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 fire-suppression piping and equipment for the following building systems:

1. Wet-pipe, fire-suppression sprinklers, including piping, valves, specialties, and automatic sprinklers.
2. Provide high-temperature heads in the IT Computer Server Vault. The primary coverage in this room is a Clean Agent Fire Suppression System.
3. Provide dry-type sidewall sprinklers at the northwest corner of Level 2 if the covered balcony alternate is included in the project.
4. Contract starting Point: point of connection to fire main, five feet outside of the building.
5. Carefully coordinate sprinkler piping with structure and mechanical especially ductwork. Sheet metal design may vary from that shown on mechanical drawings due to coordination issues.

B. Related Sections include the following:

1. Division 10 Section "Fire-Protection Specialties" for cabinets and fire extinguishers.
2. Division 13 Section “Clean-Agent Fire Extinguishing System”
3. Division 16 Section "Fire Alarm Systems" for alarm devices not in this Section.

1.3 DEFINITIONS

A. Working Plans: Documents, including drawings, calculations, and material specifications prepared according to NFPA 13 and NFPA 14 for obtaining approval from authorities having jurisdiction.

B. Authority having Jurisdiction: The building official, Engineer and the insurance underwriter where applicable.

1.4 SYSTEM PERFORMANCE REQUIREMENTS

A. Design sprinkler piping according to the following and obtain approval from engineer, prior to submitting to other authorities having jurisdiction. :

1. Design Sprinkler system with the following 10% reduced flow data:
   Flow Data available at hydrant on 4100 South at an elevation of 4710 ft.
   Static - 81 psi
   Residual - 46 psi @ 1,983 gpm flowing
   Date of Test – 2/13/2007, performed by Craig Blue, P.E..
2. Include losses through water-service piping and valves.
3. Sprinkler Occupancy Hazard Classifications: As follows:
   b. Restaurant, Kitchen, and Bakery Service Areas: Ordinary Hazard, Group 1.
c. Mechanical Equipment Rooms: Ordinary Hazard, Group 1.
d. Building Service Areas: Ordinary Hazard, Group 1.
e. Electrical Equipment Rooms: Ordinary Hazard, Group 1.
f. General Storage Areas: Ordinary Hazard, Group 1.
g. Library Stack Areas: Ordinary Hazard, Group 2.
h. Mechanical Boiler Rooms: Ordinary Hazard, Group 2.

4. Minimum Density for Automatic-Sprinkler Piping Design: As follows:
   (Reduce Design areas with quick response heads when applicable and increase design area as required for pitched ceilings or Dry Pipe Systems).
   a. Light-Hazard Occupancy: 0.10 gpm over 1500-sq. ft. area.
   b. Ordinary-Hazard, Group 1 Occupancy: 0.15 gpm over 1500-sq. ft. area.
   c. Ordinary-Hazard, Group 2 Occupancy: 0.20 gpm over 1500-sq. ft. area.

5. Maximum Protection Area per Sprinkler: As follows (except as modified by authorities having jurisdiction)
   a. Office, Classroom, and Public Space: 225/400 sq. ft..
   b. Storage Areas: 130/400 sq. ft..
   c. Mechanical Equipment Rooms: 130 sq. ft..
   d. Electrical Equipment Rooms: 130 sq. ft..
   e. Other Areas: According to NFPA 13 recommendations, unless otherwise indicated.
   f. Future Finish Areas: 100 sq. ft. (shell space)

B. Components and Installation: Capable of producing piping systems with 175-psig minimum working-pressure rating, unless otherwise indicated.

1.5 SUBMITTALS
A. Product Data: For the following:
   1. Pipe and fitting materials and methods of joining for sprinkler piping.
   2. Pipe hangers and supports.
   3. Valves, including specialty valves, accessories, and devices.
   5. Fire department connections. Include type; number, size, and arrangement of inlets; caps and chains; size and direction of outlet; escutcheon and marking; and finish.
   6. Sprinklers, escutcheons, and guards. Include sprinkler flow characteristics, mounting, finish, and other pertinent data.

B. Approved Sprinkler Piping Drawings: Working plans, prepared according to NFPA 13, that have been approved by authorities having jurisdiction. Include hydraulic calculations, unless noted otherwise. Drawings are to be approved by the Engineer prior to submitting to other authorities having jurisdiction.

