State of Utah

JON M. HUNTSMAN, JR.
Governor

GARY R. HERBERT
Lieutenant Governor

Department of Administrative Services
KIMBERLY K. HOOD
Executive Director

Division of Facilities Construction and Management
DAVID G. BUXTON
Director

ADDENDUM #3

Date: 8 April 2008

To: Design/Build Teams

From: Matthias Mueller, Project Manager

Reference: Southern Utah University
Campus Housing – Phase II Design/Build Stage II
DFCM Project No. 07032730

Subject: **Addendum No. 3**

Pages	Addendum	1	page
	Revised Project Schedule	1	page
	Mechanical/Electrical Specifications	33	pages
	Total	**35**	**pages**

Note: This Addendum shall be included as part of the Contract Documents. Items in this Addendum apply to all drawings and specification sections whether referenced or not involving the portion of the work added, deleted, modified, or otherwise addressed in the Addendum.

While we contend that SB220 should only be potentially applicable to a contract issued after the effective date of said bill, this is to clarify that for purposes of this contract, regardless of the execution or effective dates of this contract, the status of Utah Law and remedies available to the State of Utah and DFCM, as it relates to any matter referred to or affected by said SB220, shall be the Utah law in effect at the time of the issuance of this Addendum.

3.1 SCHEDULE CHANGES – There are changes to the Project Schedule.
The attached Revised Project Schedule dated April 8, 2008, reflects changes to the following project schedule events: ***Final Addendum Issued, April 15, 2008.***

3.2 GENERAL – See following attachment**:**
Addendum #3
- **3.1 Schedule Changes**
- **3.2 Mechanical Specifications**
- **3.3 Electrical Specification**

End of Addendum #3

STATE OF UTAH - DEPARTMENT OF ADMINISTRATIVE SERVICES

Division of Facilities Construction and Management

DFCM

PROJECT SCHEDULE – REVISED
PER ADDENDUM NO. 2 DATED APRIL 8, 2008

PROJECT NAME:	**CAMPUS HOUSING – PHASE II** **SOUTHERN UTAH UNIVERSITY – CEDAR CITY, UTAH**			
DFCM PROJECT NO.	**07032730**		**DESIGN/BUILD STAGE II**	
Event	**Day**	**Date**	**Time**	**Place**
Request for Proposals Available	Monday	February 25, 2008	5:00 PM	DFCM 4110 State Office Bldg SLC, UT and the DFCM web site*
Work Session 1 with DFCM/Users	Monday	March 3, 2008	7:30 AM to 4:00 PM	Sharwan Smith Center Southern Utah University Cedar City, UT
Work Session 2 with DFCM/Users	Thursday	March 20, 2008	7:30 AM to 4:00 PM	Sharwan Smith Center Southern Utah University Cedar City, UT
Work Session 3 with DFCM/Users	Tuesday	April 1, 2008	7:30 AM to 4:00 PM	Sharwan Smith Center Southern Utah University Cedar City, UT
Last Day to Submit Questions	Friday	April 4, 2008	2:00 PM	Matthias Mueller - DFCM Email: mmueller@utah.gov Fax: (801)-538-3267
Final Addendum Issued	**Tuesday**	**April 15, 2008**	**2:00 PM**	**DFCM web site ***
Prime Contractors Turn In Cost Proposals and Designs	Tuesday	April 22, 2008	12:00 NOON	DFCM 4110 State Office Bldg SLC, UT
Subcontractor List Due	Wednesday	April 23, 2008	12:00 NOON	DFCM 4110 State Office Bldg SLC, UT Fax (801-538-3677
Statements of Qualifications and Management Plans Due	Thursday	April 24, 2008	12:00 NOON	DFCM 4110 State Office Bldg SLC, UT
Interviews	Tuesday	April 29, 2008	TBD	TBD
Announcement	Wednesday	April 30, 2008	By 5:00 PM	DFCM web site *
Substantial Completion Date	Thursday	July 23, 2009		

*** DFCM's web site address is http://dfcm.utah.gov.**

Addendum 3

3.1 Schedule Changes: On DFCM Project Schedule: Change “Addendum Issued April 8, 2008" to “Final Addendum issued April 15, 2008"

3.2 Mechanical Specifications: Add Sections 15186 and 15486 included with this addendum.

3.3 Electrical Specification: Add Sections 16420, 16452, 16510, 16551, 16560, 16561, 16600, 16721, 16740, 16780, 16782 and 16786 included with this addendum.

SECTION 15186 - STEAM CONDENSATE PUMPS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.

1.2 SUMMARY

A. This Section includes electric-driven steam condensate pumps.

1.3 SUBMITTALS

A. Product Data: Include certified performance curves and rated capacities, operating characteristics, furnished specialties, and accessories for each type of product indicated. Indicate pump's operating point on curves. Include receiver capacity and material.

B. Shop Drawings: Show pump layout and connections. Include setting drawings with templates for installing foundation and anchor bolts and other anchorages.

1. Wiring Diagrams: Power, signal, and control wiring.

C. Operation and Maintenance Data: For pumps to include in operation, and maintenance manuals.

1.4 QUALITY ASSURANCE

A. Source Limitations: Obtain steam condensate pumps through one source from a single manufacturer.

B. Product Options: Drawings indicate size, profiles, and dimensional requirements of steam condensate pumps and are based on the specific system indicated. Refer to Division 1 Section "Product Requirements."

C. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, Article 100, by a testing agency acceptable to authorities having jurisdiction, and marked for intended use.

