ADDENDUM NO. 02

February 4, 2025

Perry Township Schools Holder Field Baseball & Softball Complex
4355 E. Stop 11 Road
Indianapolis, IN 46227

TO: ALL BIDDERS OF RECORD

This Addendum forms a part of and modifies the Bidding Requirements, Contract Forms, Contract Conditions, the Specifications and the Drawings dated January 7, 2025, by Schmidt Associates. Acknowledge receipt of the Addendum in the space provided on the Bid Form. Failure to do so may subject the Bidder to disqualification.

This Addendum consists of Pages ADD 2-1 through ADD 2-3 and attached Schmidt Associates Addendum No. 2, dated February 3, 2025, consisting of 3 pages and 29 drawing sheets.

BID OPENING DATE AND TIME – REMINDER

Bids will **ONLY** be submitted and accepted online through the Skillman Plan Room (skillmanplanroom.com) via the eBID Electronic Bid Submission System.

Go to www.skillmanplanroom.com - Do not wait until 2:00 pm eastern time to submit your bid; When the countdown clock expires, even if you are in the middle of the bid submission process, your bid will not be accepted by the ebid system.

1. Sign In or Register.
2. Click Blue River Valley Schools – Perry Township Schools Holder Field Baseball & Softball Complex.
3. Click submit bid button and follow the instructions.

- Save your bid form and all required attachments in pdf format. (ONE FILE PER BID

CATEGORY)

- Name your pdf bid file:
  - BC 01 General Trades_Contractor Name
  - BC 02 Masonry_Contractor Name
  - BC 01_02 General Trades_Masonry_Contractor Name
- Upload pdf bid file where indicated with **"Drag Files Here, or Browse"**.
- Click "Submit Bid"

The Bid Opening on Tuesday, February 11, 2025, **at 2:00 PM Eastern Time**, will **ONLY** be available to watch via Microsoft Teams; see meeting link below:

Microsoft Teams

Join the meeting now
Meeting ID: 243 096 680 86
Passcode: f8XY6tN6
Dial in by phone
+1 317-762-3960,,96778318# United States, Indianapolis
Find a local number
Phone conference ID: 967 783 18#

A. SPECIFICATION SECTION 01 12 00 – Multiple Contract Summary

1. Section 1.09 – Permits, Fees and Notices

Add: A.2 – The Construction Manager will pay for all required drainage permit inspections over the course of construction and will be reimbursed by the Owner.

Add: A.3 – The Architect will secure and pay for the drainage permit. After the drainage permit is secured, the Architect will proceed to secure and pay for the improvement of the location permit.

2. Paragraph 3.03 – Bid Categories

BID CATERGORY 1 – GENERAL TRADES

Add the following Clarifications:
29. Responsible for installation of posts, fabric, gates & hardware of permanent fencing interfacing on the remaining (3) sides of the bullpens/battings cages at the varsity softball & baseball turf fields.
30. Responsible for grounding all permanent fencing installed by this bid category contractor.

BID CATEGORY 5 – ELECTRICAL

Add the following Clarifications:
11. Not responsible for providing any fire alarm or access control. These scopes of work are not included in the overall project design.

BID CATEGORY 6 – SYNTHETIC TURF

Add the following Clarifications:
10. Responsible for grounding all permanent fencing installed by this bid category contractor.

ADDENDUM NO. 2
FEBRUARY 3, 2025

PREPARED BY SCHMIDT ASSOCIATES FOR:
HOLDER FIELD PHASE 2
PERRY TOWNSHIP SCHOOLS

This Addendum consists of 3 Addendum pages and 67 attachment pages totaling 70 pages.

Acknowledge receipt of this Addendum by inserting its number on the Bid Form. Failure to do so may subject the Bid to disqualification. This Addendum is part of the Contract Documents.

Bidder is encouraged to verify with reprographer of record all Addenda issued (do not rely exclusively on third party plan room services).

PART 1 - CHANGES TO PRIOR ADDENDA (NOT APPLICABLE)

PART 2 - CHANGES TO THE PROJECT MANUAL

Modifications described herein shall be incorporated in the Project Manual. All other Work shall remain un-changed.

2.1 DIVISION 11 – EQUIPMENT

A. **Section 116823.99 "SITE ATHLETIC EQUIPMENT"**

1. ADD Subparagraph 2.1.B.5.C, as follows:
   "C. Gill Athletics"
2. ADD Subparagraph 2.1.C.1.C as follows:
   "C. Gill Athletics"
3. ADD Subparagraph 2.1.C.2.C as follows:
   "C. Gill Athletics"
4. ADD Subparagraph 2.1.C.3.C as follows:
   "C. Gill Athletics"

2.2 DIVISION 13 - SPECIAL CONSTRUCTION

A. **Section 133417 "PRESSBOX"**

1. DELETE AND REPLACE Section per the attached.

B. **Section 133416.53 "FRAME BLEACHERS"**

1. ADD Subparagraph 2.01.1.E as follows:
   "E. Sturdisteel"

2.3 DIVISION 23 - HEATING, VENTILATING, AND AIR-CONDITIONING(HVAC)

A. **Section 238239.16 "PROPELLER UNIT HEATERS"**

1. ADD Subparagraph 2.1 A. 13. as follows:

"13. Ouellet"

2.4 DIVISION 27 – COMMUNICATIONS

A. **Section 275300 – "COMMUNICATIONS BACKBONE CABLING"**

1. DELETE AND REPLACE Section 275120.99 in its entirety.

B. **Section 275120.99 "SOUND REINFORCEMENT SYSTEM"**

1. DELETE AND REPLACE Section 275120.99 in its entirety.

2.5 DIVISION 28 – ELECTRONIC SAFETY AND SECURITY

A. **Section 284621 – "ADDRESSABLE FIRE ALARM SYSTEMS"**

1. DELETE Section 284621 in its entirety.

2.6 DIVISION 32 - EXTERIOR IMPROVEMENTS

A. **Section 321823.99 "SYNTHETIC TURF PLAYING SURFACE"**

1. ADD Subparagraph 2.2.D as follows:

"D. Approved Manufacturers turf types:

1. Motz Group: Cross Flex 2" 41oz dual fiber for both baseball and softball

2. Field Turf: Doubleplay Natural For both baseball and softball. "

2. MODIFY Subparagraph 2.2.A.2.a) as follows:

"a) Turf: Monofilament"

B. **Section 328000** "**IRRIGATION**"

1. DELETE AND REPLACE Section 328000 per the attached.

PART 3 - CHANGES TO THE DRAWINGS

Modifications described herein shall be incorporated in the Drawings. All other Work shall remain unchanged.

3.1 DRAWING SHEETS: ADDITIONS, DELETIONS AND REPLACEMENTS

DRAWING NO.	INDICATE ACTION: ADD (A), DELETE (D), DELETE & REPLACE (R),
G-SERIES DRAWINGS	
G-001	DELETE AND REPLACE

C-SERIES DRAWINGS		
	CL101	DELETE AND REPLACE
	CL102	DELETE AND REPLACE
	CL103	DELETE AND REPLACE
	CL104	DELETE AND REPLACE
	CL501	DELETE AND REPLACE
	CL502	DELETE AND REPLACE
	IR101	ADD
	IR102	ADD
	IR103	ADD
	IR501	ADD
	CD102	DELETE AND REPLACE
	CD103	DELETE AND REPLACE
	CU501	DELETE AND REPLACE
A-SERIES DRAWINGS		
	A-300	DELETE AND REPLACE
E-SERIES DRAWINGS		
	E-501	ADD
	E-502	ADD
	E-601	DELETE AND REPLACE
	E-602	DELETE AND REPLACE
	E-603	DELETE AND REPLACE
	E-604	DELETE AND REPLACE
	E-605	ADD
	EL1A1	DELETE AND REPLACE
	EP1A1	DELETE AND REPLACE
	ER1A1	DELETE AND REPLACE
	ES101	DELETE AND REPLACE
	ES102	DELETE AND REPLACE
T-SERIES DRAWINGS		
	TS101	DELETE AND REPLACE
	T-501	DELETE AND REPLACE

END OF ADDENDUM 2

CONTRACTOR QUESTIONS AND ANSWERS

1. Can synthetic fibers be used in the turf curb concrete in lieu of the two rows of #4 rebar shown on CL501 detail 1C? No

2. It is assumed no top of fence guard protection required on the job, is that correct? That is correct

Section 133417- Press Box

Part 1 - General

1.1 SCOPE of WORK

A. Furnish a prefabricated, modular press box

B. Approved Manufacturers

1. Dant Clayton

2. Sturdisteel Company

3. Southern Bleachers

4. E&D Specialty Stands

1.2 RELATED Work/RELATED SECTION

A. Grandstand / Section 133416.53
B. Alternates

1.3 SUBMITTALS

A. Bidders with any deviation from the specifications must comply with the following requirements seven (7) days prior to the bid opening.

1. Plan view and wall section showing complete detail of layout, connection and trim detail.

2. Schedule of Work Experience, including names of contacts and phone numbers; 10 jobs minimum within the last five (5) years.

3. List of three (3) similar jobs within the past two (2) years .

4. Resume including Corporate Officers, Sales Representatives, Technical Advisor, Project Manager, and Job site Superintendent.

5. Project schedule, including phasing with other trades and designation for all tasks, milestone dates for drawing submittal, fabrication time, key material delivery dates and designated dates of installation.

6. Shop drawings stamped and signed by a Professional Engineer licensed in Indiana.

1.4 DESIGN CRITERIA

A. All material and workmanship shall be in accordance with the applicable state building code/ IBC current edition and NFPA.

B. All electric components shall be UL listed.

C. Design Loads:

1.	Live Load	100 psf	Floor
		50 psf	Roof (w/ filming platform)
	Wind	20 psf	on vertical surfaces

D. Design Classification

1. Use Group: B, Construction Type: V-B

1.5 QUALITY ASSURANCE

A. Manufacturer: Company specializing in modular building construction with experience in manufacturing press boxes.

B. Engineer qualifications: The press box shall be approved by a registered professional engineer in the state the Press Box will exist in in.

C. Warranty: Press box shall be guaranteed for one (1) year against defective material or workmanship. Damage resulting from abnormal use or vandalism is not applicable.