C. Field Test Reports and Certificates: Indicate and interpret test results for compliance with performance requirements and as described in NFPA 13. Include "Contractor's Material and Test Certificate for Aboveground Piping", Test Certification of Backflow prevention and "Contractor's Material and Test Certificate for Underground Piping."

D. Maintenance Data: For each type of standpipe and sprinkler specialty to include in maintenance manuals specified in Division 1.

1.6 QUALITY ASSURANCE
A. Installer Qualifications: An experienced installer who has designed and installed fire-suppression piping similar to that indicated for this Project and obtained design approval and inspection approval from authorities having jurisdiction. The Engineer requires evidence to support the ability of the contractor to perform work in the scope and volume as specified. A contractor who cannot show such experience, may be found not suitable to perform the work.

PRE-APPROVED CONTRACTOR LIST:

1. Delta Fire
2. Grinnell
3. Western Automatic
4. Firetrol
5. Fire Engineering
6. Band
7. Chapparal Fire
8. Fire Systems Specialist
9. Kimco Fire
10. Safety Team
11. Alta Fire

B. Engineering Responsibility: Preparation of working plans using AutoCad compatible drawing program, calculations, and field test reports by a qualified professional engineer or Engineering Technician NICET Level III. Base calculations on results of fire-hydrant flow test, refer to data provided in section 1.4.A.1.

C. Manufacturer Qualifications: Firms whose equipment, specialties, and accessories are listed by product name and manufacturer in UL's "Fire Protection Equipment Directory" and FM's "Fire Protection Approval Guide" and that comply with other requirements indicated.

D. Standpipe and Sprinkler Components: Listing/approval stamp, label, or other marking by a testing agency acceptable to authorities having jurisdiction.

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

F. NFPA Standards: Equipment, specialties, accessories, installation, and testing complying with the following:

1. NFPA 13-07, "Installation of Sprinkler Systems."
2. NFPA 14-02, "Standpipe and Hose Systems."

G. International Conference of Building Code Officials codes and standards complying with the following:

2. IFC-2006, "International Fire Code."

1.7 EXTRA MATERIALS

A. Furnish extra materials described below that match products installed and that are packaged with protective covering for storage and identified with labels describing contents.

1. Sprinkler Cabinets: A supply of spare sprinklers (never less than 6) shall be supplied and located in a cabinet where the temperature does not exceed 100°F. These sprinklers shall correspond to the types and temperature ratings to the sprinklers installed on the project. Special sprinkler head wrenches shall be included to correspond to the types of heads provided.
The stock of spare sprinklers shall include all types and ratings installed and shall be as follows:

a. For systems with not over 300 sprinklers, not less than 6 sprinklers.
b. For systems with 300 to 1000 sprinklers, not less than 12 sprinklers.
c. For systems with over 1000 sprinklers, not less than 24 sprinklers.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

1. Specialty Valves and Devices:
   a. Tyco corp.
   b. Reliable Automatic Sprinkler Co., Inc.
   c. Viking Corp.

2. Water-Flow Indicators and Supervisory Switches:
   a. Tyco Corp.
   c. Potter Electric Signal Co.
   d. Reliable Automatic Sprinkler Co., Inc.
   e. Viking Corp.

3. Sprinkler, Drain and Alarm Test Fittings:
   a. Tyco Corp.
   b. Fire-End and Croker Corp.
   c. Victaulic Co. of America.

4. Fire Department Connections:
   b. Fire-End and Croker Corp.
   c. Firematic Sprinkler Devices, Inc.
   d. Tyco Corp.
   e. Reliable Automatic Sprinkler Co., Inc.

5. Sprinklers:
   a. Tyco Corp.
   b. Reliable Automatic Sprinkler Co., Inc.
   c. Viking Corp.
   d. Victaulic Co. of America

6. Gate Valves:
   b. Tyco corp.
   c. McWane, Inc.; Clow Valve Co. Div.
   d. McWane, Inc.; Kennedy Valve Div.
e. Nibco, Inc.

7. Indicator Valves:
   a. Tyco Corp.
   b. McWane, Inc.; Kennedy Valve Div.
   c. Milwaukee Valve Co., Inc.
   d. Nibco, Inc.
   e. Victaulic Co. of America.

