120V control wiring shall be the responsibility of the Electrical Contractor. Low voltage temperature control wiring shall be the responsibility of the Temperature Control Contractor.



Main Lobby Decorative Pendant Lighting



Marquee Lighting Contactors



Concessions Panels at Main Lobby



### Service and Power Distribution – Existing Conditions

The theatre block consisting of the theatre, travel agency, and other separately metered spaces are presently served by multiple small residential overhead electric services from Northern Indiana Public Service Company (NIPSCO), the local utility provider in the area. Each tenant has a dedicated, residential style load center to accommodate lighting, receptacles, and mechanical equipment within their space.

Building Owner, Downtown Ministry of Goshen will need to initiate a “Service Upgrade Request” through NIPSCO when modifications to this system are required:

NIPSCO (Commercial & Industrial):  
Mr. Chris Pieri, Major Account Manager  
Phone: 574-284-2162  
Email: [cnpieri@nisource.com](mailto:cnpieri@nisource.com)

The electric service to the theatre originates from NIPSCO pole-mounted transformers and overhead service conductors, and enters the building from the alley on the east side of the theatre. The conductors travel through a weather head and mast down to the basement and into the main electrical service panel.

The metered electric service is rated 600A, 120/240V-1Ø-3W and connects building loads including sub-panels, lighting, receptacles, and mechanical equipment from the circuit breaker distribution panel:

- 100AF/100AT; Load Center – Lights / Recepts
- 200AF/200AT; Load Center – Projection Room / Tower
- 200AF/200AT; Load Center – Concessions
- 200AF/200AT; Load Center – Air Conditioning

The service equipment is newer and installed within the last 10 years however, most of the load centers downstream are either original or inadequate for future capacity and should be replaced with commercial grade panelboards. The existing power distribution system capacity is minimally adequate to serve the facility’s present needs. It is not suitable to serve the facilities future needs as they relate to modern performance type functions and theatrical equipment related to audio and dimming systems typically found in today’s renovated theatres.

### Emergency Power Distribution – Existing Conditions

Although there is no dedicated emergency power distribution system, unitized equipment is installed throughout portions of the facility. It consists of battery-operated, combination emergency lighting and exit signs. The combination units are constructed of polycarbonate housing material which is fine for mechanical rooms and storage spaces but, typically not appropriate in public areas of venues such as this. An exit sign with an antique or polished metallic finish would be more suitable with the renovation and restoration of the theatre building.



Proscenium Arch Incandescent Lighting



Basement Main Distribution Panel



East Alley NIPSCO Pole-Mtd Transformer

### Lighting System – Existing Conditions

Several areas of the facility have antiquated light fixtures which need to be either replaced or refurbished, if they have historic significance:

- *Exterior:* “Goshen” marquee at front entrance has several lamps burned out or missing; recommended replacement with LED lamps. The exterior alleys consist of city standard, ornamental street lights.
- *Main Entry Vestibule:* The entry vestibule consists of antiquated decorative incandescent pendant fixtures.
- *First Floor:* The offices consist of recessed fluorescent troffers.
- *Main Lobby:* The lighting consists of antiquated decorative fluorescent pendant bowl luminaires, incandescent downlights, and recessed fluorescent downlights.
- *Auditorium:* Consists of decorative incandescent recessed, pendant, and surface-mounted fixtures, residential ceiling fans with integral incandescent lights, incandescent accent lighting on balcony face and proscenium, recessed incandescent lights on ceiling beams, and decorative wall sconces on back and side walls of theatre.
- *Stage:* The lights consist of foot, border and electrics hung above stage area. See theatrical section for detailed description.
- *Mechanical:* Consists of incandescent porcelain sockets and industrial fluorescent fixtures.
- *Basement Playschool:* Area contains recessed fluorescent troffers, along with incandescent track accent lighting.
- *Third Floor:* The dance/rehearsal space consists of recessed fluorescent troffers.

Lighting in all areas throughout the facility are controlled locally by multiple toggle switches or directly from panelboard circuit breakers. Auditorium lighting is controlled by the stage right switchboard, through individual switches located on the stage or directly from panelboard circuit breakers by the concession area.

Most but not all exits and exit doors are marked by approved exit signs that are readily visible from any direction of egress travel.