PART 2 - PRODUCTS

2.1 Size

A. Size: As shown on drawings

B. Bleachers: Pressbox to be integrated with bleachers. See bleacher specification.

C. Foundations and Columns: All structural design shall be done by Manufacturer.

D. CDR. Manufacturer is required to submit for CDR.

2.2FLOOR CONSTRUCTION

A. Bottom Board: 1/2” CCX foundation grade treated plywood. Industrial grade asphalt-based pint. Continuous aluminum vents on 8’ centers.

B. Insulation: 6” R-19 fiberglass batts, with vapor barrier.

C. Joists: 2” x 6” #2 SYP, on 16” centers, longitudinal framing.

D. Decking: 3/4” Sturdifloor, underlayment grade, tongue and groove fir plywood, (Index24 in O.C.)

E. Covering: 1/8” Armstrong Excelon vinyl composition tile.

F. Molding: 4” Thermoplastic rubber base molding by Roppe.

2.2) WALL CONSTRUCTION

A. Studs: 2” x 4”, #2 or better SPF, on 16” centers, BOCA framing.

B. Bottom Plate: 2” x 4” #2 or better SPF.

C. Top Plates: (2) 2” x 4” #2 or better SPF.

D. Headers: As span and design load requires

E. Ceiling Height: 8’-2” x 8’-0”, front to back.

F. Covering: 5/8” vinyl-faced gypsum panels, Class A, F.S.R.

G. Insulation: 3-1/2” R-13 fiberglass batts with vapor barrier.

H. Sheathing: 1/2” CDX plywood.

I. Siding: .026 gauge ribbed steel panels with Kynar 500 finish (color to be determined by school)

2.3 ROOF CONSTRUCTION

A. Joists: 2” x 8”, #2 SYP, 16” O.C. spacing.

B. Overhang: 15-1/2” over front wall; 6” over rear wall. .019 metal fascia with perforated vinyl soffit panels.

C. Ceiling: 5/8” type-x fire-rated gypsum board, taped and bedded with spray textured finish, Class A F.S.R.

D. Insulation: 6” R-19 fiberglass batts with vapor barrier.

E. Decking: 3/4” tongue & groove oriented strand board (Index 24” O.C.).

F. Covering: .060 single-ply EPDM rubber membrane, fully adhered.

2.4 WINDOWS

A. Soft-Lite “Barrington DSL7 HS”, Double horizontal slider windows w/ extruded vinyl frames, AAMA Structural Rating, w/ ¾” insulated Low-E, Argon filled tempered glass w/ removable insect screens.

B. Interior Windows to be ¼” tempered safety glass fixed pan with stained jambs and casing

2.5 DOORS

A. 36” x 80” Insulated vinyl-faced steel clad with wood jambs; 16” insulated/tempered lite, aluminum threshold, vinyl weather stops, stainless steel hinges and heavy-duty retention chains. Doors equipped with commercial lever-handled keyed locksets.

B. Doors (Interior) - 1-3/8” Solid-core stained birch with stained birch wood jambs and casing and passage lever handled hardware

2.6 ELECTRICAL

A. Service Entrance Panel: Square D; rated at 208Y/120 volt, three phase, 4-wire, 225 amp with 3P-225 main circuit breaker, 42 circuit, bolt on circuit breakers, door-in-door hinged cover, recessed panel. Pressbox manufacturer is responsible for furnishing all mechanical equipment, Light fixtures, 20 amp duples receptacles,extra associated with the prefab pressbox. Pressbox manufacturer is responsible for making all electrical connections to Light fixtures, receptacles, mechanical equipment, etc. associated with in the pessbox connecting into the electrical panelboard. Misc.equipment located outside of the pressbox on site, the wiring and conduit will be installed in the pressbox panelboard by the Division 26 contractor. Refer to Electrical E-600 series drawings for panelboard schedules related to the pressboxes.

B. Receptacles: Pass & Seymour 125 volt/15 amp duplex, spec-grade, along the rear wall. Wiremold 5400 Series two-piece multi-channel, dual voltage, non-metallic surface raceway along front wall below scorer’s counter, outlets on 48" centers.

C. Lighting: Lithonia Lighting LBL4-4800LM-80CRI or equal by Cooper or Hubbell

D. Circuits: All branch circuit wiring is minimum #12 THHN encased in EMT thin wall conduit or MC Cable.

E. Minimum of (1) quad weather proof receptable at each camera deck location, (2) total.

F. Coordinate location for data rack/switch and provide conduit pathways.

G. Provide conduit route for data connection to camera deck location, (2) total.

2.7. SCORERS' COUNTER

A. 20” deep x 1 ½” Clear Anodized finish aluminum countertop with rounded front nose. Mounted on brackets spaced a minimum of 32”. 12” deep countertop on left press box.

2.8. CAMERA DECKS

A. Hatch: Bilco Model #NB-50 2’6” x 4’6” aluminum roof hatch

B. Ladder (Aluminum): Vertical

C. Upgraded Roof Surface: .060 polyester reinforced skid and spike resistant PVC membrane, fully adhered.

D. Railing Mounts: 1/2” galvanized threaded bolts & nuts through roof fascia on 48” centers along perimeter edge of roof. Railing mounts cannot be placed on the roof surface.

E. The guardrail system shall be of interlocking design with positive through bolt fasting. The top rail shall be designed to fully cover the rails support posts for totally snag-free area and eliminate the potential of sharp edge contact with the spectators.

F. Chain link fence shall be 2” mesh, black vinyl chain link fence.

PART 3 – EXECUTION

3.1 INSTALLATION

A. Installation: Shall be handled directly by the manufacturer or by a factory certified installation subcontractor.

B. Erect per manufacturer plans, shop drawings, and specifications.

3.2 CLEANING

A. Clean all surfaces according to manufacturer’s recommendations.

B. Remove all packaging and construction debris.

SECTION 271300 - COMMUNICATIONS BACKBONE CABLING

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. Section Includes:

1. Pathways.
2. UTP cable.
3. Optical fiber cabling.
4. Cable connecting hardware, patch panels, and cross-connects.
5. Cabling identification products.

B. Related Sections:

1. Division 27 Section "Sleeves and Sleeve Seals for Communications Pathways and Cabling.
2. Division 27 Section "Communications Equipment Room Fittings" for associated communications cabling associated with system panels and devices.
3. Division 27 Section "Communications Horizontal Cabling" for associated communications cabling associated with system panels and devices.
4. Division 27 Section "Telecommunications Grounding and Bonding".

1.3 DEFINITIONS

A. BICSI: Building Industry Consulting Service International.

B. Cross-Connect: A facility enabling the termination of cable elements and their interconnection or cross-connection.

C. EMI: Electromagnetic interference.

D. IDC: Insulation displacement connector.

E. LAN: Local area network.

F. RCDD: Registered Communications Distribution Designer.

G. UTP: Unshielded twisted pair.

H. Furnish: Supply and deliver to Project site, ready for unloading, unpacking, assembling, erecting, placing, anchoring, applying, working to dimension, finishing, curing, protecting, cleaning, and similar operations.

I. Install: Operations at project site including unloading, temporarily storing, unpacking, assembling, erecting, placing, anchoring, applying, working to dimension, finishing, curing, protecting, cleaning, and similar operations.

J. Provide: Furnish and install, complete and ready for the intended use.

1.4 BACKBONE CABLING DESCRIPTION

A. Backbone cabling system shall provide interconnections between communications equipment rooms, main terminal space, and entrance facilities in the telecommunications cabling system structure. Cabling system consists of backbone cables, intermediate and main cross-connects, mechanical terminations, and patch cords or jumpers used for backbone-to-backbone cross-connection.

B. Backbone cabling cross-connects may be located in communications equipment rooms or at entrance facilities. Bridged taps and splitters shall not be used as part of backbone cabling.

1.5 PERFORMANCE REQUIREMENTS

A. General Performance: Backbone cabling system shall comply with transmission standards in TIA/EIA-568-C.1, when tested according to test procedures of this standard.

1.6 ACTION SUBMITTALS

A. Product Data with Shop Drawings:

1. Product Data: For each type of product indicated. Include construction details, material descriptions, dimensions of individual components and profiles, and finishes for equipment racks and cabinets. Include rated capacities, operating characteristics, electrical characteristics, and furnished specialties and accessories.

    a. Provide as a single complete system submittal with master product list referencing each paragraph in this section specifying product.

1.7 INFORMATIONAL SUBMITTALS

A. Qualification Data: For Installer, qualified layout technician, installation supervisor, and field inspector.

1.8 QUALITY ASSURANCE

A. All Work specified under this Section shall be fully compliant with following:

1. ANSI/TIA-568-C.1-2009 "Commercial Building Telecommunications Cabling Standard (Currently Ratified) including all addenda and subsets."
2. ANSI/TIA-569-C-2012 " Telecommunications Pathways and Spaces (Currently Ratified) including all addenda and subsets."
3. ANSI/TIA-606-B-2012 "Administrative Standard for Telecommunications Infrastructure (Currently Ratified) including all addenda and subsets."
4. ANSI-TIA-607-B-2012 "Generic Telecommunications Bonding and Grounding (Earthing) for Customer Premises (Currently Ratified) including all addenda and subsets."
5. ANSI/TIA-758-B-2012 "Customer-owned Outside Plant Telecommunications Infrastructure Standard (Currently Ratified) including all addenda and subsets."

B. In addition, all Work shall fully comply with these specifications and related Drawings and all manufacturers' recommended installation practices.

C. Installer Qualifications: Cabling Installer must have personnel certified by BICSI on staff and shall have a thorough understanding of all standards referenced in this Section.

1. Layout Responsibility: Preparation of Shop Drawings and Cabling Administration Drawings, Cabling Administration Drawings, and field testing program development by an RCDD.
2. Installation Supervision: Installation shall be under the direct supervision of Registered Technician, who shall be present at all times when Work of this Section is performed at Project site.
3. Testing Supervisor: Currently certified by BICSI as an RCDD to supervise on-site testing.

D. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and application.

E. Telecommunications Pathways and Spaces: Comply with TIA/EIA-569-A.

F. Grounding: Comply with ANSI-J-STD-607-A.

1.9 DELIVERY, STORAGE, AND HANDLING

A. Test cables upon receipt at Project site.

1. Test optical fiber cable to determine the continuity of the strand end to end. Use optical loss test set.
2. Test optical fiber cable while on reels. Use an optical time domain reflectometer to verify the cable length and locate cable defects, splices, and connector, including the loss value of each. Retain test data and include the record in maintenance data.
3. Test each pair of UTP cable for open and short circuits.

