January 27, 2020

Request for Proposal
Paging Systems

For

TSD Bid # 9899
Troy School District
4400 Livernois
Troy, MI 48098

Prepared by

Convergent Technology Partners, LLC
6197 Miller Rd, Suite 4
Swartz Creek, MI 48373
810.720.3820
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SCHEDULE OF EVENTS

The following is a projected schedule of events for this project. The schedule may change depending upon the results of the responses and a final schedule will be established prior to contracting with the Contractor.

EVENT	DATE
Bid Release	Jan 27, 2020
Mandatory Pre-bid meeting Date and time – 10:00 A.M. Larson Middle School, 2222 E. Long Lake Rd, Troy, MI 48085	Jan 30, 2020
Final Date and time for Questions - 12:00 P.M. EDT	Feb 6, 2020
Bid Due Date/time – 11:00 A.M.	Feb 18, 2020
Public Opening – Immediately after due date/time	
Contract Award	Mar 17, 2020
Project Kickoff – week of	Mar 23, 2020
Earliest Project Start Date	Mar 30, 2020
Substantial Completion	Aug 3, 2020
System Training Complete	Aug 7, 2020
Project Completion and Closeout	Aug 14, 2020

TROY SCHOOL DISTRICT

BID PROPOSAL FORM

OWNER: Troy School District
Services Building – IT department
4420 Livernois
Troy, Michigan 48098
Attn: Beth Soggs, IT Director

PROJECT: Paging Systems – Bid # 9899

NAME OF BIDDER: _____

BASE BID:

Lump sum bid for all work specified and shown on the drawings as indicated for base bid in the amount of:

_____ Dollars ($_____)

The Bid Proposal amount shall be shown in both words and figures. In the case of discrepancy, the amount shown is words shall govern.

BASE BID: The undersigned, having examined the Bid Documents and examined the conditions affecting the Work/Project, hereby proposes and agrees to furnish all of the labor, materials, and equipment and perform all work necessary to complete the Work/Project as required by the Bid Documents for the stipulated sum identified above and detailed in Supplemental A (Cost Analysis Worksheet). The Bid Documents set forth the terms and conditions upon which the Bidder will provide a "turnkey" solution for the installation and operation of the project for use by the Owner and represents and warrants that the design, operation and functionality of the project are in accordance with the Bid Documents. All prices provided by the Bidder on this Bid Proposal Form must include all cables, connectors, equipment etc. that are necessary to the make the project fully operational for the intent and purpose stated in the Bid Documents

BID SECURITY

Enclosed herewith find (Certified Check)/ (Bid Bond) in the amount of $_____ being five percent (5%) of the maximum Bid Proposal herein, made payable to Troy School District or naming Troy School District as obligee. The proceeds of which are to remain the property of Troy School District, if the Bidder does not, within ten (10) days after notice of the acceptance of Bid Proposal, enter into the Contract.

TAXES

Please identify the amount, if any, of this Bid Proposal that has been attributed to sales or use tax. If an amount has been attributed to such tax, please identify which components of the Bid to which the tax has been attributed.

_____

_____

_____

SUBCONTRACTORS

Bidders must provide attach complete list of proposed subcontractors (one per discipline), if any are proposed to be utilized on the project. Listing two or more subcontractors per discipline will be grounds for disqualification.

_____

EXCEPTIONS

Any Exceptions to the terms and conditions contained in the RFP or contract are identified below:

_____

_____

_____

_____

_____

ADDENDA

This RFP incorporates the following Addenda:

Addendum No. ____ Dated _____ Addendum No. ____ Dated _____

Addendum No. ____ Dated _____ Addendum No. ____ Dated _____

BID PROPOSAL FORM SUPPLEMENTS:

The following Bid Form Proposal Supplements are attached hereto and are considered an integral part of this Bid Proposal Form:

- SUPPLEMENTAL A – Cost Analysis Worksheet
- SUPPLEMENTAL B – Unit Pricing
    - Bill of Material
- SUPPLEMENTAL C – Mandatory Alternates
- SUPPLEMENTAL D – Familial Disclosure Affidavit
- SUPPLEMENTAL E – Iran Economic Sanctions Act Compliance Affidavit

BIDDER NAME: _____

ADDRESS: _____

_____

_____

DATE: _____

TELEPHONE: _____

EMAIL ADDRESS: _____

If award is made to our firm based upon our Bid Proposal, we agree to enter into the form of Contract with the School District in accordance with this Request for Proposal, the contract and our Bid Proposal.

My signature certifies that the Bid Proposal as submitted complies with all terms and conditions as set forth in this Request for Proposal, unless specifically enumerated as an exception as part of this Bid Proposal Form.

I hereby certify that I am authorized to sign as a Representative for the Firm:

_____ _____

(Printed Name) (Title)

_____

(Authorized Signature)

TROY SCHOOL DISTRICT

COST ANALYSIS WORKSHEET

SUPPLEMENTAL A

Note this form must be returned with bid submission, filled out completely and accurately or the bidder may be disqualified from consideration.

OWNER: Troy School District
Services Building – IT department
4420 Livernois
Troy, Michigan 48098
Attn: Beth Soggs, IT Director

BIDDER: _____

ADDRESS: _____

_____

BASE BID BREAKDOWN

	COMPONENT	Cost
Elementary Schools	Material	
	Labor	
	Elementary Schools Sub Total	
Middle Schools	Material	
	Labor	
	Middle Schools Sub Total	
High Schools	Material	
	Labor	
	High Schools Sub Total	
	Project Subtotal – all buildings	
	Performance, Labor and Material Bond	
	Proposal Total	

UNIT PRICING

SUPPLENTAL B

All bid proposals shall include a detailed Bill of Materials that notes each item, part number, and installed unit price. Provide this Bill of Materials, attached to and submitted with the Bid Proposal. Bill of Materials pricing will be used for price revisions prior to award.

Provide installed unit pricing, which shall be considered firm pricing during the contract period and not subject to change, will be used to determine costs for additions and deletions during the contract period (after award). All unit pricing shall include all labor, materials, licenses, software, fees etc. The Owner reserves the right to adjust any or all quantities at any time.

UP #	Description	Model/ PN	Installed	Material only cost
UP1	ValCom 2' x 2' Lay- in Speaker (Classrooms)	Model V-9062 Talk Back	$	$
UP2	ValCom 2' x 2' Lay- in Speaker (Common Areas)	Model V-9021 One-way	$	$
UP3	Surface mounted Wall Speakers	Valcom Model V-1052C	$	$
UP4	Replacement in-tile classroom speakers	Model V-1060A	$	$
UP5	Replacement in-tile common area speakers	Model V1020C	$	$
UP6	Paging Horns	Clarity Model SX–Series	$	$
UP7	Administrative Handset	ValCom Model VEADP3	$	$
UP8	External Microphone and associated equipment	ValCom Model V – 400	$	$
UP9	Classroom Audio integration: amplifier, PA override, associated cable, mounts and raceway (per classroom)		$	$
UP10	70V to 25V Line Matching Transformer		$	$
UP11	Hourly rate to troubleshoot existing malfunctioning speakers		$	
UP12	Paging interrupt unit		$	$
UP13	Classroom amplifier			$

UP13	Amplifier and paging interrupt for classroom program audio		$	
UP14	IP Strobe	ValCom Model VIP-999A	$	

TROY SCHOOL DISTRICT

MANDATORY ALTERNATES

SUPPLEMENTAL C

Mandatory Alternate 1: Reuse existing speakers, replace all wiring

Add/Deduct _____ Dollars ($ _____)

Mandatory Alternate 2: Replace all existing speakers and wiring

Add/Deduct _____ Dollars ($ _____)

Mandatory Alternate 3: Provide 100% turn-key paging system at the ITT building

Add/Deduct _____ Dollars ($ _____)

Voluntary Alternate 1:

Add/Deduct _____ Dollars ($ _____)

TROY SCHOOL DISTRICT

FAMILIAL DISCLOSURE AFFIDAVIT

SUPPLEMETNAL D

The undersigned, the owner or authorized officer of _____ (the "Bidder"), pursuant to the familial disclosure requirement provided in the Troy School District (the "School District") Request For Proposals, hereby represents and warrants that, except as provided below, no familial relationships exist between the owner or any employee of the Bidder, and any member of the Board of Education of the School District or the Superintendent of the School District.

List any Familial Relationships:

BIDDER:

_____

By:

_____

Title:

_____

STATE OF MICHIGAN
COUNTY OF _____

This instrument was acknowledged before me on the _____ day of _____, 2019, by

_____.

_____

, Notary Public

_____ County, Michigan

My Commission Expires: _____

Acting in the County of: _____

AFFIDAVIT OF COMPLIANCE – IRAN ECONOMIC SANCTIONS ACT

SUPPLEMENTAL E

Michigan Public Act No. 517 of 2012
The undersigned, the owner or authorized officer of the below named applicant (the "Applicant"), pursuant to the compliance certification requirement provided in the Troy School District (the "School District") Request For Proposals for Data Network and Wireless Upgrades (the "RFP"), hereby certifies, represents and warrants that the Applicant (including its officers, directors and employees) is not an "Iran linked business" within the meaning of the Iran Economic Sanctions Act, Michigan Public Act No. 517 of 2012 (the "Act"), and that in the event Applicant is awarded a contract as a result of the aforementioned RFP, the Applicant will not become an "Iran linked business" at any time during the course of performing the Work or any services under the contract.

The Applicant further acknowledges that any person who is found to have submitted a false certification is responsible for a civil penalty of not more than $250,000.00 or 2 times the amount of the contract or proposed contract for which the false certification was made, whichever is greater, the cost of the School District's investigation, and reasonable attorney fees, in addition to the fine. Moreover, any person who submitted a false certification shall be ineligible to bid on a request for proposal for three (3) years from the date it is determined that the person has submitted the false certification.

