

E-RATE Funding Year (2027-2028)

RFP 17031

470 # 270000588

Spring Branch Independent School District

955 Campbell Rd

Houston, TX 77024

Proposal for Wired, Wireless and Internet Services

Questions and Answers – Addendum #4

Due to E-Rate requirements, any mention of specific manufacturers or model/part numbers is assumed to be followed by “or equivalent.”



DIVISION 27 – COMMUNICATIONS

DIVISION 27 INTENT

This section specific guidelines for materials and installation of Communication systems and equipment, including details where applicable.

Separate sections have been prepared for all sub-categories within this division, including:

CSI SECTION	TITLE	REVISION DATE
	General Requirements	NOT USED
27 01 00	Operation and Maintenance of Communication Systems	NOT USED
27 05 00	Common Work Results for Communications	VERSION 2.0
27 06 00	Schedules for Communications	NOT USED
27 08 00	Commissioning of Communications	NOT USED
27 10 00	Structured Cabling	VERSION 2.0
27 20 00	Data Communications	NOT USED
27 30 00	Voice Communication	NOT USED
27 40 00	Audio-Video Communications	VERSION 2.0
27 50 00	Distributed Communications and Monitoring Systems	VERSION 2.0
27 60 00	Wireless Transceivers	NOT USED

PERFORMANCE SPECIFICATIONS

<u>27 53 19</u>	<u>Distributed Antenna System (DAS)</u>	<u>TO BE DELETED</u>
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DIVISION 27 – COMMUNICATION

27 05 00

COMMON WORK RESULTS FOR COMMUNICATION

1. The contractor shall furnish all equipment, accessories, and material required for the installation of a comprehensive communication system in strict compliance with these specifications and applicable contract drawings. Any material and/or equipment necessary for the proper operation of the system, which is not specified or described herein, shall be deemed part of this specification.
2. The system is to be designed and configured for maximum ease of service and repair.
3. Scope for Additions and renovations:
 - a. Cabling and Cameras – district wants to upgrade to new standards for all renovation projects and additions. (Cat 6). Same for fiber (50 micron OM4).
 - b. New additions to Video Surveillance and SCS shall adhere to the most current standard.
 - c. Intrusion, Fire Alarm, Access Control, Intercom will need to communicate with existing systems in place, but need to be designed based on the existing systems if they are to remain.
 - d. SBISD Planning & Construction will review specific items on a case-by-case basis.
4. Salvage materials shall remain the property of SBISD, and shall be delivered to such destination as directed by the District's representative. Items the District chooses not to retain shall be the responsibility of this Contractor to remove and properly dispose of.
5. The Contractor shall inform SBISD Planning & Construction and the design team of any items scheduled for relocation and/or reuse found to be in damaged condition prior to commencement of the work. Contractor shall not commence removal until given further instructions by SBISD. Items damaged in repositioning operations are the contractor's responsibility and shall be repaired or replaced by the contractor as approved by the owner's representative, at no additional cost to the Owner.
6. Materials and/or items scheduled for relocation and which are damaged during dismantling or reassembly operations shall be repaired and restored to good operative condition.
7. All items to be relocated shall be carefully removed in reverse to original assembly or placement and protected until relocated. The Contractor shall clean and repair and provide all new materials, fittings, and appurtenances required to complete the relocations and to restore them to good operative order. All relocations shall be performed by workmen skilled in the work and in accordance with standard practice of the trades involved.
8. Contractor to test all existing system. Any portions of a system, not reported to be functioning properly, shall be noted and reported in written documentation. Documentation to be submitted to all parties prior to commencement of work. Any items not reported prior to commencement and found not function or functioning improperly, shall be replaced and/or repaired by the contractor, at no additional cost to the project or the owner.
9. Phone system shall remain as ShoreTel VoIP phone system. Shortel to provide and install



phone system. Design standards to state that will be an IP based system as manufactured by Shortel. This system shall be provided and installed by the owner. Project design team to coordinate any infrastructure required.

10. The communications system shall bear the label of a Nationally Recognized Testing Laboratory (NRTL) such as E.T.L., D.S. & G., or UL and be listed by their re-examination service. All work must be completed in strict accordance with all applicable electrical codes, including N.E.C. Section 800-51 (i), under direction of a qualified and factory approved distributor, to the approval of the owner.
11. No part of the specifications may be Added, Deleted, Modified or Changed without the express written permission of the SBISD Planning and Construction. Any system and/or equipment proposed as an equal to that specified must be proven to conform to the standards contained herein. The contractor must obtain the architect's or engineer's approval in writing, prior to bidding equipment other than that specified. The manufacturer's name, model numbers, and one (1) electronic and one (1) hard copy of shop/working drawings complete with catalog sheets, technical and installation data shall be submitted for approval.
12. The contractor shall warrant the equipment to be new and free from defects in material and workmanship, and will, within one year from date of installation, repair or replace any equipment found to be defective. This warranty shall not apply to any equipment that has been subject to misuse, abuse, negligence, accident, or unauthorized modification.
13. Conduit and wiring to items to be removed, salvaged, or relocated shall be removed to points indicated on the drawings, specified, or acceptable to the Owner's representative. Conduit and wiring not scheduled for reuse shall be removed to the points at which reuse is to be continued or service is to remain. Such services shall be sealed, capped, or otherwise tied-off or disconnected in a safe manner acceptable to the Construction Inspector. All disconnections or connections into the existing facilities shall be done in such a manner as to result in minimum interruption of services to adjacent occupied areas. Services to existing areas or facilities that must remain in operation during the construction period shall not be interrupted without prior specific approval of the Owner's representative hereinbefore specified.
14. Maintain existing system in service. Disable system only to make switchovers and connections. Notify the Owner at least 48 hours before partially or completely disabling system. Minimize outage duration.
15. The contractor will be required to provide a fully installed mock-up room for approval. The room shall have all Conduits, Back boxes, cables, faceplates and all other required Low voltage cables and devices installed. This room must be accepted by SBISD Planning & Construction and Spring Branch Technology department prior to the installation of any other cable or devices in the building.
 - a. Mock up room will be reviewed at the following stages of construction:
 - 1) Initial rough in
 - 2) Prior to wall cover up
 - 3) Prior to ceiling cover up
 - 4) Final condition



27 10 00

STRUCTURED CABLING

1. Provide a complete and tested Structured Cabling System (SCS) for the interconnections of the Local Area Network (LAN). The SCS shall include fully terminated unshielded twisted pair cables, fiber optic cabling, raceways, conduit, back boxes, copper/fiber optic termination components, station mounting hardware, fiber optic enclosures, patch panels, copper/fiber optic patch cables, relay cabinets/cabinets, and other incidental and miscellaneous premises wiring system hardware as required for a complete, tested, and usable system that is in compliance with the latest NEC, ANSI/EIA/TIA, BICSI, and Authorities Having Jurisdiction codes and standards. The installation shall comply with all applicable requirements, design guidelines, and standards in effect at the job site and as indicated in the Drawings and Specifications.
2. The equipment/products described herein, and furnished per these specifications shall be the product of one manufacturer or must be able to obtain the full warranty of the combined solution. All references to model numbers and other detailed descriptive data is intended to establish standards of design performance, and quality, as required. The contractor shall not deviate from the part numbers listed. Any deviation from specified part numbers will result in the removal of non-specified materials and reinstallation of approved materials at no cost to the project.
3. An IDF will be required when the distance between classrooms and MDF exceeds 280 feet. IDF's shall be selected and organized to be minimum in number while still reaching all locations to be wired.
4. Each IDF will connect to the MDF with a 24 strand multimode armored clad fiber optic cable and a 25-pair, category 3 copper tie cable. All fiber optic cable to be 24-strand connecting all IDFs.
5. MDF/IDF room requirements:
 - a. Minimum IDF room size: 10'x10'; minimum MDF size: 15'x18'
 - b. All MDF and IDF rooms require stand-alone cooling units.
 - c. All power loads shall connected to emergency.
6. Documents to state that all below slab cabling to route from the outlet, to the serving MDF/IDF and remain in slab, osp rated cable (fiber, indoor, outdoor, plenum-rated) – (24 strand armor plated OM4).
7. Contractor to provide complete warranty documentation to the owner, in the owner's name.
8. All specifications shall state no sub-contracting by the certified installer and all site installers must be able to provide documentations to this on request. Including but not limited to: certification, employee identification, licensing
9. The approved manufacturers shall provide a complete Category 6A solution with a minimum 15-year performance warranty.
10. The Data Cable System Installer shall be licensed and shall meet all applicable regulations of the State of Texas and Department of Labor insofar as they apply to this type of system. The proposer shall be a firm normally employed in the low voltage and data cabling industry and shall provide a reference list of ten (10) large-scale projects and contact names confirming successful Category 6A premises wiring system installations.



11. The SCS Installer shall be a Certified, local area, integrator of the manufacturer's product, Pre-Approved by Spring Branch ISD and must be able to provide the manufacturer's maximum available warranty for the solution on the entire SCS. The contractor's certification must have been obtained and held within 75 miles of the project's location.
12. The installing contractor must have a full-time employed (RCDD) Registered Communications Distribution Designer on staff. Current RCDD certification shall be provided in the product submittals.
13. All individuals installing the SCS must be employees of the certified installer and at least 25% of the installing staff shall have undergone a training class given by the manufacturer. Current certification indicating the successful completion of the training course shall be available upon request at the project and submitted in the contractor's product submittals.
14. The proposing contractor and the installing contractor must be the same company. No subcontractor to the proposing SCS contractor will be allowed for any portion of the SCS scope of work.
15. At Substantial Completion: Provide drawings to SBISD Planning & Construction and Technology to reflect installed cabling with correct labeling and cable routing.
16. Drawing Compliance: A letter shall be provided stating that the SCS installer complies with the ENTIRE project drawing, including all general, keyed, and notes to contractor. If the installer intends to deviate from any portion of the specifications, a detailed explanation of reason in which the installer would like to deviate shall be provided in addition to the specification compliance letter. NO DEVIATIONS SHALL BE ACCEPTABLE UNTIL THEY HAVE BEEN APPROVED BY THE SPRING BRANCH ISD TECHNOLOGY DEPARTMENT.
17. For all IDF and MDF locations: Contractor shall provide and install new Chatsworth floor mounted "server" cabinet systems. Standard cabinet is 32 x 44. Refer to floor plan and enlarged MDF/IDF room layouts for number or cabinets to provide at each location. For rooms with multiple floor mounted cabinet enclosures contractor shall provide side panels for cabinets on end of bayed cabinet system.
18. Cable Tray: Metal cable tray shall be provided to affix to the top of all floor mount cabinets. Cable tray shall be used to brace cabinets to walls and to route cable from walls to cabinets in communication closets.
19. Cable Support System: All low voltage cabling shall be installed and supported using a PANDUIT® Corp. J-MOD™ modular cable support system (or approved equivalent) at 48" intervals unless installed in conduit. Do not exceed manufacture recommendation for the quantity of cables supported in an individual support.
20. All cable bundles shall be grouped together using plenum rated Velcro for the entire run above and below the ceilings. Contractor to leave a complete, bound free pull string, in all pathways for future use. This string shall be install at the end of the project and remain clear.
21. Label all cable indicating type and system.
22. Conduit Bushings shall be installed prior to the installation of any cable. If cable is found to be installed without the bushing the cable will have to be removed and re-installed. No cut bushings will be accepted. If cable damage occurs during any portion of the installation, the cable will be removed and replaced at no cost to the project. This item will be strictly enforced and adhered too.
23. The project's electrical contractor shall provide and install all metallic conduit and



back boxes indicated to be installed on the drawings. It is the SCS installer's responsibility to coordinate all conduit requirements with the electrical contractor to ensure that all conduit sizes and locations are correctly installed. If box locations and conduit sizes are found to vary from the project documents after installation the SCS installer will bare all financial responsibility to ensure these items are installed correctly. The RCDD for the SCS will be responsible for ensuring conduit sizes are sufficient for cable count while maintaining a 40% fill ratio. Minimum size 1" for classroom conduits, with no more than four (4) data circuits per any one (1) outlet.

24. Raceway shall consist of a 4"x4" back box, with a single gang reducer ring and a minimum of 1" conduit.
25. Light layout to be coordinated with the rack layouts, in the MDF/IDFs, to ensure that lighting is focused in front and the read of the racking system, not above the cabinets.

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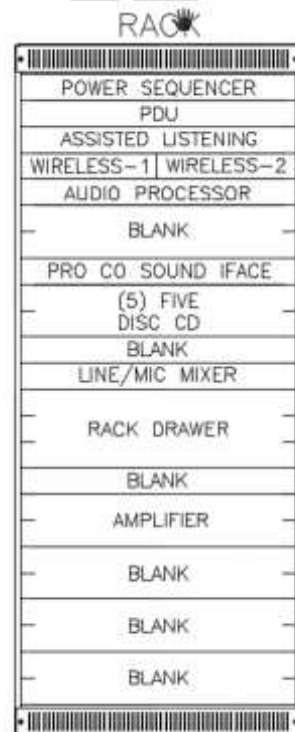
AUDIO-VIDEO COMMUNICATIONS

1. Classroom Video Projection system:
 - a. Provide and install all cable and components designated on the project drawings and within this specification section to furnish a complete infrastructure for the owner provided system. Standard system is short throw projectors and marker boards with magnetized surface.
 - b. Provide and install ceiling mounted speakers for each interactive white board location as designated on the project drawings and within this specification.
 - c. Provide and install infrastructure for the ceiling/wall mounted projector systems as designated on the project drawings and within this specification. Each projector systems shall include all of ceiling/wall mounts, audio-video cabling required to connect the projectors to the teacher's computer, USB extenders from the teacher's computer location to the presentation wall for interactive white board connection, and local ceiling mounted speakers. Final adjustments of projector shall be performed by this contractor to make the instruction space complete and ready for use.
 - d. Provide and install flat panel LCD monitors with stands at locations indicated to be installed on casework or with articulating wall mount brackets at location indicated to be wall mounted. Reference project drawings for locations and type of installation applications.
 - e. At all interactive board and LCD monitor locations; the current project construction contractor is providing and installing all audiovisual faceplates and necessary audiovisual cabling and connectors.
 - f. Proposing contractor must coordinate with project construction schedule and existing technology system contractor to provide complete turn-key solution to owner.
2. Sound Reinforcement systems:
 - a. Provide a local sound reinforcing system in all gyms, cafetoriums, student dining commons, auditoriums, dance classrooms, weight rooms, libraries, multi-purpose rooms, LGIs, exterior covered play areas, and sports fields.
 - b. All sound reinforcement system design shall deliver clean, undistorted, full-range response from 20Hz to 20kHz with sufficient power to maintain a level of 100db



throughout listening area unless otherwise noted.