8. Double Check Valve Assembly
   a. Ames
   b. Febco
   c. Wilkins
   d. Watts

9. Fire-Protection-Service Valves:
   a. Tyco Corp.
   b. McWane, Inc.; Kennedy Valve Div.
   c. Nibco, Inc.
   d. Victaulic Co. of America.

10. Keyed Couplings for Steel Piping:
    a. Tyco Corp.
    b. Victaulic Co. of America.
    c. Anvil, Gruvlok.
    d. Ward, Couplox
    e. Star

11. Press-Seal Fittings for Steel Piping: (not allowed)

2.2 PIPING MATERIALS
   A. Refer to Part 3 "Piping Applications" Article for applications of pipe, tube, fitting, and joining materials.

2.3 PIPES AND TUBES
   A. Ductile-Iron Pipe: AWWA C151, mechanical-joint type; with cement-mortar lining and seal coat according to AWWA C104. Include gland, rubber gasket, and bolts and nuts according to AWWA C111.

   B. Standard-Weight Steel Pipe: ASTM A 53, ASTM A 135, or ASTM A 795; Schedule 40 in NPS 6 and smaller, and Schedule 30 in NPS 8 and larger.

   C. Thinwall, Threadable Steel Pipe: ASTM A 135 or ASTM A 795, with wall thickness less than Schedule 40 and greater than Schedule 10, (Dyna-Thread 40.)

   D. Schedule 10 Steel Pipe: (Not Allowed)

   E. Hybrid Steel Pipe: (Not allowed).

2.4 PIPE AND TUBE FITTINGS
A. Ductile-Iron Fittings: AWWA C110, ductile-iron or cast-iron type; or AWWA C153, ductile-iron, compact mechanical-joint type. Include cement-mortar lining and seal coat according to AWWA C104 and glands, rubber gaskets, and bolts and nuts according to AWWA C111.


D. Steel, Threaded Couplings: ASTM A 865.

E. Steel Welding Fittings: ASTM A 234/A 234M, ASME B16.9, or ASME B16.11.

F. Steel Flanges and Flanged Fittings: ASME B16.5.

G. Steel, Grooved-End Fittings: UL-listed and FM-approved, ASTM A 47, malleable iron or ASTM A 536, ductile iron; with dimensions matching steel pipe and ends factory grooved according to AWWA C606.

2.5 JOINING MATERIALS

A. Refer to Division 15 Section "Basic Mechanical Materials and Methods" for pipe-flange gasket materials and welding filler metals.

B. Ductile-Iron, Flanged Joints: AWWA C115, ductile-iron or gray-iron pipe flanges, rubber gaskets, and steel bolts and nuts.

C. Steel, Keyed Couplings: UL 213 and AWWA C606, for steel-pipe dimensions. Include ASTM A 536, ductile-iron housing, rubber gaskets, and steel bolts and nuts. Include listing for dry-pipe service for couplings for dry piping.

D. Transition Couplings: AWWA C219, sleeve type, or other manufactured fitting the same size as, with pressure rating at least equal to, and with ends compatible with piping to be joined.

2.6 POLYETHYLENE ENCASEMENT

A. Polyethylene encasement for Ductile-Iron Piping: ASTM A 674 or AWWA C105, film, 0.008-inch minimum thickness, tube or sheet.

2.7 GENERAL-DUTY VALVES

A. Refer to Division 15 Section "Valves" for gate, ball, butterfly, globe, and check valves not required to be UL listed and FM approved.

2.8 FIRE-PROTECTION-SERVICE VALVES

A. General: UL listed and FM approved, with minimum 175-psig nonshock working-pressure rating. Valves for grooved-end piping may be furnished with grooved ends instead of type of ends specified.

B. Gate Valves, NPS 2 and Smaller: UL 262; cast-bronze, threaded ends; solid wedge; OS&Y; and rising stem.

C. Indicating Valves, NPS 6" and Smaller: UL 1091; butterfly or ball-type, and integral indicating device.
1. Indicator: Electrical prewired, supervisory switch. Coordinate voltage and number of circuits with Fire Alarm requirements.