APPLICANT:
Name of Applicant

By:

Title:

Date:

STATE OF Michigan
COUNTY OF _____)

This instrument was acknowledged before me on the _____ day of _____, _____, by

_____.

_____, Notary Public _____ County,

_____

My Commission Expires: _____

Acting in the County of: _____

BIDDING REQUIREMENTS & INSTRUCTION TO BIDDERS

PART 1 - GENERAL

1.1 The Troy School District is seeking bids and proposals for Paging System Upgrades (hereafter "PA system").

1.2 **Bid documents may be obtained from the purchasing page (under Departments, Business Services) of the District's web site at www.troy.k12.mi.us.**

1.3 **Due on or before date and time indicated on the schedule of events ("Due Date")**, the Owner will receive bid proposals for the project. The Owner will not consider or accept a bid proposal received after the due date for bid proposal submission. All bid proposals received after the due date will be returned by making them available to the respective Bidder, unopened, for said Bidder to pick-up at their sole cost and expense. Bid proposals shall be submitted to:

Troy School District
Services Building
4420 Livernois
Troy, Michigan 48098
Attn: Beth Soggs, Technology Director

1.4 PROPOSALS/QUOTES

A. Bidders must submit a complete set of all bid documents as indicated herein. Proposals or bids that are incomplete or missing required documents will not be accepted. Proposals must consist of the original forms in the original format to be accepted.

B. Three (3) "hard" copies and two (2) "soft" (electronic) copies on a USB "flash" drive of the proposals is to be submitted in sealed packaging, clearly marked: "PAGING SYSTEMS" and shall be identified with the Bidder's name and address and the date and time of the bid proposal opening. The Owner is not responsible for any postal or delivery delays. No email, facsimile or other electronic bid proposals will be accepted.

C. Proposals will be opened publicly on the time and date specified in Schedule of Events at the Owner's facility.

1.5 PROPOSAL FORMAT

A. The Bid response shall be structured as follows in both the hard and electronic copies:

1. Section 1:

a. Proposal Form

b. Submittal Letter & Executive Summary
c. Iran Sanctions Affidavit
d. Familial Disclosure
e. Mandatory Alternates
f. Voluntary Alternates

2. Section 2:

a. System/Solution Proposal
b. Bid Bond and Pricing
c. Cost Analysis Worksheet
d. Unit Pricing
e. Bill of Material and installed pricing

3. Section 3 – Narratives & System Description, Information, and Brochures

a. Comprehensive Narrative/System Description of the proposed System/Solution
b. Information, Diagrams or Schematics supporting the System/Solution Narrative
c. Catalog Cut sheets, Brochures, Equipment Configuration

4. Section 3 - Resume of Qualification, References

a. Bidder's qualifications (Company and proposed Staff)
    1) Company's Level of Manufacturer's Certification (Included in cover letter)
b. Resume of Qualification including:
    1) Three (3) verifiable references demonstrating direct experience on recent systems of similar type and size, including contact names and phone numbers of projects that qualify
    2) Technical resumes of experience for the vendor's Project Manager and on-site installation supervisor who will be assigned to this project.
    3) A list of subcontractors and their training and certification

5. Section 4 – Proposed Contracts

a. Maintenance Contract and pricing if desired for consideration

6. Section 5 – Alternate System/Solution Proposal (If Applicable)

a. Alternate solutions will be accepted provided the base bid requirements are met first. Alternate proposals must meet all base bid performance requirements to be accepted. The Owner may review alternate solutions but is under no obligation to consider or award them regardless of cost.
b. Comprehensive Narrative/System Description of the proposed Alternate System/Solution
c. Information, Diagrams or Schematics supporting the proposed Alternate System/Solution Narrative

d. Bill of Material and installed pricing, Catalog Cut sheets, Brochures, Equipment Configuration

B. The "hard copy" Bids shall be submitted on 8 1/2" by 11" paper, single sided, single spaced using 10 to 12-point print, in 3 ring binders, clearly labeled to show the Bidder's name.

C. The "soft copy" Bid shall be in the same structure as the "hard copy" Bids, bound in a .pdf file, submitted on an USB drive with the hard copies.

1. The Electronic Copy must be formatted in the same manner as the hard copy format, with separate PDFs per section, and contain an exact copy of the Hard Copy.

1.6 SECURITY

A. The Bid Proposal shall be accompanied by a Bid Security of a certified check or cashier's check payable to the Owner or by a satisfactory Bid Bond Entity naming the Owner as the obligee and executed by the Bidder and a surety company authorized to do business in the State of Michigan, in an amount identified in the Instructions to Bidders. The check or amount of Bid Bond shall be forfeited to the Owner upon failure of the Contractor to enter into the Contract. The Contractor's Bid security will be retained until the Contractor has signed the contract and has furnished the required Certificates of Insurance and other required Bonds and documents required by the RFP. Bonds signed by an Attorney-In-Fact must be accompanied by a certified and effectively dated copy of their Power of Attorney.

B. The Owner reserves the right to retain the Bid security of all Bidders until the Contractor enters into the contract or until ninety (90) days after bid opening, whichever is later. If the Contractor refuses to enter into the Contract, the Owner may retain their Bid Security as liquidated damages but not as a penalty.

1.7 PERFORMANCE AND LABOR AND MATERIAL PAYMENT BONDS

A. At or prior to delivery of the signed Contract, the Owner will require the Contractor to secure and post a Labor and Material Payment Bond and a Performance Bond including bonding for all subcontractors, each in the amount of 100% of the Contract Sum including bonding for all subcontractors. Surety shall be a company incorporated in the United States and must appear on the U.S. Treasury Departments approved surety list and be adaptable to the Owner. The Contractor shall obtain such bonds in a manner consistent with Michigan law.

1.8 FAMILIAL DISCLOSURE AFFIDAVIT

A. Each bid proposal must be accompanied by a sworn and notarized statement disclosing any familial relationship that exists between the owner or any employee of the bidder and any member of the board of education or the superintendent of

troy school district. The board of education will not accept a bid proposal that does not include this sworn and notarized disclosure statement.

1.9 AFFIDAVIT OF COMPLIANCE – IRAN ECONOMIC SANCTIONS

A. Each bid proposal must be accompanied by the Iran economic sanctions affidavit of compliance in compliance with Michigan public act no. 517 of 2012. The board of education will not accept a bid proposal that does not include this sworn and notarized disclosure statement.

1.10 RESERVATION OF RIGHTS

A. The Owner reserves the right, in its sole and absolute discretion (for this provision and all other provisions contained in this RFP), to accept or reject, in whole or in part, any or all bid proposal with or without cause, to waive any irregularities or informalities in this RFP process or any bid proposal, and to award the contract to other than the low bidder, when in the opinion of the Owner, such action will best serve the Owner's interests.

1.11 WITHDRAWAL OF BID PROPOSALS/QUOTES

A. Bid proposals submitted shall not be withdrawn and shall be irrevocable for a minimum period of ninety (90) calendar days following the due date for receipt of bid proposals set forth above.

1.12 REQUESTS FOR CLARIFICATION

A. Bidders may request that the Owner clarify information contained in this RFP. All such requests must be made in writing via email to Mr. Eric Helsel, Convergent Technology Partners, at ehelsel@ctpartners.net. Requests for clarifications and inquiries may only be made via email.

1.13 CONTRACT

A. The form of contract that the successful bidder ("contractor") will be expected to sign with troy school district is attached as Exhibit 1.

1.14 BOARD OF EDUCATION APPROVAL

A. Implementation of the proposed project is fully contingent on the approval of the Troy School District Board of Education.

1.15 RESTRICTION ON COMMUNICATION

A. From the issue date of this RFP until a Contractor is selected and the contract is awarded a prospective Contractor shall not communicate about the subject of this RFP or a Contractor's bid proposal with the Owner, its Board of Education, or any individual member, administrators, faculty, staff, students, or employees, except for additional requests for clarification in accordance with the paragraph above.

1.16 RELEASE OF CLAIMS

A. Each Bidder by submitting its Proposal releases the Owner from any and all claims arising out of, and related to, this RFP process and selection of a Contractor.

1.17 PROPOSAL COST

A. Respondents of this RFP are responsible for any and all costs incurred by them or others acting on their behalf in preparing or submitting a bid proposal, or otherwise responding to this RFP, or any negotiations incidental to its bid proposal or this RFP.

1.18 COLLUSIVE BIDDING

A. All Bidders certify that its bid proposal is made without any previous understanding, agreement or connection with any person, firm or corporation making a bid proposal for the same project and is in all respects fair, without outside control, collusion, fraud or otherwise illegal action.

1.19 INSURANCE REQUIREMENTS

A. The contractor, and any and all of their subcontractors, shall not commence work under this contract until they have obtained the insurance required under this paragraph, and shall keep such insurance in force during the entire life of this contract. All coverage shall be with insurance companies licensed and admitted doing business in the state of Michigan and acceptable to the Owner. The requirements below should not be interpreted to limit the liability of the contractor:

1. Workers' compensation insurance, including employers' liability coverage, in accordance with all applicable statutes of the state of Michigan.

2. Commercial general liability insurance on an "occurrence basis" with limits of liability not less than $2,000,000 per occurrence and aggregate. Coverage shall include, but not limited to, the following: (a) contractual liability; (b) products and completed operations; (c) independent contractors' coverage; (d) broad form general liability extensions or equivalent; (e) explosion, collapse, and underground, if applicable.

3. Automobile liability, including Michigan no-fault coverages, with limits of liability not less than $1,000,000 per occurrence combined single limit for bodily injury, and property damage. Coverage shall include all owned vehicles, all non-owned vehicles, and all hired vehicles.

