SECTION 28 05 43 – PUBLIC SAFETY RADIO COMMUNICATION SYSTEMS

PART 1 – GENERAL

1.1 SUMMARY

A. Provide all labor, materials, and equipment for the complete installation of Work called for in the Contract Documents.

B. This Section includes the minimum requirements for the Public Safety Distributed Antenna System (PDAS) extension.

C. Extend the existing PDAS to provide the required 700 MHz P25 trunked communications throughout the facility. The PDAS extension shall include:

.1. Complete design to support 700 MHz P25 communications throughout 97% of the facility.
.2. Modifications/enhancements to the existing headend (if necessary) to support the proposed design,
.3. Remote equipment, hardware, software, distribution antennas, RF cabling, etc. to support the design.
.4. Grounding and Bonding
.5. Cable Pathways
.6. Cable management
.7. Documentation and testing
.8. Complete integration into the existing PDAS.
.9. Incorporation into the existing PDAS maintenance contract

D. The Contractor shall engage the Owner's System Maintenance Vendor for system engineering, installation and integration of the Radio DAS system.

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1.2 RELATED WORK - OWNER FURNISHED EQUIPMENT AND SYSTEMS

A. Fiber optic connectivity between headend and remote equipment as specified by the design.

B. Equipment room(s) for housing active components.

C. 19" equipment rack/cabinet in specified equipment room(s).

D. Backup power systems (UPS).

1.3 QUALITY ASSURANCE

A. All cable and equipment shall be installed in a neat and workmanlike manner. All methods of construction that are not specifically described or indicated in the contract documents shall be subject to the control and approval of the Owner.

B. Strictly adhere to all BICSI and TIA recommended installation practices when installing the systems described in this specification.

C. Contractor's Qualifications:

.1. Firms regularly engaged in the design and installation of Distributed Antenna Systems and that have five (5) years of installation experience with systems similar to that required for this project.
.2. Provide references to include client names, phone numbers and a summary of project details. These references will be checked, and the clients will be asked questions relative to the performance of your company.
.3. Provide verification that installation personnel responsible have been properly trained to install the products described in this Section.

D. Manufacturer's Qualifications:

.1. Firms regularly engaged in manufacture of products of the types, ratings and capacities required for this project; whose products have been in satisfactory use in similar service for not less than five (5) years, with production capabilities per applicable NEMA standards.

E. Codes, Standards and Ordinances

.1. Federal Communications Commission

a. Equipment requiring FCC registration or approval shall have received such approval and shall be appropriately identified.

.2. Design, manufacture, test, and install telecommunications networks per manufacturer's requirements and in accordance with NFPA-70 (National Electrical Code®), state codes, local codes, requirements of authorities having jurisdiction, and particularly the following standards:

a. NECA 1 – Standard Practice of Good Workmanship in Electrical Construction, 2010
b. ANSI/NECA/BICSI-568 – Standard for Installing Commercial Building Telecommunications Cabling, 2006
c. ANSI/TIA/EIA Standards

1) ANSI/TIA-568.0-E– Generic Telecommunications Cabling for Customer Premises, 2020
2) ANSI/TIA-568.1-E – Commercial Building Telecommunications Cabling Standard, 2009 - Part 1: General Requirements, 2020
3) ANSI/TIA-568.2-D – Commercial Building Telecommunications Cabling Standard, 2009 - Part 2: Balanced Twisted Pair Cabling Components, 2018
4) ANSI/TIA-568.3-D – Optical Fiber Cabling Components Standard, 2016
5) ANSI/TIA-569-E – Commercial Building Standard for Telecommunications Pathways and Spaces, 2019
6) ANSI/TIA-606-C – Administration Standard for Telecommunications Infrastructure, 2017
7) ANSI/TIA-607-D – Generic Telecommunications Bonding and Grounding (Earthing) for Customer Premises, 2019
8) ANSI/TIA-526.7-A – Measurement of Optical Power Loss of Installed Single-Mode Fiber Cable Plant, 2015
9) ANSI/TIA-526.14-C – Optical Power Loss Measurement of Installed Multimode Fiber Cable Plant, 2015
10) ANSI/TIA-758-B – Customer-Owned Outside Plant Telecommunications Infrastructure Standard, 2012
11) ANSI/TIA-942-B – Telecommunications Infrastructure Standard for Data Centers, 2017