D. Gate Valves, NPS 2-1/2 and Larger: UL 262, iron body, bronze mounted, taper wedge, OS&Y, and rising stem. Include replaceable, bronze, wedge facing rings and flanged ends.

E. Swing Check Valves, NPS 2 and Smaller: UL 312 or MSS SP-80, Class 150; bronze body with bronze disc and threaded ends.

F. Swing Check Valves, NPS 2-1/2 and Larger: UL 312, cast-iron body and bolted cap, with bronze disc or cast-iron disc with bronze-disc ring and flanged ends or grooved ends.

G. Double Check Valve Assembly: Resilient seated, spring loaded with testable outlets provided, as required by authorities having jurisdiction.

2.9 SPECIALTY VALVES

A. Ball Drip Valves: UL 1726, automatic drain valve, NPS 3/4, ball check device with threaded ends.

2.10 SPRINKLERS

A. Sprinkler Types and Categories: Nominal 1/2-inch orifice for "Ordinary" temperature classification rating, unless otherwise indicated or required by application.

B. Sprinkler types, features, and options include the following:

1. Concealed ceiling sprinklers, including cover plate.
2. Extended-coverage sprinklers.
3. Pendent sprinklers.
4. Pendent, dry-type sprinklers.
5. Quick-response sprinklers.
7. Sidewall, dry-type sprinklers.
8. Upright sprinklers.

C. Sprinkler Finishes: Chrome-plated, bronze, and painted.

D. Sprinkler Escutcheons: Materials, types, and finishes for the following sprinkler mounting applications. Escutcheons for concealed and sprinklers are specified with sprinklers.

1. Ceiling Mounting: white steel, one piece, flat.
2. Ceiling Mounting: white steel, two piece, with 1-inch vertical adjustment.
3. Sidewall Mounting: white steel, one piece, flat.

E. Sprinkler Guards: Wire-cage type, including fastening device for attaching to sprinkler.

2.11 SPECIALTY SPRINKLER FITTINGS

A. Specialty Fittings: UL listed and FM approved; made of steel, ductile iron, or other materials compatible with piping.

B. Locking-Lug Fittings: (not allowed).

C. Mechanical-T Fittings: (not allowed).

D. Mechanical-Cross Fittings: (not allowed).
E. Drop-Nipple Fittings: UL 1474, with threaded inlet, threaded outlet, and seals; adjustable.

F. Sprinkler, Drain and Alarm Test Fittings: UL-listed, cast- or ductile-iron body; with threaded inlet and outlet, test valve, and orifice and sight glass.

2.12 FIRE DEPARTMENT CONNECTIONS

A. Wall, Fire Department Connections: UL 405; cast-brass body with brass, wall, escutcheon plate; brass, lugged caps with gaskets and brass chains; and brass, lugged swivel connections. Include inlets with threads according to NFPA 1963 and matching local fire department sizes and threads, outlet with pipe threads, extension pipe nipples, check devices or clappers for inlets, and escutcheon plate with marking “AUTO-SPRINKLER FIRE DEPARTMENT CONNECTION.” Number of NPS 2-1/2 connections and size of outlet as indicated. (4 X 2 ½ x 2 ½) Single outlet shall be allowed for 3” and less risers.

1. Type: Flush mounting.
2. Escutcheon Plate: Round/square.
3. Finish: Rough chrome.

2.13 ALARM DEVICES

A. General: Types matching piping and equipment connections.

B. Electronic Bell, listed for exterior installation.

C. Water-Flow Indicators: UL 346; electrical-supervision, vane-type water-flow detector; with 250-psig pressure rating; and designed for horizontal or vertical installation. Include two single-pole, double-throw, circuit switches for isolated alarm and auxiliary contacts, 7 A, 125-V ac and 0.25 A, 24-V dc; complete with factory-set, field-adjustable retard element to prevent false signals and tamperproof cover that sends signal if removed.

D. Valve Supervisory Switches: UL 753; electrical; single-pole, double throw; with normally closed contacts. Include design that signals controlled valve is in other than fully open position.

2.14 PRESSURE GAGES

A. Pressure Gages: UL 393, 3-1/2- to 4-1/2-inch- diameter dial with dial range of 0 to 250 psig.

PART 3 - EXECUTION

3.1 PREPARATION

A. Obtain Engineer’s Water Analysis or fire hydrant flow test. Use results for system design calculations required in “Quality Assurance” Article in Part 1 of this Section.