4. Additional insured: policy(ies) and coverages as described above, excluding workers' compensation insurance, shall include an endorsement stating the following shall be additional insureds: The Owner, all elected and appointed officials, all employees and volunteers, agents, all boards, commissions, and/or authorities and board members, including employees and volunteers thereof. It is understood and agreed by naming the Owner as additional

insured, coverage afforded is primary and any other insurance the Owner may have in effect shall be considered secondary and/or excess.

B. Proof of insurance coverage: the contractor shall provide the Owner at the time the contracts are returned by him/her for execution a certificate of insurance as well as the required endorsements. In lieu of required endorsements, a copy of the policy sections, where coverage is provided for additional insured and cancellation notice, may be acceptable. Copies of all policies mentioned above shall be furnished, if so requested.

1.20 DEFINITIONS

A. Bid Documents are defined as the Instructions to Bidders, Schedule of Events, this RFP, including any Supplemental forms, Attachments, Appendices, Specifications, Drawings and, Other Information as noted herein (Narratives, diagrams, etc.), Addenda and the Contract.

B. Addenda are written or graphic instruments issued prior to the due date of bid proposals which modify or interpret the Bid Documents by additions, deletions, clarifications or corrections. All Addenda issued to Bidders prior to the due date of bid proposals shall become part of the Bid Documents and all bid proposals are to include the Project/Work therein described. Each Bid Proposal submitted shall list all Addenda that have been received prior to the due date of bid proposals.

C. As used in these Instructions to Bidders, the term "Bid Proposal" means a bid proposal prepared and submitted in response to this RFP.

D. As used in these Instructions to Bidders, the term "PSC" refers to the Professional Service Contractor and means Convergent Technology Partners and its assigned representative.

E. Throughout this RFP and Contract, the “Owner” will be used to refer to Troy School District and bidders submitting bid proposals will be referred to as "Bidders" or "Vendors” and a successful Bidder or Vendor will be referred to as a “Contractor”.

F. Throughout this RFP and Contract the Project may also be referred to as “PA”, “Paging”, “PA Project”, “Paging System” or “PA System”.

1.21 BIDDER’S REPRESENTATION

A. Each Bidder, by submitting a Bid Proposal, represents that the Bidder has read and understands the Bid Documents and is familiar with the local conditions under which the project is to be performed. Bidders will be held to have compared the Sites with Bid Documents and have satisfied themselves to all conditions affecting the execution of the Work/Project.

1.22 EXAMINATION OF BID DOCUMENTS

A. A mandatory bidder’s conference will be held per the schedule of events for answering questions from the Bidders and reviewing the site and existing conditions/system. The location of the Bidder’s conference is:

Troy School District
Larson Middle School
2222 E. Long Lake Rd
Troy, MI 48085

B. Before submitting a Bid Proposal, each Bidder shall examine the RFP documents carefully and shall read the Specifications and the Bid Documents. Each Bidder shall gather complete information prior to bidding as to existing conditions and limitations under which the Work/Project is to be performed and shall include in its Bid Proposal a sum to cover the cost of items necessary to perform the Work/Project as set forth in the Bid Documents.

C. No allowance or additional fees will be made to a Bidder because of lack of such examination or knowledge. The submission of a Bid Proposal will be considered as conclusive evidence that the Bidder has made such examination. An on-site-inspection of the Sites during the Bidder's Conference will be for all Bidders and their subcontractors, if any. Vendors may use subcontractors in connection with the Work/Project performed under this RFP provided the Owner has approved the subcontractors. In using subcontractors, the Vendor agrees to be responsible for all their acts and omissions to the same extent as if the subcontractors were employees of the Vendor.

1.23 REQUESTS FOR CLARIFICATION

A. Bidders may request that the Owner clarify information contained in this RFP. All such requests must be made in writing via email to Eric Helsel, Convergent Technology Partners, at ehelsel@ctpartners.net. Only a written interpretation or correction by Addendum shall be binding on Bidders. No explanations or interpretations requested or made orally will be considered binding. All questions will be responded to in writing. Requests for Clarifications and inquiries may only be made via email – **please note in the subject line the RFP name**. The deadline for all Requests for Clarification is per the Schedule of Events. The aggregated answers to all Requests for Clarification will be provided in an addendum to the RFP which will be issued and posted on the District's web site at www.troy.k12.mi.us no less than three (3) business days prior to the bid opening date for all potential proposers to view.

1.24 BIDDING PROCEDURES

A. All Bids Proposal must be submitted on the Bid Proposal Forms provided as part of the Bid Documents and in accordance with the Advertisement to Bid and Instructions to Bidders. Bidders must provide a complete list of proposed subcontractors (one per discipline) as indicated on the Bid Forms. Listing two or more subcontractors per discipline will be grounds for disqualification.

B. All Bidders must provide a proposal for the Base Bid that meets or exceeds the specifications set forth in this RFP. However, all Bidders may suggest Alternates if it is felt that the alternate proposal better suits the intent of this RFP. Any Alternate must be listed as such with separate pricing sheets. Any variance of the

feature/functionality of the Base Bid must be identified in any Alternates proposed.

C. Prior to the due date for bid proposals, all Addenda will be available for inspection wherever the Bid Documents are kept available for that purpose. No Addendum will be issued later than three (3) days prior to the due date for bid proposals. It is each Bidders responsibility to ascertain prior to submitting a Bid Proposal that he/she has received all Addenda issued and shall acknowledge their receipt in their Bid Proposal Form.

D. All Bids must be signed as follows:

1. Corporations: Signature of an officer of the firm who is authorized to bind the corporation.
2. Partnerships: Signature of one partner who is authorized to bind the firm and all of its Partners.
3. Bids submitted by Joint Ventures shall be signed by one of the Joint Ventures and shall be accompanied by a certified copy of the Power of Attorney authorizing the individual signing to bind all the Joint Ventures. If a certified copy of the Joint Venture's certificate submitted with the Bid Proposal indicates that all Joint Ventures have signed, no authorization is required.
4. Individuals signing on own behalf: No authorization is required.
5. Individual signing on behalf of another: Power of Attorney or comparable evidence of authority shall accompany Bid.

E. Bid proposals shall be prepared on unaltered Bid Forms which are a part of this RFP. Beyond listing of exceptions, bidders shall make no additional stipulations on the Bid Form nor qualify the Bid Proposal in any other manner. Unauthorized conditions, limitations, or provisions attached to the Bid Proposal will be cause for rejection of the Bid Proposal. If alterations by erasure or interlineations are made for any reason, explain over such erasure or interlineations with a signed statement from the Bidder. No additional charges, other than those listed on the Bid Proposal Form and other Bid submissions, shall be made. Prices quoted will include verification/coordination of order, all costs for shipping, delivery to all Sites, insurance, payment and performance bonds, unpacking, setup, installation, operation, testing, cleanup, training and all other requirements contained in the bid documents.

F. Bids shall be submitted in a sealed envelope. Identified on the face of the envelope:

1. Project name
2. Name and address of Bidder
3. Notation "PAGING SYSTEMS RFP #9899"

G. No responsibility shall attach to the PSC, the Owner, or the authorized representatives of either one, for the premature opening of any Bid Proposal

which is not properly addressed, delivered and/or identified. In such event, that Bid Proposal will not be considered, and the Bidder will be automatically disqualified from consideration.

H. Negligence in preparation, improper preparation, errors in and/or omissions in the Bid Proposal shall not relieve the Bidder from fulfillment of all applicable obligations and requirements of contained in the Bid Documents.

I. The Owner or PSC in making copies available of the Bid Documents to Bidders do so only for the purpose of obtaining bid proposals on the project and do not confer a license or grant of use to a Bidder for any other purpose.

J. All Bidders must complete, sign and return the attached "FAMILIAL DISCLOSURE AFFIDAVIT" and "Iran Sanctions Affidavit" with their Bid Proposal.

K. Bidders must include a Bill of Material (BOM), along with installed line item pricing for all components proposed, including maintenance and support, with the total listed where indicated in the Bid Proposal Forms. Failure to provide the BOM with line item pricing may result in disqualification of the Bid proposal.

L. The Owner considers this RFP legally binding and will require that this Request for Proposal and the Bid Proposal be incorporated by reference into any subsequent Contract between the Contractor and the Owner. It should be understood by the Bidder that this means that the Owner expects the Bidder to satisfy all requirements and specifications contained in the RFP. Any exceptions to the RFP must be explicitly noted in the Bid Proposal. Lack of listing all exceptions will be considered acceptance of all specifications as presented in this RFP.

1.25 SUBSTITUTIONS

A. Each Bid Proposal shall be based upon equipment described in the Bid Documents.

B. In addition to the Base Bid, the submission of voluntary alternates is acceptable. If a voluntary alternate is submitted for consideration, it shall be expressed on the Bid Form as an "add" or "deduct" amount from the Base Bid. If a voluntary alternate is submitted, the Bidder shall also submit enough information in the form of drawings, specifications, and a complete description of the proposed substitute, the cost savings or advantages. Additionally, provide the name of the material or equipment for which it is substituted, drawings, cuts, performance and test data and any other data or information necessary for a complete evaluation, enough for analysis of the alternate. The Owner reserves the right to unilaterally accept or reject, in whole or in part, any voluntary alternates.