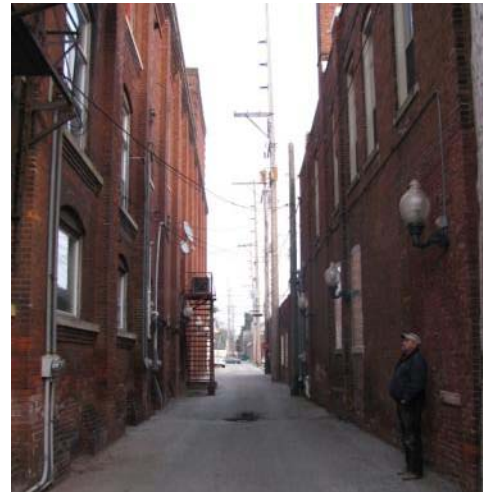
### Fire Alarm System – Existing Conditions

There is no existing fire alarm system in the building. Also, there are no fire alarm annunciation devices provided to notify occupants in the event of a fire alarm situation.

Area coverage is accomplished by several standalone smoke detectors, 120 VAC powered or battery-operated that are sporadically located throughout the facility. However, it does not appear that adequate coverage is provided. There is no centralized system.

### Telecommunications System – Existing Conditions

The building is currently being served from the local telephone



South Alley NIPSCO Overhead Electric Services



Stage Left Auxiliary Power Panel



Stage Right Theatre Switchboard

company. The telephone service consists of underground lines routed to a telecommunications backboard located in the basement of the building. The telephone/data lines are distributed throughout the building.

### Service and Power Distribution – New Work

Upgrade of the electrical service is recommended to accommodate additional building loads. Based on mechanical and theatrical equipment included in other parts of this report, we recommend a new 2000A, 208Y/120V-3Ø-4W electric service.

The new electric service from NIPSCO shall replace the existing 600A, 120/240V-1Ø-3W service. In general, the new electric service equipment shall be installed in a new main electrical room located in the basement level, adjacent to the east alley. The service transformer(s) from NIPSCO shall be installed in the alley either on a pole structure or pad-mounted. Service conductors shall be routed underground into the basement to the new switchboard.

The power distribution system shall consist of the main switchboard rated 2000A, 208Y/120V-3Ø-4W, an incoming main section equipped with a main breaker and digital customer metering. The distribution sections shall contain group-mounted, molded case circuit breakers.

The switchboard shall utilize conduit and wiring to distribute to all related downstream panelboards and mechanical equipment. Acceptable power distribution equipment manufacturers shall be Cutler-Hammer Products/ Eaton Corporation, GE Electrical Distribution & Control, Siemens Energy & Automation, and Square D.

Power connections shall be provided as required from new electrical distribution equipment to existing panelboards, existing mechanical loads, new mechanical loads, new elevator, and new theatrical equipment:

#### Performance Theatre

- 400A, 208Y/120V-3Ø-4W dimming rack to serve stage and house lighting circuits.
- 400A, 208Y/120V-3Ø-5W company switch located at stage level for touring show power.
- 100A, 208Y/120V-3Ø-5W company switch with isolated ground and located at stage level for AV.
- 100A, 208Y/120V-3Ø-4W relay panel, 24-pole
- 100A, 208Y/120V-3Ø-4W panelboard for miscellaneous specialty power receptacles
- 60A, 208Y/120V-3Ø-4W fusible switch for rigging
- 50A, 208Y/120V-3Ø-4W bus pedestal at dock area

#### Dance Hall / Rehearsal Room

- 100A, 208Y/120V-3Ø-4W relay panel, 12-pole
- 100A, 208Y/120V-3Ø-4W panelboard for miscellaneous specialty power receptacles

#### Mechanical Equipment

- 20A, 120V-1Ø connection to F-1
- 20A, 120V-1Ø connection to F-2



Basement Air Conditioning Power Panel



West Mechanical Room Load Center



Playschool Area Load Center



- 20A, 120V-1Ø connection to F-3
- 20A, 120V-1Ø connection to F-4
- 20A, 120V-1Ø connection to F-5
- 30A, 208V-1Ø connection to CU-1
- 30A, 208V-1Ø connection to CU-2
- 30A, 208V-1Ø connection to CU-3
- 30A, 208V-1Ø connection to CU-4
- 30A, 208V-1Ø connection to CU-5
- 200A, 208V-3Ø connection to AHU-1
- 100A, 208V-3Ø connection to AHU-2
- 100A, 208V-3Ø connection to RTU-1

A transient voltage surge suppression (TVSS) device shall be installed adjacent or integral to the new main switchboard and on selected low voltage panelboards downstream to protect equipment from damage due to external and internal surges and spikes. Acceptable TVSS manufacturers shall be Current Technology, Liebert Corporation or Transtector.

