

XL CENTER RENOVATION

MECHANICAL, ELECTRICAL AND PLUMBING SYSTEMS NARRATIVE

With a major new renovation that would transform the XL Center into a modern multi-use arena for the next 25 years, all existing Mechanical, Electrical, Plumbing and Low Voltage components and distribution systems should be replaced except for the following:

MECHANICAL SYSTEMS NARRATIVE

This narrative provides conceptual-level information to help confirm the cost and configuration of the Mechanical systems. The narrative should not be considered inclusive of all requirements.

General

The facility will be designed in accordance with the 2012 International Building Code, 2012 International Mechanical Code, 2012 International Plumbing Code, local amendments, and ASHRAE Standards.

Current ASHRAE 0.4% weather data shall be used to determine peak heating and cooling loads. Interior spaces shall be maintained at a maximum of 75F in summer and a minimum of 68F in winter. For ice events, the seating bowl shall be maintained at a minimum of 60F and a maximum of 65F. Transient spaces such as storage rooms and stairwells shall be heated only. The facility will be designed to meet the requirements of ASHRAE Standard 90.1 for energy efficiency. All areas shall be mechanical or naturally ventilated per code.

Compliance with applicable codes should be considered a minimum requirement.

Background

The 2014 Renovation of the XL Center included numerous additions and revisions to the existing facility. One addition was the creation of a new locker room for the UConn Husky Hockey Team. All of the plumbing and HVAC systems serving this space are new and should remain in service.

The building is provided with chilled water and steam from the Hartford Steam Company district utility. The main pressure reducing station, meters and valves for this incoming utility have all been replaced with new and should remain in service.

A new 40 ton DX cooling rooftop unit was provided to serve the Upper Suites on the east end of the arena. This unit could be salvaged and used for the proposed new Club Lounge in that area. It should be adequate to serve up to 15,000 square feet.

Airhandling unit, S-20, which serves the East Exhibition Hall space was replaced in its entirety. This unit could be re-used to serve the future needs of that space.

A smoke removal system was recently installed for the seating bowl, main level concourses and the east and west upper concourses. The seating bowl system should be adequate to serve the needs of the future seating bowl. The concourse systems will likely have to be replaced for the reconfigured concourses.

Several new split system air conditioning units have been installed to serve the new press room, the scoreboard control room and communication rooms.

Systems

Chilled Water Plant

The arena will be served with chilled water produced off-site at by the Hartford Steam Company. A variable flow pumping system distributes chilled water to cooling coils at air handlers and fan coils throughout the arena. The chilled water load for XL Center is estimated at 3,000 tons.

Heating Water Plant

The arena is served with high pressure steam produced off-site by the Hartford Steam Company. A new steam to hot water heat exchanger will be installed in the mechanical room. A variable flow pumping system will distribute heating water to heating coils at finned tube, air handlers, terminal units, and fan coils throughout the arena. The heating water load is estimated at 22,000 MBH.

Ice Chiller Plant

A new Ice Chiller Plant will be provided for the main bowl ice floor. The system will include at least 3 compressors and a dedicated cooling tower and be on emergency power in accordance with NHL standards. The system will include an under-slab permafrost prevention system using heat rejection from the compressors.

Seating Bowl

The seating bowl will be served by four VAV air handlers with full economizer, estimated 100,000 cfm each. Units to supply a main duct loop high in the arena bowl estimated at 90" diameter. They will be provided with preheat, cooling and reheat coils to manage both space comfort conditioning as well as dehumidification for ice events. Provide line item pricing for separate desiccant dehumidifying air handlers coupled to each bowl air handler. The desiccant units are estimated at 40,000 cfm and include a pre-cool coil, desiccant wheel, a gas-fired reactivation, and appropriate filtration. The desiccant units may not be required until an NHL team is committed to the arena.

Ventilation shall be provided per code via the bowl air handling units. Demand control ventilation shall be provided to reduce ventilation rates when possible.

Suites

Suites shall be provided with four pipe fan coil units for temperature control. Ventilation shall be provided via the bowl air handling units.

Concourses

Open concourse areas will be served by air transferred from the seating bowl. Areas with high loads (glass or pre-function areas) will be “spot cooled” by fan coils or VAV air handlers with full economizer providing heating, cooling and ventilation. Perimeter finned tube will be used at large window areas where occupants may be seated. Cabinet heaters will be located at all perimeter entries.