1.26 CONSIDERATION OF BIDS

A. The Bidder acknowledges the right of the Owner to accept or reject any or all Bid proposals, in whole or in part, with or without cause, to waive any irregularities or informalities in this RFP process or any Bid Proposal, and to award the contract to other than the low bidder. In addition, the Bidder recognizes the right of the Owner to reject a Bid Proposal:

1. If the Bidder fails to furnish any required Bid Security, or to submit the data required by the Bid Documents; or
2. If the Bid Proposal is in any way incomplete (see checklist on bid form) or irregular; or
3. If the Bidder's performance was unsatisfactory under a prior contract for the construction, repair, modification, or demolition of a facility with the Owner, or a contractor in privacy of contract with the Owner, which was funded, directly or indirectly, by the Owner;

B. The Owner shall have the right to accept alternates in any order or combination and to determine the lowest qualified Bid based on the sum of the base bid and the alternates accepted.

C. Once the contract is awarded to the Contractor, the contract is contingent upon Owner's Board approval and the Contractor providing the Owner with all documents required by the RFP prior to commencement of the Work/Project (i.e. Insurance Certificates, etc.). Further, the Owner reserves the unrestricted right to modifying the contract amount by changing the scope of Work/project and/or components. Any such action will be taken before specific work on a building or on a project component has commenced. Contract amount shall be reduced or increased based on the unit pricing values.

D. Bidders to whom an award of a contract is under consideration shall submit to the Owner upon his/her request a properly executed Contractor's Qualification Statement, AIA Document A305 or other information format specified by the Owner.

1.27 TAXES

A. Installation services for the tangible personal property purchased by the Owner is not subject to sales taxation. Moreover, the Owner is exempt from taxation on all tangible personal property purchased by the Owner for its use and consumption; however, this exemption would not apply to any materials required under the Bid Documents that are deemed to be a component of a construction/improvement project to the Owner's Sites/Facilities. All prices submitted on the Bid Proposal Form shall be inclusive of all applicable taxes.

1.28 PERMITS AND FEES

A. All prices submitted on the Bid Proposal Form shall be inclusive of any and all Applicable and/or required permits and fees.

1.29 MICHIGAN RIGHT-TO-KNOW LAW

A. All Contractors must conform to the provisions of the Michigan Right-To-Know Law, 1986 PA 80, which requires employers to:

1. Develop a communication program designed to safeguard the handling of hazardous chemicals through labeling of chemical containers, and development and availability of Material Safety Data Sheets.
2. Provide training for employees who work with these chemicals; and
3. Develop a written hazard communications program.

B. The law also provides for specific employee rights. These include:

1. The right to be notified (by employer or Contractor posting) of the location of Safety Data Sheet (SDS);
2. The right to be notified (by employer or Contractor posting) of new or revised SDS no later than five working days after receipt; and
3. The right to request copies of SDS from their employers or Contractors.

C. Provisions of Michigan's Right-to-Know Law may be found in those sections of the Michigan Occupational Safety and Health Act (MIOSHA), which contain Right-to-Know provisions, and the Federal Hazard Community Standard, which is part of the MIOSHA Right-to-Know Law through adoption.

1.30 QUALIFICATIONS

A. The system Contractor must be a factory-authorized representative or distributor of equipment used in the system(s) bid. Further, this contractor must have a minimum of five years of experience in the specific application of the equipment proposed for these systems.

B. The contractor shall maintain permanent service facilities within 100 miles of the owner's facility capable of furnishing adequate inspection and service to the system. The facilities shall include a permanent source of factory trained service technicians experienced in servicing the associated system bid and shall provide warranty and manufacturer suggested maintenance service to afford the Owner maximum coverage. The contractor shall also provide a central source of support to guarantee immediate answers to Owner's problems and questions.

1. The Vendor shall maintain at their facility the necessary spare parts in the proper proportion as recommended by the manufacturer to maintain and service the equipment being supplied.

C. 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 systems bid and have personnel who are trained and certified in the use of such tools and equipment.

1.31 WITHDRAWAL OF BIDS

A. A Bidder may withdraw its Bid Proposal by written request from an authorized Bidder representative, at any time prior to the due date of bid proposals.

B. No Bidder may withdraw a Bid Proposal for a period of ninety (90) calendar days, following the due date for receipt of bid proposals, and all bid proposals shall be subject to acceptance by the Owner during this ninety (90) day period.

1.32 EXECUTION OF CONTRACT

A. The Contractor to whom the contract is awarded shall, within ten (10) calendar days after Notice of Award and receipt of the contract from the Owner, execute and deliver required copies to the Owner.

B. At or prior to delivery of the executed Contract, the Contractor to whom the contract is awarded shall deliver to the Owner those Certificates of Insurance required by the Bid Documents and such Labor and Materials Payment Bonds and Performance Bond as are required by Owner and any other documents required by this RFP.

C. **The Owner shall approve the provided Bonds and Certificates of Insurance before the Contractor may proceed with the Work/Project.** Failure or refusal to provide Bonds, Certificates of Insurance or any other documents required by this RFP in a form(s) satisfactory to the Owner shall subject the Contractor to loss of time from the allowable construction period equal to the time of delay in furnishing the required material.

1.33 POST BID INFORMATION

A. Bid Form(s) shall be submitted as indicated in the Bid Documents. The Bid Form(s) requires all proposed subcontractors for the project to be named; no more than one per discipline.

1.34 TIME OF COMPLETION

A. The Bidder agrees to complete the Work within the timeframes listed in the Schedule of Events.

1.35 EQUAL OPPORTUNITY

A. The Contractor and all its subcontractors shall not discriminate against any employee or applicant for employment because of race, religion, color, sex or national origin.

PART 2 - PRODUCT – NOT USED

PART 3 - EXECUTION

3.1 SITE REQUIREMENTS

A. No systems will not be taken off-line or removed from service during normal working hours or scheduled board room usage without coordination of the Owner's representative, and the staff of the affected building. Arrangements must be made by the Contractor to coordinate any such activities.

B. Applicable Codes, Standards, Best Practices, Industry Norms

1. All Work performed on this Project will be installed in accordance with Audiovisual and Integrated Experience Association™ (AVIXA) best practices and standards, the current edition of the National Electrical Code®, the current edition of the BICSI Telecommunications Distribution Methods Manual, the current edition of the BICSI Cabling Installation Manual, the latest issue of the ANSI/TIA/EIA Standards as published by Global Engineering Documents as TIA/EIA Commercial Building Telecommunications Standard, and all local codes and ordinances.
2. All ceiling or wall hung equipment (i.e. - Displays) must meet all ADA requirements, in particular: height clearance.

3.2 QUALITY ASSURANCE

A. Project Manager

1. The Contractor will provide a full-time Project Manager who will act as a single point of contact for all activities regarding this Project. The Project Manager must be a management employee and will not be involved in personally performing craft installation Work
2. The Project Manager is required to attend necessary meetings for coordination.
3. The Project Manager will be required to make on-site decisions regarding the scope of the Work and any changes required by the Work.
4. The Project Manager will be totally responsible for all aspects of the Work and shall have the authority to make immediate decisions regarding implementation or Owner approved changes to the Work.

B. Compliance with Laws and Regulations

1. The Contractor performance of the Work shall comply with all applicable federal, state, and local laws, rules, and regulations and Owner policies, procedure, rules and regulations. The Contractor shall give required notices, shall procure necessary governmental licenses and inspections, and shall pay without burden to the Owner, all fees and charges in connection therewith unless specifically provided otherwise. In the event of violation, the Contractor shall pay all fines and penalties; including attorney's fees and other defense costs and expenses in connection therewith.

C. Federal Communications Commission

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

D. Codes, Standards, and Ordinances

1. All Work shall conform to the latest edition of the National Electrical Code®, Michigan Electrical Code, the Building Code, and all local codes and ordinances, as applicable. ANSI/TIA/EIA-568 and ANSI/TIA/EIA-569 shall be

adhered to during all installation activities. Methodologies outlined in the latest edition of the BICSI Telecommunications Distribution Methods Manual shall also be used during all installation activities. Should conflicts exist with the foregoing, the authority having jurisdiction for enforcement will have responsibility for making interpretation. The Contractor is wholly responsible to meet or exceed all codes, standards, regulation, manufacturer installation standards and industry best practices.

3.3 SAFETY

A. The Contractor shall take the necessary precautions and bear the sole responsibility for the safety of the methods employed in performing the Work. The Contractor shall at all times comply with the regulations set forth by federal, state, and local laws, rules, and regulations concerning "OSHA" and all applicable state labor laws, regulations, and standards. The Contractor shall indemnify and hold harmless the Owner from and against all liabilities, suits, damages, costs, and expenses (including attorney's fees and court costs) that may be imposed on the Owner because of the Contractor, or its subcontractor, or supplier's failure to comply with the regulations stated herein.

3.4 INSPECTION, ACCEPTANCE, AND TITLE

A. Inspection and Acceptance will be upon successful installation unless otherwise provided. Title to/or risk of loss or damage to all items shall be the responsibility of the Contractor until acceptance by the Owner, unless loss or damage results from negligence by the Owner. If the materials or services supplied to the Owner are found to be defective or do not conform to the specifications, the Owner reserves the right to cancel the Contract upon written notice to and return products at the Contractor's expense, based upon the terms of the Contract.

1. When the Owner is referred to in this section of the RFP relative to inspections, the Owner has designated the PSC as the party to perform such inspections on behalf of the Owner. Notwithstanding the above, the Owner may also perform such inspections along with the PSC.

B. The Owner shall at all times have access to the Work wherever it is in preparation or in progress and shall provide proper facilities for such access and for inspection.

C. The Contractor shall not close up any Work until the Owner or AHJ (if applicable) has inspected the Work. Should the Contractor close up the work prior to inspection by The Owner or AHJ (if applicable), the Contractor shall uncover the Work for inspection at no cost to the Owner, and then recover the Work according to the specifications contained herein. The Contractor shall notify the Owner or AHJ (if applicable) in writing when the Work is ready for inspection. The Owner or AHJ (if applicable) will inspect the Work as expeditiously as possible after receipt of notification from the Contractor.