d. NEMA-VE-1 – Metal Cable Tray Systems, 2009
e. NEMA-VE-2 – Metal Cable Tray Installation Guidelines, 2006
f. NFPA-70 – National Electrical Code, 2017
g. NFPA-1221 – Standard for the Installation, maintenance, and Use of ERRCS, 2016

h. Install cabling in accordance with the most recent edition of BICSI® publications:

1) BICSI – Telecommunications Distribution Methods Manual, 14th Edition
2) BICSI – Information Technology Systems Installation Methods Manual, 7th Edition

i. Federal, state, and local codes, rules, regulations, and ordinances governing the Work, are as fully part of the specifications as if herein repeated or hereto attached. If the Contractor should note items in the drawings or the specifications, construction of which would be code violations, promptly call them to the attention of the Owner's Representative in writing. Where the requirements of other sections of the specifications are more stringent than applicable codes, rules, regulations, and ordinances, the specifications shall apply.

j. American Society for Testing and Materials (ASTM): ASTM E. 814 – Standard Test Method for Fire Tests of Penetration Firestop Systems

k. Underwriters Laboratories, Inc. (UL): UL 1479 – Tests of Through-Penetration Firestop Systems

l. Americans with Disabilities Accessibility Guidelines.

m. Code of Federal Regulations, Title 29, Chapter XVII, Part 1910 (OSHA).

n. Uniform Building Code (UBC).

o. International Building Code (IBC).

p. Texas Department of State Health Services (TDSHS).

q. DFW Airport Design Criteria Manual

r. Applicable codes and directives of authorities having jurisdiction

F. Work:

.1. The Work shall be performed in compliance with the applicable manufacturer’s installation instructions, Standards, and certifications listed herein, the Contract Documents, and governing codes and regulations of the authorities having jurisdiction.

.2. The drawing and specification requirements govern where they exceed Code and Regulation requirements.

.3. Where requirements between governing Codes and Regulations vary, the more restrictive provision applies.

.4. Nothing in the Contract Documents grants authority or permission to disregard or violate any legal requirements.

G. All personnel performing the work of this Section shall be thoroughly familiar with the cabling methods set forth in the latest release of the BICSI TDMM (Building Industry Consulting Services International Telecommunications Distribution Methods Manuals).

H. Contractor’s RCDD shall review all required work prior to commencing. The Contractor’s RCDD shall oversee the installation and will have the end responsibility for the quality of the installation work performed. All submitted designs and or changes to the design shall be approved and signed off by the Contractor’s RCDD.

I. Installation activities shall be performed in a workmanlike manner and shall be consistent with installation standards and esthetics of the existing PDAS equipment and components.

J. The installed cabling systems shall not generate nor be susceptible to any harmful electromagnetic emission, radiation, or induction that degrades cabling systems.

K. Expansion Capability: Unless otherwise indicated, provide spare positions in wall fields, cross connects, and terminal strips, and space in cable pathways to accommodate twenty (20) percent future growth in campus distribution and riser.

L. Pre-installation inspection: Visually inspect all cables, cable reels, and shipping cartons to detect possible cable damage incurred during shipping and transport. Damaged goods are to be returned to the supplier and replaced at no additional cost to the Owner.

M. Test optical fiber cable while on reels. Use an optical time domain reflectometer (OTDR) to verify the cable length and locate cable defects, splices, and connector, including the loss value of each.