Club Areas

Club areas will be served by VAV air handlers with full economizer providing heating, cooling and ventilation. Each Club will have a dedicated unit to maximize flexibility in operations.

Public Restrooms

Public restrooms will be open to the concourses. They will be provided with 2 CFM/SF of general exhaust. Restrooms on the perimeter wall will be heated.

Concession Stands

Concession Stands will be open to the concourses and make-up air will be drawn from adjacent spaces.

Non-cooking stands will be provided with 2 CFM/SF of general exhaust for “cooling effect.”

NFPA 96 kitchen hood exhaust systems will be provided for connection to cooking hoods. Fans will be inline, upblast or utility sets based on locations of the units. Fans shall be UL listed for kitchen exhaust application. The systems shall be individual with no common or gathering ductwork systems, except for hoods in the same kitchen or cooking stand. Ductwork will be wrapped with zero-clearance, 2-hour, UL rated, duct wrap. UV hoods will be required where sidewall (louvered) discharge is planned. Include an allowance for two connections at each cooking hood (stands and Kitchen).

Kitchens

Main cooking kitchens will be served by 100% outside air units and dedicated grease exhaust systems.

Locker Rooms

Locker rooms will be served by dedicated air handlers with energy recovery. Locker Room exhaust will be routed back through the energy recovery before being exhausted outside in order to minimize energy consumption. Additional heat will be provided in the

hockey locker rooms for hockey equipment drying. Locker Rooms of similar use will be served by the same air handler in order to minimize the number of air handlers.

Office and Administrative Areas

VAV air handlers with full economizer will serve office areas. Spaces with similar use patterns and exposures will be zoned together.

Miscellaneous Systems

Areas such as telecommunications rooms, scoreboard control room, press areas, fire command center, elevator machine rooms, and others shall be provided with dedicated fan coil units. These units shall be direct expansion with emergency power connection for operation during a power outage.

Provide carbon monoxide sensor controls for the exhaust fans serving the Marshaling area on the Event Level.

Provide a full commercial exhaust and lint filter system for the laundry.

Provide general and emergency exhaust for the Ice Chiller Plant, per ASHRAE Standard 15.

Building Management System (BMS)

A complete direct digital control system will be provided for all HVAC systems throughout the facility. It will be expandable and compatible with existing MGM controls to allow for a full campus system with control interface and data recording. Installation and programming of the system will be by an approved design build contractor.

The BMS will be coordinated with the Fire Alarm System to ensure proper operation and override control of the Smoke Control Systems.

Smoke Control Systems

The seating bowl will utilize the existing exhaust fans to exhaust air at rates determined by the Code Consultant and City code officials.

The concourses will utilize dedicated exhaust fans for smoke exhaust. Make-up air will be drawn from the seating bowl and adjacent areas.

Make-up air will be introduced through operable doors (ADA doors), the dock, and intake louvers with motorized dampers as necessary.

All egress stairs shall be pressurized with dedicated roof-mounted fans.

PLUMBING AND FIRE PROTECTION SYSTEMS NARRATIVE

General

This narrative provides conceptual-level information to help confirm the cost and configuration of the Plumbing systems. The narrative should not be considered inclusive of all requirements.

The facility will be designed in accordance with the 2012 International Building Code, 2012 International Mechanical Code, 2012 International Plumbing Code, local amendments, and ASHRAE Standards. The facility will be designed to meet the requirements of ASHRAE Standard 90.1 for energy efficiency.

Compliance with applicable codes should be considered a minimum requirement.

Plumbing fixtures in all of the public restrooms and locker rooms have been recently replaced. If they are carefully removed and stored, these fixtures could be re-used in the future restrooms and lockers.

Systems

Storm Drainage

Roof drainage will be collected in leaders and discharged to the storm water system. Overflow drainage will be through separate, overflow drains, leaders, and risers. Overflow risers will be routed to daylight through "lamb's tongue" outlets at locations coordinated with the Architect.

All horizontal storm lines and other piping subject to "sweating" will be insulated for the entire length.

Sanitary Drainage

Sanitary sewer lines will collect and route to the sewer system. Estimated peak flow is 3.4 CFS.