A clean power distribution system for AV components consisting of separate isolated grounding conductors and isolated grounding type receptacles shall be installed to separate the building equipment ground and general loads from the AV equipment. A dedicated 75kVA, K-13 rated, electrostatically shielded, isolation transformer shall provide a technical grounding system for the AV equipment. The transformer shall feed audio sequencing panelboards containing motorized circuit breakers to sequence power to the AV components.

A power system study shall be included by the distribution equipment manufacturer with the new equipment, including short circuit, protective device, time-current coordination, and arc flash analysis with field markings.

The short circuit analysis component shall include the calculation of the maximum RMS symmetrical three-phase short circuit current at each significant location in the electrical system. The resulting values from the study inform the ratings for the new equipment specified.

The time-current coordination analysis shall be performed to determine appropriate settings, ratings, and types of overcurrent protective devices within the new equipment. The analysis shall evaluate the degree of the system protection and service continuity of the existing overcurrent devices and provide recommendations for increasing system protection and device coordination.

Finally, the results of the short circuit analysis and protective device time current coordination analysis shall produce the necessary flash hazard boundaries. This information shall be printed on arc flash hazard warning labels and applied to the new distribution equipment.

Infrared scanning of all major equipment such as switchboards, fusible switches, panelboards, transformers, motor starters, etc., shall be performed after the installation of the new equipment to measure temperature and detect significant deviations from normal values. Adjustments and torque tightening shall be performed as required.

A new grounding electrode system shall also be installed together with the new electrical service. It shall consist of grounding conductors,



Radio Tower / Projection Room Power Panel



Typical Company Switch



K-13 Rated Isolation Transformer

ground rods, main service grounding and bonding and grounding of separately derived services. The system shall be tested to a reading of less than 5 ohms at the ground level.

Ground rods shall be a minimum size of 5/8" x 10'-0" copper clad steel. Interconnection of the service ground, system neutral and equipment ground conductors shall be made within the service equipment enclosure. All connections to the grounding system shall be exothermically welded. All wiring devices shall have a separate insulated grounding conductor connected to this system.

Vibration isolation shall be installed on all new electrical equipment, in all noise-producing rooms and on noise-producing equipment. Vibration isolation is intended to prevent noise and vibration from transferring into the building structure and radiating as noise in other parts of the building.

**Emergency Power Distribution – New Work**

In lieu of the battery-operated emergency lighting system, it is recommended that a new emergency power distribution system be provided together with the upgraded electric service. The emergency system shall consist of a natural gas, emergency/standby generator set rated 50kW, 208Y/120V-3Ø-4W.

The generator shall be located on the basement level in the area below the stage. The emergency system shall include a 225A, 4-pole, automatic transfer switch, and related 225A, 208Y/120V-3Ø-4W branch circuit panelboard. A separate 100A, 208Y/120V-3Ø-4W branch circuit panelboard and emergency lighting transfer system for house and lobby emergency lighting shall also be provided.

The emergency system shall serve the following loads:

- Exit signage
- Emergency and Egress lighting
- Fire Alarm System
- Security System

Acceptable generator manufacturers shall be Caterpillar, Kohler or Onan. Acceptable transfer switch manufacturers shall be Caterpillar, Emerson/ASCO Power Technologies, GE Zenith Controls, Kohler, Onan or Russelectric.