N. Test each pair of UTP cable for open and short circuits. Test results to be submitted to Owner.

O. Antennas and transmission lines shall be sweep-tested with a network analyzer prior to or upon installation. Chart recordings of sweep measurements of all RF cables and antennas shall be made and retained for inclusion in the Construction Acceptance Document.

1.4 COMPLETENESS OF WORK

A. All products, materials, labor, and programming necessary to render a fully functional system to fulfill the design intent shown on the documents shall be provided by the Contractor.

B. Catalog numbers referenced throughout this Division's drawings and specifications are intended to convey a general understanding of the type of quality of the product required. Where written descriptions differ from information conveyed by a catalog number, the written description shall govern. No extra charge shall be allowed because a catalog number is found to be incomplete or obsolete.

1.5 PRE-INSTALLATION CONFERENCE

A. Arrange and schedule pre-installation conference prior to beginning any work.

B. Agenda: Clarify questions in writing related to work to be performed, scheduling, coordination, etc. with consultant and/or project manager/Owner representative.

C. All individuals, who will be in an on-site supervisory capacity, shall be required to attend the pre-installation conference. This includes project managers, site supervisor and lead installers. Individuals who do not attend the conference will not be permitted to supervise the personnel that install, terminate, or test communications cables on the project. The Contractor's RCDD that will oversee the installation is required to attend the pre-installation conference.

D. The manufacturer that will be providing the extended warranty is required to have a representative attend the pre-installation conference.

1.6 SEQUENCE AND SCHEDULING

A. The Contractor shall comply with all scheduling requests established by OAR, both prior to commencing Work, and during construction. The Contractor shall provide a detailed schedule of work to be performed.

B. Submit schedule for installation of equipment and cabling. Indicate delivery, installation, and testing for conformance to specific job completion dates. As a minimum, dates are to be provided for installation start date, completion of cabling, completion of internal testing and labeling, installation complete date, testing (FATP & CATP), cutover, completion of the final punch list, start of demolition, Owner acceptance, and demolition completion.

1.7 SUBMITTALS

A. Comply with provisions of Division 01.

B. Shop Drawings shall include coverage prediction overlays demonstrating compliance with the coverage requirements herein.

C. Shop Drawings shall specify all requirements for Owner-supplied equipment cabinets, fiber optic circuits, and A/C power.

D. Contractor shall not utilize the Consultants' original design drawings in the submittal or shop drawing process. Contractor shall develop their own original shop drawings.

1.8 **ALTERNATES, SUBSTITUTIONS AND CHANGE ORDERS**

A. If a proposed alternate material is equal to or exceeds specified requirements, Contractor shall provide manufacturer's specifications in writing for written approval prior to purchase and installation of proposed materials. The proposed material substitution shall not void or change manufacturer's warranty.

B. Contractor shall provide a complete solution according to these written specifications and drawings. If the Owner changes the scope of work to be performed by the Contractor, it shall be in writing. Contractor shall respond to these changes with a complete material list, labor, and taxes in writing presented to the Owner for approval. Contractor shall not proceed with additional scope of work without a signed approval by the Owner.

C. Additional work performed by the Contractor will not be paid by Owner without signed approval of these changes prior to implementing changes. Submit a copy of signed change order upon billing.

1.9 **USE OF THE SITE**

A. Use of the site shall be at the Owner's direction in matters in which the owner deems it necessary to place restriction.

B. Access to building wherein the Work is performed shall be as directed by the Owner.

C. The Owner will occupy the premises during the entire period of construction for conducting his or her normal business operations. Cooperate with the owner to minimize conflict and to facilitate the owner's operations.

D. Schedule necessary shutdowns of services with the Owner and obtain written permission from the Owner. Refer to article - CONTINUITY OF SERVICES herein.

E. Proceed with the Work without interfering with ordinary use of streets, aisles, passages, exits, and operations of the owner.

F. All Contractor personnel must check in with the facilities engineering department and/or the General Contractor upon arrival and upon departure.