1.10 PROJECT CONDITIONS

A. Environmental Limitations: Do not deliver or install cables and connecting materials until wet work in spaces is complete and dry, and temporary HVAC system is operating and maintaining ambient temperature and humidity conditions at occupancy levels during the remainder of the construction period.

1.11 COORDINATION

A. Coordinate layout and installation of telecommunications pathways and cabling with Owner's telecommunications and LAN equipment and service suppliers.

PART 2 - PRODUCTS

2.1 PATHWAYS

A. General Requirements: Comply with TIA/EIA-569-B.

B. Cable Support: NRTL labeled for support of Category 6 cabling, designed to prevent degradation of cable performance and pinch points that could damage cable.

1. Support brackets with cable tie slots for fastening cable ties to brackets.
2. J-hooks.
3. Straps and other devices.

C. Cable Trays:

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

a. Cable Management Solutions, Inc.
b. Cablofil Inc.
c. Cooper B-Line, Inc.
d. Cope - Tyco/Allied Tube & Conduit.
e. GS Metals Corp.

2. Cable Tray Material: Metal, suitable for indoors, and protected against corrosion by electroplated zinc galvanizing, complying with ASTM B 633, Type 1, not less than 0.000472 inches thick.

a. Basket Cable Trays: 6 inches wide and 2 inches deep. Wire mesh spacing shall not exceed 2 by 4 inches.
b. Ladder Cable Trays: [**Nominally** 18 inches] <**Insert dimension**> wide, and a rung spacing of 12 inches.

D. Conduit and Boxes: Comply with requirements in Division 26 Section "Raceway and Boxes for Electrical Systems."[**Flexible metal conduit shall not be used.**]

1. Outlet boxes shall be no smaller than 2 inches wide, 3 inches high, and 2-1/2 inches deep.
2.

    a. Communications, Plenum Rated: Type CMP[**or MPP**], complying with NFPA 262.

2.2 UTP CABLE HARDWARE

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

1. American Technology Systems Industries, Inc.
2. Dynacom Corporation.
3. Hitachi
4. Hubbell Premise Wiring.
5. Leviton Voice & Data Division.
6. Molex Premise Networks; a division of Molex, Inc.
7. Nordex/CDT; a subsidiary of Cable Design Technologies.
8. Panduit Corp.
9. Siemon Co. (The).
10. Tyco Electronics/AMP Netconnect; Tyco International Ltd.

B. General Requirements for Cable Connecting Hardware: Comply with TIA/EIA-568-C.2, IDC type, with modules designed for punch-down caps or tools. Cables shall be terminated with connecting hardware of same category or higher.

C. Patch Panel: Modular panels housing multiple-numbered jack units with IDC-type connectors at each jack for permanent termination of pair groups of installed cables.

1. Number of Jacks per Field: One for each four-pair UTP cable indicated.

D. Jacks and Jack Assemblies: Modular, color-coded, eight-position modular receptacle units with integral IDC-type terminals.

E. Patch Cords: Factory-made, 4-pair cables in lengths as required for proper connectivity at the patch panel; terminated with 8-position modular plug at each end. Excessive slack at the patch panel is not acceptable. Coordinate with Architect/Owner.

1. Patch cords shall have bend-relief-compliant boots and color-coded icons to ensure Category 6 performance. Patch cords shall have latch guards to protect against snagging.
2. Patch cords shall have color-coded boots for circuit identification.
3. Provide (2) per 4-pair installed.

2.3 OPTICAL FIBER CABLE

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

1. Berk-Tek; a Nexans company.
2. CommScope, Inc.
3. Corning Cable Systems.
4. General Cable Technologies Corporation.
5. Mohawk; a division of Belden CDT.
6. Nordex/CDT; a subsidiary of Cable Design Technologies.
7. Optical Cable Corporation
8. SMP Datacom
9. Optical Connectivity Solutions Division; Emerson Network Power.
10. Superior Essex Inc.
11. SYSTIMAX Solutions; a CommScope Inc. brand.
12. 3M.
13. Tyco Electronics/AMP Netconnect; Tyco International Ltd.

B. Description: Indoor outdoor rated Single mode Fiber optic cable

1. Comply with ICEA S-83-596 for mechanical properties.
2. Comply with TIA/EIA-568-B.3 for performance specifications.
3. Listed and labeled by an NRTL acceptable to authorities having jurisdiction as complying with UL 444, UL 1651, and NFPA 70 for the following types:

    a. Plenum Rated, Nonconductive: Type OFNP, complying with NFPA 262.

4. Conductive cable shall be aluminum armored type.
5. Maximum Attenuation: 3.50 dB/km at 850 nm; 1.5 dB/km at 1300 nm.
6. Minimum Modal Bandwidth: 160 MHz-km at 850 nm; 500 MHz-km at 1300 nm.

C. Jacket:

1. Cable cordage jacket, fiber, unit, and group color shall be according to TIA/EIA-598-B.
2. Imprinted with fiber count, fiber type, and aggregate length at regular intervals not to exceed 40 inches.

2.4 OPTICAL FIBER CABLE HARDWARE

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

1. ADC.
2. American Technology Systems Industries, Inc.
3. Berk-Tek; a Nexans company.
4. Corning Cable Systems.
5. Dynacom Corporation.
6. Hubbell Premise Wiring.
7. Molex Premise Networks; a division of Molex, Inc.
8. Nordex/CDT; a subsidiary of Cable Design Technologies.
9. Optical Cable Corporation
10. Optical Connectivity Solutions Division; Emerson Network Power.
11. Panduit

12. Siemon Co. (The).

B. Cross-Connects and Patch Panels: Modular panels housing multiple-numbered, duplex cable connectors.

1. Number of Connectors per Field: One for each fiber of cable or cables assigned to field, plus spares and blank positions adequate to suit specified expansion criteria. Provide as required to house terminations of all fiber cable installed.

C. Patch Cords: Factory-made, dual-fiber cables in lengths as required for proper connectivity at the patch panel. Excessive slack at the patch panel is not acceptable. Coordinate with Architect/Owner. Provide (1) per each pair of fiber strands installed.

D. Cable Connecting Hardware:

1. Comply with Optical Fiber Connector Intermateability Standards (FOCIS) specifications of TIA/EIA-604-2, TIA/EIA-604-3-A, and TIA/EIA-604-12. Comply with ANSI/TIA-568-C.3.
2. Quick-connect, simplex and duplex, Type SC connectors. Insertion loss not more than 0.75 dB.

2.5 GROUNDING

A. Comply with ANSI/TIA-607-B-2012.

2.6 LIGHTNING PROTECTION

A. Provide proper lightning protection where applicable.

2.7 IDENTIFICATION PRODUCTS

A. Comply with ANSI/TIA-606-B-2012 and UL 969 for a system of labeling materials, including label stocks, laminating adhesives, and inks used by label printers.

2.8 SOURCE QUALITY CONTROL

A. Factory test cables on reels according to ANSI/TIA-568-C.1.

B. Factory test UTP cables according to ANSI/TIA-568-C.2.

C. Factory test multimode optical fiber cables according to TIA/EIA-526-14-A and ANSI/TIA-568-C.3.

D. Cable will be considered defective if it does not pass tests and inspections.

E. Prepare test and inspection reports.

PART 3 - EXECUTION

3.1 ENTRANCE FACILITIES

A. Coordinate backbone cabling with the protectors and demarcation point provided by communications service provider.

3.2 CLEANING AND PROTECTION

A. Protect system components from damage and deterioration during installation. Protect equipment from dust and debris during installation. After installation maintain equipment protection. Notify other trades of equipment sensitivity to dust and debris. Clean equipment upon final completion of Work.

B. Before final acceptance, clean system components.

3.3 WIRING METHODS

A. Wiring Method: Install cables in raceways and cable trays except within consoles, cabinets, desks, and counters and except in accessible ceiling spaces, in attics, and in gypsum board partitions where unenclosed wiring method may be used. Conceal raceway and cables except in unfinished spaces.

1. Install plenum cable in environmental air spaces, including plenum ceilings.
2. Comply with requirements for raceways and boxes specified in Division 26 Section "Raceway and Boxes for Electrical Systems."

B. Wiring Method: Conceal conductors and cables in accessible ceilings, walls, and floors where possible.

C. Wiring within Enclosures: Bundle, lace, and train cables within enclosures. Connect to terminal points with no excess and without exceeding manufacturer's limitations on bending radii. Provide and use lacing bars and distribution spools.

3.4 INSTALLATION OF PATHWAYS

A. Cable Trays: Comply with NEMA VE 2 and ANSI/TIA-569-B-2012.

B. Comply with requirements for demarcation point, pathways, cabinets, and racks specified in Division 27 Section "Communications Equipment Room Fittings." Drawings indicate general arrangement of pathways and fittings.

C. Comply with ANSI/TIA-569-B-2012 for pull-box sizing and length of conduit and number of bends between pull points.

D. Comply with requirements in Division 26 Section "Raceway and Boxes for Electrical Systems" for installation of conduits and wireways.

E. Install manufactured conduit sweeps and long-radius elbows whenever possible.

F. Pathway Installation in Communications Equipment Rooms:

1. Position conduit ends adjacent to a corner on backboard where a single piece of plywood is installed, or in the corner of room where multiple sheets of plywood are installed around perimeter walls of room.
2. Install cable trays to route cables if conduits cannot be located in these positions.
3. Secure conduits to backboard when entering room from overhead.
4. Extend conduits 3 inches above finished floor.
5. Install metal conduits with grounding bushings and connect with grounding conductor to grounding system.

G. Backboards: Install backboards with 96-inch dimension vertical. Butt adjacent sheets tightly, and form smooth gap-free corners and joints.