D. ASME Compliance: Fabricate and label steam condensate pumps to comply with ASME Boiler and Pressure Vessel Code: Section VIII, Division 1.

1.5 DELIVERY, STORAGE, AND HANDLING

A. Manufacturer's Preparation for Shipping: Clean flanges and exposed machined metal surfaces and treat with anticorrosion compound after assembly and testing. Protect flanges, pipe openings, and nozzles with wooden flange covers or with screwed-in plugs.

B. Store steam condensate pumps in dry location.

C. Retain protective covers for flanges and protective coatings during storage.

D. Protect bearings and couplings against damage from sand, grit, and other foreign matter.

E. Comply with pump manufacturer's written rigging instructions.

1.6 COORDINATION

A. Coordinate size and location of concrete bases. Cast anchor-bolt inserts into bases. Concrete, reinforcement, and formwork requirements are specified in Division 3.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. In other Part 2 articles where titles below introduce lists, the following requirements apply to product selection:

1. Manufacturers: Subject to compliance with requirements, provide products by one of the manufacturers specified.

2.2 ELECTRIC-DRIVEN STEAM CONDENSATE PUMPS

A. Description: Factory-fabricated, packaged, electric-driven pumps; with receiver, pump(s), controls, and accessories suitable for operation with steam condensate.

B. Configuration: Duplex floor-mounting pump with receiver and float switch(es); rated to pump 200 deg F steam condensate.

1. Manufacturers:

a. Aurora Pump; Division of Pentair Pump Group.
b. Domestic Pump; Div. of ITT Industries.
c. MEPCO (Marshall Engineered Products Co.).
d. Skidmore Div.; Vent-Rite Valve Corp.
e. Spence Engineering Company, Inc.; Division of Circor International, Inc.
f. Spirax Sarco, Inc.

g. Sterling, Inc.
h. Prior approved equal.

2. Receiver: Floor-mounting; with externally adjustable float switch(es), and flange(s) for pump mounting.
3. Pump(s): Centrifugal, close coupled, vertical design, permanently aligned, and bronze fitted; with replaceable bronze case ring and mechanical seal; mounted on receiver flange.
4. Factory Wiring: Between pump(s) and float switch(es), for single external electrical connection. Fused control power transformer if voltage exceeds 230 V.
5. Electrical pump alternator to operate pumps in lead-lag sequence and allow both pumps to operate if the normal start level for a single pump is exceeded.

2.3 MOTORS

A. Comply with requirements in Division 15 Section "Motors."

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine equipment foundations and anchor-bolt locations for compliance with requirements for installation tolerances and other conditions affecting performance of work.

B. Examine rough installation of steam condensate piping.

C. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 INSTALLATION

A. Install pumps according to HI 1.1-1.5, "Centrifugal Pumps for Nomenclature, Definitions, Application and Operation."

B. Install pumps to provide access for periodic maintenance including removing motors, impellers, couplings, and accessories.

C. Support pumps and piping separately so piping is not supported by pumps.

D. Install pumps on concrete bases. Anchor pumps to bases using inserts or anchor bolts.

E. Install thermometers and pressure gages.

3.3 CONNECTIONS

A. Piping installation requirements are specified in other Division 15 Sections. Drawings indicate general arrangement of piping, fittings, and specialties.

B. Install piping adjacent to machine to allow service and maintenance.

C. Install steam supply for pressure-powered pumps as required by Division 15 Section "Steam and Condensate Piping."

D. Install compressed-air supply for pressure-powered pumps as required by Division 15 Section "General-Service Compressed-Air Piping."

E. Install gate and check valves on inlet and outlet of pressure-powered pumps.

F. Install check valve, gate valve, and globe valve at pump discharge connections for each electric-driven pump.

G. Pipe drain to nearest floor drain for overflow and drain piping connections.

H. Install full-size vent piping to outdoors, terminating in 180-degree elbow at point above highest steam system connection or as indicated.

I. Ground equipment according to Division 16 Section "Grounding and Bonding."

J. Connect wiring according to Division 16 Section "Conductors and Cables."

3.4 STARTUP SERVICE

A. Verify that steam condensate pumps are installed and connected according to the Contract Documents.

B. Complete installation and startup checks according to manufacturer's written instructions.

C. Clean strainers.

D. Set steam condensate pump controls.

E. Set pump controls for automatic start, stop, and alarm operation.

F. Perform the following preventive maintenance operations and checks before starting:

1. Set float switches to operate at proper levels.
2. Set throttling valves on pump discharge for specified flow.
3. Check motors for proper rotation.
4. Test pump controls and demonstrate compliance with requirements.
5. Replace damaged or malfunctioning pump controls and equipment.
6. Verify that pump controls are correct for required application.

G. Start steam condensate pumps according to manufacturer's written startup instructions.

3.5 DEMONSTRATION

A. Engage a factory-authorized service representative to train Owner's maintenance personnel to adjust, operate, and maintain steam condensate pumps. Refer to Division 1 Section "Closeout Procedures Demonstration and Training."

END OF SECTION 15186

SECTION 15486 - GAS-FIRED WATER HEATERS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.

1.2 SUMMARY

A. This Section includes the following fuel-fired water heaters:

1. Instantaneous, tankless, gas water heaters.
2. Commercial, atmospheric, storage, gas water heaters.
3. Commercial, power-burner, storage, gas water heaters.
4. Commercial, power-vent, storage, gas water heaters.
5. Commercial, high-efficiency, gas water heaters.
6. Commercial, coil-type, finned-tube, gas water heaters.
7. Commercial, grid-type, finned-tube, gas water heaters.
8. Household, oil-fired water heaters.
9. Commercial, oil-fired water heaters.
10. Large-capacity, oil-fired water heaters.
11. Dual-fuel, gas and oil-fired water heaters.
12. Compression tanks.
13. Water heater accessories.