3.5 STATUS REPORTS, MEETINGS AND COORDINATION

A. It shall be the Contractor's responsibility to provide the Owner / PSC with written weekly project status reports while actively engaged in craft work and a summary

report at the beginning of periods of inactivity between phases or construction delays noting status at that time and expected date of return to work in addition to the requirements listed below. These reports are required and shall include, but not be limited to:

1. Project completion percentage.
2. All problems that were encountered.
3. Any foreseeable problems that may arise.
4. Work completed during the previous period and work scheduled for the next period.
5. General status of the project

B. The Owner / PSC reserves the right to hold additional status meetings on a regular basis with the Contractor's Project Manager.

END OF SECTION

COMMON WORK RESULTS FOR COMMUNICATIONS

REFERENCE

PART 1 - GENERAL

1.1. SUMMARY

A. The successful bidder/contractor (hereafter referred to as the Contractor) shall supply equipment, materials, labor, and services to provide the following systems including, but not limited to:
   1. Grounding of communications systems components.
   2. Labeling of all cabling, terminations and equipment
   3. Testing and test documentation as indicated in each Section.
   4. Fire stopping.
   5. Extended warranty and manufacturer's certification of systems, products, and labor.

B. Provide all equipment, materials, labor, whether specifically mentioned or not, which are necessary to complete or perfect all parts of the installation. Ensure that they are in compliance with requirements stated or reasonably inferred by the contract documents.

1.2. RELATED SECTIONS

A. Division 27

1.3. RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions apply to this section.

B. As indicated in each section.

1.4. REFERENCES

A. Local Codes and Standards - all applicable
   1. Anywhere low-voltage cabling Standards conflict with electrical or safety Codes, Contractor shall defer to NEC and any applicable local codes or ordinances, or default to the most stringent requirements listed by either. Knowledge and execution of applicable codes is the sole responsibility of the Contractor. Any code violations committed at the time of installation shall be remedied at the Contractor's expense. Contractor is responsible to bring any perceived conflicts between project documents and referenced Standards or Codes to the attention of the PSC for resolution.

B. Contractors shall adhere to latest ratified editions of the following; this list is not all inclusive:
   1. American Society for Testing and Materials (ASTM)
   2. American National Standards Institute (ANSI)
   3. Insulated Cables Engineers Association (ICEA)
   4. National Electrical Manufacturers Association (NEMA)
   5. Institute of Electrical and Electronics Engineers (IEEE)
      a. National Electric Safety Code (NESC IEEE C2)

6. American National Standards Institute (ANSI) Telecommunications Industry Association (TIA)
   a. ANSI/TIA 455-78 - Optical Fibers – Part 1-40: Measurement Methods and Test Procedures – Attenuation
   b. ANSI/TIA-526-7 (OFSTP-7)- Measurement of Optical Power Loss of Installed Single-Mode Fiber Cable Plant – OFSTP-7
   c. TIA/TSB 140 - Additional Guidelines for Field-Testing Length, Loss and Polarity of Optical Fiber Cabling Systems
   d. ANSI/TIA-568- Commercial Building Telecommunications Cabling Standard
   e. ANSI/TIA-568 - Balanced Twisted-Pair Telecommunications Cabling and Components
   f. ANSI/TIA-568: Optical Fiber Cabling Components
   g. ANSI/TIA-569 - Telecommunications Pathways and Spaces
   h. ANSI/TIA-598- Optical Fiber Cable Color Coding
   i. ANSI/TIA-606 - Administration Standard for Telecommunications Infrastructure
   j. ANSI/TIA-607 - **Generic Telecommunications Bonding and Grounding (Earthing) for Customer Premises**
   k. ANSI/TIA-758 – Customer-Owned Outside Plant Telecommunications Cabling Standard
   l. ANSI/IEE E 1100 Recommended Practice for Powering and Grounding Electronic Equipment
   m. ANSI NECA 1 Standard For Good Workmanship In Electrical Construction
7. ISO/IEC 11801– Information Technology – Generic Cabling For Customer Premises
8. NFPA 70 National Electrical Code (NEC) As adopted by the State of Michigan 2019
9. Rural Utility Services (USDA – RUS)
10. Restriction of Hazardous Substances Directive 2002/95/EC (RoHS)
11. Underwriters Laboratories (UL)
    a. UL 2024A Optical Fiber Cable Routing Assemblies for non-metallic cable pathways
12. NEMA VE1/CSA22.2 Metal Cable Tray systems for ladder rack and cable tray systems
13. Building Industry Consulting Services International (BICSI)
    a. Telecommunications Distribution Design Manual (TDMM)
    b. Information Technology Systems Installations Methods Manual (ITSIMM)
    c. BICSI – Outside Plant Design Reference Manual (OSPDRM)

C. Federal, state, and local codes, rules, regulations, and ordinances

1. The Contractor shall perform all work according to Federal, State, and local codes, rules, regulations, and ordinances governing the work. Where the requirements of other sections of the specifications are more stringent than applicable codes, rules, regulations, and ordinances, the specifications shall apply. OSHA Standards and Regulations – all applicable
2. Anywhere low-voltage cabling Standards conflict with electrical or safety Codes, Contractor shall defer to NEC and any applicable local codes or ordinances, or default to the most stringent requirements listed by either. Knowledge and execution of applicable codes is the sole responsibility of the Contractor. Any code violations committed at the time of installation shall be remedied at the Contractor's expense. Contractor is responsible to bring any perceived conflicts between project documents and referenced Standards or Codes to the attention of the Owner and Owner's PSC for resolution.

D. Manufacturers' Recommendations
E. Best Practices and Industry Norms
F. Others as indicated in each section.

1.5. QUALITY ASSURANCE

A. Electrical Components, Devices, and Accessories: Listed and labeled, meeting the National Electrical code or National Building Code and tested by a qualified testing agency, and marked for intended location and application
B. Telecommunications Pathways and Spaces: Comply with TIA-569, the National Electrical Code and the National Building Code.
C. Grounding: Comply with ANSI/TIA-607 and the National Electrical Code.
D. Warranty
   1. See Section 270500 "Common Work Results for Communications".

1.6. PROJECT CONDITIONS

A. Environmental Limitations: Do not deliver or install interior equipment cable until spaces are enclosed and weather-tight, wet work in spaces is complete and dry, and work above ceilings in IT spaces is complete.
B. This contractor shall examine the conditions under which the system installation is to be performed and notify the Owner's Representative or Design Professional in writing of unsatisfactory conditions. Do not proceed with the work until unsatisfactory conditions have been corrected in a manner acceptable to provide a workmanlike installation.
C. Review areas of potential interference and resolve conflicts before proceeding with the work. Coordinate ceiling layout and wall layout and other work that penetrates or is supported throughout the space of the building. All work shall be flush and workmanlike in all finished areas.

1.7. COORDINATION

A. Coordinate integration of paging system with telephone system with Owner.

B. Coordinate layout and installation of communications equipment with Owner's telecommunications and LAN equipment and service suppliers.
C. Coordinate service entrance arrangement with local exchange carrier.
D. Meet jointly with other equipment suppliers, local exchange carrier representatives, and Owner to exchange information and agree on details of equipment arrangements and installation interfaces.
E. Coordinate all work with:
    1. Owner and Construction Manager for available work hours, existing credential holder data base transition and programming.
    2. Owner IT department for integration with the Owner's network and installation of the Central database server in the server room
    3. for elevator installation, programming and sequence of operations.
    4. Others as required – Fire Alarm Vendor, Intrusion Detection Vendor, Elevator Vendor etc.
F. Record agreements reached in meetings and distribute them to other participants.
G. Adjust arrangements and locations of distribution frames, cross -connects, and patch panels in equipment rooms to accommodate and optimize arrangement and space requirements of telephone switch and LAN equipment.
H. Adjust arrangements and locations of equipment with distribution frames, cross-connects, and patch panels of cabling systems of other communications, electronic safety and security, and related systems that share space in the equipment room.
I. Coordinate location of power raceways and receptacles with locations of communications equipment requiring electrical power to operate.

1.8. PERMITS, FEES, and CERTIFICATES OF APPROVAL.

A. The Contractor SHALL make application and pay for all required permits.
B. As prerequisite to final acceptance, the Contractor shall supply to the owner certificates of inspection from an inspection agency acceptable to the owner and approved by local municipality and utility company serving the project.
C. As indicated in each section.

1.9. DEFINITIONS

A. PSC – Professional Services Contractor (Convergent Technology Partners)
B. As indicated in individual sections

1.10. SUBMITTALS

A. Shop Drawings:
    1. Provide cable routing diagrams.
    2. Provide logical fiber optic diagrams.
    3. Show patch panel numbering for all patch panels.
    4. Provide a schedule of materials list with quantities and manufactures indicated for all materials installed in the project.

5. Provide system block diagram including interconnection and numbering of all connections.
6. Provide fabrication drawings for any proposed custom-built equipment.
7. Submit for initial review 3 weeks after notice to proceed and for final review at substantial Completion.

B. Product Data:
   1. Provide manufacturer's product data specifications sheets indicating products being submitted and any long lead time items.
   2. Provide submittals for products with long lead times (4) weeks prior to ordering the materials.
   3. Provide submittals (3) weeks after receiving notice to proceed and prior to installation of any of the product.

C. Schedule
   1. Submit a coordinated schedule (3) weeks after notice to proceed to include the following;
      a. Preconstruction meeting and walkthrough.
      b. Start and duration of system milestones.
      c. Punch List.
      d. Final Punch List.