Grease waste will be routed through local grease traps or through a central grease interceptor prior to discharging to the sewer system. Assume a local grease trap at each concession stand and pantry and a central interceptor for the Main Commissary.

Domestic Cold Water

The domestic water system will include a dedicated water entry with reduced pressure backflow preventer and a domestic water booster pump skid. The peak domestic water demand is estimated at 1,500 gpm, and the booster pump skid will include (4) pumps sized at 500-gpm each (one is redundant) with VFDs and a hydro-accumulator tank.

Interior cold water hose bibs with backflow preventers will be provided for mechanical rooms, staging/loading, etc. Provide recessed, cold water wall hydrants in all general public toilet rooms.

Provide a 2" water service to the Jet Ice System, which is provided by another Division.

Domestic Hot Water

Hot water will be produced by central, steam to water heaters. Hot water will be distributed to all cooking areas at 140 degrees. Hot water will be distributed to all other areas at 120 degrees. Recirculation systems will be provided for all areas.

The Ice Re-surfacer Room will be provided with separate water heaters capable of producing 170°F water for the ice re-surfacer. An RO/Jet Ice System will be provided as part of the Ice Plant/Sheet Package.

Hot water shower heads will be provided in the ice melt pit.

Natural Gas

Natural gas service will be required to serve gas fired heating equipment and cooking equipment. Natural gas demand is estimated at 40,000 MBH.

Inside the building, the natural gas system shall consist of a gas main distributed around the Event Level with risers and laterals routed to locations requiring natural gas. The distribution pressure will be 2-psig.

Any required pressure regulating valves (PRVs) shall be vented to the outdoors as required by local code.

Beverage Conduit

Beverage conduit systems will be designed by the Food Service Consultant. Include an allowance for installation by this Division.

Fire Protection

The facility will be fully sprinkled and provided with a dedicated fire water entry. A fire pump, sized at 1,250 gpm shall be provided. Provide combination standpipes in stairwells and additional hose connections at all four “corners” of the Event Floor.

Assume the bowl is sprinklered until the local AHJ approves their removal.

Sprinkler zones shall be coordinated to match smoke control zones.

ELECTRICAL SYSTEMS NARRATIVE

This narrative provides conceptual-level information to help confirm the cost and configuration of the Electrical system design for power, lighting and special systems. The narrative should not be considered inclusive of all requirements.

General

The facility will be designed in accordance with the 2012 International Building Code, 2014 National Electrical Code, local amendments, and ASHRAE Standards.

Compliance with applicable codes should be considered a minimum requirement.

Background

The original electrical distribution equipment will need to be replaced in entirety for a substantially remodeled facility; however, equipment installed in the recent upgrade could remain and be re-applied for power distribution in the new building. The existing utility transformer vault would likely remain as long as transformer removal and replacement maintains accessible pathways. The newly installed 5000 Amp service entrance bus from the vault and associated main switchboard which currently back-feeds the original main switchboards would be maintained. The concession switchboards and transformers that were added would be re-used even if the current stands and kitchen were re-built and the new branch panelboards had to be relocated. Also installed that could remain are the normal and emergency distribution and panelboards for the remodeled locker rooms and team facilities as well as distribution for the new seating bowl matrix and video display equipment.

The emergency distribution system had substantial upgrades that would remain, such as new transfer switches, switchboards, panel boards, transformers and motor control centers which were installed for the smoke exhaust system and supporting equipment as well as egress lighting for the upgraded concourse, the new video control room and audio egress components. A new generator would still be needed with additional transfer switches and distribution.

A summary of the newly installed electrical equipment that would remain and be re-used is as follows:

- (1) 5000Amp Service Entrance Busway
- (1) 5000Amp Main Building Switchboard
- (11) Step-down Transformers, 480 – 208Y/120V

- (2) Motor Control Centers
- (28) Branch Circuit Panel boards
- (5) Distribution Switchboards
- (3) Automatic Transfer Switches
- (1) Generator distribution switchboard

The recent upgrades to A/V systems including basket trays and cabling to support the new scoreboards and matrix panels could be re-used.

Telecommunications, Data systems, Digital Antenna system, Security Access, Monitoring and Control would all be removed in entirety and be replaced with current technology and have new spaces to accommodate equipment and infrastructure and cabling.