3.2 EARTHWORK

A. Refer to Division 2 Section "Earthwork“ for excavating, trenching, and backfilling.

3.3 EXAMINATION
A. Examine roughing-in for piping to verify actual locations of piping connections before installation.

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

3.4 COORDINATION

A. All work of this contractor will be coordinated with other trades to insure minimal changes to the sprinkler system from the designs. Careful coordination of mechanical and electrical ducts, pipe and conduit shall be required.

B. The ceiling cavity must be carefully reviewed and coordinated with all trades. In the event of conflict, the installation of the mechanical equipment and piping shall be in the following order: plumbing waste, rainwater, and soil lines; supply, return, and exhaust ductwork, water piping, fire protection piping; and pneumatic control piping.

C. All piping shall be run concealed where possible. All lines will be run as high as possible so as to not interfere with future changes to ceiling heights or other mechanical equipment. This contractor will be responsible for all sleeves, core drills, and sealing of penetrations in walls, floors, and structural members to facilitate the installation of the system, however, no holes in structural members will be allowed unless approved by the structural engineer.

3.5 PIPING APPLICATIONS

A. Flanges, unions, and transition and special fittings with pressure ratings the same as or higher than system’s pressure rating may be used in aboveground applications, unless otherwise indicated.

B. Underground Service-Entrance Piping: Use mechanical-joint pipe, fittings and approved restrained joints methods.

C. Sprinkler Main Piping: Use the following:
   1. NPS 8 and Smaller: Standard-weight steel pipe with threaded ends, or grooved ends. No plain ends allowed.
   2. Outlets shall be welded, Mech. tee fittings are not allowed.

D. Branch line piping: Use the following:
   1. NPS 2 and Smaller: Threadable steel pipe with threaded ends; cast- or malleable-iron threaded fittings; and threaded joints. (Mech. Tee fittings are not allowed)

3.6 VALVE APPLICATIONS

A. Drawings indicate valve types to be used. Where specific valve types are not indicated, the following requirements apply:
   1. Fire-Protection-Service Valves: UL listed and FM approved for applications where required by NFPA 13 and NFPA 14.
   2. General-Duty Valves: For applications where UL-listed and FM-approved valves are not required by NFPA 13 and NFPA 14.
      a. Shutoff Duty: Use gate, ball, or butterfly valves.
      b. Throttling Duty: Use globe, ball, or butterfly valves.

3.7 JOINT CONSTRUCTION
A. Refer to Division 15 Section “Basic Mechanical Materials and Methods” for basic piping joint construction.

B. Ductile-Iron-Piping, Grooved Joints: Use ductile-iron pipe with radius-cut-grooved ends; ductile-iron, grooved-end fittings; and ductile-iron, keyed couplings. Assemble joints with couplings, gaskets, lubricant, and bolts according to coupling manufacturer's written instructions.

C. Steel-Piping, Grooved Joints: Use Schedule 40 steel pipe with cut or roll-grooved ends and Schedule 30 steel pipe with roll-grooved ends; steel, grooved-end fittings; and steel, keyed couplings. Assemble joints with couplings, gaskets, lubricant, and bolts according to coupling manufacturer's written instructions.

3.8 WATER-SUPPLY CONNECTION

A. Install shutoff Backflow prevention assemblies, valve, pressure gage’s, drain, and other accessories at connection to water service.

3.9 PIPING INSTALLATION

A. Refer to Division 15 Section “Basic Mechanical Materials and Methods” for basic piping installation.

B. Locations and Arrangements: Drawing plans, schematics, and diagrams indicate general location and arrangement of piping. Install piping as indicated, as far as practical.

1. Deviations from approved working plans for piping require written approval from authorities having jurisdiction. File written approval with Architect before deviating from approved working plans.

C. Install underground service-entrance piping according to NFPA 24 and with restrained joints.

D. Make connections between underground and above-ground piping using bolted flange.

E. Install mechanical sleeve seal at pipe penetrations in basement and foundation walls. Refer to Division 15 Section “Basic Mechanical Materials and Methods.”