D. Cable Test Results:
   1. Category X UTP cable: test per current version of TIA 568 and associated addenda, TSB and errata using the Permanent Link method.
   2. All Fiber Optic Testing shall be submitted to the engineer and copies to the Owner's Representative for all fibers furnished as part of this installation
      a. Submit manufacturer's test reports for each reel of cable provided prior to installation, including on-reel test results at 1310 and 1550nm for single-mode.
      b. Submit Contractor's OTDR or Power Meter/Light Source test results after bundled fiber terminations are installed. (Required for 4th Level Extended Warranties)
      c. All optical fibers shall be tested for continuity and attenuation both before and after installation.
      d. All newly installed fiber optic cable and components for network equipment use must be rated and installed to comply with the IEEE 802.3z1000Base-X Ethernet Gigabit Standard.
      e. All fiber optic backbone cables shall home-run either through conduit, utilize an interlocking armor outer jacket or inner duct from each Entrance Facility (EF) to the Main Telecommunications Equipment Room (ER), which houses the data switching equipment. The standard inter-building fiber optic backbone shall consist of single- mode fiber optic cable to all buildings. All OSP fiber optic cable installed underground

shall be waterproofed utilizing dry waterproofing compounds, no gel filled cables will be allowed.

f. Submit soft copy of test results for all fiber optic cable OTDR test results on USB or other suitable electronic format and in pdf format. Test results in comma separated variable (CSV) format shall be used whenever possible. Provide proprietary software on the digital media to enable viewing of the soft-copy test results. (Required for 4th Level Extended Warranties)

E. Project Record Drawings
   1. Submit project record documents at Contract Closeout.
   2. The contractor shall deliver three (3) sets of as-built drawings to the owner within four (4) weeks of completion of the project. A set of as-built drawings shall be provided to the owner in suitable electronic form (i.e., USB) and utilizing software that is acceptable to the owner and PSC. The contractor shall deliver the digital media to the owner/PSC within six (6) weeks of completion of the project.
      a. As-built Drawings must contain;
         1) Distances for segments/cable runs
         2) Labeling
         3) Cable locations by type, with optical fiber showing strand count

F. Submit, within 3 weeks after notice to proceed, the names and qualifications of those persons who will have management and supervisory positions over the employees on the job site. Submit the name of the supervisory person who will be on the job site daily and have responsibility for day-to- day decisions. Submit the name of the person who will attend meetings and have authority to make decisions for issues and requirements that arise from such meetings.

G. Upon request by the engineer/designer (PSC), the Owner, and/or the Owner's representative will furnish a list of references with specific information regarding the type of project and involvement in providing other products and/or support equipment used on this project.

H. Where equipment and materials have industry certification, labels, or standards (i.e., NEMA-National Electrical Manufacturer's Assn.), this equipment shall be labeled as certified or complying with the standards.

I. Material and equipment shall be new, and conform to grade, quality, and standards specified. Equipment and materials of the same type shall be a product of the same manufacturer throughout.
   1. All hardware proposed must be the current offering of the manufacturer and receive the highest level of standard support offered by the manufacturer. Factory refurbished hardware which is in "new condition" as well as used, shopworn, prototype, demonstrator models, etc. are not acceptable.

2. The System must consist of standards-based products or components whose performance, reliability, and maintainability can be demonstrated.

1.11. QUALITY ASSURANCE

A. Submit documentation with the bid listing the names of employees that will be used on this project indicating their experience, level of expertise, and certificates of training.
B. Complete Quality Assurance requirements.
C. Submit documentation from the manufacturer of the optical fiber cable and components that they are either ISO 9000 or TL9000 Certified.

1.12. WARRANTY

A. Submit at project closeout, a signed and registered product warranty and applications assurance. See individual (system) Sections for warranty requirements.
B. All software required to run or view the test data must accompany the application.
C. Copies of as built drawings must be submitted to the manufacturer via electronic or hard copy. (Drawings must be in AutoCAD or Visio)
D. Submit a statement, at notice to proceed, of any Contractor warranties in addition to the manufacturer's stated and supplied warranties. Submit at closeout signed copies of the Contractor provided warranties that are in addition to manufacturer's stated and supplied warranties.

1.13. DELIVERY, STORAGE, AND HANDLING

A. Protect equipment during transit, storage, and handling to prevent damage, theft, soiling, and misalignment. Coordinate with the owner for secure storage of equipment and materials.
B. Do not store equipment where conditions fall outside manufacturer's recommendations for environmental conditions.
C. Follow manufacturer's recommended procedures for storage of materials & equipment.
D. Do not install damaged equipment; remove from site and replace damaged equipment with new equipment.

1.14. SEQUENCE AND SCHEDULING

A. Refer to Schedule of Events and Submittals Section above.
B. Coordinate schedule and activities with Owner/ PSC/ General Contractor / Construction Manager.

1.15. USE OF THE SITE

A. Use of the site shall be at the owner's direction in matters in which the owner deems it necessary to place restriction.
B. Access to building wherein the work is performed shall be as directed by the owner.

C. The owner will occupy the premises during the entire period of construction for conducting his or her normal business operations. Cooperate with the owner to minimize conflict and to facilitate the owner's operations.
D. Schedule necessary shutdowns of plant services with the owner and obtain written permission from the owner.
E. Proceed with the work without interfering with ordinary use of streets, aisles, passages, exits, and operations of the owner.

1.16. CONTINUITY OF SERVICES

A. Take no action that will interfere with, or interrupt, existing building services unless previous arrangements have been made with the owner's representative. Arrange the work to minimize shutdown time
B. Owner's personnel will perform shutdown of operating systems. The contractor shall give three (3) days' advance notice for systems shutdown.
C. Should services be inadvertently interrupted, immediately furnish labor, including overtime, material, and equipment necessary for prompt restoration of interrupted service.

PART 2 - PRODUCTS

2.1. MANUFACTURERS

A. Provide products as indicated in individual articles.
B. Where no manufacturer is specified, provide products of manufacturers in compliance with requirements.
C. Provide proof the manufacturer selected has successfully had these same products installed at other facilities and provide references with name, title, address, phone number & e-mail address of each point of contact within each referenced account.
D. Provide proof the manufacturer has 20 years or more of designing, manufacturing and providing fiber optic cables, within the continental United States.
E. Provide proof the manufacturer is located within the U.S., is incorporated within the U.S. and that the major products (fiber optic cables, cable assemblies and termination hardware) are manufactured within the U.S.
F. Substitutions: Substitution requests will be considered only if submitted to Owner's Representative not less than 7 working days prior to project bid date. Acceptance or rejection of proposed substitution is at Owner's Representatives sole discretion. No exceptions. Requests for substitutions shall be considered not approved unless approval is issued in writing by Owner's Representative.
G. Rejection: For equipment, cabling, wiring, materials, and all other products indicated or specified as no substitutions or no alternates, Owner does not expect nor desire requests for substitutions and alternate products other than those specified. Owner reserves right for Owner's Representative to reject proposed substitution requests and submissions of alternates without review or justification.

PART 3 - EXECUTION

3.1. PRE-INSTALLATION SITE SURVEY

A. Prior to the start of systems installation, The Contractor will meet at the project site with the owner's representative and representatives of trades performing related work to coordinate efforts. Review areas of potential interference and resolve conflicts before proceeding with the work. Facilitation with the general contractor shall be necessary to plan the crucial scheduled completions of the equipment rooms and telecommunications rooms.

B. Exact locations of Splice Cases shall be field verified.

C. Examine areas and conditions under which the system is to be installed. Do not proceed with the work until satisfactory conditions have been achieved.

D. Exact location cable terminations shall be field verified with owner.

3.2. HANDLING AND PROTECTION OF EQUIPMENT AND MATERIALS

A. The contractor shall be responsible for safekeeping own materials and subcontractor's property, such as equipment and materials, on the job site. The owner assumes no responsibility for protection of above-named property against fire, theft, and environmental conditions.

3.3. CLEANUP

A. Touch-up, repair or replace damaged products before substantial completion.

B. All work materials shall be removed at the end of each workday and the work area left in the same condition as found. Upon completion of the work, the Contractor must remove all tools, equipment and all rubbish and debris from the premises and must leave the premises clean and neat.

3.4. FIRE STOPPING SYSTEMS

A. Comply with TIA 569 and BICSI "Fire stop Systems" chapter

3.5. PROTECTION OF OWNER'S FACILITIES

A. Effectively protect the owner's facilities, equipment, and materials from dust, dirt, and damage during construction.

B. Protect installed products until completion of project

C. Remove protection at completion of work.

D. Should it be found by the engineer that the materials, or any portion thereof, furnished and installed under this contract fail to comply with the specifications and drawings, with respect or regard to the quality, amount of value of materials, appliances, or labor used in the work, it shall be rejected and replaced by the contractor, and all work distributed by changes necessitated in consequence of said defects or imperfections shall be made good at the contractor's expense.

3.6. INSTALLATION

A. Prior to pulling cable through conduit, mandrel the conduits to remove foreign material before pulling commences.

B. Only install cable in conduits or sleeves that have been reamed and bushed. If bushings are not present, provide and install same.

C. Beginning installation means contractor accepts existing conditions.
D. Contractor shall furnish all required installation tools to facilitate Cable installation without damage to the cable jacket. Such equipment is to include, but not be limited to, sheaves, winches, cable reels, cable reel jackets, duct entrance funnels, pulling tension gauges, and similar devices. All equipment shall be of substantial construction to allow steady progress once pulling has begun. Makeshift devices that may move or wear in a manner to pose a hazard to the cable or employees shall not be used.
E. Cable pulling shall be done in accordance with cable manufacturer's recommended procedures and ANSI/IEEE C2 standards. Manufacturer's recommendations shall be a part of the cable submittal. Recommended pulling tensions and minimum bending radii shall not be exceeded. Any cable bent or kinked to a radius less than recommended shall not be installed.
F. During cable pulling operation, an adequate number of workers shall be present to allow cable observation at all points of duct entry and exit as well as to feed cable and operate pulling machinery.
G. Pulling lubricant shall be used to ease pulling tensions. Lubricant shall be of a type that is non- injurious to the cable material used. Lubricant shall not harden or become adhesive with age. (i.e. - Polywater)
H. Avoid abrasion and other damage to cables during installation.
I. All exposed cable shall be labeled at 35-foot (maximum) intervals with tags indicating ownership, cable type, and fiber type installed.