- c. Choice of amplifier, speaker, SPL, and speaker degree pattern calculations shall reflect size of area, room, cafeteria, gym, and sports field to achieve even audio coverage throughout listening area.
- d. All sound reinforcement systems should be considered presentation and musical performance systems. Systems should be equipped with proper audio tools such as equalizers, compressors, speaker delays, etc. that can control any common audio issue, such as feedback or distortion, to achieve successful presenter/performance audio levels.
- e. Contractor of audio reinforcement systems should specialize in professional and industrial audio install. Contractor should have full knowledge of audio equipment operation, including digital audio programming. Have 3-5 year experience tuning system to room or listening area as well as eq microphones to prevent feedback at performance levels.
- f. Emergency paging shall always override local sound – Emergency intercom to duck local sound systems.
- g. Provide separate speakers independent on the paging system.
- h. Provide rack mounted equipment for each sound rack on project. Provide microphones, wireless microphones and hanging microphones
- i. Typical Local Sound Rack Elevation:



- j. Final layout to be reviewed by SBISD Planning & Construction during design phase. Will need 2-3 data drops at rack.
 - k. Amp & speakers would change on a per project basis – shall be reviewed with SBISD Planning and Construction during design phase.
 - l. Minimum 2 wireless microphones to be provided with rack. List quantity of inputs, etc, recommended.
3. Provide network connectivity to all local system, minimum of two (2) per system.
4. Provide ADA/TAS compliant assisted listening system in auditoriums.



5. Confirm current list of approved audio/visual equipment brands with SBISD Planning & Construction and Technology Services during design phase:
 - a. Amplifiers: Crown, QSC, Peavey, Behringer
 - b. Microphones: Shure, Sennheiser, Audio Technica, AKG, Electra Voice
 - c. Digital Audio Mixer: Behringer, Midas, Allen & Heath
 - d. Analog Audio Mixer: Allen & Heath, Soundcraft, Behringer, Mackie, Alesis
 - e. Speakers: JBL, QSC, Electra Voice, Peavey
 - f. Not approved for local sound: TOA, Bogen, Rauland, Bi-amp
6. Preferred Audio Visual system vendors for New Construction include the following. Confirm with SBISD Planning & Construction during design phase.
 - a. Ford AV, www.fordav.com
 - b. Hairel Enterprises, www.hairelsound.com
 - c. LD Systems, www.ldsystems.com

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DISTRIBUTED COMMUNICATIONS AND MONITORING SYSTEMS

1. Intercom / Telephone communications systems
 - a. The intent of this specification is to provide a complete and properly operating digital telephonic communications system for the pick-up, amplification, distribution and reproduction of voice and/or other audio program material and time keeping functions. The system shall be of modular design to facilitate both expansion and service and shall be completely solid state. All necessary hook up and testing shall be by a factory approved representative.
 - b. The system shall be supplied by the manufacturer's authorized contractor. Certification shall be submitted verifying that the contractor is the manufacturer's authorized contractor. Included shall be certificates of attendance in manufacturer's installation / maintenance training by the contractors directly employed personnel. The communications contracting company shall have been in business for a minimum of 5 years, continuously furnishing the specified manufacturers' product lines and systems.
 - c. The system assemblies shall be completely factory built and tested by manufacturers of established reputation, who have and can refer to similar systems which are currently installed and functioning properly. The factory preassembled cabinets, consoles, and power supplies shall be UL approved and listed.
 - d. The system shall be guaranteed for a period of one year from the date of acceptance or first beneficial use, whichever is first, against defects in materials, workmanship, design and improper adjustment. Any defects in the system shall be corrected at no expense to the Owner, provided the system does not show signs of abuse. During the guarantee period any work found not to be in conformance with the plans, specifications, and addenda shall be brought into conformity with same at no additional cost to the owner. All parts shall be guaranteed for a period of five years.
 - e. The equipment described herein, and furnished per these specifications shall be supplied by one communications contractor. The contractor shall hold the necessary License for this type of work. All reference to model numbers and



other detailed descriptive data is intended to establish standards of design, performance, and quality as required. Equipment manufactured by Rauland-Borg as installed by a certified local Rauland-Borg integrator. Contractor is required to submit current certification from manufacturer with submittals. – Manufacturer is correct.

- f. The communications contractor shall furnish all equipment, accessories and material required for the installation of a comprehensive Intercom / Telephone System in strict compliance with these specifications and applicable contract drawings. Any material and/or equipment, not specified or described herein necessary for the proper operation of the system shall be deemed part of this specification.
- g. The contractor shall make available, and maintain a radio dispatched mobile service department capable of furnishing equipment inspection and timely service at the owner's location.
- h. The contractor shall be prepared to offer a service contract for the maintenance of the system beyond the warranty period.
- i. The contractor shall instruct personnel designated by the owner in the proper use, basic care, and maintenance of the equipment. Such training shall be provided as an integral component of the system. Training shall be documented with copies forwarded to SBISD Planning & Construction and Facilities Services Low Voltage Department.
- j. The contractor shall submit certificates of factory authorization and completion of the manufacturer's telephone installation and maintenance training.
- k. Provide a complete and comprehensive micro processed School Communications for campus location. The New system must provide seamless integration with the present school System (Telecenter U). The system shall incorporate integrated Facilities for connection to outside telephone lines as specified. All system functions shall be enabled by DTMF/microprocessor control. The communications system shall be provided by one supplier to assure smooth coordination of all communications needs. The wireless master clock shall synchronize with the present Telecenter System in operation. The high school system shall act as the Master timing system for all Class change signals, Paging, Intercom and Tone functions. Provide a means to disable this capability via block programming and dial access codes.
- l. SBISD will provide Server for TCU Campus controller and will load any necessary software prior to TCU Software. Contractor shall connect to existing system.
- m. Provide programmable and addressable intercom system to every occupied space and to the building exterior.
- n. Building exterior zone shall be dedicated for exterior only, separate from corridor zones.
- o. Locate Intercommunications Rack in MDF room.
- p. Provide independent voice path to each occupied space, excluding corridors and restrooms.
- q. Indicate location of remote console media containing digital tuner, Antenna for tuner, microphone, desk stand and player in administration reception area. Coordinate location selection with SBISD Planning & Construction during design. Provide lockable, ventilated millwork cabinet for console. Provide 1" conduit from cabinet interior to accessible ceiling space. Provide duplex outlet adjacent to conduit inside cabinet.
- r. Provide wall-mounted volume control for speakers at all offices, clinic, all special education classrooms and conference rooms. Verify volume control locations



- with SBISD Planning & Construction and Facilities Services Low Voltage Department during design phase.
- s. Provide ACS stations. Locate one in principal's office and one in reception area.
 - t. Provide a "square wave" UPS for PA system, 15 minute capacity.
 - u. Coordinate Voice over IP System to access PA system. Provide programming and peripherals as required to interface VoIP and PA.
 - v. Provide six (6) data drops to intercom headend location for Telecenter U and Wireless Clock System.
 - v. Note that call buttons shall be removed from schools in district and shall be part of any renovation scope. Confirm extent with SBISD Planning & Construction during design phase. Call buttons may be provided for special needs classrooms only.

27 53 13 CLOCK SYSTEMS

1. Wireless clock Site-Sync:
 - a. Wireless clocks, 120v powered – hard wired to clock (no receptacle) Locate on teaching wall, on door side.
 - b. Master clock system shall be provided with 120v power and data drop.
 - c. Provide signal testing devices per system installed
 - d. System time to synchronize via network connection
 - e. Clock on teaching wall
 - f. Main head-in for clocks shall be next to PA so can be synced. Locate in MDF room.
 - g. Provide repeaters as required
 - h. Centrally located antenna if possible on campus – System shall be designed such that entire campus is covered.
 - i. Impact resistant cages in high impact prone areas
 - j. Analog clocks with SBISD customized face – 12" in classrooms and 15" in common spaces.

27 53 16 CATV SYSTEMS

2. Verify current SBISD provider during design phase. Need to provide an RG-11 cable from MDF to all IDF rooms. All taps will be located in the IDFs (8-point tap). 3 drops per building: principal's office, library, and lobby.

END OF SECTION`



SECTION 27 53 19 DISTRIBUTED ANTENNA SYSTEM (DAS)

GENERAL

1.1 SUMMARY

- A. This specification describes technical and performance criteria for deploying a 50 Ω Neutral-Host Distributed Antenna System (DAS) capable of supporting Wireless Service Providers (WSP) and Public Safety Networks (PSN). The DAS components specified in this document include: Donor Antennas, Coverage Antennas, Coax Cable, Coax Connectors, Splitters, Combiners, Couplers, Bi-Directional Amplifiers (BDA), Fiber-Optic Master Unit and Fiber-Optic Remote Units.

1.2 SYSTEM DESCRIPTION

- A. Services: Upon commissioning, the DAS shall provide coverage for the WSPs and PSNs listed below on all frequencies currently being used by the designated WSPs and PSN in the given market. *[Edit the listing of carriers and public safety entities below per the customer's desires and local codes/ordinances. If possible, list the specific public safety frequencies/channels required per the local AHJ.]*
1. AT&T Wireless
 2. Sprint/Nextel
 3. T-Mobile
 4. Verizon
 5. (Example) 800 MHz PSN coverage, city of Plano, TX Ordinance No. **[designer will need to coordinate 1st responder radio frequencies with the local authorities]**
- B. Expansion: Without replacing or adding to the Passive DAS Infrastructure, the DAS shall have expansion capabilities to support the following WSP and PSN frequencies deployed in a SISO *[Indicate SISO or MIMO. Note that MIMO will require twice the cable infrastructure.]* antenna environment. Any additional Components required for system expansion shall comply with all specifications of this Section.

Service	Uplink, MHz	Downlink, MHz
Cellular	824 - 849	869 - 894
PCS	1850 - 1915	1930 - 1995
AWS	1710 - 1755	2110 - 2155
Commercial 700 Band	698 - 716, 776-787	728 - 746
Narrow Band Public Safety 700 Band	799 - 805	769 - 775
800 Band	806 - 824	851 - 869
900 Band	896 - 902	935 - 941
BRS/EBS	2496-2690	

- C. WSP Approval: The Contractor shall propose and deploy a DAS system capable of receiving WSP Approval for interconnection to the WSPs' macro networks. As such, per the local WSP's design requirements, the DAS system should achieve dominant RF coverage over the WSPs macro network.
- D. PSN Approval: The Contractor shall propose and deploy a DAS system capable of receiving approval of the PSN Authority Having Jurisdiction (AHJ).
- E. Network Management:
- F. NMS: The DAS shall have a Network Management System (NMS) capable of alarm, monitor, configuration and control of all Active Components.



- G. SNMP Integration: The DAS NMS shall be capable of integration with 3rd party SNMP based NMS products for alarm purposes and provide alarming information.

1.3 ALTERNATIVES

- A. No alternative component(s) shall be accepted as equal to the components and manufacturers specified in this document unless the Contractor proves that the alternative component(s) are of equal or superior specifications and quality, and that they have been used in similar projects of size and complexity for no less than 3-years. The following information shall be required for each alternative component with submittal of the bid response:
 - 1. Passive Components:
 - a) Product samples
 - b) Detailed product specifications
 - c) Independent test results verifying the product specifications
 - d) Written documentation from the manufacturer guaranteeing that the alternative component(s) shall remain available for new purchase for a period of 7-years from the date of system acceptance.
- B. Active Components:
 - 1. Hardware and software manuals
 - 2. Detailed product specifications
 - 3. Mean Time Between Failure (MTBF) data for each Active Component
 - 4. Independent test results verifying the product specifications
 - 5. Written documentation from the manufacturer guaranteeing that the alternative component(s) shall be supported for a period of 7-years from the date of system acceptance.
 - 6. For Active Components serving the WSPs, written documentation from the WSPs that the alternative component(s) are approved for use within the WSP's network and that interconnection of the DAS to the WSP's network will not be withheld due to the alternative component being used in the DAS.
 - 7. For Active Components serving the PSN, written documentation from the AHJ that the alternative component(s) are approved for use within the PSN and that system acceptance of the DAS to the PSN will not be withheld due to the alternative component being used in the DAS.

1.4 CODES, STANDARDS AND CERTIFICATIONS

- A. All work, including but not limited to: cabling, pathways, support structures, wiring, equipment, installation, workmanship, maintenance and testing shall comply with the latest editions of the National Electrical Code, National Electrical Safety Code, all applicable local rules and regulations, equipment manufacturer's instructions, and the National Electrical Contractor's Association (NECA) Standard of Installation. In case of discrepancy or disagreement between the documents noted above, the contractor shall satisfy the most stringent requirements.
- B. Requirements set forth by first-responder code, ordinance, or the PSN AHJ shall supersede the requirements described herein and shall be met in their entirety. It is the Contractor's responsibility to ensure that the DAS complies with local code, ordinances or requirements established by the PSN AHJ.