F. Use approved fittings to make changes in direction, branch takeoffs from mains, and reductions in pipe sizes.

G. Install unions adjacent to each valve in pipes NPS 2 and smaller. Unions are not required on flanged devices or in piping installations using grooved joints.

H. Install "Inspector's Test Connections” in sprinkler piping, complete with shutoff valve, sized and located according to NFPA 13.

I. Install sprinkler piping with drains for complete system drainage.

J. Install ball drip valves to drain piping between fire department connections and check valves. Drain to floor drain or outside building.

K. Install alarm devices in piping systems.

L. Hangers and Supports: Comply with NFPA 13 for hanger materials. Install according to NFPA 13 for sprinkler piping and to NFPA 14 for standpipes.

1. No powder driven studs allowed.
2. Wrap-around braces are to be provided at end of branch lines.
3.10 **SPECIALTY SPRINKLER FITTING INSTALLATION**  
A. Install specialty sprinkler fittings according to manufacturer's written instructions.

3.11 **VALVE INSTALLATION**  
A. Refer to Division 15 Section "Valves" for installing general-duty valves. Install fire-protection specialty valves, trim, fittings, controls, and specialties according to NFPA 13 and NFPA 14, manufacturer's written instructions, and authorities having jurisdiction.

B. Valves: Install fire-protection-service valves supervised-open, located to control sources of water supply except from fire department connections. Provide permanent identification signs indicating portion of system controlled by each valve.

C. Double Check Valve Assemblies: Install valves in vertical or horizontal position, per listings and for proper direction of flow.

3.12 **SPRINKLER APPLICATIONS**  
A. General: Sprinkler heads shall be of the latest design closed spray type for 155°F unless specified otherwise or required by code. Heads in Light Hazard Occupancies shall be quick response type. Orifices larger than 1/2" may be used as required by density and spacing demands. Use sprinklers according to the following applications:

1. Rooms without Ceilings: Upright and/or pendent sprinklers. Provide mechanical guards on all heads at or below 7'-0" height above the floor or where damage from room occupant use may occur.
2. Rooms with Ceilings: Semi-recessed sprinklers.
4. Spaces Subject to Freezing: Upright; pendent, dry-type; and sidewall, dry-type sprinklers.
5. Provide freeze proof type automatic sprinkler heads serving exterior canopy area, unconditioned spaces, areas subject to freezing and in other areas requiring their use.
6. Heads located within the air streams of unit heaters or other heat-emitting equipment shall be selected for proper temperature rating.
7. Sprinkler Finishes: Use sprinklers with the following finishes:
   a. Upright, Pendent, and Sidewall Sprinklers: Chrome in finished spaces exposed to view; rough bronze in unfinished spaces not exposed to view.
   b. Semi-recessed Sprinklers: White, with white two-piece escutcheon.
   c. Concealed Sprinklers: Rough brass, with white cover plate to match ceiling color.

B. Sprinklers: Use the following:

1. All sprinklers shall be listed, quick response type.
2. Sprinkler in future finish spaces shall be pendants/uprights installed on a maximum spacing of 100 sq. ft. per head with 1 x ½" bushings, to accommodate future finishes. Coverage to be for Ordinary Hazard -1.

3.13 **SPRINKLER INSTALLATION**  
A. Every effort shall be required to insure that the heads form a symmetrical pattern in the ceiling with the ceiling grid, lights, diffusers and grilles. Offsets shall be made in piping to accommodate ductwork in the ceiling. Heads should be symmetrical and all piping run parallel or perpendicular to building lines.
1. In no case shall sprinkler heads be installed closer than approved distances from ceiling obstructions and HVAC ductwork.
2. Sprinkler heads shall not conflict with tile grids.
3. Exposed piping in clerestory/lobby areas shall be coordinated with architect and approved prior to installation.

B. Where layout of sprinkler heads is shown on reflected ceiling plans the locations shall be followed unless approval is obtained from the Architect or such locations shown do not meet the requirements of NFPA-13. In either case, approval of the Architect shall be obtained in writing before sprinkler head locations are changed. If the installation of additional heads are needed to conform to NFPA 13 requirements in areas where heads are shown on reflected ceiling plans, they shall be included in the contract price.

C. Do not install pendent or sidewall, wet-type sprinklers in areas subject to freezing. Use dry-type sprinklers with water supply from heated space.