3.5 INSTALLATION OF CABLES

A. Comply with NECA 1.

B. General Requirements for Cabling:

1. Comply with ANSI/TIA-568-C.1.
2. Comply with BICSI ITSIM, Ch. 6, "Cable Termination Practices."
3. Install 110-style IDC termination hardware unless otherwise indicated.
4. Terminate all conductors; no cable shall contain unterminated elements. Make terminations only at indicated outlets, terminals, cross-connects, and patch panels.
5. Cables may not be spliced. Secure and support cables at intervals not exceeding 30 inches and not more than 6 inches from cabinets, boxes, fittings, outlets, racks, frames, and terminals.
6. Install lacing bars to restrain cables, to prevent straining connections, and to prevent bending cables to smaller radii than minimums recommended by manufacturer.
7. Bundle, lace, and train conductors to terminal points without exceeding manufacturer's limitations on bending radii, but not less than radii specified in BICSI ITSIM, "Cabling Termination Practices" Chapter. Use lacing bars and distribution spools.
8. Do not install bruised, kinked, scored, deformed, or abraded cable. Do not splice cable between termination, tap, or junction points. Remove and discard cable if damaged during installation and replace it with new cable.
9. Cold-Weather Installation: Bring cable to room temperature before dereeling. Heat lamps shall not be used for heating.
10. In the communications equipment room, install a 10-foot- long service loop on each end of cable.
11. Pulling Cable: Comply with BICSI ITSIM, Ch. 4, "Pulling Cable." Monitor cable pull tensions.
12. Install patch cords as directed by the Owner.

C. UTP Cable Installation:

1. Comply with ANSI/TIA-568-C.2.
2. Do not untwist UTP cables more than 1/2 inch from the point of termination to maintain cable geometry.

D. Optical Fiber Cable Installation:

1. Comply with ANSI/TIA-568-C.3.
2. Cable may be terminated on connecting hardware that is rack or cabinet mounted.

E. Open-Cable Installation:

1. Install cabling with horizontal and vertical cable guides in telecommunications spaces with terminating hardware and interconnection equipment.
2. Suspend UTP cable not in a wireway or pathway, a minimum of 8 inches above ceilings by cable supports not more than 60 inches apart.
3. Cable shall not be run through structural members or in contact with pipes, ducts, or other potentially damaging items.

F. Group connecting hardware for cables into separate logical fields.

G. Separation from EMI Sources:

1. Comply with BICSI TDMM and ANSI/TIA-569-B-2012 recommendations for separating unshielded copper voice and data communication cable from potential EMI sources, including electrical power lines and equipment.
2. Separation between open communications cables or cables in nonmetallic raceways and unshielded power conductors and electrical equipment shall be as follows:

    a. Electrical Equipment Rating Less Than 2 kVA: A minimum of 5 inches.
    b. Electrical Equipment Rating between 2 and 5 kVA: A minimum of 12 inches.
    c. Electrical Equipment Rating More Than 5 kVA: A minimum of 24 inches.

3. Separation between communications cables in grounded metallic raceways and unshielded power lines or electrical equipment shall be as follows:

    a. Electrical Equipment Rating Less Than 2 kVA: A minimum of 2-1/2 inches.
    b. Electrical Equipment Rating between 2 and 5 kVA: A minimum of 6 inches.
    c. Electrical Equipment Rating More Than 5 kVA: A minimum of 12 inches.

4. Separation between communications cables in grounded metallic raceways and power lines and electrical equipment located in grounded metallic conduits or enclosures shall be as follows:

    a. Electrical Equipment Rating Less Than 2 kVA: No requirement.
    b. Electrical Equipment Rating between 2 and 5 kVA: A minimum of 3 inches.
    c. Electrical Equipment Rating More Than 5 kVA: A minimum of 6 inches.

5. Separation between Communications Cables and Electrical Motors and Transformers, 5 kVA or HP and Larger: A minimum of 48 inches.
6. Separation between Communications Cables and Fluorescent Fixtures: A minimum of 5 inches.

3.6 FIRESTOPPING

A. Comply with requirements in Division 07 Section "Penetration Firestopping." Comply with ANSI/TIA-569-B-2012, "Firestopping."

B. Comply with BICSI TDMM, "Firestopping Systems" Article.

3.7 GROUNDING

A. Install grounding according to BICSI TDMM, "Grounding, Bonding, and Electrical Protection" Chapter.

B. Comply with ANSI/TIA-607-B-2012.

C. Locate grounding bus bar to minimize the length of bonding conductors. Fasten to wall allowing at least 2-inch clearance behind the grounding bus bar. Connect grounding bus bar with a minimum No. 4 AWG grounding electrode conductor from grounding bus bar to suitable electrical building ground.

D. Bond metallic equipment to the grounding bus bar, using not smaller than No. 6 AWG equipment grounding conductor.

3.8 IDENTIFICATION

A. Identify system components, wiring, and cabling complying with ANSI/TIA-606-B-2012. Comply with requirements for identification specified in Division 26 Section "Identification for Electrical Systems."

1. Administration Class: 1.
2. Color-code cross-connect fields and apply colors to voice and data service backboards, connections, covers, and labels.

B. Comply with requirements in Division 09 Section "Interior Painting" for painting backboards. For fire-resistant plywood, do not paint over manufacturer's label.

C. See Division 27 Section "Communications Horizontal Cabling" for additional identification requirements. See Evaluations for discussion about TIA/EIA standard as it applies to this Section.Paint and label colors for equipment identification shall comply with ANSI/EIA-606-B-2012 for Class 2 level of administration[**including optional identification requirements of this standard**].

D. Comply with requirements in Division 27 Section "Communications Horizontal Cabling" for cable and asset management software.

E. Cable Schedule: Install in a prominent location in each equipment room and wiring closet. List incoming and outgoing cables and their designations, origins, and destinations. Protect with rigid frame and clear plastic cover. Furnish an electronic copy of final comprehensive schedules for Project.

F. Cabling Administration Drawings: Show building floor plans with cabling administration-point labeling. Identify labeling convention and show labels for telecommunications closets, backbone pathways and cables, entrance pathways and cables, terminal hardware and positions, horizontal cables, work areas and workstation terminal positions, grounding buses and pathways, and equipment grounding conductors.

G. Cable and Wire Identification:

1. Label each cable within 4 inches of each termination and tap, where it is accessible in a cabinet or junction or outlet box, and elsewhere as indicated.
2. Each wire connected to building-mounted devices is not required to be numbered at device if color of wire is consistent with associated wire connected and numbered within panel or cabinet.
3. Exposed Cables and Cables in Cable Trays and Wire Troughs: Label each cable at intervals not exceeding 15 feet.
4. Label each terminal strip and screw terminal in each cabinet, rack, or panel.

    a. Individually number wiring conductors connected to terminal strips and identify each cable or wiring group being extended from a panel or cabinet to a building-mounted device with name and number of particular device as shown.
    b. Label each unit and field within distribution racks and frames.

5. Identification within Connector Fields in Equipment Rooms and Wiring Closets: Label each connector and each discrete unit of cable-terminating and connecting hardware. Where similar jacks and plugs are used for both voice and data communication cabling, use a different color for jacks and plugs of each service.

H. Labels shall be preprinted or computer-printed type with printing area and font color that contrasts with cable jacket color but still complies with requirements in ANSI/TIA-606-B-2012, for the following:

1. Cables use flexible vinyl or polyester that flexes as cables are bent.

3.9 FIELD QUALITY CONTROL

A. Testing Agency: a qualified testing agency to perform tests and inspections.

B. Tests and Inspections:

1. Visually inspect UTP and optical fiber jacket materials for NRTL certification markings. Inspect cabling terminations in communications equipment rooms for compliance with color-coding for pin assignments, and inspect cabling connections for compliance with ANSI/TIA-568-C.1.

2. Visually inspect cable placement, cable termination, grounding and bonding, equipment and patch cords, and labeling of all components.
3. Test UTP copper cabling for DC loop resistance, shorts, opens, intermittent faults, and polarity between conductors. Test operation of shorting bars in connection blocks. Test cables after termination but not cross-connection.

    a. Test instruments shall meet or exceed applicable requirements in ANSI/TIA68-C.2. Perform tests with a tester that complies with performance requirements in "Test Instruments (Normative)" Annex, complying with measurement accuracy specified in "Measurement Accuracy (Informative)" Annex. Use only test cords and adapters that are qualified by test equipment manufacturer for channel or link test configuration.

4. Optical Fiber Cable Tests:

    a. Test instruments shall meet or exceed applicable requirements in ANSI/TIA68-C.2. Use only test cords and adapters that are qualified by test equipment manufacturer for channel or link test configuration.
    b. Link End-to-End Attenuation Tests:

        1) Horizontal and multimode backbone link measurements: Test at 850 or 1300 nm in 1 direction according to TIA/EIA-526-14-A, Method B, One Reference Jumper.
        2) Attenuation test results for backbone links shall be less than 2.0 dB. Attenuation test results shall be less than that calculated according to equation in ANSI/TIA-568-C.1.

C. Data for each measurement shall be documented. Data for submittals shall be printed in a summary report that is formatted similar to Table 10.1 in BICSI TDMM, or transferred from the instrument to the computer, saved as text files, and printed and submitted.

D. Remove and replace cabling where test results indicate that they do not comply with specified requirements.

E. End-to-end cabling will be considered defective if it does not pass tests and inspections.

F. Prepare test and inspection reports.

END OF SECTION 271300

SECTION 275120.99 - SOUND REINFORCEMENT SYSTEM (Varsity Baseball & Varsity Softball Fields)

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 and other Division 16 Specification Sections, apply to this Section. Refer to Division 16 Section “Basic Electrical Requirements” for additional requirements.

1.2 SUMMARY

A. This Section includes a sound reinforcement system for thenew Baseball and Softball Pressboxes at Holder Field.. Provide all features, functions and components specified herein and/or required on the drawings. Systems provided per these specifications shall include but not be limited to the following components: The project will require a new sound system and speakers at the varsity baseball and softball press boxes only.

1. Loudspeaker Systems: distributed loudspeakers
2. Amplifier / DSP
3. Input Wall Plates
4. Microphones and Stands

B. Related Sections include the following:

1. Division 26 Section “Basic Electrical Requirements.”
2. Division 26 Section “Basic Electrical Materials, Methods.”
3. Division 26 Section “Raceways and Pull Boxes.”
4. Division 26 Section “Outlet and Junction Boxes.”
5. Division 26 Section “Electrical Identification.”

1.3 System Description

A. Provide a new Sound Reinforcement System for the Varsity Baseball and Varsity Softball press boxes as indicated on the drawings and specified herein.

B. Furnish and install all equipment, accessories, materials and wiring in accordance with these specifications and drawings to provide a complete and operating Sound Reinforcement System.