1.3 DEFINITIONS

A. LP Gas: Liquefied-petroleum fuel gas.

1.4 SUBMITTALS

A. Product Data: For each type and size of water heater indicated. Include rated capacities, operating characteristics, furnished specialties, and accessories.

B. Shop Drawings: Diagram power, signal, and control wiring.

1. Dimensioned Outline Drawings of Equipment Unit:

C. Operation and Maintenance Data: For water heater to include in operation, and maintenance manuals.

D. Warranty: Special warranty specified in this Section.

1.5 QUALITY ASSURANCE

A. Electrical Components, Devices, and Accessories: Shall be listed and labeled as defined in NFPA 70, Article 100, by a testing agency acceptable to authorities having jurisdiction, and marked for intended use.

B. ASHRAE/IESNA 90.1-2004Compliance: Shall comply with Applicable requirements in ASHRAE/IESNA 90.1-2004.

C. ASME Compliance:

1. Hotwater heater package shall be, fabricated and labeled commercial water heater storage tank shall comply with ASME Boiler and Pressure Vessel Code: Section VIII, Division 1.
2. Fabricate and label commercial, finned-tube water heaters to comply with ASME Boiler and Pressure Vessel Code: Section IV.

D. Comply with NSF 61, "Drinking Water System Components - Health Effects; Sections 1 through 9" for all components that will be in contact with potable water.

1.6 COORDINATION

A. Coordinate size and location of concrete bases with equipment supplied.

1.7 WARRANTY

A. Special Warranty: Manufacturer's standard form in which manufacturer agrees to repair or replace components of fuel-fired water heaters that fail in materials or workmanship within specified warranty period.

1. Failures include, but are not limited to, the following:

a. Structural failures including storage tank and supports.
b. Faulty operation of controls.
c. Deterioration of metals, metal finishes, and other materials beyond normal use.

2. Warranty Period(s): From date of Substantial Completion:

a. Commercial, Gas Water Heaters:

1) Storage Tank: Five years.
2) Controls and Other Components: Five years.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. In other Part 2 articles where titles below introduce lists, the following requirements apply to product selection:

1. Manufacturers: Subject to compliance with requirements, provide products by one of the manufacturers specified.

2.2 COMMERCIAL, GAS WATER HEATERS

A. Commercial, Finned-Tube, Gas Water Heaters: Comply with ANSI Z21.13 for hot-water boilers.

1. Manufacturers:

a. Bradford White Corporation.
b. Laars Heating Systems; Waterpik Technologies, Inc.
c. Lochinvar Corporation.
d. Precision Boilers.
e. Rheem Water Heater Div.
f. Ruud Water Heater Div.
g. Smith, A. O. Water Products Company.
h. Prior approved equal.

2. Description: Packaged unit with boiler, vertical storage tank, pump, piping, and controls.
3. Boiler Construction: ASME code with 160-psig working-pressure rating for hot-water-boiler-type water heater.

a. Heat Exchanger: Horizontal, straight, finned-copper tubes with bronze headers.
b. Connections: Factory fabricated of materials compatible with boiler. Attach to boiler before testing.

1) NPS 2 and Smaller: Threaded ends according to ASME B1.20.1.
2) NPS 2-1/2 and Larger: Flanged ends according to ASME B16.24 for copper and copper-alloy flanges.

4. Boiler Appurtenances:

a. Insulation: Comply with ASHRAE/IESNA 90.1. Surround entire boiler except connections and controls.
b. Jacket: Steel with enameled finish.
c. Burner: For use with grid-type, finned-tube water heaters and for natural-gas fuel.
d. Temperature Control: Adjustable, storage tank temperature-control fitting and flow switch, interlocked with circulator and burner.

e. Safety Control: Automatic, high-temperature-limit cutoff device or system.
f. Automatic Ignition: Intermittent electronic ignition complying with ANSI Z21.20.

5. Building Automation System Interface: Normally closed dry contacts for enabling and disabling water heater.
6. Support: Steel base or skids.
7. Draft Hood: Draft diverter; complying with ANSI Z21.12.
8. Automatic Damper: ANSI Z21.66, electrically operated, automatic-vent-damper device with size matching draft hood.
9. Hot-Water Storage Tank: Connected with piping to circulating pump and water heater.

    a. Construction: According to ASME Boiler and Pressure Vessel Code: Section VIII, steel with 125-psig working-pressure rating.
    b. Tappings: Factory fabricated of materials compatible with tank. Attach tappings to tank before testing.

        1) NPS 2 and Smaller: Threaded ends according to ASME B1.20.1.
        2) NPS 2-1/2 and Larger: Flanged ends according to ASME B16.24 for copper and copper-alloy flanges.

    c. Interior Finish: Comply with NSF 61 barrier materials for potable-water tank linings, including extending finish into and through tank fittings and outlets.
    d. Insulation: Comply with ASHRAE/IESNA 90.1. Surround entire storage tank except connections and controls.
    e. Jacket: Steel with enameled finish.
    f. Anode Rods: Factory installed, magnesium.
    g. Drain Valve: Corrosion-resistant metal complying with ASSE 1005, factory installed.
    h. Combination Temperature and Pressure Relief Valves: ANSI Z21.22/CSA 4.4. Include one or more relief valves with total relieving capacity at least as great as heat input, and include pressure setting less than water heater working-pressure rating. Select one relief valve with sensing element that extends into storage tank.