1.10 **DELIVERY AND STORAGE**

A. Insofar as possible, deliver items in manufacturers' original unopened packaging. Where this is not practical, cover items with protective materials, to keep them from being damaged. Use care in loading, transporting, unloading, and storage to keep items from being damaged.

B. Store items in a clean dry place and protect from damage.

C. Storage space on project site may be limited. Contractor shall coordinate delivery and arrange storage of materials and equipment with the OAR.

D. Components sensitive to damage in a harsh environment shall be stored off-site and delivered as needed.

E. Provide protective covering during construction to prevent damage or entrance of foreign matter.

F. Contractor is responsible for on-site security of tools, test equipment and materials.

G. Replace at no expense to Owner, product damaged during storage, handling or the course of construction.

1.11 CONTRACTOR CLOSE OUT SUBMITTALS

A. Submit Closeout documentation in accordance with Division 1 of the Project Manual and any applicable supplements. The number of submittal sets required is the greater of either the requirements of Division 1 of the Project Manual, or a minimum of four (4) sets.

.1. Segregate documents into separate binders containing data relevant to operational, maintenance, and warranty issues.
.2. Test reports on all copper and optical fiber cables (electronic file format and hard copy).
.3. As-built cable schedules with recorded cable routing and lengths of each designated run.
.4. As built documentation of all cabling systems.
.5. As built documentation of IDF/TR modifications and associated cabinet elevations.

B. Warranty and Maintenance:

.1. Test Report Binder(s)
.2. Record Drawings

1.12 RECORD DRAWINGS

A. Keep a hard copy set of project drawings at the job site exclusively for recording deviations from the Construction Drawings.

B. Record locations and depths of buried and concealed conduits from fixed, easily identifiable objects, such as building walls. Where conduits are concealed in walls, indicate distances off of building corners or other building features not likely to be disturbed by future alterations.

C. Mark deviations in a different color so that work of various systems can be easily identified.

D. When Work is completed, record all deviations in an electronic format using AutoCAD 2007 in a format usable to the Owner. Coordinate this format with the Owner.

E. Submit two copies of completed "record drawings" on electronic media such as CD or DVD to Owner's Representative for distribution.

1.13 PERFORMANCE REQUIREMENTS

A. The PDAS extension shall provide the same level of service and frequency support as the existing campus-wide system.

B. The PDAS communication system design should satisfy the following conditions:

.1. System shall distribute RF coverage of 99% and not less than 90% in the non-critical areas. Critical building areas are outlined below:

a. Mechanical rooms
b. Floor areas
c. Basement
d. Stairwells
e. Elevators and elevator lobbies
f. Sprinkler sectional valve locations
g. General Use spaces (break rooms, staff rooms)
h. Restrooms

C. The System shall have the capability for separate control over each service (or wireless operator) to allow the ability to adjust and control power levels without disturbing other services/operators.

D. The System shall support PS services in a modular architecture, so services can be added or removed without requiring new infrastructure, without readjustment of signal power levels, or disturbing existing services.

E. The System shall not impede any management features or functionality of any attached network and/or device management system.

F. The System shall allow for proactive management and end-to-end alarming of active electronics.

G. The System shall be able to engage with 3rd party SNMP-based element management systems and provide fault management information.

H. Coverage

.1. The system shall provide not less than DAQ 3.4 audio intelligibility for the specified frequencies throughout 97% of the building structure. DAQ 3.4 shall be defined as -95 dBm with a signal-to-noise ratio of 18 dB. The -95 dBm minimum signal level shall be delivered to portable radio units within the building. Likewise, the PDAS headend shall supply a minimum of -95 dBm with a signal-to-noise ratio of 18 dB from portable radios within the building to the 700 MHz P25 system. Inbound performance shall assume an ERP of 3 watts from a typical portable radio unit.