1.5 DEFINITIONS

- A. Acceptance: Expressed approval by the customer
- B. Active: DAS components that require AC/DC power for operation
- C. Carrier Approval: Expressed approval to interconnect to the WSP macro network
- D. Cellular Access Unit: The Active device that allows the mobile devices to connect to the DAS network.
- E. Channel: A path for an RF transmission between two points
- F. Component: A main system element of the DAS
- G. Contractor: The prime contractor bidding the project
- H. Delivered Audio Quality (DAQ): A measure of audio quality over a transmission medium used to quantify the quality of audio heard over a radio system. DAQ levels are defined by the following scale:
 - 1. DAQ 1: Unusable. Speech present but not understandable.
 - 2. DAQ 2: Speech understandable with considerable effort. Requires frequent repetition due to noise or distortion.
 - 3. DAQ 3: Speech understandable with slight effort. Requires occasional repetition due to noise or distortion.
 - 4. DAQ 3.4: Speech understandable without repetition. Some noise or distortion present.
 - 5. DAQ 4: Speech easily understandable. Little noise or distortion.
 - 6. DAQ 5: Perfect. No distortion or noise discernible.
- I. DAS Sub-contractor: A qualified and experienced DAS integrator performing the DAS deployment for the Contractor.
- J. Head-End Equipment: The equipment that accepts the RF Source, and then typically attenuates, combines, filters and converts the various RF Source signals before transmitting the RF signals to the Remote Units.
- K. Passive: DAS components that do not require AC/DC power for operation
- L. Remote Unit: The equipment that receives the RF signals from the Head-End Equipment, and then typically filters, converts and often amplifies the RF signal before transmitting it to the coverage antenna or Cellular Access Unit.

1.6 PERFORMANCE REQUIREMENTS

- A. WSP DAS:
 - 1. On a per channel basis, the downlink RSL for each frequency band shall meet or exceed the criteria in Table 1. To meet the WSP's dominate design requirements, the RSL criteria below may need to be increased per the results of the RF site survey.

Table 1. System Parameters

Parameters	Unit	Lower 700 MHz, BRS/EBS	Cellular, PCS, AWS, Commercial 800/900 MHz	Public Safety 380 - 512, 700, 800 MHz
Minimum downlink receive signal level (RSL)	dBm	-77	-85	-95

- 2. Contractor shall state the assumed channel loading and frequency bands for the proposed WSP in-building coverage. Prior to installation, contractors shall confirm the channel loading and frequency use in the serving area, and shall guarantee coverage for these channels per the criteria in Table 1.
- 3. The DAS shall deliver coverage per the criteria in Table 1 throughout 95% of the building. The coverage areas shall include the stairwells, elevators, basement, and garage. *[Stairwell and elevator coverage can add substantial cost to the*



system; you may want to consider less stringent coverage requirements for WSP only systems.]

4. The contractor shall explain the method used to avoid downlink and uplink interference.

B. PSN DAS:

1. The PSN DAS shall be capable of complying with the latest edition of NFPA-72.
2. Where the in-building coverage requirements include 700 - 800 MHz public safety system and commercial wireless in-building coverage, the two systems shall operate over a unified Passive Cable and Coverage Antenna Infrastructure unless restricted by local code or ordinance.
3. Using industry best-practices, and within the limits of the manufacturers' equipment, the building, the spectral environment and the PSNs radio system, the Contractor will be responsible for mitigating interference associated with the DAS. Contractor shall make use of advanced filtering technologies in BDAs and best-practices to minimize adjacent channel interference and time domain interference.
4. If not identified in Section 1.02 A, Contractors shall state the assumed channel count for the PSN Frequency Bands identified above in Section 1.02 A. with submittal of bid response. Prior to installation, contractors shall confirm the channel count and frequencies with the AHJ, and shall guarantee coverage for these channels per the criteria stated above.
5. The DAS shall be capable of upgrade, without additional hardware or software, to allow for changes to system frequencies within the deployed frequency band in order to maintain radio system coverage as originally designed.

1.7 ADDITIONAL REQUIREMENTS

- A. WSP Approval: The Contractor shall be responsible for providing the WSP with information each WSP requires to approve interconnection of the DAS to the WSP's macro network.
- B. PSN Approval: When public safety coverage is included in the DAS, the Contractor shall be responsible for facilitating AHJ approval(s).

1.8 SUBMITTALS

A. Submittal Requirements with Bid Response:

1. Product Data: Submit manufacturer datasheets for the following components:
 - a) Donor and Coverage Antenna
 - b) Coaxial Cable and Connectors
 - c) Splitters, Combiners and Couplers
 - d) Bi-Directional Amplifiers (BDA)
 - e) Head-End Equipment
 - f) Remote Units
 - g) Cellular Access Units
2. Shop Drawings: Submit the following items:
 - a) RF link budget
 - b) Overlay of system Components on floor plans
 - c) Drawings for Donor Antenna and grounding
 - d) Bill-of-Material (BOM)
3. Statement of Work (SOW): Submit sample SOW
4. Acceptance Test Plan (ATP): Submit sample ATP
5. Recommended Spares
6. Maintenance Service Pricing
7. Warranty Documents:
 - a) Submit for all manufactured Components specified in this Section.
 - b) Submit Contractor's System Warranty.



- B. Submittal Requirements Prior to Start of Construction
 1. Final RF link budget
 2. WSP design approvals *[Requiring WSP design approval prior to the start of construction will often delay the DAS deployment. However, WSP's often require changes to Contractor's design, so careful consideration should be made when considering including or omitting this requirement.]*
 3. Overlay of system Components on floor plans
 4. Drawings for Donor Antenna and grounding
 5. RF propagation modeling
 6. Signal to Noise Interference Ratio (SNIR) Map
 7. Bill-of-Material (BOM)
 8. Maintenance Service Contract
 9. Statement of Work (SOW): The contractor shall submit a SOW that has been accepted by the customer or customer's designated representative.
 10. WSP Acceptance Test Plan (ATP): The contractor shall submit an ATP that has been accepted by the customer or customer's designated representative.
- C. Submittal Requirements at Close Out
 1. Submit as-built drawings indicating:
 - a) Donor antenna, grounding and lightning protection details
 - b) Cable routing, splitters, couplers and coverage antenna locations
 - c) Active component locations, layout and configuration
 2. Test Reports:
 - a) WSP DAS: Submit accepted ATP reports confirming the requirements of Section 1.07 A have been met.
 - b) PSN: Submit Accepted ATP reports confirming the requirements of Section 1.07 B have been met.
 3. Configurations:
 - a) Copies of Component configurations in electronic and hard copy formats, including log-in and password information
 - b) Copies of all required Component registration information
 4. Field Reports: Submit sweep-testing results for all cable runs.
 5. Field Reports: Submit OTDR test results for all fiber runs.
 6. Operation and Maintenance Data: Submit hardware and software manuals for all Active Components.
 7. Warranty Documents:
 - a) Submit for all manufactured components specified in this Section.
 - b) Submit Contractor's System Warranty.
 - c) Submit Manufacturer's Extended Warranty

1.9 QUALITY ASSURANCE

- A. Qualifications and Requirements:
 1. Contractor or DAS Sub-contractor shall have a minimum of 4-years full-time experience executing DAS work of similar scope and complexity.
 2. Contractor or DAS Sub-contractor shall have deployed a minimum of 1,000 DAS systems.
 3. Contractor or DAS Sub-contractor shall have an existing NOC in operation with at least ten DAS systems being monitored.
 4. Contractor or DAS Sub-contractor Engineers designing and commissioning the DAS must be degreed engineers or hold an FCC General Radiotelephone Operator license (GP).
 5. Contractor or DAS Sub-contractor Project Managers must be PMI Certified.
 6. Contractor or DAS Sub-contractor shall provide an onsite construction foreman to oversee the installation.
 7. Contractor or DAS Sub-contractor shall provide a project manager to oversee the DAS deployment.



B. Certifications:

1. The DAS manufacture(s) of the active components shall maintain a formal authorized and certified value-added reseller program, which consists of routine quality audits of the participating value-added resellers. The list of authorized value-added resellers shall be published and the Contractor or DAS Sub-contractor shall be listed in the Manufacturer's publication of value-added resellers.
2. Contractor or DAS Sub-contractor(s) shall provide manufacturer certification that their personnel have been trained on the passive and active components being installed.
3. Contractor or DAS Sub-contractor shall be an authorized and certified value-added reseller for the proposed DAS manufacturer of passive and active DAS components.

C. Contractor(s) meeting the above certifications, requirements and qualifications include:

1. Connectivity Wireless Solutions
Corporate Headquarters
2707 Main Street, Suite 1
Duluth, GA 30096
Phone: (678) 584-5799
Fax: (678) 584-5622

1.10 WARRANTY

A. Manufacturer Warranty:

1. Splitters, Couplers and Coverage Antennas: 5-year limited warranty from date of system acceptance.
2. Coaxial Cable and Connectors: 10-year limited warranty from date of system acceptance.
3. Fiber-Optic Cable: 10-year limited warranty from date of system acceptance.
4. Active Components: The earliest of 1-year limited warranty from date of system installation or 15 months from date of shipment.

B. Contractor Warranty: Contractor shall warrant the system performance as specified in Section 1.07 for 1-year.

1.11 MAINTENANCE & SUPPORT

A. The Contractor shall provide an optional annual maintenance service contract to include:

1. 24x7x365 Remote Monitoring
2. Remote Diagnostics & Repair
3. 24x7x365 Technician Dispatch (On-site within 24 hours)
4. Annual Preventive Maintenance
5. Service Provider Coordination
6. Equipment Warranty Management

PRODUCTS

2.1 MANUFACTURERS

- A. Specified Manufacturers for 50 Ohm passive DAS components:
CommScope/Andrew
- B. Specified Manufacturers for 50 Ohm Active components:
CommScope/Andrew, Corning/MobileAccess and SOLiD Technologies
- C. Acceptable Manufacturers: As permitted in Section 1.03.



2.2 COMPONENTS

- A. Omni-Directional Coverage: Omni-Directional Coverage antennas shall feature a multi-band design, accommodating multiple frequency bands in a single small antenna. *(If UHF services are required as specified in section 1.02 A, the specifications for the Omni-Directional Coverage antenna shall be MARS MA-CQ26-1X or functional equivalent.)*
1. Electrical Band 1:
 2. Frequency Band: 698 – 800 MHz
 3. VSWR: $\leq 1.8:1$
 4. Gain: ≥ 1.5 dBi
 5. Maximum input power:
 6. Impedance: 50 Ω
 7. Beamwidth, Horizontal: 360° omnidirectional
 8. Beamwidth, Vertical: 80° nominal
 9. Return Loss: 10.9 dB
- B. Electrical Band 2:
1. Frequency Band: 1710 – 2700 MHz and 800 – 960 MHz
 2. VSWR: $\leq 1.5:1$
 3. Gain: ≥ 1.5 dBi @ 800–960 MHz and ≥ 5.0 dBi @ 1710 – 2700 MHz
 4. Maximum input power:
 5. Impedance: 50 Ω
 6. Beamwidth, Horizontal: 360° omnidirectional
 7. Beamwidth, Vertical: 65° nominal
 8. Return Loss: ≤ 13.9 dB
- C. Mechanical:
1. Connector: 50 Ω N Type Female
 2. Mounting: Thru-hole ceiling mount
 3. Radome material: ABS, UV resistant
 4. Pigtail cable: KSR195, plenum rated
- D. Environmental:
1. Application: Indoor
 2. Operating Temperature: 40 °C to +60 °C (40 °F to +140 °F)
 3. Relative Humidity: Up to 100%
- E. Regulatory Compliance/Certifications: RoHS 2002/95/EC
- F. Approved Manufacturer: Andrew CELLMAX-O-CPUSE or equivalent, in accordance with Section 1.03.

2.3 DIRECTIONAL COVERAGE ANTENNAS:

- A. Directional coverage antennas shall feature a multi-band design, accommodating multiple frequency bands in a single small antenna. *(if uhf services are required as specified in section 1.02 a, the specifications for the omni-directional coverage antenna shall be mars ma-wa46-1x or functional equivalent.)*
1. Electrical Band 1:
 - a) Frequency Band: 698 – 800 MHz
 - b) VSWR: $\leq 1.8:1$
 - c) Gain: ≥ 5.0 dBi @ 698 – 800 MHz
 - d) Maximum input power: 50W
 - e) Impedance: 50 Ω
 - f) Beamwidth, Horizontal: 110° nominal
 - g) Polarization: Vertical
 - h) Return Loss: ≤ 10.9 dB



2. Electrical Band 2:
 - a) Frequency Band: 1710 – 2700 MHz and 800 – 960 MHz
 - b) VSWR: $\leq 1.5:1$
 - c) Gain: ≥ 5.0 dBi @ 800 – 960 MHz and ≥ 6.0 dBi @ 2170 – 2700 MHz and ≥ 8.0 dBi @ 1710 – 2170 MHz
 - d) Maximum input power:
 - e) Impedance: 50Ω
 - f) Beamwidth, Horizontal: 90° nominal
 - g) Return Loss: ≤ 13.9 dB
3. Mechanical:
 - a) Connector: 50Ω N Type Female
 - b) Mounting: 4-hole wall mounting plate
 - c) Radome material: ABS, UV resistant
 - d) Pigtail cable: RG58, plenum rated
 - e) Environmental:
 - f) Application: Indoor
 - g) Operating Temperature: 40°C to $+60^\circ\text{C}$ (40°F to $+140^\circ\text{F}$)
 - h) Relative Humidity: Up to 100%
4. Regulatory Compliance/Certifications: RoHS 2002/95/EC
5. Approved Manufacturer: Andrew CELLMAX-D-CPUSE or equivalent, in accordance with Section 1.03

B. Air Dielectric, Plenum Rated Cable:

1. Material Characteristics:
 - a) Jacket: Halogenated, Fire-Retardant
 - b) Outer Conductor Material: Corrugated Aluminum or Corrugated Copper
 - c) Inner Conductor Material: Copper-Clad Aluminum Wire
2. Electrical Characteristics:
 - a) Impedance: $50 \pm 2.0 \Omega$
 - b) Frequency Band: 1 - 8800 MHz
 - c) Peak Power Rating: ≥ 40.0 kW
3. Mechanical Characteristics:
 - a) Diameter Over Jacket: $\leq .627$ in
 - b) Minimum Bending Radius: ≤ 5 in
 - c) One Time Minimum Bending Radius: ≤ 3 in
4. Attenuation Characteristics:

Frequency (MHz)	Attenuation (dB/100ft)
150	≤ 0.848
450	≤ 1.53
800	≤ 2.105
2000	≤ 3.564

- a) Standard Conditions: VSWR 1.0, ambient temperature 20°C (68°F)
- b) Approved Manufacturer: Andrew HL4RP-50A, AL4RPV-50A or equivalent, in accordance with Section 1.03.