**Lighting System – New Work**

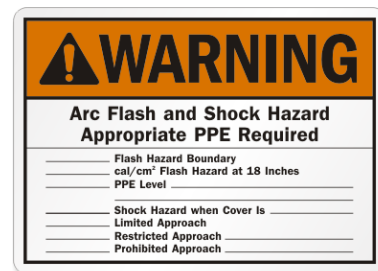
- *Exterior:* "Goshen" marquee shall be refurbished and reinstalled with new, retrofit LED style, socket lamps. New controls shall be provided, including marquee controller. The exterior city standard, ornamental street lights shall remain.
- *Main Entry Vestibule:* The entry vestibule fixtures shall be replaced with new decorative fluorescent fixtures.
- *First Floor:* New recessed fluorescent troffers shall be provided.
- *Main Lobby:* The decorative fluorescent pendant bowl luminaires shall be replaced with new.
- *Auditorium:* The decorative incandescent recessed lights on



Architectural Edge-Lit LED Exit Sign



Main Electric Service TVSS Device



Arc Flash Warning Label per NFPA 70E



Occupancy Sensor



ceiling beams, pendant, and surface-mounted fixtures under balcony, and residential ceiling fans with integral incandescent lights shall be replaced with new quartz downlights. Accent lighting on balcony face and proscenium arches shall remain however, lamps shall be replaced with new retrofit, dimmable long life, LED style, socket lamps with new sockets, and new wiring. The decorative wall sconces shall be refurbished.

- *Stage:* See theatrical section for new scope description.
- *Mechanical:* Incandescent porcelain sockets shall be replaced with new retrofit, LED style lamps. The industrial fluorescent fixtures shall remain.
- *Basement Playschool:* Recessed fluorescent troffers, and incandescent track accent lighting shall remain.
- *Third Floor:* The dance/rehearsal space recessed fluorescent troffers shall remain.

Lighting fixtures and associated branch circuit wiring shall be provided for the following areas:

- Performance areas including but not limited to auditorium, stage, and other technical areas. (NOTE: Lighting referred to herein relates to general area "non-show" lighting.)
- Aisle lighting shall be provided in the auditorium by incorporating lights within new seats and/or by providing wall mounted step lights. All low voltage seat lighting shall include remote transformers rated 120V-1Ø and shall be connected to the emergency generator.
- Public areas including, but not limited to, lobbies, restrooms, and concessions.
- Performer's support area including but not limited to dressing rooms (including toilet and showers), green room, wardrobe, rehearsal room, and laundry room.
- Dressing rooms will be provided with ceiling mounted fluorescent fixtures. In addition, incandescent "marquee" type light bars will be provided at all dressing tables.
- Administration areas including but not limited to housekeeping, offices, electrical/mechanical rooms, and equipment/storage areas.

New specification grade luminaires shall be provided in all new support spaces. Luminaires used in non-public areas (offices, workrooms, storage, projection rooms, etc.) shall be a combination of lay-in, indirect/direct, fluorescent troffers and/or compact-fluorescent downlights. Control shall be by local switching, occupancy sensors and/or controllable breakers. Local, low-level, task lighting shall be accomplished where required with long life LED lamp sources.

Work shall include new multiple lighting control locations for the theatre, as well as the main lobby. The dimming system shall also control all restroom lighting with on/off control. Raceway accommodations, back-boxes, faceplates, and appurtenances for ethernet and data cabling between dimming system cabinets and various remote control stations shall be provided.

All support spaces shall be updated with automatic lighting control strategies. Lighting controls result in energy savings of more than 30% and reduce building operating cost by 10% or more. Lighting control shall be by local override switching, occupancy sensors and/or



Ground Clamps and Rods



Natural Gas Emergency Generator



Automatic Transfer Switch



Emergency Lighting Transfer System

relay panels. Lighting shall be designed to turn-off during unoccupied times. Areas with access to natural light shall be controlled by daylight harvesting which incorporates sensing of natural light to adjust the level of artificial lighting. It is recommended that a lighting dimmer control system with photo-sensitive control be installed in such areas.

Target Lighting Levels in Foot-Candles (fc)	
Location and Tasks	Maximum Illuminance (Horizontal)
Auditoriums – Assembly	10
Auditoriums – Social activity	5
Conference Rooms – Meeting	30
Conference Rooms – Video Conference	50
Offices - Filing	50
Offices – Open office plan intensive VDT use	30
Offices – Open office plan intermittent VDT use	50
Offices – Private office	50
Offices – Lobbies, lounges, and reception areas	10
Reading – Photocopiers	30
Reading – Ball-point pen	30
Toilets and washrooms	5
Maintenance	50
Service spaces – Stairways, corridors	5



Fire Alarm Control Panel

Existing battery-operated emergency lighting units and exit signs shall be disconnected and removed. New emergency lighting circuits for renovated public areas shall be provided including theatres, lobbies, restrooms, etc. Circuits shall be fed from a natural gas emergency generator via emergency lighting transfer systems as manufactured by Electronic Theater Controls, ASCO Power Technologies, Stagecraft Industries, Strand Lighting or Union Connector.