.2. The Contractor shall be responsible for a system configuration which delivers the specified coverage requirements. The Contractor shall optimize the system and shall provide any and all adjustments, modifications, and/or enhancements needed to comply with the coverage requirements and successfully complete the Coverage Acceptance Test Plan (“CATP”). The system optimization procedures shall include methods for balancing outbound and inbound performance and verifying that a balanced link is consistently maintained.

.3. Shop Drawing submittals shall include coverage predictions overlaid on building floorplans. The coverage predictions shall clearly demonstrate compliance with the coverage requirements.

.4. The PDAS extension shall in no way degrade performance of the existing PDAS. In addition to the CATP, system acceptance shall require verification that the existing PDAS performance is not adversely impacted by the PDAS extension.

I. The existing PDAS was designed with headend redundancy. The PDAS extension shall fully support the redundant headend configuration.

J. The existing PDAS is equipped with a fault and alarm reporting subsystem. Faults, alarms, and status messages are reported to the headend and an SNMP manager. The PDAS extension equipment shall be fully integrated into the existing reporting subsystem and provide comparable functionality, features, and visibility.

PART 2 – PRODUCTS

2.1 MATERIALS AND EQUIPMENT

A. All materials and equipment used in carrying out these specifications are to be new and shall meet the following regulatory requirements:

.1. All active devices shall be UL listed and FCC-certified for the proposed frequencies of operation and specific configurations deployed.

.2. The system and all components shall be compliant with applicable requirements for the operation of FCC Part 90 Class B Signal Boosters. The Contractor shall perform necessary FCC registration of relevant equipment per 47 C.F.R. § 90.219(d) (5).

.3. FCC OET Bulletin - The Contractor shall perform an analysis and provide certification that all radiating elements in the system are compliant with FCC Guidelines for Human Exposure to Radio Frequency Electromagnetic Fields per relevant sections of the most recent revision of FCC OET Bulletin 65.

B. Model numbers and manufacturers included in this specification are listed to establish as standard of product quality.

C. Other qualified manufacturers may be substituted only with The Owner's written consent. To request a substitution, the Contractor shall submit complete technical data, samples, and if requested, results of independent testing laboratory tests of proposed equipment.

D. If proposed System includes equipment other than specified model numbers, submit a list of major items and their quantities, with a one-line schematic diagram for review.

E. Material not specifically identified within this document, but which is required for the successful implementation of the intended system(s), shall be of the same class and quality as the specified material and equipment.

2.2 ANTENNAS

A. Antenna devices shall be low-profile with minimal visual and esthetic impact. Final antenna selection and mounting methodology must be approved by the Owner. An antenna mounting mock-up may be required at the Owner's discretion.

PART 3 – EXECUTION

3.1 COORDINATION

A. Insofar as it is possible to determine in advance, advise the General Contractor to leave proper chases and openings. Visit site and be informed of conditions under which work must be performed. No subsequent allowance will be made because of error or failure to obtain necessary information to completely estimate and perform work involved.

B. Carefully coordinate with other divisions to ensure proper power requirements, grounding, fireproofing and interlocking controls between the fire alarm system, security system, and other owner furnished systems.

C. Notify other tradesmen of any deviations or special conditions necessary for the installation of work. Interferences between work of various Contractors to be resolved prior to installation. Work installed not in compliance with specifications and drawings and without properly checking and coordinating as specified above shall, if necessary, be removed and properly reinstalled without additional cost to Owner.

D. The Owner or the Owner's Representative shall be the mediating authority in all deviation and disputes arising on project.

E. Coordinate with other trades to provide wall and ceiling access panels wherever required for access to communication equipment.

F. Intent:

.1. These sections of specifications and drawings form a complete set of documents for communications systems for this project. Neither is complete without the other. Any item mentioned in one shall be as binding as though mentioned in both.
.2. The intent of these specifications and drawings is to form a guide for a complete systems installation. Where an item is reasonably necessary for a complete system but not specifically mentioned, such as pull boxes, fittings, expansion fittings, support hangers, filters, jumpers, etc. provide same without additional cost to Owner.
.3. Communication equipment room layouts indicated on drawings are diagrammatical only. Exact location of outlets and equipment to be coordinated and governed by project conditions. The Designer reserves the right to make any reasonable changes (approximately 6 feet) in location of junction boxes, or equipment prior to roughing in of such without additional cost to Owner.