C. Foam Dielectric Cable:

1. Material Characteristics:
 - a) Jacket: Non-halogenated, Fire-Retardant Polyolefin
 - 1) Outer Conductor Material: Corrugated Copper
2. Inner Conductor Material: Copper-Clad Aluminum Wire or Copper Tube
3. Electrical Characteristics:
 - a) Impedance: $50 \pm 1.0 \Omega$
 - b) Frequency Band: $1/2"$ Nominal: 1 - 8800 MHz, $7/8"$ Nominal: 1 - 5000 MHz
 - c) Peak Power Rating: ≥ 40.0 kW



4. Mechanical Characteristics:
 - a) Diameter Over Jacket: 1/2" Nominal: $\leq .630$ in, 7/8" Nominal: ≤ 1.1 in
 - b) Minimum Bending Radius: 1/2" Nominal: ≤ 5 in, 7/8" Nominal: ≤ 10 in
 - c) One Time Minimum Bending Radius: 1/2" Nominal: ≤ 2 in, 7/8" Nominal: ≤ 5 in
5. Attenuation Characteristics: 1/2" Nominal

Frequency (MHz)	Attenuation (dB/100ft)
150	≤ 0.815
450	≤ 1.447
800	≤ 1.968
2000	≤ 3.251

- a) Standard Conditions: VSWR 1.0, ambient temperature 20 °C (68 °F)

6. Attenuation Characteristics: 7/8" Nominal:

Frequency (MHz)	Attenuation (dB/100ft)
150	≤ 0.417
450	$\leq .744$
800	≤ 1.014
2000	≤ 1.683

- a) Standard Conditions: VSWR 1.0, ambient temperature 20 °C (68 °F)
- b) Approved Manufacturer: Andrew LDF4-50A, FXL-540-NHR, FXL-780-NHR or equivalent, in accordance with Section 1.03.

- D. Splitters, Combiners, Couplers, Coax Jumpers and Connectors:
 1. Approved Manufacturer: Andrew or equivalent, in accordance with Section 1.03.
- E. BDA: When the DAS dictates a BDA as the RF source, the BDA shall use digital filtering to mitigate interference and accommodate multiple services for PSNs and WSPs.
 1. Characteristics
 - a) Operating Temperature Range: -33 °C to +50 °C
 - b) Filtering: Digital for Public Safety Bands
 - c) Separate Control: Each RF amplifier shall be capable of adjusting and controlling power levels for each WSP when multiple WSPs share a single amplifier.
 2. FCC Part 90.219 Type Classification: Class A narrowband for LMR/SMR/ESMR frequency bands
 3. Alarming: Shall support both SNMP and SMS using wireless modem
 4. Compliance:
 - a) NFPA: For Public Safety bands, the BDA shall comply with NFPA 72 In-Building Public Safety Radio Enhancement Systems.
 - b) FCC: Shall be FCC type certified.
 5. Approved Manufacturers: CommScope/Andrew, Axell Wireless, Bird Technologies or equivalent, in accordance with Section 1.03.
- F. Fiber-Optic Master Unit: When building size dictates an Active fiber DAS, the Fiber-Optic Master Unit shall convert radio over coax to Radio-Over-Fiber (RoF) for distribution to Fiber-Optic Remote Units.
 1. Approved Manufacturers: CommScope/Andrew, Corning/MobileAccess and SOLiD Technologies or equivalent, in accordance with Section 1.03.
- G. Fiber-Optic Remote Units: The Fiber-Optic Remote Unit converts the RoF signal back to radio over coax, as well as provides filtering so that multiple frequency bands can reside over the same passive cable and antenna infrastructure.
 1. Approved Manufacturers: CommScope/Andrew, MobileAccess and SOLiD Technologies or equivalent, in accordance with Section 1.03.



EXECUTION

3.1 INSTALLATION

- A. The contractor and/or DAS Sub-contractor shall design, install, commission and test the DAS in accordance with the manufacturer's instructions and recommendations.
- B. The contractor and/or DAS Sub-contractor shall install the DAS in accordance with the accepted SOW.
- C. The contractor and/or DAS Sub-contractor shall adhere to all work and safety requirements while working at the job site.
- D. The contractor and/or DAS Sub-contractor shall have DAS project foreman on site overseeing the installation.
- E. The contractor and/or DAS Sub-contractor shall have at a minimum one PMP certified Project Manager on staff overseeing the project. The Project Manager will be responsible for the following:
 - 1. Developing and maintaining a project plan consistent with the overall milestones of the project.
 - 2. Overseeing and coordinating the activities of the DAS project, including: initiating and holding weekly project conference calls, as well as maintaining and distributing meeting minutes.
 - 3. Act as the point-of-contact interface for all DAS project activities.
 - 4. Provide weekly status updates regarding work performed, worked scheduled, open items, problems/issues and resolutions.
- F. The contractor and DAS Sub-contractor shall be prepared to deploy the DAS in a phased approach as dictated by the building construction and/or work of other trades.
- G. The contractor and DAS Sub-contractor shall facilitate PSN and WSP Approval and connection to their respective macro networks.
- H. The contractor and DAS Sub-contractor shall be prepared to connect to the PSN and WSP's network(s) in a phased approach as dictated by the PSN and WSP's schedules.

3.2 ACCEPTANCE TESTING

- A. Acceptance testing will be performed confirming the requirements of Section 1.07 have been met.
- B. The contractor shall complete the WSP acceptance testing per the WSP's requirements and as prescribed in the approved WSP Acceptance Test Plan (ATP) submittal.
- C. PSN Acceptance Testing
 - 1. PSN Acceptance Testing shall comply with the following:
 - a) The Acceptance Test shall ensure that two-way coverage on each floor of the building meets the minimum coverage requirements detailed in Section 1.07.
 - b) Tests shall be made using the frequencies listed in Section 1.02.A.
 - c) Testing shall be coordinated with the Customer and AHJ to ensure no undue interference to any public safety operations.
 - d) All testing shall be done on frequencies authorized by the FCC.

3.3 TEST PROCEDURES

- A. The test plan shall ensure testing throughout the building. Testing shall be performed on a grid system. A spot located approximately in the center of a grid area will be selected for the test. Once the spot has been selected, prospecting for a better spot within the grid area will not be permitted. A grid is overlaid onto a floor area to provide 20 grid cells. Grid cells are provided with definite minimum and maximum dimensions. For most buildings, using a minimum grid dimension of 20 ft and a maximum grid dimension of 80 ft will suffice to encompass the entire floor area. A maximum of one area will be



allowed to fail the test (95% coverage). Where a floor exceeds 128,000 sq ft, which is the floor area that can be covered by the maximum grid dimension of 80 ft, the floor be subdivided into 40 equal sectors, with each sector being tested individually. A maximum of two non-adjacent areas will be allowed to fail the test (95% coverage). In addition to the above requirement, all critical areas, which include; the emergency command center(s), the fire pump room(s), exit stairs, exit passageways, elevator lobbies, standpipe cabinets, sprinkler sectional valve locations, and other areas deemed critical by the AHJ, shall be provided with 99 percent floor area radio coverage. Signal strength measurements shall be performed using standardized parameters as specified below.

3.4 MEASUREMENT PARAMETERS

- A. Signal levels shall be measured to ensure the system meets the criteria specified in the Technical Proposal. Downlink measurements shall be made with the following standardized parameters:
1. Measurements shall be recorded using a calibrated spectrum analyzer or a calibrated automatic signal-level measurement recording system measuring RSSI in each band with a dipole antenna positioned approximately 4' above the surface.
 2. If P25 Phase II TDMA signals are being measured, the system BER will be measured on a known P25 Phase II TDMA signal. The signal source for measuring the system BER will be provided by the AHJ. The downlink signal level will be measured and the BER will be determined. The DAS coverage will be considered acceptable if the measured BER is five percent (5%) or less.
 3. In addition, the AHJ may conduct portable radio test to show true system performance for P25 Phase I and Phase II TDMA and FDMA services being used on the DAS. These tests shall be conducted using the DAQ scale. A successful test shall include any score measuring DAQ 3.4 or greater.
 4. Measurements will be recorded for the test pattern as described above.
 5. The System uplink noise floor will be measured by connecting a spectrum analyzer to the uplink output of the donor BDA to verify that it agrees with levels predicted by the design link budgets detailed in the Contractor's TF link budget submittals.
 6. System acceptance is achieved when 95% of the averaged data points meet or exceed the requirements specified here and in Section 1.07.

END OF SECTION



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DIVISION 28 – ELECTRONIC SAFETY AND SECURITY

DIVISION 28 INTENT

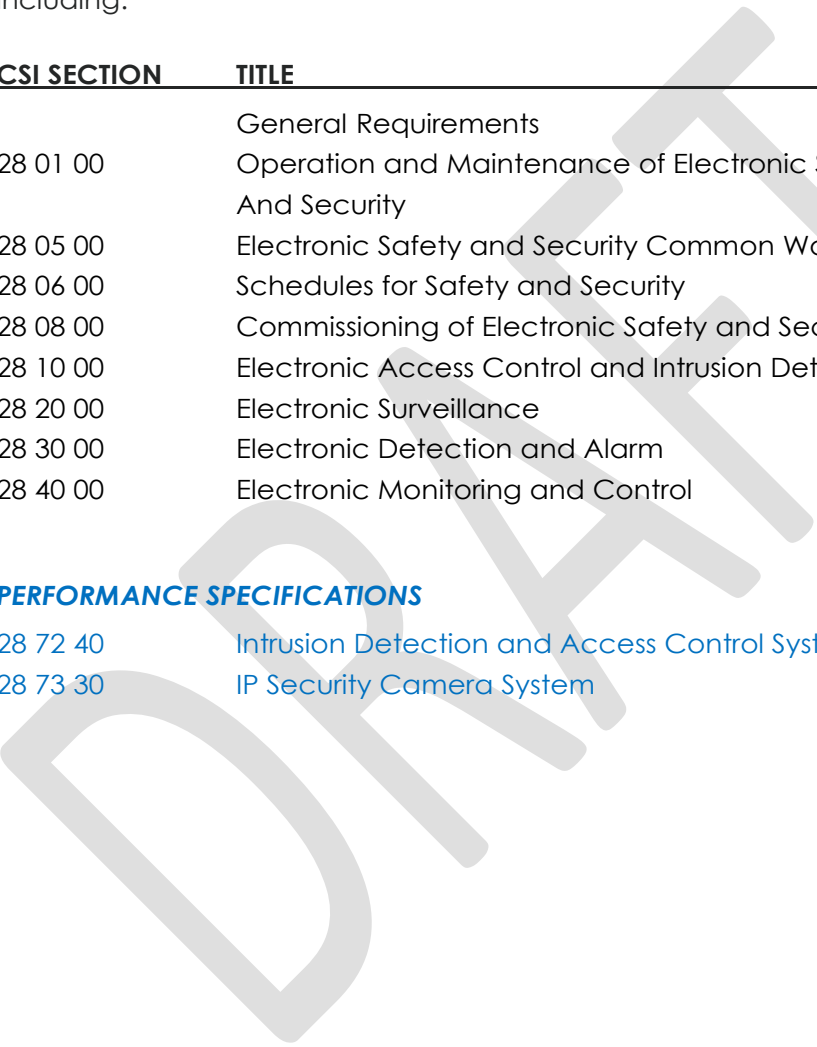
This section specific guidelines for materials and installation of Safety and Security systems, components and equipment in new and existing facilities.

Separate sections have been prepared for all sub-categories within this division, including:

CSI SECTION	TITLE	REVISION DATE
	General Requirements	NOT USED
28 01 00	Operation and Maintenance of Electronic Safety And Security	NOT USED
28 05 00	Electronic Safety and Security Common Work Results	VERSION 2.0
28 06 00	Schedules for Safety and Security	NOT USED
28 08 00	Commissioning of Electronic Safety and Security	NOT USED
28 10 00	Electronic Access Control and Intrusion Detection	VERSION 2.0
28 20 00	Electronic Surveillance	VERSION 2.0
28 30 00	Electronic Detection and Alarm	VERSION 2.0
28 40 00	Electronic Monitoring and Control	NOT USED

PERFORMANCE SPECIFICATIONS

28 72 40	Intrusion Detection and Access Control System	TO BE DELETED
28 73 30	IP Security Camera System	TO BE DELETED





DIVISION 28 – ELECTRONIC SAFETY AND SECURITY

28 05 00

ELECTRONIC SAFETY AND SECURITY COMMON WORK RESULTS

1. For Renovation projects or Additions, exact scope shall be determined on a school-by-school basis depending on what systems are currently at that campus. Shall be reviewed with SBISD Planning & Construction during design phase.
2. Minimum standards for new and upgraded facilities.
 - a. For any campus receiving a major renovation shall include a safety and security review of that campus, with evaluation of any recommended upgrade to current district safety standards. Shall include all systems: access control, surveillance, intrusion, fire alarm, etc, covered under Division 28.
 - b. District will review option to have new stand-alone systems, or upgrade, pending age of existing systems at campuses.