10. Circulating Pump: UL 778, all-bronze, centrifugal, overhung-impeller, separately-coupled, in-line pump as defined in HI 1.1-1.2 and HI 1.3. Include mechanical seals, 125-psig minimum working-pressure rating, and 225 deg F continuous-water-temperature rating.
11. Piping: Copper tubing; copper, solder-joint fittings; and brazed or flanged joints.
12. Mounting: Water heater, tank, and accessories factory mounted on skids.

2.3 COMPRESSION TANKS

A. Description: Steel, pressure-rated tank constructed with welded joints and factory-installed, butyl-rubber diaphragm. Include air precharge to minimum system-operating pressure at tank.

1. Manufacturers:

    a. AMTROL Inc.
    b. Armstrong Pumps, Inc.
    c. Bell & Gossett.
    d. Smith, A. O.; Aqua-Air Div.
    e. State Industries, Inc.
    f. Prior approved equal.

2. Construction:

    a. Tappings: Factory-fabricated steel, welded to tank before testing and labeling. Include ASME B1.20.1 pipe thread.
    b. Interior Finish: Comply with NSF 61 barrier materials for potable-water tank linings, including extending finish into and through tank fittings and outlets.
    c. Air-Charging Valve: Factory installed.

2.4 WATER HEATER ACCESSORIES

A. Gas Shutoff Valves: ANSI Z21.15/CGA 9.1, manually operated. Furnish for installation in piping.

B. Gas Pressure Regulators: ANSI Z21.18, appliance type. Include pressure rating, capacity, and pressure differential required between gas supply and water heater.

C. Gas Automatic Valves: ANSI Z21.21, appliance, electrically operated, on-off automatic valve.

D. Pressure Relief Valves: Include pressure setting less than working-pressure rating of water heater.

1. Gas Water Heaters: ANSI Z21.22/CSA 4.4.

2.5 SOURCE QUALITY CONTROL

A. Test and inspect water heater storage tanks, according to ASME Boiler and Pressure Vessel Code.

B. Hydrostatically test water heater storage tanks before shipment to minimum of one and one-half times pressure rating.

C. Prepare test reports.

PART 3 - EXECUTION

3.1 WATER HEATER INSTALLATION

A. Install commercial water heater package on concrete bases.

1. Concrete base construction requirements are specified in Division 15 Section "Basic Mechanical Materials and Methods."

B. Install water heaters level and plumb, and referenced standards. Maintain manufacturer's recommended clearances. Arrange units so controls and devices needing service are accessible.

C. Install seismic restraints for commercial water heaters. Anchor to substrate.

D. Install gas water heaters according to NFPA 54.

E. Install gas shutoff valves on gas supplies to gas water heaters without shutoff valves.

F. Install gas pressure regulators

G. Install automatic gas valves on gas supply

H. Install water heater drain piping as indirect waste to spill by positive air gap into open drains or over floor drains.

I. Install thermometer on outlet piping of water heaters. Refer to Division 15 Section "Meters and Gages" for thermometers.

J. Install pressure gages on inlet and outlet piping of commercial, fuel-fired water heater piping. Refer to Division 15 Section "Meters and Gages" for pressure gages.

K. Fill water heaters with water.

L. Charge compression tanks with air.

3.2 CONNECTIONS

A. Piping installation requirements are specified in other Division 15 Sections. Drawings indicate general arrangement of piping, fittings, and specialties.

B. Install piping adjacent to water heaters to allow service and maintenance. Arrange piping for easy removal of water heaters.

C. Ground equipment according to Division 16 Section "Grounding and Bonding."

D. Connect wiring according to Division 16 Section "Conductors and Cables."

3.3 FIELD QUALITY CONTROL

A. Manufacturer's Field Service: Engage a factory-authorized service representative to inspect, test, and adjust field-assembled components and equipment installation, including connections, and to assist in field testing. Report results in writing.

B. Perform the following field tests and inspections and prepare test reports:

1. Leak Test: After installation, test for leaks. Repair leaks and retest until no leaks exist.
2. Operational Test: After electrical circuitry has been energized, confirm proper operation.
3. Test and adjust controls and safeties. Replace damaged and malfunctioning controls and equipment.

C. Remove and replace water heaters tank etc. that do not pass tests and inspections and retest as specified above.

3.4 DEMONSTRATION

A. Engage a factory-authorized service representative to train Owner's maintenance personnel to adjust, operate, and maintain water heaters. Refer to Division 1.

END OF SECTION 15486

SECTION 16420 - SERVICE ENTRANCE

PART 1 - GENERAL

1.1. DESCRIPTION OF WORK:

A. Extent of service-entrance work is indicated by drawings and schedules.

B. Consult local utility relative to all costs for line extensions, connections, etc.

C. Provide labor and materials as required to accomplish power company metering in accordance with power company standards and requirements.

1.2. QUALITY ASSURANCE:

A. Comply with NEC and NEMA standards.

1.3. SUBMITTALS:

A. PRODUCT DATA: Submit manufacturer's data.

B. SHOP DRAWINGS: Submit dimensioned layouts.

C. MAINTENANCE STOCK, FUSES: Furnish spare fuses.

PART 2 – PRODUCTS

2.1. SERVICE - ENTRANCE EQUIPMENT:

A. GENERAL: Provide service-entrance equipment and accessories, of types, sizes, ratings and electrical characteristics indicated.