G. Deviations:

.1. No deviations from specifications and drawings to be made without full knowledge and consent of Designer.
.2. Should the Contractor find during progress of work that existing conditions make desirable a modification of the requirements of any particular item, report such item promptly to Designer for his decision and instructions.

H. Main Horizontal Pathway/Raceway

.1. Unless otherwise noted on the drawings, all communications/low voltage systems cabling shall be routed above accessible corridor ceilings parallel to room walls and corridors via cable tray and/or conduit. Cabling shall be segregated by function as follows:

a. Voice/data cabling.
b. All other systems.

3.2 CONTINUITY OF SERVICES

A. The Contractor shall not take any action that will interfere with, or interrupt, existing building services unless previous arrangements have been made with the owner's representative. Arrange the Work to minimize shutdown time.

B. Owner's personnel will perform shutdown of operating systems. The Contractor shall give three (3) days' advance notice for systems shutdown.

C. Should services be inadvertently interrupted, immediately furnish labor, including overtime, material, and equipment necessary for prompt restoration of interrupted service.

3.3 INSTALLATION WORKMANSHIP

A. Active components shall be installed in owner-supplied 19” equipment racks/cabinets, located in designated communications rooms. The Contractor’s design shall clearly specify communications rooms that will be utilized and all space requirements.

B. Installation activities shall be performed in a workmanlike manner and shall be consistent with installation standards and esthetics of the existing PDAS equipment and components.

C. The Contractor shall be responsible for all final connections to owner-supplied power outlets and fiber optic circuits.

3.4 FIRESTOPPING

A. Select appropriate type or types of through penetration firestop devices or systems appropriate for each type of communications penetration and base each selection on criteria specified herein.

B. Selected systems shall not be less than the hourly time delay ratings indicated in the Contract Documents for each respective fire-rated floor, wall, or other partition of building construction. Firestop for each type of communications penetration shall conform to requirements of an independent testing laboratory design drawing or manufacturer's approved modification when used in conjunction with details shown on the Drawings.

C. Perform all necessary coordination with trades constructing floors, walls, or other partitions of building construction with respect to size and shape of each opening to be constructed and device or system approved for use in each instance.

D. Coordinate each firestop selection with adjacent Work for dimensional or other interference and for feasibility. In areas accessible to public and other "finished" areas, firestop systems Work shall be selected, installed, and finished to the quality of adjacent surfaces of building construction being penetrated.

E. Use materials that have no irritating or objectionable odors when firestopping is required in existing buildings and areas that are occupied.

F. Provide damming materials, plates, wires, restricting collars, and devices necessary for proper installation of Firestopping. Remove combustible installation aids after firestopping material has cured.

G. All firestops shall be installed in accordance with the manufacturer’s instructions in order to maintain the specific rating assigned by the independent testing laboratory.

H. Existing raceways, cable trays, and cabling that penetrate existing building construction shall be firestopped to the extent necessary to fill cavities that may exist between existing building construction and existing communications penetrations or existing conduit sleeve, and between existing conduits and existing conduit sleeve.

I. If required by inspecting authorities:

   a. Expose and remove Firestopping to the extent directed by inspecting authority to permit his or her inspection.
   b. Reinstall new firestopping and restore Work where removed for inspection.

3.5 INSPECTIONS AND TESTING

A. On completion of Work, installation shall be entirely free of damaged conductors, damaged hardware, hardware errors, software errors, incomplete terminations, and incomplete labeling of cables and components.

B. Prepare a Construction Acceptance Report documenting resolution of internal punch list items and testing results of all transmission and data cables. Submission of the Construction Acceptance Report shall indicate completion of installation activities and readiness for installation inspection by the Owner.