28 10 00

ELECTRONIC ACCESS CONTROL AND INTRUSION DETECTION

28 13 00 - ACCESS CONTROL AND INTRUSION DETECTION SYSTEM

1. Coordinate ALL work through SBISD Planning & Construction and Low Voltage Division.
2. Unless otherwise noted prior to start of the project, all systems will be considered to be fully functional. It is the responsibility of the general contractor to note any deficiencies in the system prior to starting any project and submit this prior to start of work. An authorized security system contractor will be required for this purpose. It is the responsibility of the general contractor to provide SBISD Low Voltage Division, Facility Improvement Manager, and SBISD Planning & Construction a copy of the existing system status prior to the start of any construction. This report shall be included in the security contractor's submittal package.
3. It will be the responsibility of the general contractor on a daily basis, to repair damage to the existing security alarm/access control systems in a manner in which they can provide continuous coverage and protection of school district property during construction or to provide an approved security watch detail until system is repaired.
4. An authorized security system contractor will be required for the purpose of working on any portion of the security system. Other trades (Electrical Contractors, etc.) shall not work on any portion of the security system except as otherwise noted in this document.
5. SBISD Low Voltage Division must be notified daily of any changes in the status of the system. An authorized security system contractor may move, remove or disable existing sensors/wiring/systems during construction as needed. With approval, secure and retain all parts in whole where possible and return to owner, or Install new/replacement/additional system(s)/part(s) where appropriate.



6. It will be the responsibility of the general contractor to see that the security alarm system, and/or access control system and its components are installed and working at completion of the project. This includes but not limited to the repair/replacement of any component removed, lost, stolen or damaged during construction.
7. Access Control System shall be completely integrated with Intrusion Detection system. System:
 - a. System: Bosch B9512G.
 - b. Door Controllers: Bosch B901
 - c. Refer to performance specification for all components
8. System shall be on emergency power, breaker locations will be marked inside all enclosures.
9. Two data drops are to be provided at Intrusion Detection main panel.
10. SBISD Low Voltage Department shall approve system install submittals including locations and types of initiating devices.
11. Access Control Two Way intercom system:
 - a. Aiphone IX, included on emergency power
 - b. To be installed at:
 - Main Entrance
 - Kitchen Entrance
 - Electronic Vehicular access Gates
 - c. Master stations to be provided at front desk and kitchen manager's office.
12. A/E team required to coordinate Div 8 and 28 for required door hardware on doors with access control.



28 20 00

ELECTRONIC SURVEILLANCE

28 23 00 - SECURITY CAMERA SYSTEMS

1. Provide a complete turnkey and tested IP based digital video surveillance system including but not limited to cameras, cabling, integration and accessibility with Owner's Local/Wide Area Network (LAN/WAN), Internet accessibility thru remote view application software, simultaneous user access capability and all applicable licensing. Provide fully terminated unshielded twisted pair (UTP) cable, UTP terminations, racks, raceways, conduit, and other incidental and miscellaneous premises wiring system hardware as required for a complete and useable system. The installation shall comply with applicable codes and standards in effect at the job site and as indicated in the Specifications and Drawings - System will be central system for district, not located at each campus.
2. The system shall be Non-Proprietary in nature and be available through multiple distribution channels in the nearest metropolitan marketplace. Systems that are manufactured and installed by a factory office and are not available through multiple distribution channels will not be accepted.
3. All work shall be coordinated and reviewed with SBISD Planning & Construction and SBISD Technology Department during design phase.
3. Locate security monitoring station in general administrative area.
4. Provide all electronic hardware and coordinate with the building's LAN/WAN. The contractor shall coordinate with other system vendors, where appropriate, to facilitate equipment installation, scheduling, protection of equipment and access to the project site in order to provide the Owner a substantially complete project in a timely manner.
5. Acceptable manufacturers of IP recording software shall be Video Insight. All servers will be purchased by the owner.
6. The Contractor performing this scope of work must be a current integrator of solution Video Insight, and be able to include information on current support staff to be able to service this client as needed 24x7 for emergency support.
7. Contractor is responsible for coordinating all electrical work required on this project for connection of a NVR, cameras, conduit, and power supplies. Contractor shall provide a complete turnkey solution to the owner and be responsible for the complete installation of a complete and functional security camera system - shall coordinate with the electrical subcontractor for any scope associated with installation and connection.
8. Maintain existing security camera systems in a manner in which they can provide continuous coverage and protection of school district property during construction.
9. It will be the responsibility of the General Contractor to ensure that the security CCTV System and its components are installed and working at substantial completion of the project. This includes but not limited to the repair/replacement of any component removed or damaged during construction.
10. All vendors/contractors/sub-contractors working on CCTV system will submit to SBISD Technology Department a complete set of plans for approval prior to the beginning of any project. Plans must include, but not limited to, complete equipment list, wiring



diagram and data drop locations. A Pre-Installation meeting will be held between all parties in order to review submittals and coordinate installation. Additional meetings will be held as needed.

11. All new CCTV I.P. camera installations and upgrades will be a turnkey operation - this includes but is not limited to: purchasing, programming cameras, equipment, focusing of cameras, naming of cameras..
12. The types of cameras to be installed will be coordinated prior to installation and labeled on shop drawings; Shop drawings must be approved prior to the installation of any equipment for rough in.
13. The installation of a weatherproof surface mounted single gang service box is required on all outside cameras (installed below camera) and on the inside cameras (installed above camera) where there is not a dropped ceiling. This service box is for testing of video and power cables - service box size shall be coordinated with specific camera type and located on the design plans.
14. For all canopy and exterior cameras and cabling, use outdoor-rated cables in conduit - provide waterproof box on top of canopy.
15. There is no minimum camera count, but minimum camera coverage shall include the following locations – doors, stairs, corridors, perimeter of school, bus lane, parent drop off, exterior courtyards, exterior entrances, kitchen entrances and service yard. Locations to be reviewed and approved by SBISD Planning & Construction and SBISD Technology Department during design phase.

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28 30 00

ELECTRONIC DETECTION AND ALARM

28 31 00 - FIRE DETECTION AND ALARM

1. For Renovation projects or Additions, exact scope shall be determined on a Project-by-Project basis depending on currently installed systems.
2. If the existing system is no longer manufactured or supported, the system shall be replaced in its entirety. Refer to SBISD Fire Alarm specifications.
3. SBISD Approved Fire Alarm Systems are to be open dealer platform and non-proprietary that allows options for procurement/dealers. Approved Fire Alarm Systems are:
 - a. Potter AFC/PVX system
 - b. Silent Knight XL-EVS
4. The contractor shall furnish and install a jurisdictional code compliant and Authority Having Jurisdiction approved complete microprocessor based 24VDC, electrically supervised, analog intelligent fire alarm system as specified herein and indicated in the contract documents and capable of communicating alarm signals over TCP/IP communication to SBISD Dispatch center. The system shall include but not be limited to:
 - a. Fire Alarm Control Panel
 - b. Power supplies
 - c. Initiating devices
 - d. Audible and visual notification appliances
 - e. All accessories required to provide a complete operating fire alarm system.
5. Two network drops are to be provided in the Fire Alarm Control Panel enclosure
6. General Contractor and Sub contractor shall assume responsibility for a complete tested operational and code compliant Life Safety Fire Alarm system.
7. Unless otherwise noted prior to start of the project, all systems will be considered to be fully functional. It is the responsibility of the general contractor to note any deficiencies in the system prior to start of work. An authorized security system contractor will be required for this purpose. It is the responsibility of the general contractor to provide SBISD Low Voltage Department and Facility Improvement Managers a copy of the existing system status prior to the start of the construction. This report shall be included in the security contractor's submittal package.



8. It will be the responsibility of the general contractor on a daily basis, to repair damage to the existing security alarm/access control systems in a manner in which they can provide continuous coverage and protection of school district property during construction or to provide an approved security watch detail until system is repaired.
9. Submittals: It is the contractor's responsibility to submit for approval, to SBISD Low Voltage Department, the complete engineered system configuration and layout showing all devices, wiring, conduit and locations along with other required information as specified herein. Refer to the SBISD Life Safety Fire Alarm specifications for more details.
10. As BUILTS and Closeouts: The installing contractor and/or equipment manufacturer shall provide two printed sets and one electronic set, in PDF format, of complete and detailed, AHJ approved as-built drawings at Substantial Completion to SBISD Low Voltage Department and SBISD Project Manager. Shall include detailing all component locations and detailed wiring diagrams showing all cable runs. Refer to SBISD Life Safety Fire Alarm Specifications for more details. Floor Plan drawings shall include:
 - a. Location of all devices associated with the Fire Alarm System.
 - b. Conduit and wiring routing with conduit sizing and number of conductors by type.
 - c. NFPA symbols shall be used for all Fire Alarm only basic equipment.
11. It shall be the responsibility of the installing contractor to coordinate all requirements surrounding installation of the fire alarm system with all trades including, but, not exclusive of: electrical contractor, sprinkler contractor, and HVAC/controls contractor and intercom system. Adequate coordination shall be provided to ensure proper installation and interface to all peripheral items required to interact with the fire alarm and communication system to provide a complete and functional life safety system.
12. System shall be on emergency power, with a dedicated electrical circuit. Breaker locations will be marked inside all enclosures.
13. The contractor performing this scope of work must be a current integrator and certified by the system manufacturer, and be able to provide information on current support staff to be able to service this client as needed 24x7 for emergency support.
14. All bidders shall be able to provide a minimum of 3 multi-site installations, preferably in school districts in the past one (1) year, if requested by SBISD.
15. Installer Qualifications:
 - a. The company installing the Fire Alarm System and its installers shall be licensed and shall meet all applicable regulations, and Texas State Fire Codes. The contractor shall be a firm normally employed in the Fire Alarm industry.
 - b. The contractor shall be certified by the manufacturing company in all aspects of design, installation and testing of the products described herein. Each contractor shall furnish, with their submittal, a letter from the manufacturer indicating they are a dealer in good standing,
 - c. The contractor must be certified by the manufacturer of the products, adhere to the engineering, installation and testing procedures and utilize the authorized manufacturer components and distribution channels.



- d. The contractor shall be experienced in all aspects of this work and shall be required to demonstrate direct experience on recent systems of similar type and size. The contractor shall own and maintain tools and equipment necessary for successful installation and testing of the system being installed and have personnel who are adequately trained in the use of such tools and equipment.
- e. A resume of qualifications shall be submitted with the contractor's proposal indicating the following:
 - A list of five recently completed projects using the product proposed of similar type and size with contact names and telephone numbers for each.
 - A list of test equipment proposed for use in verifying the installed integrity of metallic cable systems on the project.
 - A technical resume of experience for the contractor's Project Manager and on-site installation supervisor who shall be assigned to the project.
- f. The Owner's representative reserves the right to reject all or a portion of the work performed, either on technical or aesthetic grounds.
- g. The contractor performing the scope shall label all devices with label maker. All labels shall include zone number, module number, point number
- h. The contractor shall provide at end of job
 - 1- Extra Control panel
 - 1- Extra Power Supply
 - 1 – Extra Annunciator
 - 10% of each Smoke Detector, Pull stations, Horn Strobes, Speaker Strobes
- i. The contractor shall provide a point list in Excel format no less than one week prior to final inspection, to the low voltage department.

END OF SECTION



SECTION 28 72 40

INTRUSION DETECTION SYSTEM/ACCESS CONTROL SYSTEM

GENERAL

1.1 SCOPE OF WORK

- A. The concept of the SCOPE OF WORK is to provide to Spring Branch I.S.D. the highest quality product/service and:
- B. Coordinate ALL work through SBISD Low Voltage Division and SBISD Planning & Construction,
- C. Unless otherwise noted prior to start of the project, all systems will be considered to be fully functional. It is the responsibility of the GENERAL CONTRACTOR to note any deficiencies in the system prior to starting any project and submit this prior to start of work. An AUTHORIZED security system contractor will be required for this purpose. It is the responsibility of the GENERAL CONTRACTOR to provide SBISD Police Low Voltage Department and SBISD Planning & Construction a copy of the existing system status prior to the start of any construction. This report shall be included in the security contractor's submittal package.
- D. It will be the responsibility of the general contractor on a daily basis, to repair damage to the existing security alarm/access control systems in a manner in which they can provide continuous coverage and protection of school district property during construction. The general contractor is REQUIRED to make repairs within forty-eight (48) hours notice of service request. An AUTHORIZED security system contractor will be required for this purpose (See section Approved Contractors).
- E. An AUTHORIZED security system contractor will be required for the purpose of working
- F. on ANY portion of the security system. Other trades (Electrical Contractors, etc.) SHALL NOT work on any portion of the security system except as otherwise noted in this document. And
- G. SBISD Low Voltage Division must be notified daily of any changes in the status of the system. An AUTHORIZED security system contractor may move, remove or disable existing sensors/wiring/systems during construction as needed. With approval, secure and retain all parts in whole where possible and return to owner, or install new/replacement/additional system(s)/part(s) where appropriate.
- H. IT WILL BE THE RESPONSIBILITY OF THE GENERAL CONTRACTOR TO SEE THAT THE SECURITY ALARM SYSTEM, AND/OR ACCESS CONTROL SYSTEM AND ITS COMPONENTS ARE INSTALLED AND WORKING AT COMPLETION OF THE PROJECT. THIS INCLUDES BUT NOT LIMITED TO THE REPAIR/REPLACEMENT OF ANY COMPONENT REMOVED, LOST, STOLEN OR DAMAGED DURING CONSTRUCTION.
- I. Job specifications/documents/books SHALL include:
- J. Work shall be done in accordance with the latest revision of the SPRING BRANCH I.S.D. Police LOW VOLTAGE DEPARTMENT SECURITY ALARM SPECIFICATIONS.
- K. All systems SHALL be installed in accordance with ALL local, city, state, federal and Authority Having Jurisdiction laws, regulations, codes, standards and ordinances. All equipment shall be installed and tested in accordance with MANUFACTURES specifications and installation instructions. Additional requirements may be found in other sections of this document. All equipment will be UNDERWRITERS LABORATORIES Inc. approved for the purpose it is being used.
- L. Security Contractor(s) & Sub-Contractors:
- M. All RADIONICS/BOSCH equipment and SECURITY DEVICES (Sensors, Door Contacts, Power Supplies, Panels, etc.) will ONLY be installed by an authorized security system contractor (See section Approved Contractors).
- N. An "authorized" security contractor WILL be the PRIMARY security contractor for the project. The primary security contractor WILL be an AUTHORIZED RADIONICS/BOSCH DEALER utilizing factory trained personnel/technicians (See section 23) – NO EXCEPTIONS.
- O. Use of sub-contractor(s) by the PRIMARY Security Contractor WILL require on-site



supervision, at all times, of the sub-contractor(s) by the primary contractor's factory trained personnel/technician(s) - NO EXCEPTIONS.