B. Provide each service entrance switchboard with transient voltage surge suppressors.

2.2. OVERCURRENT PROTECTIVE DEVICES:

A. METERING: Provide meters, current and potential transformers, selector switches, wiring, etc. for a complete metering system.

2.3. RACEWAYS AND CONDUCTORS:

PART 3 – EXECUTION

3.1. INSTALLATION OF SERVICE-ENTRANCE EQUIPMENT:

A. Comply with manufacturer's written instructions, and with recognized industry practices.

3.2. GROUNDING:

A. Provide system and equipment grounding.

3.3. ADJUST AND CLEAN:

A. Adjust operating mechanisms.

3.4. FIELD QUALITY CONTROL:

A. Test service-entrance equipment and electrical circuitry, energize circuitry and demonstrate capability and compliance with requirements.

END OF SECTION 16420

SECTION 16452 - GROUNDING

PART 1 - GENERAL

1.1. DESCRIPTION OF WORK:

A. Types of grounding in this section include the following:

1. Underground Metal Water Piping
2. Metal Building Frames
3. Grounding Electrodes
4. Grounding Rods
5. Separately Derived Systems
6. Service Equipment
7. Enclosures
8. Systems
9. Equipment
10. Other items indicated on drawings

1.2. QUALITY ASSURANCE:

A. Comply with NEC, ANSI and IEEE requirements. Provide UL listing.

PART 2 – PRODUCTS

2.1. GROUNDING:

A. MATERIALS AND COMPONENTS:

1. GENERAL: Provide grounding system including cables, connectors, terminals, ground rods, bonding jumper braid, and accessories.

B. GROUND RODS AND PLATES:

1. GROUND RODS: Steel with copper welded exterior, 3/4" dia. x 10'.

PART 3 – EXECUTION

3.1. INSTALLATION OF GROUNDING SYSTEMS:

A. Comply with manufacturer and with recognized industry practices.

B. Provide grounding for the entire raceway, enclosure, equipment and device system.

END OF SECTION 16452

SECTION 16510 - INTERIOR AND EXTERIOR BUILDING LIGHTING

PART 1 - GENERAL

1.1. DESCRIPTION OF WORK:

A. Types of lighting fixtures in this section include the following:

1. High-Intensity-Discharge (HID)
2. Fluorescent
3. Incandescent

1.2. QUALITY ASSURANCE:

A. Comply with NEC, NEMA and ANSI 132,1. Provide UL-listing.

1.3. SUBMITTALS:

A. PRODUCT DATA: Submit manufacturer's data.

B. SHOP DRAWINGS: Submit dimensioned drawings of lighting fixtures.

PART 2 - PRODUCTS

2.1. ACCEPTABLE MANUFACTURERS:

A. FLUORESCENT AND HID BALLASTS INCANDESCENT AND FLUORESCENT LAMPS HID LAMPS: As Specified.

2.2. INTERIOR AND EXTERIOR LIGHTING FIXTURES:

A. SUPPORT REQUIREMENTS: Provide pendant and stem hung fixtures with flexible ball joint hangers. Provide all detachable fixture parts, luminous ceiling accessories, louvers, diffusers, lenses, and reflectors with locking catches, screws, safety chain, or safety cable.

B. FLUORESCENT-LAMP BALLASTS: Provide Class P; sound-rated A, and with internal thermal protection. For interior fixtures, provide full light output energy conserving ballasts.

C. FLUORESCENT LAMPS: Equip interior fixtures with full light output, energy conserving lamps.

D. DIFFUSERS: 100 percent virgin acrylic compound; minimum thickness, .125 inches.

PART 3 - EXECUTION

3.1. INSTALLATION OF LIGHTING FIXTURES

A. Install lighting fixtures in accordance with fixture manufacturer's instructions, applicable requirements of NEC.

B. Provide all necessary supports, brackets, and miscellaneous equipment for mounting of fixtures.

C. COORDINATION MEETINGS: Meet at least twice with the ceiling installer. Coordinate depth and location of all fixtures and duct work in all areas.

D. ADJUST AND CLEAN: Clean lighting fixtures of dirt and debris.

E. Protect installed fixtures from damage.

3.2. FIELD QUALITY CONTROL:

A. Demonstrate capability and compliance with requirements.

B. Replace lamps not working at Substantial Completion.

C. GROUNDING: Provide equipment grounding connections for each lighting fixture.

END OF SECTION 16510

SECTION 16551 - EXTERIOR AREA LIGHTING

PART 1 - GENERAL

1.1. DESCRIPTION OF WORK: Extent of area lighting is indicated by drawings.

1.2. QUALITY ASSURANCE: Comply with NEC, NEMA and ANSI/IES requirements. Provide UL listing.

1.3. SUBMITTALS: Product Data: Submit manufacturer's.

PART 2 - PRODUCTS:

2.1. MANUFACTURER: As specified.

2.2. FUSES: Provide spare fuses for each type and size used.

PART 3 - EXECUTION:

3.1. Install in accordance with manufacturer's written instructions, applicable requirements of NEC, NESC and NEMA.

3.2. Coordinate with other work interface installation of roadway and parking area lighting with other work.

3.3. Mount lighting units on concrete bases as indicated.

3.4. Provide Bussman HEB fuseholder with "breakaway" receptacles. Provide equipment grounding connections.

3.5. GROUNDING: Provide equipment grounding connections.

END OF SECTION 16551

SECTION 16560 - LIGHTING CONTROL EQUIPMENT

PART 1 - GENERAL

1.1. DESCRIPTION OF WORK:

A. Type of lighting control equipment specified in this section includes the following:

B. Building lighting control system.

PART 2-PRODUCTS

2.1. ACCEPTABLE MANUFACTURERS:

A. Provide lighting control equipment of one of the following:

1. Wattstopper
2. PCI
3. Lithonia
4. Douglas Lighting Control

2.2. LIGHTING CONTROL EQUIPMENT:

A. Building: Provide a low-voltage lighting control system to comply with ASHRAE. Provide relay panels.

B. Relay panels will be programmable. Interior lighting circuits will be programmed to respond to low voltage switch inputs for manual control, and by time-of-day for automatic control. Lighting circuits in public areas will be programmed to operate by time-of-day work schedule. Exterior lighting will be programmed to operate by combination of photosensor and time-of-day.