C. The Owner will conduct on-site inspections of all system facilities, equipment rooms, and hardware installations prior to execution of the Functional Acceptance Test Plan and Coverage Acceptance Test Plan. The inspections shall demonstrate that all system components have been delivered and installed at their proper location and comply with all relevant installation standards. The inspections shall verify that all equipment has been connected to electrical service and properly grounded; and all fiber, signal, coaxial, and data cables have been properly labeled and connected to the equipment. Any discrepancies or issues impacting system performance must be corrected by the Contractor prior to execution of the various system tests. Minor issues may be added to a punch list for correction prior to Final Acceptance.

D. Execute the official “DFW PDAS – Functional Acceptance Test Plan”, Document: DW_TPL_170201 dated December 18, 2017 and submit a FATP report per the requirements of that document.

E. Execute the official “DFW Airport Contract No. 7006061 Coverage Acceptance Test Plan”, Document: DW_TPL_038 dated January 13, 2017 and submit a CATP report per the requirements of that document.

F. Prior to final observation and acceptance, complete all tests and test reports, resolve punch list items, and leave in satisfactory operating condition, all systems, equipment, and software associated with the PDAS extension.

3.6 CLEANING

A. After completing system installation, including outlet fittings and devices, inspect exposed finish. Remove burrs, dirt, dust, and construction debris and repair damaged finish, including chips, scratches, and abrasions. This includes touching up paint removed for grounding.

B. Contractor shall provide a clean work environment, free from trash/rubbish accumulated during and after cabling installation.

C. Maintain construction materials and refuse within the area of work. Clean the work area at the end of each day.

D. Contractor shall keep all liquids (drinks, sodas, etc.) off finished floors, carpets, tiles, racks and equipment. If any liquid damage to above finishes or equipment, Contractor shall provide professional services to clean or repair scratched/soiled finishes or damaged equipment at own expense

3.7 INSPECTION FEES

A. Obtain and pay for all necessary inspection fees required for communication systems installation.

3.8 OBSERVATIONS

A. When field observation services are a part of the project scope, the Designer's office will provide periodic observation of the progress of Work specified herein. The purpose of the observation service is to ensure compliance of Contractor's Work with specifications and drawings. The Designer's office may also observe tests required of this Contractor as called for in other sections of the specifications.

B. Specifications and drawings represent Work to be done in view of total project requirements. To eliminate possible conflict with other trades, final location of conduits, jacks, outlets, components, etc., is responsibility of this Contractor. Contractor to provide all supervision required for his personnel to ensure that installation is made in accordance with specifications and drawings and all safety rules and regulations are observed. In event of conflicts of Work on project with other trades, Contractor is to make every reasonable effort to resolve conflict through meetings and discussions with other parties involved, by preparation of drawings, or other appropriate action. Only after this has been done shall the Designer's assistance be requested through the RFI process.

C. When the Designer is requested to visit the project to aid in resolution of conflicts, or for witnessing tests, they shall be given a minimum of 48 hours' notice prior to time their presence is requested at job site.

3.9 WARRANTY-GUARANTEE

A. The Designer reserves right to accept or reject any part of the installation which does not successfully meet requirements as set out in these specifications.

B. This Contractor shall, and hereby does, guarantee all Work installed under this division shall be free from defects in workmanship and materials for a period of one year from date of final acceptance. This Contractor further agrees to repair or replace any defective material or workmanship which is or becomes defective within the terms of this warranty-guarantee.

C. All surplus parts and pieces to the installation shall be maintained as a spare parts inventory at the building site. Parts replaced during the warranty period shall have a warranty matching that of the original part from date of replacement.

3.10 SYSTEM MAINTENANCE

A. The existing PDAS is protected by a long-term maintenance contract. The PDAS extension shall include pricing to add all supplied equipment, hardware, and software to the existing PDAS maintenance contract after expiration of the initial warranty period.

END OF SECTION 28 05 43