- P. A copy of the Dealer Certificate and Number or letter from verifying dealership currently in good standings, WILL BE REQUIRED – NO EXCEPTIONS.
- Q. A copy of dealer's personnel/technician(s) certified BOSCH training WILL BE REQUIRED – NO EXCEPTIONS.
- R. ALL personnel doing work on Section 1, MUST have current training certificates for the BOSCH equipment being installed (B9512G Alarm Communicator, etc.).
- S. SECTION 1 EXCEPTIONS: Cable/wire installation, Hardware such as poles, conduit, pull boxes, high voltage electrical (90vac +) etc. may be installed by others.
- T. Alarm system control panel will consist of BOSCH brand, model series B9512G. This will include upgrade to and/or replacement of existing panel(s) at the project facility. This may also include upgrading all or part of the existing system (POPIT's, Keypads, etc.) to be compatible with the model B9512G panel.

1.2 NO EXCEPTIONS

- A. Panels will be equipped with, but not limited to, the following features: Dual Batteries of not less than 12VDC, 7Ah. each. B430 module. Transformer (As required by panel model number) One (1) telephone line cord. Command Center (Keypad). One (1) network drop. Quantity to be determined by project requirements.
- B. Enclosure (Cabinet) Grey in color. Other colors as approved by Spring Branch I.S.D. ~~Police~~ Low Voltage Department. Red will not be allowed. Two (2) POPEX Modules. POPIT module of the latest version available at the time of installation. Quantity as required by project. Non-tampered version ONLY. ACCESS CONTROL Module(s) and equipment. If required by project. See Section 15. Network Interface Card
- C. POPIT data loops/circuits will be installed and tested in accordance with ~~RADIONICS~~ BOSCH POINT IDENTIFICATION SYSTEM VALIDATION PROCESS REV. 00.17 AUGUST 1995 or later. All POPITS will be mounted in a protective box with cover and in such a manner as to allow for service/replacement from a standard six (6) foot step ladder.
- D. Popit must be in a 1900 box located next to the device. If device is in a classroom place the 1900 box in the hallway if you can service it from a 6ft. ladder.
- E. All vendors/contractors/sub-contractors working on security alarm system will submit to SBISD Planning & Construction and ~~Police~~ Low Voltage Department Alarm Division complete plans for approval PRIOR to the beginning of any project.
- F. Submittals must include, but not limited to, complete equipment list, wiring diagram, sensor type and location, power supply, panel and keypad location(s) POPIT location, address and description, Status of existing security alarm system. Equipment cut sheets, including wire specifications voltage & battery calculations Contractor qualifications, including but not limited to dealer certificates, personnel & technician certificates, sub-contractor information & qualifications etc., contact name and numbers of all parties including sub-contractors. warranty & service information
- G. A PRE-INSTALLATION meeting WILL BE held between all parties in order to review submittals and coordinate installation. Additional meetings will be held as needed.
- H. Vendor/contractor will supply SBISD Planning & Construction and ~~Police~~ Low Voltage Department Alarm Division a complete set of "AS BUILT" drawings within ten (10) days from job completion. The drawings must accurately include, but not limited to, actual cable routing, sensors type and location,
- I. POPIT locations, power supply locations including electrical panel and breaker number, Keypad (s) and panel locations, correct room numbers and any other information deemed necessary. Drawings will be submitted as electronic drawings (CAD). DRAWINGS WILL BE REQUIRED PRIOR TO ACCEPTANCE OF JOB.
- J. Final inspection of "AS BUILT" job will be performed by Spring Branch I.S.D. ~~Police~~ Low Voltage Department Alarm Division prior to acceptance of job. Any/All corrections will be completed prior to acceptance of the system.
- K. Contractor will maintain sufficient spare parts in order to facilitate warranty repairs in a timely manner.
- L. General Contractor will provide warranty and service for all parts and labor within forty-eight (48) hours notice for a period of one (1) year from the date of ACCEPTANCE by



SBISD Planning & Construction and Police Low Voltage Department Alarm Division. The General Contractor will provide to SBISD Planning & Construction and Police Low Voltage Department, prior to "ACCEPTANCE" of the project, a copy of the agreement between the General Contractor and the Security Contractor that will provide warranty service. The Security Contractor that will provide warranty service may be other than PRIME project security contractor. Warranty Service Provider will be required to meet all requirements of an AUTHORIZED RADIONICS/BOSCH DEALER utilizing factory trained personnel/technicians – NO EXCEPTIONS.

M. General Contractor and/or Architect will provide Names, Addresses and Emergency Telephone Numbers of all primary contacts for Architects, General Contractors, Contractor(s), Sub-Contractor(s) and any other party (ies) involved in the installation of the system.

N. Wire Requirements:

1. All wire will be Underwriters Laboratories approved for the purpose it is used.
2. Data backbone wiring will be six (6) conductor, shielded cable with bleed wire, 18 AWG, stranded, and CL2P low smoke plenum cable. Jacket color should be Grey. Other colors may be approved by SBISD Low Voltage Division. Red will not be allowed. Conductor colors will be RED, GREEN, and BLACK, WHITE (Or Yellow), BLUE, & BROWN. Red will be sensor power POSITIVE, Black will be sensor power NEGATIVE, White will be DATA POSITIVE, Green will be DATA NEGATIVE, BLUE, & BROWN will be used for cable supervision. BLUE, & BROWN will be connected to a board point (Points 1 – 8) or POPIT point. It will be programmed as a 24 Hour Supervision Point. Point resistor (EOL) will be place at the furthestmost end of the cable from the panel and location.
3. Zone loops will be 22AWG. (Or larger), four (4) conductor non-shielded, CL2P Low Smoke plenum cable. Jacket color should be White. Red will not be allowed.
4. Conductor colors will be RED, BLACK, GREEN & WHITE (or Yellow). RED will be sensor power POSITIVE, BLACK will be sensor power NEGATIVE, WHITE (Yellow) & GREEN will be ALARM CONTACTS.
5. Ground wire shall be 16 AWG. Or larger solid copper. Panel will be grounded in accordance with RADIONICS/BOSCH INSTALLATION GUIDE and NEC CODE requirements.
6. All cable/wiring will be tested by vendor/contractor/sub-contractor with a meter for continuity, grounds, shorts and opens. Documentation will be provided to SBISD Low Voltage Division of test results. Any cable/wiring that does not pass will be replaced in its entirety and re-tested.
7. All wiring will be run in a manner as not to allow wire to be in contact with fluorescent lights or other data generating wiring/devices (data, telephone, video, etc.), steam, hot water or any other attachment that could or will cause damage, decay or interference. Wire runs in open/plenum ceilings should be run in a support ring, cable tray (NOT SHARED) or other devise. Cable runs may not rest on grid (lift out) "T-Bar" ceiling supports. Wire/Cable WILL BE protected where deemed necessary to prevent damage. Wire to be run in conduit or metal wire mold as required. Plastic molding will not be allowed.
8. Power supply wire not part of six conductor data cable must be approved by SBISD Planning & Construction and SBISD Low Voltage Division PRIOR to installation. Wire/Cable will be 18 AWG. Or larger, two (2) conductor, CL2P rated plenum cable. Jacket color optional (RED not allowed) to be approved by SBISD Low Voltage Division. Conductor color will be RED (White) & BLACK. Red (White) will be POSITIVE and Black will be NEGATIVE conductors.
9. All data cable wire runs WILL be in a continuous loop where possible. "T-Tapping" will not be allowed. NO EXCEPTIONS
10. Shield/Bleed Wires will be continuous, insulated and grounded only at the panel. No existing wire may be used. EXCEPTION – Case by Case ONLY with prior approval of the SBISD Planning & Construction and SBISD Low Voltage Division. Wire exposed less than seven (7) feet above grade/floor or in risk of damage (by any means) will be in approved conduit/wire mold. Pull strings will be placed on all data cable wire runs. Use of existing pull strings will be



- replaced. All splice points WILL BE SOLDERED and insulated. A splice point is defined as where three (3) or more wires are connected at a common point.
11. Security Contractor will provide any and all telephone/data/communications cables required for Security System(s). Contractor will run 8 conductor, plenum rated Cat 5 cable(s) to the nearest Telephone/Data/Communications IDF/MDF. Coordination with the SBISD. Telecommunications Department is required – NO EXCEPTIONS. Contractor will provide necessary jack(s) and terminate cable(s) on both ends. Conduit may not be less than 3/4" in size. Conduit between non-connecting buildings to building will be not less than 2" in size.
 12. Wire mold will be of a color suitable to the decor. Conduit/Wire Mold will be dedicated to security alarm system ONLY. No sharing of conduit/wire mold will be allowed. This includes, but not limited to, floor, wall, underground and roof penetrations.
 13. Conduit/Wire Mold required for system(s) installation(s) WILL BE the responsibility of the SECURITY CONTRACTOR - NO EXCEPTIONS.
 14. The Security Contractor may contract the installation of the conduit/wire mold to others.
 15. ANY EQUIPMENT AND/OR CONDUIT PULL BOX SUBJECT TO VANDALISM WILL REQUIRE TAMPER RESISTANT AND/OR LOCKED ENCLOSURES. This includes but not limited to outdoor manholes, ground level pull boxes, etc. Enclosures outdoors, subject to weather, humidity and any other adverse condition WILL require weather resistant enclosures. Sharing of any pull boxes by any other systems/trades WILL NOT BE ALLOWED – NO EXCEPTIONS Where applicable industry standard concrete, or tile cable duct may be used. Minimum tube size for concrete/tile duct must be two (2") inches. Use of these products will require prior approval of SBISD Planning & Construction and SBISD Low Voltage Division.
 16. Conduit, wire mold, concrete/tile duct, floor duct, distribution rings and any other device containing wire/cabling may not be more than seventy-five per cent (75%) occupied.
 17. High voltage electrical power (90vac +) required for any/all portions of the security alarm project and conduit (etc.) between non-connecting buildings/wings will be the responsibility of the PROJECT ELECTRICAL CONTRACTOR.
 - a) EXCEPTION: If there is no project electrician, the Primary Security Contractor WILL be responsible for all high voltage circuits (110vac). Installation may be contracted to others (Electrical Contractor). ALL ordinances, permits, laws and AHJ regulations will be followed.

1.3 OTHER EQUIPMENT

- A. Alarm sensors Brand, Type, Range will be approved by SBISD Low Voltage Division PRIOR to installation and may be of the following or combination as job requires. Shall be of the latest revision or replacement for the Make/Model listed below.
- B. The following is applicable at the time of the document revision 05/06 and subject to change by manufacturer prior to installation. Substitution of specified product will require notification and approval of the SBISD Planning & Construction and SBISD Low Voltage Division PRIOR to installation of substituted part(s).
- C. During warranty period, if original part is no longer available, the contractor WILL use the latest version/replacement available from the manufacturer.
- D. The following is a list of standard equipment used by SBISD. See Job worksheet(s) for specific equipment to be used:
 1. Bosch ~~DS9370~~ DS9360 360 degree Ceiling Mount
 2. Bosch – ISC-CDLI-WA126 Commercial Series Tri-Tech
 3. Bosch OD850 outdoor Tri-Tech for outdoor applications as needed.
 4. Any other sensor approved or specified by SBISD Low Voltage Division.



- 1.4 ACCESS CONTROL EQUIPMENT. (WHERE REQUIRED ON A PER JOB BASIS)
- A. All Access Control Systems Must Be Installed in accordance with ALL local, city, state and Authority Having Jurisdiction laws, regulations, codes, standards and ordinances. Coordinate emergency door release with the fire system contractor and/or SBISD Low Voltage Division.
 - B. All interface readers, electronic locks, etc. and other associated equipment must be compatible with the **RADIONICS/BOSCH** control panel(s). **WIEGAND 26 bit** format will be used. Systems larger than thirty two (32) doors will have an additional set of specifications from this section. All door hardware and locking mechanisms **MUST** meet SBISD Locksmith's specifications.
 - C. Equipment as required per project may include:
 - 1. Panel: **(Coordinate existing or new model number with SBISD Low Voltage Division prior to system design.)**
 - 2. Access Control Module: **(Coordinate existing or new model number with SBISD Low Voltage Division prior to system design.)**
 - D. To be mounted above door to be controlled. Any other location will require written PRIOR approval of S.B.I.S.D. Low Voltage Department.
 - E. HID 5365 Mini Prox Readers **(Confirm, with SBISD Low Voltage Division current reader type to be used at all locations or various types at specific locations)**
 - F. HID Proxkey II Proximity Key fob - Quantity to be determined on a per project basis. Minimum of two hundred (200) units (key fobs) required.
 - G. Locking hardware is Von Duprin or Hess brand or approved by SBISD Planning & Construction and SBISD Low Voltage Division. It will be of the 12vdc version. Door strikes will be of the "FAIL SECURE" type. All locking hardware will be provided by the primary security contractor – NO EXCEPTIONS.
 - H. Use of Magnetic Locks on glass and/or aluminum doors is not recommended and will require PRIOR approval of the SBISD Low Voltage Division.
 - I. Wire and cable must be of the type used for Access Control equipment.
 - J. Power supplies must be of the type listed for Access Control Equipment. ALTRONIX brand and models are recommended.
 - K. "Request to Exit" devises, i.e. Buttons, P.I.R.s, etc. must be U. L. Listed and approved by the AHJ for use in access control systems.
 - L. Surge suppressors must be used on electronic locks per manufactures requirements.
 - M. Request to Exit" P.I.R. to be Detection Systems DS 1501 (Grey) or DS 1511 (White) as needed to blend with decor.
 - N. "Bio" readers (finger print, palm, retina eye scan, etc.) will be specified on a case by case basis.
 - O. All equipment will be securely mounted. No glue or double sided tape will be allowed. Plastic anchors will not be allowed on equipment mounted on the exterior of the building, to mount power supplies, POPIT or communicator enclosures.
 - P. Reuse of existing sensors, power supplies or other equipment may be approved on a case by case basis.
 - Q. All equipment subject to abuse will be enclosed in protective boxes, screen cages or other enclosures of the type to be approved by SBISD Planning & Construction and SBISD Low Voltage Division. Also see Section 13 for additional requirements.
 - R. Power Supplies:
 - 1. Power Supplies will be of sufficient size to meet the load demand with a twenty percent (20%) reserve capacity. Brand/Type/Model to be approved by SBISD Low Voltage Division.
 - 2. Mount in a location and height for ease of service. Height shall not exceed the ability of service from a six (6) foot ladder.
 - 3. Minimum back-up battery size of 12VDC7Ah. Transformers will be either hardwired or secured to the outlet