PART 3- EXECUTION

3.1. INSTALLATION OF LIGHTING CONTROL EQUIPMENT:

A. Coordinate with other electrical work, including raceways, and electrical boxes and fittings, as necessary to interface installation of lighting control equipment work with other work. Contractor shall be on site as required, to adjust lighting control units for proper light levels as directed by engineer.

3.2. MANUFACTURER AUTHORIZED PERSONNEL TRAINING:

A. Building Operating Personnel Training: Train Owner's building personnel in procedures for starting-up, testing and operating lighting control system equipment.

END OF SECTION 16560

SECTION 16561 - OCCUPANCY LIGHTING CONTROL AND EQUIPMENT

PART 1 – GENERAL

1.1 DESCRIPTION OF WORK:

A. The extent of occupancy sensor work is indicated by drawings.

B. Types of occupancy sensors in this section include the following:

1. Passive Infrared Wall Switch
2. Dual Technology Ceiling Sensor w/ Control Pack

1.2 QUALITY ASSURANCE:

A. Comply with NEC and NEMA standards as applicable to construction and installation of occupancy sensors. Provide occupancy sensors which have been UL listed and labeled.

B. All sensors shall be capable of operating normally with electronic ballasts, PL lamp systems, motor loads and any other passive infrared or microwave systems.

PART 2 - PRODUCTS

2.1 OCCUPANCY SENSORS:

A. PASSIVE INFRARED WALL SWITCH: Where units are indicated provide a sensor that meets the following minimum requirements:

1. Sensor shall utilize a dual element pyroelectric detector behind a lens to detect the motion of infrared energy emitted by the human.
2. Lens shall be of the multi-element type that divides the field of view into forty zones of detection.
3. Sensor shall fit a single gang switch box and utilize a decorator cover plate.
4. Sensor shall have a time-out delay, adjustable from 1 minute to 30 minutes.
5. Sensor shall have an Automatic/OFF switch on front of unit.
6. Sensor shall have a 170 degree field of view. Detection beam shall be horizontal.
7. Sensor shall be rated for 0 to 600 watts at 120VAC and 277VAC and adapt automatically to the operating voltage.

B. DUAL TECHNOLOGY CEILING SENSOR: Where units are indicated, provide a sensor that meets the following minimum requirements:

1. Sensor shall incorporate ultrasonic (microphonics) and infrared technologies in a single unit.
2. Sensor shall have automatic self-adjustment algorithm which adjusts timer and sensitivity settings to maximize performance and minimize energy usage.
3. Sensor shall have manual time-out adjustment from 8 minutes to 32 minutes and automatic time out from 8 minutes to 100 minutes.
4. Sensor’s microprocessor shall automatically reduce either PIR or ultrasonic sensitivity in response to false on condition.
5. Sensor microprocessor will automatically monitor PIR background threshold

signal level and makes corresponding sensitivity adjustments automatically.

6. Infrared lens shall have 360 degree field of view. Two types of lens shall be available, standard and extra dense.

PART 3 – EXECUTION

3.1 INSTALLATION OF LIGHTING CONTROL EQUIPMENT:

A. Install occupancy lighting control system components and ancillary equipment as indicated, in accordance with equipment manufacturer's written instructions, and with recognized industry practices, to ensure that lighting control equipment complies with requirements.

3.2 MANUFACTURER AUTHORIZED PERSONNEL TRAINING:

A. Building Operating Personnel Training: Train Owner's building personnel in procedures for starting-up, testing and operating lighting control system equipment.

END OF SECTION 16561

SECTION 16600 - TRANSIENT VOLTAGE SURGE SUPPRESSION (TVSS)

PART 1 – GENERAL

1.1 DESCRIPTION OF WORK:

A. Extent of TVSS work is indicated by drawings, schedules and specified herein. Work includes complete installation, electrical connections and testing.

1.2 QUALITY ASSURANCE:

A. Comply with NEC, NEMA and IEEE Standards as applicable to wiring methods, construction and installation of TVSS devices. Comply with applicable requirements of ANSI/IEEE C62.11, C62.41, and C62.45; and UL 1449. Provide complete packaged units that have been listed and labeled by Underwriters Laboratory. UL surge ratings (UL 1449) must be permanently affixed to the TVSS device.

PART 2 - PRODUCTS:

2.1 GENERAL:

A. Except as otherwise indicated, provide high energy transient voltage surge suppression devices, with high frequency line noise filtering. Provide types, sizes, ratings and electrical characteristics that comply with manufacturer's standard materials, design, and construction in accordance with published information and as required for a complete installation.

2.2 TVSS SYSTEM DESCRIPTION:

A. Provide TVSS devices that comply with the following:

1. Have a maximum continuous operating voltage not less than 125% of the nominal system operating voltage, and a frequency operating range of 47 to 63 hertz.
2. Provide protection modes of line-to-neutral (when neutral is present in the system), line-to-ground, and neutral-to-ground (when neutral is present).