1.4 ACTION SUBMITTALS

1. [Product Data,][Shop Drawings,][Wiring Diagrams,][Certifications]:

a. Product Data: for Sound Reinforcement System components including product dimensions, installed features and a list of materials.
b. Shop drawings: shall include scaled plans and component locations with interconnection wiring indicated. Components indicated on the shop drawings shall be labeled with the zone grouping of the component.
c. Wiring diagrams: for all devices or equipment, which is part of the Sound Reinforcement System. Include diagrams for equipment and for system with all terminals and interconnections identified. Include drawings for typical device wiring requirements.
d. Certifications: required by 1.5.B of this section.

2. Pre-Bid submission shall consist of an item-by-item reference to Bid Specification concerning any deviations from this Specification. Any notations and exceptions to these Documents shall be included. Information provided is to correspond with existing equipment, systems, and software only. New features, functions and equipment not currently in use as standard product on a similar project are to be noted as such in Contractor's Bid.

1.5 QUALITY ASSURANCE

A. Manufacturer's Qualifications:

1. Firms regularly engaged in manufacture of Sound Reinforcement System Components and materials of types, sizes, and electrical characteristics required, and whose products have been in satisfactory use in similar service for not less than 5 years.

B. Supplier – Contractor Qualifications:

1. All items of equipment including wire and cable shall be designed by the supplier-contractor to function as a complete system and shall be accompanied by the supplier-contractor's complete submittals and drawings detailing all interconnections.
2. The supplier-contractor shall be an established electronic systems contractor that has had and currently maintains a locally run and operated business for at least 10 years.
3. The supplier-contractor shall be the factory-authorized distributor for the products specified herein and as submitted. Supplier-contractor shall submit satisfactory proof of factory authorization with product submittals.
4. The supplier-contractor shall show satisfactory evidence, upon request, that the supplier maintains a fully equipped service organization capable of furnishing adequate inspection and service to the system. The supplier-contractor shall maintain at this facility the necessary spare parts in the proper proportion as recommended by the manufacturer to maintain and service the equipment being supplied.
5. The supplier-contractor shall employee NICET or CEST certified technicians for system installation, programming and testing. Supplier-contractor shall submit certifications with product submittals.
6. The supplier-contractor shall employee design staff with NICET Level II certification in the technical sub-field of audio systems to prepare installation drawings and provide project support. Supplier-contractor shall submit certifications with product submittals.

7. The supplier-contractor shall employee design staff/ technicians factory certification in the programming of the mixer/DSP. Supplier-contractor shall submit certifications with product submittals.
8. Use of systems by other, named equals will be considered based upon the system's ability to provide the functions and features of the specified equipment and as specified. It shall be the Contractor's responsibility to provide equipment in complete compliance with the Specifications.
9. Acceptance of a system by another manufacturer, based on submittal documents furnished by the Contractor, shall only be construed as permission to proceed with the installation pending final test and approval of the system. Contractor shall continue to bear the liability for replacement of the proposed system with the specified system if, in the opinion of the Owner or Architect/Engineer, the system fails to perform as specified or fails to meet approval of authorities having jurisdiction during the indicated warranty period.
10. Contractor shall be responsible for all costs and any damages arising from the Contractor's failure to provide equipment that meets these Specifications including, but not limited to, any penalties for failure to meet construction deadlines.

C. Electrical Component Standard:

1. Provide work complying with applicable requirements of NFPA 70 "National Electrical Code".

D. EIA Compliance:

1. Comply with the following Electronics Industries Association Standards:

a. Sound Systems, EIA-160
b. Loudspeakers, Dynamic Magnetic Structures, and Impedance,
c. EIA-299-A.
d. Racks, Panels, and Associated Equipment, EIA-310-A.
e. Amplifiers for Sound Equipment, SE-101-A.
f. Speakers for Sound Equipment, SE-103.

1.6 DELIVERY, STORAGE, AND HANDLING

A. Deliver products in factory containers. Store in clean, dry space in original containers. Protect products from fumes and construction traffic. Handle carefully to avoid damage.

B. In addition Division 16 Section "Basic Electrical Requirements" should be referenced for delivery, storage and handling materials.

1.7 IN-SERVICE TRAINING

A. The contractor shall provide minimum of four (4) hours of in-service training with this system. These sessions shall be broken into segments that will facilitate the training of individuals in the operation of the system. Operators' manuals and users guides shall be provided at the time of this training.

1.8 WARRANTY

A. The supplier-contractor shall guarantee availability of local service by factory-trained personnel of all specified equipment under this section. On-the-premise maintenance shall be provided at not cost to the purchaser for a period of one (1) year (parts and labor) from date of acceptance unless damage or failure is caused by misuse, abuse, neglect, or accident.

B. In addition the Sound Reinforcement System product manufacturer's shall provide a one (1) year (parts only) limited warranty from the date of acceptance. All warranty periods shall begin on the date of acceptance by the owner/engineer.

C. The supplier-contractor shall, at the owner's request, make available a service contract offering continuing factory authorized service of the system after the initial warranty period.

D. Honor component warranties for the term established by the manufacturer, if greater than one year.

E. System defects and failures occurring during the warranty period are to be corrected and repaired within 72-hours of notification of such defects and failures.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

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

1. Atlas Sound
2. JBL
3. BiAmp
4. Peavey
5. Crown Audio
6. QSC
7. Tascam
8. Denon
9. Proco
10. Belden
11. West Penn Wire

B. Basis of Design: The specified products herein are based on the manufacturers listed above. Systems from any pre-approved manufacturer may be provided. The Engineer however, reserves the right to determine equivalent components and operation to those specified.

C. The intent of this specification is to establish a standard of quality, function and features. It is the responsibility of the bidder to insure that all pre-approved products meets or exceeds every standard set forth in these specifications. Any prior approval of an alternate product does not exempt the supplier-contractor from meeting the intent of these specifications. Failure to comply with the operational and functional intent of these specifications may result in the total removal and replacement of the alternate system at the expense of the contractor.

2.2 GENERAL

A. Provide complete and fully functional sound reinforcement system using materials and equipment of types, sizes, ratings and performances as indicated. Use materials and equipment that comply with the referenced standards and manufacturer's standard design and construction in accordance with the published product information. Coordinate with features of materials and equipment so they form a complete system with components and interconnections matched for optimum performance of specified functions.

2.3 MATERIALS

A. Mixer / DSP: The mixer/DSP indicated on the drawings shall provide functions as scheduled below:

1. Twelve (12) input channel capacity. Input type and level shall be software selectable for each channel.
2. Four (4) output channel capacity.
3. The software programming shall include but not be limited to standard, matrix and automatic mixing, automatic feedback suppression, parametric and graphic equalizers, compressor/limiter, output gain controls and preset recall. The unit shall be programmed for no less than five (5) presets. Presets to include:

    a. Preset 1 - all loudspeakers on, all inputs live
    b. Preset 2 - all loudspeakers on, designated inputs only are live
    c. Preset 3 - loudspeakers over seating area only on, all inputs live
    d. Preset 5 – loudspeakers off, all inputs muted

4. Unit shall include provisions for an external volume control and/or preset selector panel.

B. Mixer / DSP Remote Panel: Provide functions as listed below:

1. Eight-channel preset selector switch and an eight-channel volume control with LED indication on preset number and volume level on a two-gang plate.
2. Volume control channels shall be as follows:

    a. Channel 1 – Overall system volume
    b. Channel 2 – Microphone input number 1 gain
    c. Channel 3 – Microphone input number 2 gain
    d. Channel 4 – Media Player

C. Reference Product(s): Include compatable volume controllerAmplifier: Provide functions as listed below:

1. Two (2) channel, 300 watts per channel at 70 volts output.
2. Frequency response shall be +/- 0.25db at one watt from 20Hz to 20,000Hz.
3. Total harmonic distortion at full rated power from 20Hz to 20,000Hz shall be <1%.
4. Reference Product(s): The amplifier shall be a Biamp Voltera D 1200.4, Crown CDI4000, or approved equal.

D. Loudspeakers:Outdoor Loudspeakers indicated on the drawings shall provide functions as scheduled below:

1. The loudspeaker system shall be a two-way, full-range bass reflex design with a single cast 8" and one ¾" exit HF driver coaxially mounted on a 90° x 40° horn. Drivers shall be connected to an integral crossover with a crossover frequency of 2 kHz with driver protection using DYNA-TECH active protection circuitry.

2. The input connections shall be one 12' (4m) SJOW #16-gauge 2-conductor cable with stripped ends. The system shall be equipped for low impedance (8 Ohm) operation. The system shall be equipped with a high performance 200W autoformer for use in 70V/100V distributed systems, with taps of 25W, 50W, 100W, and 200W for 70V operation (50W, 100W, and 200W for 100V distributed systems).

3. The enclosure shall be a rotomolded low linear density polyethylene enclosure providing weather and UV resistance with a three-layer weather-resistant 1mm perforated dual-layer powder-coated aluminum grille. The enclosure shall incorporate five M8 rigging points for multiple mounting options, and an included dual-layer zinc-rich epoxy powder-coated steel mounting yoke. Integrated ribbing and internal reinforcements provide added structural support.
4. The system shall have an IEC529 IP rating of IP55W. The system shall have an operating range of 100 Hz to 16 kHz (-10 dB) and a low impedance (8 Ohm) input capability of 40V RMS. The nominal sensitivity on axis at one meter with a power input of 1 Watt shall be 97dB. The nominal dispersion shall be 90° H x 40° V. The loudspeaker shall be 11.3" (287mm) H (front) x 11.3" (287mm) W x 13.3" (338mm) D.
5. Referenced product R.5-94Z speakers or approved equal.

E. Equipment Rack: Provide functions as listed below:

1. Wall mounted with 18” deep center section. Provide enough racking height to allow for all necessary equipment plus 10% empty rack space. Provide a perforated front door to allow cooling. Install blank or vent panels as required in any used rack spaces.
2. Unit shall include:

   a. One 120VAC switch power strip with surge suppression
   b. Cooling Kit - model PET-K-CWR or approved equal
   c. Bonding kit - model # PET-K-CWR or approved equal

Referenced product EIA compliant 19” cabling wall mount rack shall be Middle Atlantic Products model # CWR-18-22PD. Overall dimensions shall be approximately 19” W x 36” H x 22” D, with a useable

depth of 20". Weight capacity shall be 200 lbs. Center section and back pan shall be 16-gauge steel, phosphate pre-treated and finished in a black textured powder coat. Or approved equal.