1.5 HIGH VOLTAGE ELECTRICAL:

- A. Dedicated electrical power associated with security alarm system WILL BE required. Any electrical work must meet NEC, City of Houston or other AHJ and be approved by the SBISD Planning & Construction and Maintenance Department.
- B. High Voltage (90vac +) Will Be connected to a "HOT" breaker only by the PROJECT ELECTRICAL CONTRACTOR. Conduit and wiring may be installed by others. See Section 11 for EXCEPTIONS.
- C. ANY and ALL high voltage circuits associated with the security systems(s) must be labeled at the breaker panel. Location of breaker panel and breaker number(s) MUST be included on the "as built" drawings – NO EXCEPTIONS.
- D. Contractor will provide a copy of the programming and database PRIOR to the system(s) being programmed. Contractor will coordinate all programming and data base with the SBISD Planning & Construction and Low Voltage Department. All programming will be done by the contractor with the exception of system users. System users and their pass cards will be programmed by the Spring Branch ISD Police Department.
- E. Security alarm programming requirements:
- F. All spring branch ISD projects are to be programmed as follows:
- G. Alarm point programming will use point indexes:
 - 1. 7 = perimeter instant
 - a) Point type 1
 - b) Point response 2
 - c) Point index 7 is used for all interior motion detectors, interior and exterior door contacts.
 - 2. 25 = entry exit delay point
 - a) Point type 1
 - b) Point response 5
 - c) Entry delay 60 seconds
 - d) Point index 25 is used for perimeter entry exit doors or doors leading to a secure area.
 - 3. 13 = interior follower
 - a) Point type 3
 - b) Point response 5
 - c) Entry delay 60 seconds
 - d) Point index 13 interior follower is used for alarm points associated with entry exit delay points.
- H. Alarm point indexes 7 and 13 are to be programmed yes for:
 - 1. Bypassable
 - 2. Swinger bypass
 - 3. Bypass returnable
 - 4. Force arm returnable
- I. Point descriptions (signage):
 - 1. It is the responsibility of the contractor to verify that the room signage has not changed during the course of the project, any discrepancies between room signage and programmed alarm point text will be corrected by the contractor at his own expense.
 - 2. Point descriptions are to match room signage and architectural drawings with device code and location in a room with multiple devices.
 - a) Example: A 302NW DC
 - b) A = section
 - c) 302 = room number
 - d) NW = location of device in room
 - e) DC = door contact (device code)
 - f) Another example: A3 CORR SE
 - g) A3 = section and floor
 - h) CORR = corridor
 - i) SE = location in corridor



- J. These examples pertain mainly to classrooms and corridors, when dealing with administrative offices, mechanical rooms, kitchen areas etc. use the room name:
 - 1. A100 CLINIC
 - 2. F100 DRY STOR
 - 3. A112 MECH RM
 - K. Since 90% of all alarm devices are motion detectors there is no need to distinguish it in the point description, however it is very important to distinguish door contacts for custodial and staff to recognize doors that need to be secure in order to arm an area.
 - L. Device codes:
 - 1. DC = door contact
 - 2. GB = glass break sensor
 - 3. All alarm devices and keypads are to be assigned to their appropriate areas.
 - a) 1 main building
 - b) 2 = kitchen
 - c) 3 = gym/pe
 - d) 4 = band/orchestra or fine arts
 - e) 5 = security office
 - M. Master keypads will be located in specified areas of the building for custodial and staff to arm and disarm multiple areas. Including but not limited to:
 - 1. Custodial office
 - 2. Administrative office
 - N. As built drawings are to be submitted to not only the general contractor but to SBISD Low Voltage Division with correct room signage and device location in order for jobs acceptance.
 - O. Any deviations of the scope of work must be approved in writing by SBISD Low Voltage Division; in blue print and auto cad form with correct room signage and device location in order for jobs acceptance.
 - P. It is the responsibility of the security contractor to notify SBISD Low Voltage Division, prior to the installation of ANY portion of the project that may result in a lack of 100% performance of any equipment/wire/cable/sensor/location/view/range. (Example- Motion detector with object blocking views [projection screen, television, door, wall, etc.]). Failure to notify SBISD Low Voltage Division will result in the contractor correcting the problem at his expense.
 - Q. SBISD Low Voltage Division WILL have final authority for:
 - 1. Approval of all submittals, plans and specifications.
 - 2. Parts/equipment brand, model, number and placement of same.
 - 3. Cable and wiring.
 - 4. Approval of changes and/or substitutions to any part of the project.
 - 5. Acceptance of installed system.
 - 6. Acceptance of programming and Data Base.
- 1.6 WARRANTY
- A. Contractor will maintain sufficient spare parts in order to facilitate warranty repairs in a timely manner.
 - B. Contractor will provide warranty and service for all parts and labor within forty-eight (48) hours notice for a period of one (1) year from the date of SUBSTANTIAL COMPLETION by SBISD Low Voltage Division.
 - C. WARRANTY PERIOD BEGINS AT THE TIME OF SUBSTANTIAL COMPLETION OF THE SECURITY ALARM PROJECT BY THE SBISD LOW VOLTAGE DIVISION AND IS INDEPENDENT OF ANY OTHER WARRANTY SPECIFIED IN OTHER SECTIONS OF THE JOB DOCUMENT AND/OR CONTRACT.



1.7 APPROVED CONTRACTORS

- A. SBISD Planning & Construction and SBISD Low Voltage Division shall approve all security contractors.
- B. SBISD Low Voltage Division, in order not to show bias toward any contractor(s), provides a means for contractor(s) to become approved to do business with SBISD Low Voltage Division. Contractor wishing to be placed on SBISD Low Voltage Division's list of APPROVED contractors and meet any/all qualifications/specifications must follow procedures set forth in document "Application for Approved Contractor – SBISD Low Voltage Division".
- C. Applications must be submitted no later than 60 days prior to bid process in order to review applications and verify documentation. – NO EXCEPTIONS

1.8 Removal from "Approved Contractors Lists":

- A. Contractor(s) may be removed from the "APPROVED CONTRACTOR LIST" at anytime for "CAUSE". This includes, but not limited to (a) violation of specification(s), (b) false statements/documentation, (c) not completing projects in a timely manner and/or (d) any reason that would result in SBISD Low Voltage Division and/or Spring Branch Independent School District not receiving the quality of workmanship/service/equipment required by these specifications.

1.9 Security Intercom System for Doors

- A. Main entrance shall have an Aiphone Audio Intercom Door stations, with video; hardwired; one master station at reception with a secondary slave station (location determined by SBISD Planning & Construction during design phase).
- B. Kitchen shall have an Aiphone Audio Intercom Door stations, with video; hardwired; one master station at sty the kitchen manager's office.
- C. Intercom system shall have full 2-way audio capabilities
- D. System shall be as manufactured by Airphone

END OF SECTION



SECTION 28 73 30

IP SECURITY CAMERA SYSTEM

Conditions of the Contract and Division 1, as applicable, apply to this Section.

GENERAL

1.1 DESCRIPTION OF WORK

- A. Provide a complete turnkey and tested IP based digital video surveillance system including but not limited to cameras, cabling, integration and accessibility with Owner's Local/Wide Area Network (LAN/WAN), Internet accessibility thru remote view application software, simultaneous user access capability and all applicable licensing. Provide fully terminated unshielded twisted pair (UTP) cable, UTP terminations, racks, raceways, conduit, and other incidental and miscellaneous premises wiring system hardware as required for a complete and useable system. The installation shall comply with applicable codes and standards in effect at the job site and as indicated in the Specifications and Drawings.
- B. The system shall be Non-Proprietary in nature and be available through multiple distribution channels in the nearest metropolitan marketplace. Systems that are manufactured and installed by a factory office and are not available through multiple distribution channels will not be accepted.
- C. Provide all electronic hardware and coordinate with the building's LAN/WAN. The contractor shall coordinate with other system vendors, where appropriate, to facilitate equipment installation, scheduling, protection of equipment and access to the project site in order to provide the Owner a substantially complete project in a timely manner.
- D. Acceptable manufacturers of IP recording software shall be Video Insight.
- E. All IP cameras to be installed, will be of a make and model that is compatible and with free licensing when used with the Video Insight camera software. Preferred makes are Panasonic and Advitia. All cameras will use the H.265 format unless specified otherwise by SBISD.
- F. The Contractor performing this scope of work must be a current integrator of solution Video Insight, and be able to include information on current support staff to be able to service this client as needed 24x7 for emergency support.
- G. Contractor is responsible for coordinating all electrical work required on this project for connection of, any cameras, and conduit. Contractor shall provide a complete turnkey solution to the owner and be responsible for the complete installation of a complete and functional security camera system.
- H. All work shall be coordinated through, Facility Improvement Project Manager and SBISD Low Voltage Department.
- I. Maintain existing security camera systems in a manner in which they can provide continuous coverage and protection of school district property during construction.
- J. It will be the responsibility of the General Contractor to ensure that the security CCTV System and its components are installed and working at completion of the project. This includes but not limited to the repair/replacement of any component removed or damaged during construction.
- K. All systems SHALL be installed in accordance with ALL local, city, state, federal and Authority Having Jurisdiction laws, regulations, codes, standards and ordinances and approved by the SBISD Facilities Improvement Project Manager, and/or SBISD Low Voltage Department.
- L. All camera installers shall be certified in the installation and programming of IP cameras.
- M. The contractor must have a minimum of one (1) year experience in installing at least 32 IP cameras at multiple sites.
- N. All bidders should be able to provide a minimum of 3 multi-site installations preferably in school districts in the past one (1) year, if requested by SBISD.
- O. All contractors installing I.P. cameras to the I.P. Software. Must certify in writing a 24 hour turn around on trouble calls, if I.P. Video Insight Software, or IP cameras are down.



- P. Contractor must have experience/knowledge of Video Insight, client and viewer Software, and advidia IP cameras.
- Q. Type of I.P Software for I.P. cameras to be installed on all I.P. camera projects will be, Video Insight Software Platforms.
- R. All equipment shall be UL Listed and approved for the purpose it is being used.
- S. All vendors/contractors/sub-contractors working on CCTV system will submit to SBISD Low Voltage Department and SBISD Facility Improvement Project Manager a complete set of plans for approval prior to the beginning of any project. Plans must include, but not limited to, complete equipment list, wiring diagram and POE locations. A Pre-Installation meeting will be held between all parties in order to review submittals and coordinate installation. Additional meetings will be held as needed.
- T. All new CCTV I.P. camera installations and upgrades will be a turnkey operation - this includes but is not limited to: purchasing, programming and licensing of all software, equipment, focusing of cameras, naming of cameras, administrative views and mapping of the campus within the software.
- U. The types of cameras, to be installed will be compatible with and come with free licensing to Video Insight Software Platform. Preferred makes are Panasonic and Advidia, and be coordinated prior to installation and labeled on shop drawings; Shop drawings must be approved prior to the installation of any equipment for rough in, this will also include all conduit locations, and pathways where applicable. All cameras will use the H.265, unless determined otherwise by SBISD Low Voltage Department. Locations, Makes and Models will be made by SBISD Low Voltage Department on a case by case install.

1.2 QUALITY ASSURANCE

- A. Installer Qualifications:
 - 1. The Video Surveillance System Installer shall be licensed and shall meet all applicable regulations. The Contractor shall be a firm normally employed in the security and surveillance industry.
 - 2. The contractor shall be certified by the manufacturing company in all aspects of design, installation and testing of the products described herein. Each contractor shall furnish with their submittal a letter from the manufacture indicating they are a dealer in good standing.
 - 3. The contractor must be certified by the manufacturer of the products, adhere to the engineering, installation and testing procedures and utilize the authorized manufacturer components and distribution channels.
 - 4. The contractor shall be experienced in all aspects of this work and shall be required to demonstrate direct experience on recent systems of similar type and size. The contractor shall own and maintain tools and equipment necessary for successful installation and testing of video surveillance distribution systems and have personnel who are adequately trained in the use of such tools and equipment.
 - 5. A resume of qualifications shall be submitted with the Contractor's proposal indicating the following:
 - a) A list of five recently completed projects using the product proposed of similar type and size with contact names and telephone numbers for each.
 - b) A list of test equipment proposed for use in verifying the installed integrity of metallic cable systems on this project.
 - c) A technical resume of experience for the contractor's Project Manager and on-site installation supervisor who shall be assigned to this project.
 - d) A list of technical product training attended by the contractor's personnel that shall install the video surveillance system shall be submitted.
 - e) Any subcontractor who shall assist the video surveillance contractor in performance of this work shall have the same training and certification as the video surveillance contractor.
 - f) A Certification from Video Insight, with class completion dates.