B. Provide units consisting of engineered solid-state high-performance suppression and filtering modules consisting of arrays of nonlinear voltage dependent metal oxide varistors, selenium cells, and/or silicon avalanche diodes that optimally share surge currents in a seamless, low-stress manner assuring maximum performance.

2.3 UNITS INSTALLED AT LEVEL ONE LOCATIONS:

A. Where units are shown on the drawings installed at MDP (or required by other sections of the specification), provide a TVSS, sine wave tracking, high frequency filtering device, which meets the following minimum requirements:

1. Minimum single impulse surge current rating:

a. Line to neutral (each individual phase): 160,000
b. Line to ground (each individual phase 160,000
c. Neutral to ground: 100,000

2. UL 1449 suppressed voltage rating not exceeding:

	Voltage	L-N	L-G
a.	120/208	400	400

3. Category C3 clamping voltage ANSI/IEEE C.62.41-1991(Reaffirmed 1995) (20KV-1.2/50 microsec., 10KA microsec.) Not exceeding:

	Voltage	L-N	L-G
a.	120/208	625	625

PART 3 – INSTALLATION

A. Install TVSS devices as shown in accordance with manufacturer's recommendations and as necessary to meet requirements. Install with conductors of minimum length practicable, but in no case exceeding 30" in length; minimum conductor size - #8 AWG copper.

END OF SECTION 16600

SECTION 16721 - FIRE ALARM AND DETECTION SYSTEMS

PART 1 - GENERAL

1.1. DESCRIPTION OF WORK:

A. Comply with NEC. Provide UL-listing

1.2. SUBMITALS:

A. PRODUCT DATA: Submit manufacturer's data; typical riser and complete wiring diagrams.

B. SHOP DRAWINGS: Provide shop drawings showing equipment/device locations and connecting wiring

PART 2 - PRODUCTS

2.1. ACCEPTABLE MANUFACTURERS:

A. MANUFACTURERS: As specified

2.2. FIRE ALARM AND DETECTION SYSTEMS:

A. SYSTEM TYPE: Addressable.

2.3. SYSTEM OPERATION:

A. Annunciate alarms.
B. Deactivate air supply and return fan units.
C. Selectively activate and/or deactivate fan units.
D. Release magnetic door holders.
E. Damper and shut down supervision.
F. Sprinkler Supervision. Provide a signal initiating and supervisory circuit to each sprinkler riser and subdivision.
G. Provide relays at control panel for kitchen hood.
H. Provide wiring from gas shut off valve.
I. Initiate smoke control procedures.
J. Remote Signal Transmission. Provide transmitter. Transmit alarm and trouble signal to remote alarm monitoring service company.

2.4. EQUIPMENT:

A. FIRE CONTROL PANEL: Provide solid-state, modular design with integral static protection.

B. ZONE MODULES: Provide Style "D" (Class A) zone modules capable of receiving and annunciating an alarm from any detector.

C. SIGNALING MODULES: As required.

D. MUNICIPAL TRIP: Distinct, separate municipal trip circuit and municipal trip disconnect switch.

E. BATTERIES: (Nickel Cadmium, Gel Cell) located in central control unit.

F. MANUAL FIRE ALARM STATION (Honeywell, Model S464): Double action, break glass.

G. TEMPERATURE DETECTORS, COMBINATION FIXED TEMPERATURE/RATE OF RISE (Thermotech Model 302, 302H): Automatically resetting.

H. IONIZATION SMOKE DETECTORS (Honeywell, Model TC100C): Resetable from central control panel.

I. GATE VALVE SUPERVISORY SWITCHES (Honeywell, Model PTROSYS13):

J. POST INDICATOR VALVE SWITCH (Honeywell, Model PTRPRIVSC):

K. WATER FLOW SWITCHES (Honeywell, Model PTRVSRB):

L. MAGNETIC DOOR HOLDERS (Honeywell, Model S4003): Minimum hold force of 156 lb. at 85% of rated voltage.

M. AUDIOVISUAL ALARM HORNS (Honeywell, Model SC807A): Capable of 95 db sound level at 10 feet.

N. ALARM HORNS (Honeywell, Model SC806A): Capable of 87 db sound level at 10 feet.

O. DUCT IONIZATION DETECTORS (Honeywell, Model TC100):

P. FOUR ZONE ANNUNCIATOR (Honeywell, Model AFD-34424): Indicate four distinct alarm zones.

Q. MULTIZONE ANNUNCIATOR PANEL (Honeywell, Model AFD-34434): Capable of indicating zone alarm for all present and future zones.

PART 3 - EXECUTION

3.1. INSTALLATION OF FIRE ALARM AND DETECTION SYSTEMS:

A. Install as indicated, in accordance with equipment manufacturer's written instructions.

B. Wire initiating circuits are four wire, Class A circuits with separate conduit runs for outgoing and return portions of the Class A loop.

C. Install all wiring in raceway. Minimum raceway size, 3/4"; minimum conductor size, #14 AWG.

3.2. TESTING:

A. Provide factory trained representative to perform complete system testing.

END OF SECTION 16721

SECTION 16740 - TELEPHONE SYSTEMS RACEWAYS

PART 1 - GENERAL

1.1. DESCRIPTION OF WORK:

A. Includes raceway, cables, outlets, device plates, backboards, cabinets, grounding.

1.2. QUALITY ASSURANCE:

A. Comply with NEC. Provide UL listing.

PART 2 - PRODUCTS

2.1. GENERAL: Provide complete raceway and cabling system.

PART 3 - EXECUTION

3.1. INSTALLATION OF TELEPHONE RACEWAY SYSTEM:

A. Install to comply recognized industry practices. Branch circuit telephone cables will be run in conduits from outlets to corridor communications cable tray in corridors, and extend in cable tray to backboard locations.