3.7. LABELING

A. All labeling shall be in accordance with ANSI/TIA-606 unless otherwise noted by the owner or in individual sections.
B. Mark up floor plans showing Cable routes, segments, Cable type, and marking of cables. Turn these drawings over to the owner two (2) weeks prior to move-in to allow the owner's personnel to connect and test owner-provided equipment in a timely fashion.
C. The contractor shall deliver three (3) sets of as-built drawings to the Owner's Representative within four (4) weeks of completion of the project. A set of as-built drawings shall be provided to the owner in digital form (i.e., CD-ROM or other suitable format) and utilizing software that is acceptable to the owner. The contractor shall deliver the digital media to the owner within six (6) weeks of completion of the project.

3.8. COOPERATION

A. The contractor shall cooperate with other trades and owner's personnel in locating work in a proper manner. Should it be necessary to raise or lower or move longitudinally any part of the work to better fit the general installation, such work shall be done at no extra cost to the owner, provided such decision is reached prior to actual installation. The contractor shall check location of electrical outlets with respect to other installation before installing.

3.9. TESTING AND ACCEPTANCE

A. The equipment must meet or exceed the agreed acceptance criteria during a 30-day acceptance period, which begins on the installation (cut-over) date. The system will then be accepted following this successful 30-day period.
B. Test procedures must meet manufacturer's standards.
C. The Contractor shall correct, in a timely manner, any failure to comply with Contract Documents as reasonably determined by Owner.
D. If final acceptance is significantly delayed because of defective new equipment or because the installation is not in accordance with the Contract Documents, the Contractor shall pay for all the Owner's additional time and expenses resulting from the delay and any extensions of Acceptance Testing.
E. As additionally indicated in each Section.
F. Optical Fiber
    1. The contractor shall provide to engineer/Owner's representative, the cable manufacturer's test report for each reel of fiber cable provided. These test reports shall include manufacturer's on-reel attenuation test results at 1310 nm and 1550 nm for single-mode for each optical fiber of each reel prior to shipment from the manufacturer.
    2. The contractor will perform an attenuation test with an OTDR or Power Meter of each optical fiber of each fiber cable reel prior to installation. The contractor shall supply this test data to the engineer prior to installation.
    3. The fibers utilized in the installation shall be traceable to the manufacturer. On-the-reel bandwidth performance as tested at the factory (for multimode fibers) shall be provided upon request.
    4. Optical fiber bundle shall be tested before utilization as follows:
        a. Perform all tests and provide copies of all test results to the engineer/Owner's Representative.
        b. The contractor is responsible for supplying all equipment and personnel necessary to conduct the acceptance tests. The bidder should detail the proposed test plan for each cable type including equipment to use, test frequencies, and wavelengths, etc.
        c. The contractor shall conduct acceptance testing according to a schedule coordinated with the owner. Representatives of the Owner may be in attendance to witness the test procedures.
        d. The contractor shall offer adequate advance notice (at least one week) to the Owner' Representative as to allow for such participation.
        e. The contractor is to describe how they will conduct the tests and provide copies of all test results to the PSC/engineer Owner's Representative.

5. All fibers shall be initially tested with a light source and OTDR utilizing procedures as stated in ANSI/TIA/EIA 455-78B Measurement Methods for Attenuation. Measured results shall be plus/minus 1 dB of the submitted loss budget calculations. If loss figures are outside this range, test cable with an optical time domain reflectometer to determine cause of variation. Correct improper splices and replace damaged fiber at no charge to the owner.
   a. Fibers shall be tested at 1310 nm and 1550 nm for single-mode optical fiber bundles.
   b. Bi-directional testing of optical fibers is required.
6. Test results shall include a record of wavelength, fiber type, fiber and bundle number, test equipment and model number, date reference setup, and operator (crew members).
7. The contractor shall provide written reports of all test data in written form to the owner. At such time the contractor turns over test data to the engineer.
8. In the event that test results are not satisfactory, the contractor shall make adjustments, replacements, and changes as necessary and shall then repeat the test or tests that disclosed faulty or defective material, equipment, or installation method, and shall perform additional tests as the engineer deems necessary.
   a. Tests related to connected equipment of others shall only be done with the permission and presence of the contractor involved. The contractor shall perform only that testing as required to prove the fiber connections are correct.
   b. Three (3) record copies of all test data shall be submitted to the PSC/engineer for approval. The contractor shall notify the PSC/engineer at least one week in advance of the test date so that the PSC/engineer may be present.

END OF SECTION

BONDING & GROUNDING FOR COMMUNICATIONS SYSTEMS

REFERENCE

PART 1 - GENERAL

1.1. SUMMARY

A. Section Includes:

1. Commercial building grounding and bonding requirements for telecommunication infrastructure.

2. Requirements for bonding and communications cabling, equipment, pathways, spaces, and mounting equipment.

1.2. RELATED SECTIONS:

A. Section 27 05 00 – Common Work Results

B. Section 27 00 00 - Telecommunications.

1.3. RELATED DOCUMENTS

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

1.4. CODES, STANDARDS AND REFERENCES

A. The Contractor shall adhere to the latest edition of the following codes, standards, and references. Additionally, the Contractor shall adhere to all other codes, regulation and standards not stated here:

1. As listed in Section 270500

2. As listed in each section

1.5. SUBMITTALS

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

B. Shop Drawings: For communications equipment room fittings. Include plans, elevations, sections, details, and attachments to other work.

1.6. SYSTEM DESCRIPTION

A. Provide a communications bonding and grounding system as described in this document, documents and drawings specific to that project, and in compliance with the above cited Codes, Standards and Agencies.

B. Bond the following items within the telecommunications grounding system.

1. All communications system active equipment.

2. All PDU and surge protection equipment.

3. Raised floor systems.
4. Underfloor grounding grids (a.k.a. "supplemental bonding grids" or SBGs) for computer or telecommunications rooms.
5. Metallic raceway systems, including metallic cable trays.
6. Communications equipment enclosures (cabinets) or cross-connect frames.
7. Broadband passive devices.
8. Metallic splice cases.
9. Metallic cable screens, armor or shields.
10. All metal cable conduit.
11. Electrical service panels in entrance facilities, telecommunications and equipment rooms.
12. Wall and rack mounted grounding bus bars.
13. Exposed building steel that is within 6 feet of equipment racking systems.
14. Building steel extending to earth in outside-plant.
15. All related bonding accessories.

1.7. DESIGN REQUIREMENTS

A. Quality Assurance:

1. Grounding to conform to applicable building codes.
2. Cable and equipment to be installed in a neat and workmanlike manner.
3. Methods of construction that are not specifically described or indicated in the contract documents to be subject to the control and approval of the OWNER or their official representatives.
4. Equipment and materials specified shall be of the quality and manufacture indicated. The equipment specified is based upon the acceptable manufacturers listed.
5. Where "approved equal" is stated, equipment shall be equivalent in every way to that of the equipment specified and subject to written approval by from the Owner per the Substitutions Policy listed below.
6. Materials and Methods shall comply in every way with above cited Standards and Codes.

PART 2 - MATERIALS

2.1. GENERAL

A. Provide products as indicated in individual articles. Where no manufacturer is specified, provide products of manufacturers in compliance with requirements.

B. Materials shall be consistent throughout the building. Where two or more units of the same class of equipment or wiring are required, these units shall be the standard product of a single manufacturer and shall be the same product with the same material, model and manufacturer number.

2.2. PRODUCT CERTIFICATION

A. Components shall be UL or third party certified. Where equipment or materials are specified to conform to industry and technical society reference standards of the organizations, submit proof of such compliance. The label or listing by the specified organization will be acceptable evidence of compliance. In lieu of the label or listing, submit a certificate from an independent testing organization, competent to perform testing, and approved by the Owner. The certificate shall state that the item has been tested in accordance with the specified organization's test methods and that the item complies with the specified organization's reference standard.

2.3. APPROVED MANUFACTURERS

A. Panduit

B. Hubbell

C. Belden

D. General

2.4. TELECOMMUNICATIONS BONDING BACKBONE (TBB) GROUNDING CONDUCTORS:

A. To be bare or insulated copper, of minimum conductor size #6 AWG and sized at 2 kcmil per linear foot up to a maximum size of 750 kcmil. (For details on TBB sizing see "Execution" section at end of this document).

B. Where un-insulated, to be identified with green tape at termination location.

C. Labeled in accordance with recommendations set forth in ANSI/TIA-606 Administration Standard for Telecommunications Infrastructure.

2.5. Two-hole, Long-barrel Copper Compression Lugs for Grounding Conductors:

A. Meets ANSI/TIA-607 requirements for network systems grounding applications.

B. Tested by Telcordia – meets NEBS Level 3 with AWG conductor.

C. UL Listed and CSA Certified with AWG conductor for use up to 35 KV** and temperature rated 90°C when crimped with specified manufacturers' material, crimping tools and dies.