Fire Alarm Smoke Detector and A/V Appliance

Emergency lighting in all other areas shall be fed from the emergency generator via individual emergency transfer devices as manufactured by Bodine, Lighting Control and Design, LVS Inc., or Nine 24 Inc. Where emergency lighting in public areas cannot be provided from the emergency generator as described herein, self-contained, concealed, recessed, unitized emergency lighting fixtures shall be provided as manufactured by Concealite or Emergilite, Inc.

**Fire Alarm System – New Work**

A new voice annunciated fire alarm system shall be provided consisting of an addressable, microprocessor based central processing unit, remote annunciator panels and power extender panels. The system shall use closed loop initiating device circuits with individual zone supervision, individual indicating appliance circuit supervision, and incoming and standby power supervision.

Area coverage shall be accomplished by manual pull stations, sprinkler system flow switches, smoke detectors, combination fixed temperature and rate of rise heat detectors, and duct-type smoke detectors with remote alarm stations for mechanical HVAC equipment moving large volumes of air. Audio/visual appliances (speaker/strobes), audio only appliances (speakers) and visual only notification appliances (strobes) shall be installed where required.

The system shall perform the following functions:

- Supervise and monitor all intelligent/addressable detectors, manual pull stations, tamper switches, flow switches, control modules and monitor modules for normal, trouble and alarm conditions.
- Addressable, duct-type photoelectric smoke detectors, sampling tubes, and remote test stations shall be provided for all HVAC units rated for 2000 cfm or larger for unit shutdown. Furnish smoke detector head with one (1) set of normally closed and one (1) set of normally open, 125-volt rated auxiliary contacts. Duct-type smoke detector shall be furnished by electrical contractor, mounted by HVAC contractor, and wired by electrical contractor.
- Visually and audibly annunciate any trouble, supervisory, or alarm condition on fire alarm control panels and serial LCD remote annunciators located at building entrance as well as automatically dial out to local fire department or a third party monitoring service per local requirements.
- Illuminate all theatre and lobby lights to full intensity upon alarm signal.
- Shutdown all audio systems upon alarm signal.
- Provide annunciation through the audio/visual appliances.
- Provide monitoring of fire suppression systems.

The fire alarm system shall be complete, code-compliant, and be designed in accordance with the International Building Code, NFPA-72 and NFPA-909. Acceptable fire alarm system manufacturers shall be Gamewell, General Electric, Notifier, Siemens/Cerberus or SimplexGrinnell.

### **Telecommunications System**

A new telephone/telecommunications service point of minimum-presence (POMP) shall be established. It shall be provided with service related terminal board(s) with #6 cu. (minimum) connected to building grounding electrode system provided above. As a minimum, the terminal board shall be 4'x 8'x 3/4" thick plywood, painted on both sides and all edges with flame-retardant paint.

The main communication system shall include the following:

- Raceway system from the telecommunications service provider's common service facilities (pole, manhole, cabinet, etc.) to the POMP for the serving utility's cables.
- Raceway accommodations for all interior telecommunications and data cabling.
- Accommodations for telecomm/data (T/D) outlets in locations and in sufficient quantities. Typically, T/D accommodations include a stamped-steel, 4"x 4", flush-mounted box mounted at 18" above finished floor, single-gang plaster ring, blank



cover plate, and one (1) 3/4" empty conduits stubbed into an accessible ceiling space.

- Faceplates and jacks on T/D outlets as specified by the Owner. Provide blank cover-plates over all unused outlet boxes.

All telephone handsets and head-end communications systems including equipment racks, punch down blocks, patch panels, routers, wiring hubs, wire management channels, cable trays, cabling, computer workstations and other additional related hardware and software, etc., shall be the responsibility of the Owner.