B. GROUNDING: Provide one #6 bare copper ground from each telephone terminal board to the service entrance.

END OF SECTION 16740

SECTION 16780 - TELEVISION SYSTEM

PART 1 - GENERAL

1.1. DESCRIPTION OF WORK: Raceway, outlets, cables, device plates, backboards, cabinets, grounding and miscellaneous items.

PART 2 - PRODUCTS:

2.1. Complete system for television.

PART 3 - EXECUTION:

3.1. Comply with NEC.

END OF SECTION 16780

SECTION 16782 – ACCESS CONTROL SYSTEM

PART 1 – GENERAL

1.1 DESCRIPTION OF WORK

A. Provide access control system as is hereby defined to include, but not be limited to raceway, outlets, coverplates, backboards, cabinets, grounding and miscellaneous items required for complete system.

B. SYSTEM DESCRIPTION

1. The Security Management System specified shall be fully integrated and installed as a complete package by the Access/Security Control Contractor. The SMS shall be able to provide for and integrate the following subsystems:

a. Integrated Access Control.
b. Alarm Monitoring.
c. Associated Access Control and Alarm Equipment Control.
d. Access Initiated and Event Initiated Control

The SMS shall be based upon a distributed system of fully intelligent, stand-alone controllers, operating in a multi-tasking, multi-user environment on a true peer-to-peer, token passing Local Area Network (LAN).

1.2 SUBMITTALS:

A. Product Data: Submit manufacturer's data: Typical riser and complete wiring diagrams.

B. SHOP DRAWINGS: Provide shop drawings showing equipment/device locations and connecting wiring.

PART 2 – PRODUCTS

2.1 GENERAL: Provide and install a complete and operable access control system which utilize devices to maintain building security.

A. Acceptable manufacturers:

1. Security access system:

a. Persona.

B. Materials: Furnish and install at locations shown, the specified equipment to provide a completely operational Access Control/Security Management system. The following list of main items of the installation shall not be considered to be all-inclusive:

1. Door hardware and accessories
2. Readers
3. Monitors
4. Distributed Control Units (DCU's) – Main Controller
5. Door Processing Units (DPU's) – Main Door Controllers
6. Alarm relays
7. Miscellaneous cable, wire, associated connectors, and hardware
8. Power supplies

C. All materials and equipment shall be standard, regularly manufactured equipment.

D. All systems and components shall be thoroughly tested and proven in actual field use.

E. All system main control components shall be from one manufacturer.

2.2 HARDWARE SPECIFICATIONS - 7920 DOOR CONTROLLERS

2.3 HARDWARE SPECIFICATIONS - 7930 DIGITAL INPUT CONTROLLER

2.4 HARDWARE SPECIFICATIONS - 7940 DIGITAL INPUT/OUTPUT CONTROLLER

2.5 HARDWARE SPECIFICATIONS - 7798 I/SITE LAN CONTROLLER

2.6 HARDWARE SPECIFICATIONS - 7793 MICRO CONTROLLER INTERFACE

2.7 HARDWARE SPECIFICATIONS - 7800 SERIES TAPS

2.8 HARDWARE SPECIFICATIONS NETPLUS ROUTER (NPR)

2.9 HARDWARE SPECIFICATIONS – READERS

2.10 PROXIMITY READERS

PART 3 – EXECUTION

3.1 INSTALLATION OF ACCESS CONTROL SYSTEM

A. GENERAL: Install access control system as indicated, in accordance with equipment manufacturers written instructions, and with recognized industry practices, to ensure that system equipment complies with requirements. Comply with requirements of NEC, and applicable portions of NECA's "Standards of Installation" practices.

1. FINAL ACCEPTANCE TEST:

a. After the testing report and as built drawings have been approved by the customer's representative, the completed system shall be tested in the presence of the customer's representative.

B. GROUNDING

1. Take particular attention to the grounding of equipment cases and shielded cables to eliminate noise interference and avoid electrical loops. Provide shielded cable for all communications cabling. Correctly terminate shields at ground bars and connect to the main building ground or as specified by the manufacturer.

C. Coordinate all equipment locations and mounting details with other trades and suppliers.

END OF SECTION 16782

SECTION 16786 - CLOCK SYSTEM

PART 1–GENERAL

1.1. DESCRIPTION OF WORK

A. Types of equipment included in this section are:

1. Battery operated atomic clocks.

1.2. SYNCHRONOUS WIRED SECONDARY CLOCKS:

A. Provide clocks in locations shown on drawings. Provide 12" round semi-flush clocks with black hands and numerals displayed against a white background. Equip clock with metal case, sweep second hand. Provide an appropriate backbox.

1.3. ACCEPTABLE MANUFACTURES: Subject to compliance with requirements, provide products of one of the following:

A. Simplex Time Recorder Co.
B. Cincinnati Time Recorder Co
C. Edwards

PART 2 - EXECUTION

2.1. INSTALLATION OF CLOCK AND PROGRAM SYSTEMS:

A. Coordinate with other electrical work, including cable/wires, raceways, electrical boxes and fittings, as appropriate to interface installation of clock and program systems work with other work.

END OF SECTION 16786