F. Microphone/Auxiliary Input Wall Plate: Microphone/Auxiliary input plates indicated on the drawings shall provide functions as scheduled below:

1. Shall be brushed stainless steel.
2. Shall include one (1) Neutrik NC3FDL-1 XLR connector and one (1) Neutrik NJ3FP-6C three conductor 1/4" connector.
3. Reference Product(s): Proco WP1055 or equal by Whirlwind or Liberty.

G. Vocal Microphone

1. Microphone shall be a dynamic, low impedance unit with a cardioid pattern.
2. Units shall provide and on/off switch.
3. Frequency response shall be 45Hz to 15kHz and the sensitivity shall be 2.9mV/Pascal @ 1 kHz.
4. Provide each microphone withdesk stand and 15' connection cable.
5. Provide two 2vocal microphones, two (2) desk stands and two (2) 15' microphone connection cables. per pressbox.
6. Reference Product(s): The vocal microphone shall be an SHURE Model #SM58 or as or equal Electro Voice.. The microphone desk stand shall be an Atlas Sound DS7E or equal. The microphone cable shall be Proco M25 or equal by Whirlwind or Liberty.

H. Wiring and Cable

1. Microphone/Auxiliary Cable: Provide plenum rated, one twisted shielded pair, 20 AWG shielded cable. Provide West Penn Wire 25292B. Belden 6400FE shall be considered equal. Install two cables from each wall plate to the equipment rack,
2. Loudspeaker Cable: Provide plenum rated, one twisted pair, 18 AWG cable. Provide West Penn Wire 25224B. Belden 6300UE shall be considered equal.

PART 3 - EXECUTION

3.1 GENERAL

A. Refer to Division 16 Section "Requirements for Electronic Systems" for the installation and electronic systems, wiring installation, grounding, field quality control, checking, start-up and training requirements in addition to all requirements listed herein.

B. Refer to Division 16 Section "Electronic Systems Testing" for the testing and proof of performance requirements in addition to all requirements listed herein.

3.2 INSTALLATION

A. Grounding: Maintain a true earth single point equipment ground. Do not compromise the ground by other metallic connections between the rack and the building. Where necessary to preserve the isolated ground, insulate the connections between metallic conduits containing low voltage wiring and the rack.

B. Polarity: Maintain an absolute strict polarity convention for all wiring, from the microphone receptacles to the loudspeakers.

C. The loudspeaker assemblies shall be mounted securely to the bottom of the building structure at approximately the 25’ level. Each loudspeaker assembly shall have a safety cable running from the enclosure to the building structure.

D. Install all wiring in conduits and connect all speakers and equipment complete where shown on the Drawings.

E. Provide and make connections to all specified system equipment, unless otherwise indicated in Contract Documents.

F. Install equipment in strict accordance with manufacturer's instructions.

G. Install equipment in the locations and mounting heights indicated in the Contract Documents.

H. Securely mount equipment plumb and square in place. Where equipment is installed in cabinets, provide mounting bolts in all equipment fastening holes.

I. Confirm the connections of all wiring and other system components before installation.

3.3 TESTING

A. Microphone/Auxiliary Line: Select a microphone or auxiliary line. Verify an open circuit between the two conductors and between each of the two conductors and the shield. Place a plug in microphone receptacle shorting pin #3 conductor to shield. Repeat this with pin #2 and the shield. Verify shorts. Repeat and document this procedure for each microphone line.

B. Loudspeaker Line: Select a loudspeaker line at the rack. Test the impedance between the two conductors and verify the loudspeaker plus the wire distance is at the correct impedance. Test the impedance between each conductor and ground. Verify the circuit is open. Repeat and document this procedure for each loudspeaker line.

C. Rattle: Play a 1000Hz sine wave through the loudspeakers and adjust the system to an average of 80dB over the seating area. Slowly sweep the frequency from 40Hz to 18kHz. Locate and eliminate any rattles or audible vibration caused by the loudspeaker or their mountings.

3.4 IDENTIFICATION

A. Identify system components, wiring, cabling and terminals according to Division 16 Section "Electrical Identification."

3.5 FIELD QUALITY CONTROL

A. Manufacturer's Field Service: Engage a factory-authorized supplier-contractor to inspect field-assembled components and equipment installation and supervise pre-testing, testing, and adjusting of the system equipment. Record test results and include a printed report in the maintenance manuals. The sound reinforcement supplier-contractor shall provide on site a competent supervisor and qualified supporting technical personnel during the entire installation and be responsible for verifying that all units and controls are properly installed, connected, and labeled and that interconnecting wires and terminal are identified.

3.6 ADJUSTING AND CLEANING

A. Remove any paint splatters and other spots, dirt and debris. Touch up scratches and marred finish to match original finish.

B. Clean installed items using methods and materials recommended by the manufacturer.

END OF SECTION 275120.99

END OF SECTION 275120

PART 1 - GENERAL

1.01 RELATED DOCUMENTS:

A. The site plan, draining plan, grading plan, utility plan and landscaping plan will affect the installation of the irrigation system. Coordinate to avoid conflicts.

1.02 INSPECTION OF SITE

A. All prospective Bidders are urged to visit the project site and to examine existing conditions and make note of any conditions which may pertain to his class of work. Failure to do so will not relieve bidder of responsibility in connection with his work.

1.03 DESCRIPTION OF WORK

A. General:

1. The extent of base landscape irrigation as shown on the drawings.

2. Unless otherwise specified, the plans and specifications are intended to include everything obviously requisite and necessary for the proper installation and completion of the work, whether or not each necessary item is mentioned herein. The plans and specifications are intended to be cooperative, and any item called for in one and not the other shall be binding as if called for in both.

B. The system shall provide 100% coverage and uniformly irrigate all areas and perform as required by these plans and specifications:

1. Provide an underground irrigation system as shown on the drawings and specifications and as required by these plans and specifications.

a) Automatic irrigation system including piping, fittings, sprinkler heads, control wire, quick coupler valves, controllers, and accessories.

b) Excavating and backfilling irrigation system work.

c) Testing and adjusting of system.

d) “As-Built” drawings.

e) Winterization - shutdown - spring start-up.

2. All work required by the plans and specifications shall be accomplished by the Contractor even though minor items required may not be specifically mentioned in the above listing.

C. Drawings: The system layout is diagrammatic. Exact locations of piping, sprinkler heads, valves, and other components may need to be modified by the Contractor in the field at time of installation to allow for actual on-site conditions. Proper spacing of sprinkler heads will be required to obtained satisfactory coverage. Minor adjustments in the system layout will be permitted to clear fixed obstructions. Any major revisions to the irrigation system shall be submitted in writing to the owner for approval. The final system layout must be acceptable to the owner.

D. Verification of Plans and Specifications: It shall be the responsibility of the Contractor to carefully examine the plans and specifications relating to this work for completeness, accuracy, and clarity. It is the Contractor’s responsibility to obtain the most current site survey, utility plans, landscape plans

and any other document necessary to complete the installation of the irrigation system in cooperation with the site improvements. These documents may be obtained through contact with the owner's authorized representative. Any conflict, errors or clarifications request shall be immediately brought to the attention of the Architect for written interpretation or instructions. No claim for increased compensation for additions, changes, or alterations will be considered unless written authorization is granted by Owner's representative. Otherwise, any additional materials and/or labor due to existing conditions shall be furnished under this contract.

E. The Contractor is responsible for obtaining all permits required for installation of this work.

1.04 QUALITY ASSURANCE

A. Manufacturing Qualifications:

1. Provide the landscape irrigation system as a complete unit produced by acceptable manufacturers for all portions of the working equipment which includes heads, valves, controls, and accessories. All irrigation products shall be purchased from a local authorized irrigation supply company.

B. Work and materials shall be in accordance with the latest rules, and other applicable state or local laws. Nothing in the Contract Documents is to be construed to permit work not conforming to these codes.

C. Contractors Qualifications: Bidding Contractors shall have a minimum of three years experience in the construction of a job of similar size and complexity.

1. Provide the General Contractor a list of five equivalent irrigation system installations, performed in the last five years, incorporating the following information:

a) Name and address of product.

b) Name and address of Owner.

(1) Contact person

(c) Name and address with whom contract was with.

(1) Contact person

D. Requirements of regulatory agencies and utilities:

1. System shall comply with the latest requirements of all state and local codes and ordinances.

2. System shall comply with the latest rules and requirements by all utility companies involved.

3. Nothing in the contract documents is to be constructed to permit work not conforming to these rules, codes and ordinances.

E. Electrical devices shall carry Underwriter's Laboratory labels.

F. Required pressure testing shall be the responsibility of the Contractor.

G. Materials, equipment, and methods of installation shall comply with the following codes and

standards:

1. National Fire Protection Association (NFPA)

2. National Electric Code (NEC)

3. American Society for Testing and Materials (ASTM)

4. The Irrigation Association (IA)

5. American Water Works Association (AWWA)

1.05 SUBMITTALS

A. Manufacturer's Data:

1. Submit copies of manufacturer's specifications and instructions for all manufactured materials and products if other than those specified herein.

B. Record Drawings:

1. After completion of the work and before final acceptance, a set of scaled, reproducible record drawings, and two sets of prints showing the location of the complete work shall be submitted to the Owner. Final payment and any retainage will not be released until these drawings are submitted and accepted by the Owner.

C. 1. Submit a weekly irrigation schedule based on an annual evapotranspiration rates, average rainfall etc. amounts or as directed by the Owner.

D. Construction Schedule:

1. Submit a construction schedule to be approved by the Owner.

1.06 WARRANTY

A. The Contractor shall furnish a manufacturer's written warranty to the effect that all heads, valves, and controllers will be warranted for a period of one year (or as determined to be more than one year by the manufacturer) , to be free from defects and faulty workmanship, and that any defective heads, valves, or controllers shall be promptly repaired or replaced without additional cost to the Owner in accordance with that warranty.

B. All materials other than those referred to in Paragraph A above shall be warranted for a period of one full year from the date of final acceptance by the Owner.

C. All installation labor used on this project will be warranted for one full year from date of final acceptance by the Owner.

PART 2 - PRODUCTS

2.01 MATERIALS

A. General:

1. The materials chosen for the design of the sprinkler system have been specifically referred to by manufacturer to enable the Owner to establish the level of quality and performance required by the system design. After award of contract and prior to beginning work, the Contractor shall submit for approval (3) copies of the

complete list of materials which he proposes to install. No deviations from the specifications will be allowed.