- g) A Certification from FluidMesh Networks, for use in wireless application weather use on the project or not.
- B. The Owner's representative reserves the right to reject all or a portion of the work performed, either on technical or aesthetic grounds.
- C. The following is a list of contractors that are approved, meet specifications and have successfully done work for SBISD Low Voltage Department. Names, addresses and other information is correct at the time this document was created and subject to changes and revision:

C.Link
Lance Stewart
281-997-9111 Office
lance@clinkcorp.com

DAC
Mike Skillern
713-975-8160 Office
mskillern@dac-inc.com
Houston, TX

Datavox
713-881-7106 Office
mikeb@datavox.net

Any other contractor that meets all other requirements in the specifications must be preapproved by SBISD Planning & Construction no less than 10 days prior to Bid to be considered for the project.

DRAFT



1.3 REGULATORY REQUIREMENTS

- A. Standards: All work shall be performed in accordance with the latest revisions of the following standards and codes:
 - 1. Local Building Code
 - 2. Local Electrical Code
 - 3. NEC National Electrical Code
- B. Other references:
 - 1. TIA/EIA-568-A - Commercial Building Telecommunications Wiring Standard
 - 2. EIA/TIA-569 - Commercial Building Standard for Telecommunications Pathways and Spaces.
 - 3. TIA/EIA-606 - The Administration Standard for the Telecommunications Infrastructure of Commercial Buildings
 - 4. TIA/EIA-607 - Commercial Building Grounding and Bonding Requirements for Telecommunications
 - 5. TIA/EIA TSB 67 - Transmission Performance Specification for Field Testing of Unshielded Twisted-Pair Cabling Systems.
 - 6. ISO/IEC 11801 - Generic Cabling Standard
 - 7. EN 50173 - Generic Cabling Standards for Customer Premises
- C. Governing Codes and Conflicts: If the requirements of these specifications or the Project Drawings exceed those of the governing codes, regulations, and manufacturer installation requirements, then the requirements of these specifications and the drawings shall govern. However, nothing in the drawings or specifications shall be construed to permit work not conforming to all governing codes, regulations, and manufacturer installation requirements.

1.4 SUBMITTALS

- A. The video surveillance system installer shall furnish all CCTV system submittals in a single consolidated submittal
- B. Shop Drawings: Submit the following items, for Owner review and approval:
 - 1. Samples: Complete manufacturer's product literature and samples (if requested) for all pre-approved substitutions to the recommended products made during the course of the Project.
 - 2. Permits: The Contractor shall obtain all required permits and provide copies to the Owner/Architect/Engineer
 - 3. Product Literature: Complete manufacturer's product literature for all electronics, cable, cable supports, cable labels, outlet devices, and other products to be used in the installation. In addition, whenever substitutions for recommended products are made, samples (when requested by the Owner/Architect/Engineer) and the manufacturer's supporting documentation demonstrating compatibility with other related products shall be included.
 - 4. Testing: Proposed Contractor test result forms, a list of instrumentation to be used for systems testing.
 - 5. A complete point-to-point floor plan diagram indicating camera locations part numbers, and all required cabling to connect systems shall be provided for review prior to installation. No work shall start until drawings have been reviewed and approved.
- C. All subcontractors shall provide submittals to general contractor for normal distribution to Architects, Engineers and Spring Branch ISD project managers. The general contractor shall also distribute to The Spring Branch ISD Technology Low Voltage Department, at the following email address: techsubmittals@springbranchisd.com.



- D. Project Completion: As a condition for project acceptance, the Contractor shall submit the following for review and approval:
1. Inspection and Test Reports: During the course of the Project, the Contractor shall maintain an adequate inspection system to ensure that the materials supplied and the work performed, conform to contract requirements. The Contractor shall provide written documentation that indicates that materials acceptance testing was conducted as specified. The Contractor shall also provide documentation, which indicates that all cable termination testing was completed and that all irregularities were corrected prior to job completion.
 2. Operating and Maintenance Instructions for all devices within the system. These instructions shall reflect any changes made during the course of construction, and shall be provided to the Owner, for their use, in a three-ring binder labeled with the project name and description. (4 copies)
 3. All training sessions with district staff and training media shall be complete.
 4. As-built Drawings shall include cable pathways, camera locations with correct labeling and MDF/IDF locations. The as-built drawings shall be prepared using AutoCAD. Provide the Owner with electronic versions of the as-builts on CDs.

PRODUCTS

2.1 GENERAL REQUIREMENTS

- A. Materials shall be as listed no alternate products will be allowed without prior consent of the projects technology consultant. Any items approved as equivalent products shall be published by addendum ten days prior to proposal for Architect/Engineer review.
- B. The Contractor is responsible for providing all incidental and/or miscellaneous hardware not explicitly specified below as required for a complete and operational system.
- C. All equipment and materials used shall be standard components, regularly manufactured, regularly utilized in the manufacturer's system.
- D. Cable and Connectivity: Refer to SBISD data cabling specifications, and parts list.
- E. Cabling will be from the POE switches to the IP camera with no splicing. IP cameras will get their power from the POE switches. Switches to be provided by owner. Refer to SBISD Networking specifications.
- F. If camera being used does not have an integrated RJ45 port, then the contractor will terminate cable in data jack in ceiling. The contractor will provide 3 foot patch cord as stated in A.1. Cabling Requirements, Refer to SBISD data specifications and parts list.
- G. All cable/wiring will be tested by vendor/contractor/sub-contractor with a meter for continuity, grounds, shorts and opens. Documentation will be provided to SBISD Technology Dept of test results. Any cable/wiring that does not pass will be replaced in its entirety and retested, No splicing will be allowed.
- H. All wiring shall be run in a manner as not to allow wire to be in contact with fluorescent lights or other data generating wiring/devices (data, telephone, video, etc.) steam, hot water or any other attachment that could or will cause damage, decay or interference. All cabling will be appropriately suspended and fastened according to applicable standards.
- I. No splices between patch panel and camera are allowed. Each run should have a minimum 5ft service loop at camera and a 10' service loop in closet for a total length not to exceed 325ft Including 20' Patch cable.
- J. Conduit
1. Cable will be protected where deemed necessary to prevent damage. Cable to be in conduit or metal wire mold as required.
 2. Flexible type conduit (SEAL TIGHT) shall be used on exterior weatherproof housing installations. A junction box will be mounted to the building and flexible conduit ran between j-box and camera housing.
 3. Conduit/Wire Mold will be dedicated to security CCTV system ONLY. No sharing of conduit/wire mold will be allowed. This includes, but is not limited to, floor, wall and roof penetrations.
 4. Conduit must be a minimum of ¾ inch.



5. ALL 120 VAC electrical service or higher needed for system Shall be installed/ moved/replaced/removed by the electrical contractor for the project.
- 2.2 DATA CLOSET (MDF/IDF) TERMINATION HARDWARE
- A. Refer to SBISD Data specifications, ~~and material list in Appendix A of this section.~~
- 2.3 INSTALLATION
- A. Provide all penetrations and all conduits as necessary for installation of the video surveillance system.
- B. All exterior penetrations require necessary weatherproofing to avoid moisture penetration.
- C. All outdoor cable runs underground shall be rated for underground use.
- D. Coordinate the location all power circuits required for the servers and camera power supplies with the project electrical contractor prior to installation.
- E. The contractor shall provide a sleeve for cable pathway through any wall. Fire rated walls will require sealing to maintain fire rating.
- F. Contractor shall not run any power cabling for any security equipment on rack tray system due to EMI considerations. Contractor shall provide individual cabling support for all low voltage power cabling.
- G. All cabling for entire project shall be installed at 5'-0" intervals in dedicated support system using a j-hooks support system. Cable supports will be securely attached directly to building structure. Do not attach cabling or supports to ductwork, piping, grid hangers, conduit, or equipment.
- 2.4 IP BASED RECORDING EQUIPMENT
- A. All servers that shall serve as recording equipment shall be provided by the owner and contractor installed.
- 2.5 CAMERAS
- A. Camera Types:
1. Tamper resistant with all movable parts enclosed behind a protective cover.
 2. Integrated Dome In-Ceiling flush mount.
 3. Water resistant.
 4. 3-year warranty on all cameras. Refer to Panasonic/Advidia camera warranty.
 5. All IP cameras unless noted otherwise will be H.265 format, with the free licensing when used with Video Insight Software Platform, preferred makes Panasonic or Advivia cameras.
- B. Acceptable Manufacturers:
1. All exterior cameras unless noted otherwise shall be IP Network Cameras, Camera types ~~to~~ acceptable for use will have free licensing with Video Insight software and using the H.265 format, preferably Panasonic or Advivia types determined by SBISD ~~CCTV~~ Low Voltage Dept.
 2. All interior cameras unless noted otherwise shall be, IP Network Cameras. Camera types ~~to~~ acceptable for use will have free licensing with Video Insight software and using the H.265 format, preferably Panasonic or Advivia types determined by SBISD Low Voltage Dept.
- C. The contractor shall provide all wall mounts, pole mounting, for exterior cameras.
- D. Camera power shall be supplied by POE switches to be provided by owner.
- E. Field Of View Determination by the contractor as necessary for fixed camera locations shall be performed at no additional cost to provide the view desired by the owner. Contractor shall coordinate all final camera views and locations with owner for final approval.
- F. Contractor will not mount any outside cameras higher than 18ft. or lower than 14ft, and will be mounted with heavy duty commercial mounting hardware. Silicon will be used on all exterior cameras as a weather sealant.
- G. Contractor will not mount any cameras on an indoor ceiling higher then 12ft; if a ceiling is higher than 12ft then Mini Dome cameras will be mounted on walls.
- H. All exterior cameras shall have in line surge suppression.
- 2.6 CAMERA POWER SUPPLIES
- A. Power Supplies for heaters/blower enclosures shall be manufactured by Altronix. No 16



Channel Power Supplies are permitted.

EXECUTION

3.1 INSTALLATION

- A. Cable Pathway: Refer to SBISD Data specifications, ~~and parts list in Appendix A of this section.~~
- B. Fire Wall Penetrations: The Contractor shall avoid penetration of fire rated walls and floors wherever possible. Contractor shall also seal all floor, ceiling and wall penetrations in fire or smoke barriers and in the wiring closet.
- C. Wall Penetrations: Where penetrations are necessary, they shall be sleeved with metallic conduit and resealed with an Underwriter Laboratories (UL) approved sealant.
- D. Provide three sided pre-finished metal hood and seal to wall where conduit penetrates exterior wall.
- E. For any required conduit, Install new portable pipe supports – (low profile type), as manufactured by Portable Pipe Hangers or Advanced Support Products. Provide roof protection pads under each support. Coordinate location and routing with design engineer prior to rough-in or installation of system.
- F. Do not install wall mounted cameras into metal fascia. Ensure they are mounted into brick, and sealed top and sides (not bottom)

3.2 DOCUMENTATION

- A. Labels: The Contractor shall label all Cameras using permanent machine engraved labels approved by the Owner. Label patch panels in the wiring closet to match those on corresponding camera locations. The font shall be at least one-eighth inch (1/8") in height, block. All labels shall correspond to as-builts and to final test reports.
- B. Contractor shall ensure complete typed labeling of all cameras with numbers that correspond to locations on video server. Labeling system shall correspond to the Owner's labeling system. Verify with Owner. Provide tags (black letters on white labels, plastic coated) on all cables and outlets.
- C. All cables shall be labeled at both ends with a machine label and all terminations shall be stenciled with a typed label for quick circuit identification. Labeling shall conform to TIA/EIA standard 606 and include interconnect cable identification numbers.
- D. A floor plan, clearly labeled with all numbered camera locations, shall be included in the as-built plans.
- E. At time of acceptance from contractor to owner, contractor will provide a set of as-builts to owner with all pertinent information on the.
- F. The contractor shall provide metallic name plates for each camera that correspond to as built drawings.
- G. The contractor shall provide (2) laminated spreadsheets that contain all installation data for the IP camera system. The spreadsheet must contain the following data.
 - 1. Camera Number
 - 2. Device ID
 - 3. Device Type
 - 4. Model Number
 - 5. Device Location
 - 6. MDF/IDF Location
 - 7. Patch Panel Port
 - 8. Switch Port
 - 9. DLK
 - 10. Mac Address
 - 11. IP Address
 - 12. Subnet
 - 13. Gateway
 - 14. User/Pass
 - 15. Firmware Version
 - 16. Video Encoding Stream Type.

3.3 CABLE TESTING - BY MANUFACTURER'S REQUIREMENTS

- A. Notification: The Owner/Architect/Engineer shall be notified one week prior to any



- testing so that the testing may be witnessed.
- B. Final Acceptance: Before requesting a final acceptance, the Contractor shall perform a series of end-to-end installation performance tests. The Contractor shall submit for approval a proposal describing the test procedures, test result forms and time table for all copper and fiber optic cabling.
 - C. Procedures: Trained personnel shall perform all testing. Acceptance of the test procedures discussed below is predicated on the Contractor's use of the recommended products and adherence to the inspection requirements and practices set forth. Acceptance of the completed installation shall be evaluated in the context of each of these factors.
 - D. Errors: When errors are found, the source of each error shall be determined, corrected and the cable retested. All defective components shall be replaced and retested. Retest results must be entered on the test results form. All corrections shall be made prior to final acceptance test.

3.4 INSPECTION

- A. Conformance to the installation practices covered above are to be verified when completed. In some cases, the Owner/Architect/Engineer may observe before acceptance.
- B. The contractor shall provide a sign in sheet and All training must be videotaped by the contractor. The contractor shall provide taped training video on (2) DVD discs and sign in sheet to the Spring Brach Technology Department prior to close out. As well as include (2) additional discs for the O&M manuals

3.5 WARRANTY

- A. Guarantee and warrant all equipment provided for a period of 3 to 5 years following date of substantial completion, or a period equal to the stated guaranty/warranty offered by the product manufacturer, whichever is the longest in duration.
- B. All such warranties shall include all parts (NVR's, and Power Supplies).
- C. Labor and all other costs as necessary to maintain the equipment in operating condition as intended by the product manufacturer after a period of 1 year shall be negotiated with the owner upon project completion.
- D. Provide 24hr repair or replacement turn around on any issue that arises during warranty period.

END OF SECTION