D. Sprinkler heads in acoustical panel ceilings are to be offset from grid members by 6" minimum.

3.14 CONNECTIONS

A. Install ball drip valves at each check valve for fire department connection. Drain to floor drain or outside building.

B. Connect piping to specialty valves, hose valves, specialties, fire department connections, and accessories.

C. Electrical Connections: Power wiring is specified in Division 16.

D. Connect alarm devices to fire alarm.

3.15 LABELING AND IDENTIFICATION

A. Install labeling and pipe markers on equipment and piping according to requirements in NFPA 13 and NFPA 14 and in Division 15 Section "Basic Mechanical Materials and Methods."

3.16 FIELD QUALITY CONTROL

A. Flush, test, and inspect sprinkler piping according to NFPA 13, "System Acceptance" Chapter.

B. Replace piping system components that do not pass test procedures and retest to demonstrate compliance. Repeat procedure until satisfactory results are obtained.

C. Report test results promptly and in writing to Architect and authorities having jurisdiction.

D. Whether the underground serving the sprinkler system is done by this contractor or another, this contractor will be responsible to assure and have in his possession a certificate that the underground has been flushed and tested by the contractor who installed it in accordance with NFPA-24 prior to connection of the underground piping to the overhead sprinkler system.

3.17 CLEANING

A. Clean dirt and debris from sprinklers.

B. Remove and replace sprinklers having paint other than factory finish.
3.18 PROTECTION
A. Protect sprinklers from damage until Substantial Completion.

3.19 COMMISSIONING
A. Verify that specialty valves, trim, fittings, controls, and accessories are installed and operate correctly.
B. Verify that specified tests of piping are complete and that “Material Test Certificates” are complete.
C. Verify that damaged sprinklers and sprinklers with paint or coating not specified are replaced with new, correct type.
D. Verify that sprinklers are correct types, have correct finishes and temperature ratings, and have guards as required for each application.
E. Verify that fire department connections have threads compatible with local fire department equipment.
F. Fill wet-pipe sprinkler piping with water.
G. Coordinate with fire alarm tests. Operate as required.

3.20 DEMONSTRATION & TESTS
A. Demonstrate equipment, specialties, and accessories. Review operating and maintenance information.
B. All tests will be conducted as required by the local authority having jurisdiction, and in no case less than those required by NFPA standards. As a minimum, piping in the sprinkler system shall be tested at a water pressure at 200 psi for a period of not less two hours, or at 50 psi in excess of the normal pressure when the normal pressure is above 150 psi. Bracing shall be in place, and air shall be removed from the system through the hydrants and drain valves before the test pressure is applied. No apparent leaks will be permitted on interior or underground piping.
C. The local jurisdiction having authority and the Utah State Fire Marshal's office (where required) shall be notified at least three working days in advance of all tests and flushing. This includes any flushing of underground, hydrostatic testing, or flow testing that may be required.
D. This contractor shall make all the required tests to the sprinkler system as required by code. He shall be responsible to assure that the Contractor Test Certificates for the overhead, backflow and underground work are completed and delivered to the owner’s insurance underwriter to assure proper insurance credit.
E. All tests requiring the witnessing by local authorities will be the responsibility of this contractor. If tests are not run or do not have the proper witness, then they will be run later and all damage caused by the system, or caused in uncovering the system for such test, will be borne by this contractor.

3.21 WARRANTY & PROJECT CLOSE-OUT
A. This contractor shall warranty the sprinkler system and all its components for one year from the date of acceptance by the owner. Any costs incurred to extend any warranties of materials to assure this time frame shall be borne by this contractor.

B. Provide Operation and Maintenance Manuals with correct as-builts included. A minimum 6 sets to be provided in red 3-ring binders, including copies of the warranty and all Contractor Test Certificates.

C. Electronic copy of AutoCad as-built drawings shall also be provided on CD, with each O&M Manual.

3.22 FIELD QUALITY CONTROL

A. Flush, test and inspect sprinkler piping according to NFPA 13, “System Acceptance” Chapter.

B. Replace piping system components that do not pass test procedures and retest to demonstrate compliance. Repeat procedure until satisfactory results are obtained.

C. Report test results promptly and in writing to Architect and authorities having jurisdiction.

END OF SECTION 13916