2. Standard of Quality Acceptable Manufacturers:

Rain Bird Sales, Inc. - Glendora, CA (Rotor Heads, Spray Heads, Control Valves, Valve Boxes & Quick Couplers, Drip, Controller, Rain Sensor)
Hunter Industries- San Marcos, CA 92078 (Rotor Heads, Spray Heads, MP Rotors, Control Valves, & Quick Couplers, Drip, Controller, Rain Sensor)
Hydro-Rain- North Salt Lake, UT (Wireless Rain Sensor, Battery Controller)
Flint & Walling-Kendallville, IN (Booster Pump)
Wilkins Division - Paso Robles, CA (Backflow Preventer)
Cresline - Evansville, IN (Piping)
Lasco - Brownsville, TN (Fittings)
Leemco, Inc.- Mount Vernon, CA (Joint Restraints)
Nibco - Elkhart, IN (Isolation Valves)

B. Substitutions

1. Proposed substitutions for materials or equipment must be submitted for approval within (10) days of the project bid date with complete drawing documents for consideration as approved equals. Otherwise, such substitutions will not be permitted. Proposals for substitutions shall be made only by the prime bidders. Manufacturers, distributors, and Sub-Contractors shall not make proposals to the Architect for substitutions.

2. No substitution shall be made unless authorized in writing by the Engineer. Should a substitution be accepted and should the substitute material prove defective or otherwise unsatisfactory for the service intended, and within the guarantee period, the Contractor shall replace this material or equipment with material or equipment specified, at his own expense, and to the satisfaction of the Architect.

3. Contractors submitting bids on substitute materials and equipment must also provide a written performance guarantee certifying that the substitute materials and equipment will provide the specified irrigation requirements.

C. Backflow Preventer

The backflow preventer shall be a 975XL RP or approved equal (as required) or approved equal and shall meet or exceed specifications and standards set by the State and USC Foundation for Cross-Connection Control and Hydraulic Research. The Contractor shall check with local authorities for code compliance. The backflow shall be sized as shown on drawings. All exposed standpipe and fittings shall be copper or galvanized pipe to 18” below grade.

D. Booster Pump (pressure unknown)

The existing water pressure was not available at the time of design development. The Contractor is required to determine the existing pressure at the irrigation point of connection prior to installation of the system. Report any deviation between the existing pressure and the required pressure in writing to the owner’s authorized representative. If the required **100** psi minimum is not available at the point of connection than a booster pump, protective cover, pump start relay and a RP backflow device shall be required and submitted as a change order to the Owner’s authorized representative. The irrigation consultant shall determine the appropriate manufactures and models. The booster pump shall be installed per manufacturer’s specifications on a concrete pad. The Owners will extend all power to the booster pump. The Contractor shall have the exact power and voltage verified for coordination with the pump prior to installation. A Munro Startbox pump start relay shall activate and control the pump. The booster pump shall be winterized and stored in an indoor facility during

the off-season. Submit a change order to the owner for approval if it is determined that a booster pump is required.

E. Main Line Piping

All main line piping shall be Cl 160 PVC SDR 26 standard weight as manufactured by Cresline or approved equal. All mainline 1" - 2 1/2" shall be solvent weld. All mainline 3" and larger shall be PVC gasketed type. Pipe shall carry the N.S.F. seal of approval and meet the following specifications: ASTM 1120/1220, C.S. 256-63, or latest revisions. Size as indicated on drawings.

F. Lateral Line Piping

All lateral lines down stream of the valves shall be CL 200 PVC SDR 21 for 1" pipe, Cl 160 PVC SDR 26 for 1 1/4" and larger pipe, standard weight as manufactured by Cresline or approved equal. Pipe shall carry the N.S.F. seal of approval and meet the following specifications: ASTM 1120/1220, C.S. 256-63, SDR 26 or latest revision. Size as indicated on drawings.

All lateral lines 1" and 1 1/4" down stream of the valves shall be 100 psi polyethylene NSF pipe manufactured by Cresline or equal. The pipe shall carry the N.S.F. seal of approval and meet the following specifications: ASTM 1120/1220, C.S. 256-63, SDR 26 or latest revisions. Lateral lines 1 1/2" and larger shall be Cl 160 PVC SDR 26 for 1 1/4", standard weight as manufactured by Cresline or equal. Pipe shall carry the N.S.F. seal of approval and meet the following specifications: ASTM 1120/1220, C.S. 256-63, SDR 26 or latest revision.
Size as indicated on drawings.

G. Pipe Fittings

All PVC fittings 1" - 3" shall be solvent weld schedule 40 standard weight. Attachment shall be made with both a primer and a solvent cement as approved by the manufacturer. Glue type saddles may be used so long as they are 3/4 round type units which grip the pipe. Saddles are to be bored or cut with appropriate equipment and holes are not to be burned into the pipe. All fittings 4" and larger shall be ductile iron with PVC gasket and hub configuration and retaining rings as manufactured by Harco or Leemco. Provide Leemco joint restraints or concrete thrust blocks where necessary on all 3" and larger fittings. Install per manufactures recommendations.

All Poly fittings shall be plastic type insert fittings ASTM D-2609. All joints 1 ¼" or larger shall be double clamped with stainless steel screw driven clamps.

H. Automatic Valves

The remote-control valves shall be a Hunter PGV Series or approved equal, normally closed, 24 VAC 50/60 cycle solenoid actuated globe design capable of having a flow rate of the gallons per minute (GPM) indicated in the drawings. The valve pressure rating shall not be less than 150 psi.

The Drip Irrigation remote control valve kit shall be Hunter PCZ or approved equal, containing the valve, filter, and pressure regulator. Refer to the irrigation plan for specific valve size and installation detail. Install per manufacturers specifications in a commercial grade 12" valve box with locking cover such as Hydro Rain or Rain Bird.

I. Valve - Controller Communication

Communication between the controller and the valves shall be accomplished with copper wire with an exterior jacket which is U.L. listed for direct burial and sprinkler control. The Contractor shall be responsible for correct wire sizing for distance and voltage loss. A minimum of 14 gauge wire will be used, and larger gauges used where voltage loss dictates.

Common wire color shall be white. Station wires shall be all the same color for the entire run and number marked at all splices and connections. All field connections will be accomplished with wire nuts and will be made watertight and oxidation resistant through the use of 3M Skotch Kast "400" or DBY electrical insulating resin packs. Other brands are not acceptable. Use of sealant without container package is not permissible.

J. Valve Enclosures

All single automatic valves shall be enclosed in a 10" round, commercial grade, fiberglass valve box with locking cover such as Rain Bird or approved equal. All valve boxes are to be filled with a minimum of 6" of washed pea gravel below pipe level to ensure adequate drainage. Controller station numbers shall be marked on the valve box cover in a permanent manner.

K. Isolation Valves

All isolation valves shall be brass, threaded gate valves as manufactured by Nibco or approved equal. Line size. Enclose in 10" round, commercial grade, fiberglass valve box with locking cover such as Rain Bird or approved equal.

L. Automatic Controller

The automatic controller shall be Hunter PRO-C or approved equal with the number of stations as indicated on the drawing. The controller shall be an eight-station base model, expandable to 32 stations with hot-swappable modules in four or eight station increments without powering down. The cabinet shall be a heavy-duty key-locking cabinet (NEMA 3R rated) with internal junction box. Flexible programming shall include cycle/soak, programmable valve delay, sensor override by station, master valve by station, calendar day off and total program and valve run times. Other options shall include Contractor programming default, seasonal adjust and battery back-up protection. All 120 VAC power to the controllers will be extended by the Owners. Confirm a ground of 15 OHMS or less. Lightening protection devices are to be installed on the primary, secondary and two wire path as required by the manufacturer. Place in the approximate area as shown on the drawings, with final location to be determined by the Owner at time of installation.

M. Rain Sensor

The wireless rain sensor shall be a Hunter WR-CLIK or approved equal. The rain sensor shall send a signal to the controller during a rain event, allowing it to stop any zones from operating. Install per manufacturers instructions.

N. Soil Moisture Sensor Kit

The soil moisture sensor shall be a Hunter WR-CLIK or approved equal. The soil moisture sensor kit shall include one corrosion resistant in-ground soil moisture sensor to control watering based on actual soil moisture content and one controller interface designed for outdoor installation. The sensor shall provide auto-calibration function which simplifies initial configuration. Based on observed soil moisture behavior in the specific soil, the auto-calibration function will set a soil moisture watering threshold that is optimal for the site-specific conditions. This threshold shall be the soil moisture value at which the sensor will allow the automatic irrigation system to water. The sensor shall communicate with the controller interface over valve wires and shall be compatible with all brands of sprinkler timers. Install per manufacturers recommendations.

O. Sprinkler Heads

Small Turf Sprays
The full or part circle pop-up spray head sprinkler shall be Hunter Model PROS Series, capable of covering the radius and pattern as shown on the drawings at a minimum base pressure of 30 psi. The nozzle piston shall have a smooth external surface, riser wiper seal in cap, full-length stainless

steel retraction spring, and filter screen. Sprinkler body constructed of non-corrosive heavy-duty plastic. All parts shall be removable through top of unit by removal of threaded nozzle. The overall pop-up height shall be 4 inches.

Small Shrub Sprays
The full or part circle pop-up spray head sprinkler shall be Hunter Model PROS, capable of covering the radius and pattern as shown on the drawings at a minimum base pressure of 30 psi. The nozzle piston shall have a smooth external surface, riser wiper seal in cap, full-length stainless steel retraction spring, and filter screen. Sprinkler body constructed of non-corrosive heavy-duty plastic. All parts shall be removable through top of unit by removal of threaded nozzle. The overall pop-up height shall be 6 or 12 inches as noted on the plans.

Multi-Stream Rotating Sprinkler
The multi-stream rotating sprinkler shall be a Hunter MP Model PROS Series or approved equal body with a MP Rotator™ nozzle. The sprinkler shall cover the radius (4'-30') and pattern as shown on the drawing at a minimum base pressure of 40 psi. The MP Rotator shall provide matched precipitation with an adjustable arc and radius in a single nozzle. The overall pop-up height shall be 4, 6 or 12 inches as noted on the plans.