Recent upgrades to Fire Alarm and the Smoke Exhaust control systems would be modified to accommodate the new and remodeled spaces as appropriate but the recently installed components could largely remain intact.

Systems

Utility Service

The current service transformers are on the service level and may be re-used if new loads do not exceed current capacity. If new or additional transformers are required, the secondary shall be 480V and feed into the existing to remain main electrical room via bus duct.

Main Electrical Room Distribution

There are currently three main distribution boards in the main electrical room. One is the new 5,000A board that can remain. Two are older boards that will need to be replaced. The new bus duct from the transformer vault can be reused. If additional switchboards are required, new bus duct feeds from the vault will be added. Assume two new 4000A switchboards and bus duct feeders from the vault.

Electrical Distribution

Four main electrical risers would be installed, one in each corner of the arena to serve the surrounding area. Each riser would come from a feed off the main electrical distribution boards in the main electrical room.

Generator

The existing generator will need to be replaced. It's anticipated that a new pad mounted, diesel generator of 2MW will be required with a buried fuel tank and weather proof housing. The increased size will accommodate the NHL requirement for emergency power to the ice chiller plant.

Emergency Power Distribution

Part of the emergency distribution was replaced in the latest renovations and can be reused. Four main emergency distribution risers would be installed, one in each corner

of the arena to serve the surrounding area. This includes power to the following emergency systems: building egress lighting, seating bowl emergency lighting, fire alarm system, ribbon boards, telecommunication rooms, main telephone room, demarcation room, seating bowl sound system. It will also include power to the following standby systems: security, smoke control fans, ice chiller/condenser/brine pump, sewage ejectors, elevators, fire pump.

Mechanical/Plumbing Connections

Power wiring will be provided for all mechanical and plumbing equipment, including all starters in motor control centers, local fused disconnect switches and thermal overload switches. Power will be provided for the mechanical control system, dampers and plumbing valves.

Equipment Connections

Power wiring will be provided for all elevators, escalators, overhead doors, loading dock equipment, electrified man doors, ADA doors, etc. Power for the head end of each control system will be provided.

Branch Circuits/Connections

Local plug and hardwire power will be provided throughout the arena's new spaces. Receptacles will be laid out in a typical/code compliant fashion for each space. Power will be provided to all AV devices, food service equipment, scoreboard equipment, retail devices, medical equipment, broadcast equipment, training equipment, etc. 480V to 120/208V transformers will be installed throughout the arena as part of the new distribution system.

Existing devices in existing to remain spaces (that have been recently renovated) will remain. Branch circuits to these devices may need to be replaced based on new locations of the panels feeding these spaces.

Signage

The bowl ribbon boards and center board have been recently upgraded. If these are to be reused, the electrical distribution can remain. Power to new signage shall be provided as required for concessions, restrooms, entryways, exterior, retail, etc.

Broadcast Truck Power

Per the new design, an area inside the arena has been designated for broadcast trucks. New 200 amp company switches with cam-lock plug-in receptacles will be installed for each truck in this area.

Lighting & Lighting Controls

New LED lighting will be provided throughout the arena, including existing to remain spaces. New LED sports lighting shall be provided within the bowl and will require appropriate mounting/support hardware with safety cables. New addressable lighting

controls system will be provided to control the entire arena. This will require lighting control relay panels, control wiring, control devices, head end equipment, controls software, compatible fixture drivers, etc. Exit signs will be provided throughout the arena. Dimming systems will be required in high end spaces throughout the arena.

Grounding System

A new #4/0 ground ring will be installed on the service level with tripod ground rods in each corner of the arena. Grounding will be distributed throughout the arena. Ground bars will be installed in all telecommunication and electrical rooms.

Lightning Protection System

A new lightning protection system with air terminals, down conductors and grounding in accordance with NFPA 780 will be installed.

Fire Alarm System

A new fire alarm system and devices will be installed throughout the arena including the existing to remain spaces. This will coordinate with the revised smoke management system as well as new kitchen hood systems.

Communications System

A new telecommunications system and devices will be installed throughout the arena, including existing to remain spaces.

Security System

A new security system and devices will be installed throughout the arena, including existing to remain spaces.