Intermediate Turf Rotors
The full or part circle sprinkler shall be Hunter I-20. A rotary gear-driven sprinkler for residential and commercial applications. It features a non-strippable drive, automatic arc return, non-reversing 360° capabilities, FloStop® control, a drain check valve, water-efficient nozzles that can be easily changed, and simple arc adjustment.

Large Turf Rotors
The full or part circle shall be a Hunter I-25, is a rotary gear-driven sprinkler for commercial applications. It features a non-strippable drive, automatic arc return, non-reversing 360° capabilities, a drain check valve, water-efficient nozzles that can be easily changed, simple arc adjustment, and optional reclaimed water ID.

Sports Turf Rotors
The full or part circle sports turf rotor shall be a Hunter I-40. A tough commercial rotor that delivers water with accuracy and efficiency at distances up to 70 feet. Featuring diverse three-port nozzle options, a non-strippable drive, and a thick rubber cover built to prevent injury, it's no wonder this rotor is found most often in stadiums worldwide. With the strength of stainless steel, the I-40 is built to last in the harshest sports, public park, and commercial environments.

P. Landscape Dripline

Dripline
Combination distribution/emission dripline shall be Hunter HDL Series or Rain Bird Landscape XF Series Dripline or approved equal. All connection fittings shall be approved Hunter parts. Refer to the irrigation legend on the plans for specific flow and spacing requirements. All buried dripline application shall utilize air relief valves unless the product contains emitters with individual check valves. Installation of the air relief valve in a 6" valve box is to occur at all highpoints of individual zones (there may be more than one depending upon layout and topography) to avoid siphoning of particulate matter into emitters. Flush caps (manual) should be installed at ends of all drip zones for the initial clearing/ flushing of the zone, and for periodic maintenance/ winterization or flushing if upstream breaks occur. Use a 6" valve box with gravel at the bottom for each flush valve.

Planting Beds: Install tubing under a 2"-3" mulch bed and stake every 18" with galvanized tie down stakes. Individual plant material requiring more water may be supplemented using additional emitters with 1/4" distribution tubing. Refer to the Landscape Dripline detail for specific installation procedures and additional components. Install a manual drain valve at the end points of the drip zone in a valve box.

Q. Quick Coupling Valves

Quick coupling valves (QCV) shall be Hunter HQ-5RC or approved equal. All brass construction with rubber cover. All quick coupling valves are to be enclosed in a 10" round fiberglass valve box with locking cover such Rain Bird, or Hydro-Rain Specification Grade. Secure quick coupler by mounting on a 1" Lasco brass insert Snap-Lok Swing Joint with stabilizer elbow Model # LG-13S-212. Provide one (1) matching valve key and swivel adapter for every ten QCV. The quick couplers are to be set at such height that the valve box will not interfere with the operation of the valve key.

R. Sprinkler Risers

Sprinkler risers tapped 3/4" and smaller shall consist of a flexible riser pipe such as Rain Bird Swing Pipe, Blu-Lok or approved equal. Compatible "no-clamp" insert fittings shall be employed if using this type of pipe.

PART 3 - EXECUTION

3.01 WATER SUPPLY

The water supply shall be from an existing service line. The tap and meter shall be the responsibility of the Contractor. Install per local code and in accordance with the water purveyors requirements. Approximate locations shown on plan, verify in the field with owners authorized representative.

3.02 SYSTEM DESIGN

A. Lay out work as accurately as possible to the drawings. The drawings, though carefully drawn, are generally diagrammatic to the extent that all offsets, fittings, and finished site conditions may not be shown.

B. The Contractor shall be responsible for full and complete coverage of all irrigated areas as to spacing and precipitation rates being matched and shall make any necessary adjustments to the system at no additional charge to the Owner. Head spacing as shown on the drawings is predicated on the water supply being a minimum of **100** static psi at the point of connection. **Contractor shall verify said pressure before beginning the installation.** Report any deviation between the said pressure and the specified pressure to the owners authorized representative. Head spacing shall not exceed 55% of manufacturer's stated diameter.

C. Any major revisions to the irrigation system must be submitted to the Owner and answered in written form, along with any change in the contract price.

3.03 TRENCHING AND BACKFILLING

A. General:

1. Pulling, Excavating, and Trenching:

a. Perform all excavations as required for the installation of the work included under this section, including shoring of earth banks to prevent cave-ins.

b. All lateral pipe (2" and smaller) shall be pulled with a vibratory plow.

c. If trenching, trenches shall be wide enough to allow a minimum of 6" between parallel pipelines. If pulling, the same lateral distance shall be observed.

2. Underground Obstructions:

a. Any unforeseen underground obstructions which might be encountered

during the installation shall be brought to the attention of the owner immediately and work on that portion of the installation shall be suspended.

b. Any additional expense involved in removing those obstructions or the re-routing of lines shall be submitted to the Owner in writing and approved prior to continuing the installation.

3. Underground Utilities:

a. It shall be the responsibility of the Contractor to locate or have located all existing public underground utilities on that portion of the site which is affected by his work. All private underground utilities shall be located and marked by the Owner. The Contractor shall contact the Owner for verification that all private utilities have been located prior to construction. The Contractor will be responsible for the repair of any cuts, which are made by him in these utilities.

B. Minimum Cover

1. A minimum of 18" cover shall be held over all main lines and control lines. A minimum of 12" of cover shall be maintained over all lateral lines.

C. Backfill

1. All irrigation trenches shall be backfilled and compacted by mechanical means in 6" lifts to a minimum of 90% of the original density. Backfill material shall be of the same soil mix as excavated and free of any rocks or debris larger than 3/4" in diameter. It shall be the Contractor's responsibility to remove all larger debris from the premises and to furnish any additional soil which may be necessary to level the trenches. All disturbed areas are to be re-seeded as specified by owners authorized representative.

2. Contractor shall be responsible for repair of any irrigation trench settling which occurs during the first year after final acceptance by the Owner.

3. Where pipe is pulled into the ground, all domes will be compacted to original grade after pulling.

D. Sleeving Pavements, Walks, Etc.

1. All mainline and lateral piping under any pavement (walks, roads etc.) and structures shall be installed in separate sleeves (min. Schedule 40 PVC) unless noted otherwise. Sleeves to be a minimum of twice (2x) the diameter of the pipe to be sleeved unless otherwise noted. Mainline sleeves shall be a minimum of 24” below subgrade and lateral sleeves shall be a minimum of 18” below subgrade. Extend sleeves into landscape area 12” minimum. Backfill material shall be free of rubbish, plant matter, frozen materials, and stones larger than 3/8” in maximum dimensions. Provide less than 6” of clearance between each lateral line and not less than 18” of clearance between lateral lines and mainlines.

2. All piping under existing pavement and walkways will be bored with appropriate equipment unless otherwise noted. Where roadway cuts are required, the asphalt is to be saw cut, the sleeve installed, and surface restored to original by professionals engaged in this business.

3. All communication wire will be placed in separate sleeving under all pavement, walks, etc. in excess of 10' in width.

4. All sleeving called for in the drawings shall be sized according to the drawings and/or general notes. If sleeving is necessary in areas other than shown on the drawings, than size two sizes larger than the pipe being sleeved. Sleeving shall be a minimum of Schedule 40 PVC material.

5. If sleeving is not immediately used, then securely cap the ends with duct tape and mark with wooden stakes for future designation.

3.04 INSTALLATION

A. General

1. Unless otherwise indicated, comply with requirements of the Local Plumbing Code.

B. Sprinkler Heads

1. Install heads at proper grade level as per manufacturer's recommendation.

2. Use only Teflon tape for sealing all heads and riser assemblies.

C. Circuit Valves

1. Install in valve box, arranged for easy adjustment and removal.

2. Adjust automatic control valves to provide flow at rated operating pressure required for each sprinkler circuit. If an over pressure condition exists, Contractor shall install, at his expense, such pressure compensation devices as are necessary to bring the circuit or heads into proper operating range.

D. Piping

1. Lay pipe on solid sub-base, uniformly sloped without humps or depressions.

2. When pipe is pulled into the ground, all PVC pipe shall be solvent welded at least 24 hours before pulling.

3. All trenches shall be snaked, or the pipe snaked within the trench to allow for expansion and contraction.

4. A single strand of 14-1 wire, yellow in color, shall be run with all main line from the point of connection to the end of the main line. This single strand of wire shall be available for main line tracking.

5. Install thrust blocks or Leemco Joint Restraints behind elbows/tees and gate valves along 3” or larger mainlines.

E. Dielectric Protection

1. Use dielectric fittings at connection where pipes of dissimilar metal are joined.

F. Closing of Pipe and Flushing Lines

1. Cap or plug all openings as soon as lines have been installed to prevent the entrance of materials that would obstruct the pipe. Leave in place until removal is necessary for completion of the installation.

2. Thoroughly flush out all main water lines before installing valves.

3. Thoroughly flush out all lateral lines after installation and before attaching heads.

G. Communication Circuitry

1. All communication circuitry shall be run, wherever possible, with the main pipe line.

2. All splices shall be made at a valve box for easy access.

3. A minimum of 12" of either control wire shall be coiled at each valve.

3.05 TESTING AND TRAINING

A. Operational Testing

1. Perform 2. Demonstrate to the owner that the system meets coverage requirements and that automatic controls function properly.

2. Demonstrate to the owner that the system meets coverage requirements and that automatic controls function properly.

3. Coverage requirements are based on operation of one circuit at a time.

B. Personnel Training

1. Contractor shall be responsible for the training of as many personnel as the Owner shall deem necessary.

2. Contractor shall be responsible for one starting and one winterizing of the system during the appropriate times of the year after final acceptance by the Owner as part of the training of the Owner's personnel.

3. Contractor shall include general troubleshooting and operation of the system with reference to head, valve, and controller operation.

4. Contractor shall furnish a complete operation and maintenance manual to the Owner's personnel. This manual shall include repair parts lists, assembly instructions, trouble-shooting guides, programming instructions, and recommended precipitation rates.

3.06 ADJUSTMENT

A. After completion of grading, seeding, or sodding, if applicable, Contractor shall return to the job site to perform any final adjustments to the system which might be deemed necessary.

B. The Contractor will be responsible for any pressure testing and start up of the system when construction is complete. The Contractor will also be responsible for the winterization of the system after the first season of operation.

END OF SPECIFICATION