D. Color-coded barrels marked with specified manufacturers' die index numbers for proper crimp die selection.

E. Have long barrel to maximize number of crimps and provides premium wire pull-out strength and electrical performance.

F. Have "inspection window" over tongue to visually assure full conductor insertion.

G. Be tin-plated to inhibit corrosion.

H. Available with NEMA and BICSI hole-sizes and spacing.

2.6. Code/Flex Conductor H-TAPs:

A. Used as a splice, or to tap smaller (pigtail) conductors into larger continuous conductors.

B. Each HTAP terminates a wide range of conductor sizes and combinations of code and flex conductors Class G, H, I and Locomotive to suit a variety of applications.

C. Tap grooves are separated from one another, allowing them to function independently so HTAP can be used with single or multiple conductors, providing maximum design and installation flexibility.

D. Color coded and marked with die index numbers for proper crimp die selection.

E. UL Listed and CSA Certified, with wide size range of conductor sizes and rated for applications up to 600 V when crimped with Panduit tools and dies, or with other specified manufacturers' crimping tool and dies.

F. Tin plated to inhibit corrosion.

G. Available with an assortment of clear covers with integrated label fields.

2.7. Code Conductor, Thin Wall, Tin-plated C-TAP (splice):

A. For copper-to-copper splicing or pigtail tap splicing.

B. Wide wire range-taking capability minimizes inventory requirements.

C. Color-coded for proper crimp die selection.

D. Ribbed design provides high strength.

E. Made from high conductivity wrought copper.

F. Tin-plated to inhibit corrosion and oxidation.

G. UL Listed and CSA Certified with AWG conductor to 600 V and temperature rated to 90°C when crimped with Panduit and specified manufacturers' crimping tools and dies.

2.8. Access Floor Grounding Clamps:

A. Bonds crossed grid conductors to each other, and bonds the access floor pedestals to the conductors.

B. Specifically designed to bond perpendicular Mesh-BN (a.k.a. MCBN or Mesh Common Bonding Network) conductors per TIA-942 and ANSI/TIA-607

C. Bonds to the pedestal with a single bolt to simplify installation.

D. Accommodates conductor sizes from #6 – 1/0 AWG, minimizing inventory requirements.

E. Bonds both round and square access floor pedestals for greater flexibility.

F. Crossing grounding conductors affixed and bonded using a split bolt quad clamp which requires only one nut to install.

G. Split bolt design allows easy insertion of perpendicular conductors speeding installation and is UL 467 Listed and CSA

1. Split bolt is UL Listed and CSA Certified for use up to 600 V and temperature rated 90°C.

H. Each clamp accepts up to two conductors for a high-performance bond with faster installation.

I. Wide wire range-taking capability minimizes inventory requirements.

J. Split-bolt made from high strength, electrolytic bronze to provide reliable grounding connections.

2.9. IEEE Universal Beam Grounding Clamp:

A. For bonding structural steel (ex: I-beams) into bonding network

B. Universal, fits on a wide range of standard (angled) and wide flange (parallel) structural steel beams.

C. Provide a mounting pad suitable for a two-hole compression lug.

D. Installs quickly and easily with standard 1/4" key hex wrench tooling.

E. UL 467 Listed and CSA 22.2 Certified for grounding and bonding suitable for direct burial in earth or concrete.

F. Comply with vibration tests per MIL-STD-202G (METHOD 201A).

2.10. Split Bolt for Bonding Cable Trays:

A. Made from high strength copper alloy to resist corrosion and provide premium electrical and mechanical performance.

B. Wire range-taking capability minimizes inventory requirements.

C. Nut hex provides correct fit with socket, box, or open-end wrenches resulting in proper torqueing of electrical connection.

D. Pressure bar provides secure connection on a full range of conductor combinations used with each connector assuring premium wire pull-out strength.

E. UL Listed and CSA Certified with AWG conductor for use up to 600 V and temperature rated 90°C.

F. Available in tin-plated version for bonding to galvanized wire baskets and Flex Tray.

2.11. Auxiliary Cable Brackets (Conductor Pathway):

A. Used for mounting telecommunications bonding conductors outside of cable tray.

B. Maintain minimum 2" separation between bonding conductors and all other types of cabling per TIA 607-B.

C. Bonds ladder rack, wire basket sections together without drilling holes or applying other split-bolt clamps.

D. Supports grounding conductors in the telecommunications room, allows separation of grounding conductors from other cables.

E. Holds up to four conductors in sizes up to 750 kcmil.

F. Bonds to all cable tray.

G. Paint piercing teeth provide electrical continuity between cable pathway sections while minimizing debris.

H. Front and back mounting screw options allow easy installation and visual inspection.

I. Can be mounted above or below the cable pathway system for flexibility.

J. Meet requirements ANSI/TIA-607.

2.12. Wall-mount Busbars (TGB and TMGB and labeling):

A. Meet BICSI and ANSI/TIA-607 requirements for network systems grounding applications.

B. Employ BICSI hole spacing to fit 2-hole lugs.

C. Be made of high conductivity copper and tin-plated to inhibit corrosion.

D. Come pre-assembled with brackets and insulators attached for quick installation.

E. Identify busbars to meet TIA/EIA-606.

2.13. Vertical Grounding Strip Busbars for Racks and Cabinets:

A. Provides clean bond to any rack mounted equipment regardless of whether or not equipment has an integrated grounding terminal.

B. Bonds up to 45 RU per rack.

C. Comes in EIA Universal mounting hole pattern.

D. Complies with US and International grounding requirements.

E. Comes in threaded rail and cage nut versions.

2.14. Rack Bonding Conductor Kits (RBC):

A. Bonds the rack or cabinet to the telecommunications grounding busbar (TGB or TMGB).

B. Jumper kits available with both ends factory terminated to provide a bolt-on solution.

C. Jumper kits available with one end factory terminated to attach to the rack or cabinet; free end accommodates unique length requirements.

D. Engineered to comply with US and international grounding requirements.

2.15. Equipment Jumper Kits (Unit Bonding Conductor or "UBC"):

A. Used to ground large, chassis-style rack mounted equipment that have built-in grounding pads or terminals.

B. Bond network equipment to grounding strip or grounding busbar.

C. Jumper kit available with both ends factory terminated to provide a bolt-on solution.

D. Jumper kit available with one end factory terminated to attach to the grounding strip or grounding busbar; free end accommodates unique equipment terminations.

E. Use jumpers with 90° bent lug, on grounding strip side, for high density grounding requirements up to one ground point per RU.

F. Use jumpers with 45° bent lugs on grounding strip side, for improved cable management.

G. Engineered to comply with US and International grounding requirements.

2.16. Surge Suppressor Jumper Kit:

A. Bonds power or data line surge suppressor to grounding strip or grounding busbar.

B. Both ends factory terminated to provide a bolt-on solution.

C. Engineered to comply with US and International grounding requirements.

2.17. Miscellaneous Bonding Accessories:

A. Anti-oxidation Paste (contact aid) For Copper to Copper and Copper to Steel Connections

B. Anti-oxidation Paste (contact aid) For Aluminum Pad-to-Pad or Thread-to-Thread Aluminum Connections

C. Green thread-forming bonding screws for bonding smaller equipment on threaded rack rails through the equipment mounting flange.

D. Green bonding cage nuts from bonding smaller equipment on cage nut rails through the equipment mounting flange.

E. Thread forming screws for bonding two-hole lugs to vertical busbars on threaded rack rails.

F. Green paint piercing grounding washers for assuring electrical continuity between painted parts of equipment racks as described in TIA 607-B Standard.

G. Bonding hardware kits (studs) for forming low-resistance bond between the rack or cabinet and painted rack mounted appliances and equipment.

PART 3 - EXECUTION

3.1. GENERAL

A. This Specification document describes a generic enterprise communications bonding and grounding system for the construction of a complete and functioning grounding system without prior knowledge of the particular facilities where it will be used. It is the responsibility of the installing contractor to adapt these general guidelines and principles to the requirements of the actual environments where the systems are to be implemented.

B. System shall provide equipment ground connections (bonds) from the premises entrance facility and outside-plant earthing system to each telecommunication room telecommunication ground busbar, through the racking systems to bond the network equipment.

C. Entire grounding link from equipment to earth should be visually verifiable except where hidden by walls, conduit or pathways.

D. Installing contractor shall label all elements of the communications bonding network according to guidelines defined in ANSI/TIA-607 and ANSI/TIA 606.

E. It is the responsibility of the installer to be knowledgeable of all previously cited Standards and Codes and to bring to the attention of the Owner any conflicts or discrepancies to achieve a fully functioning, standards-compliant earthing system.

3.2. INSTALLATION

A. Telecommunications Bonding Backbone (TBB): BY OTHERS

1. Bonding and grounding conductors may be insulated or un-insulated and shall not decrease in size as the grounding path moves closer to earth.

2. Connections (bonds) between the telecommunications grounding network and associated electrical panels shall be done by a qualified electrician in accordance with guidelines in TIA 607-B and applicable electrical codes.

3. Bonding Conductors should be continuous and routed in the shortest possible straight-line path, avoiding changes in elevation and sharp bends.

4. TBB conductors shall be protected from mechanical damage and built so as to minimize splicing. Where splicing is unavoidable, they shall be done using irreversible compression splices (C-TAPS) built to that purpose. See

the "Materials" section of this document for appropriate compression splices.

5. TBB in multi-story buildings with multiple risers (multiple TBBs) shall employ a grounding equalizer (GE) between vertical grounding backbones at the top floor of the building and minimally at every third floor in between to the lowest floor level. The GE shall be no smaller than the largest sized TBB.

6. Routing grounding conductors through ferrous metal conduit should be avoided, but if it is necessary due to building constraints, any grounding conductor running through ferrous conduit longer than 3 feet shall be bonded at the end using appropriately sized HTAP and Conduit grounding clamps as described TIA 607-B using appliances described for that purpose in the "Materials" section of this document.

7. Conductors used to bond TBB to conduit ends shall be of #6 AWG size or larger.

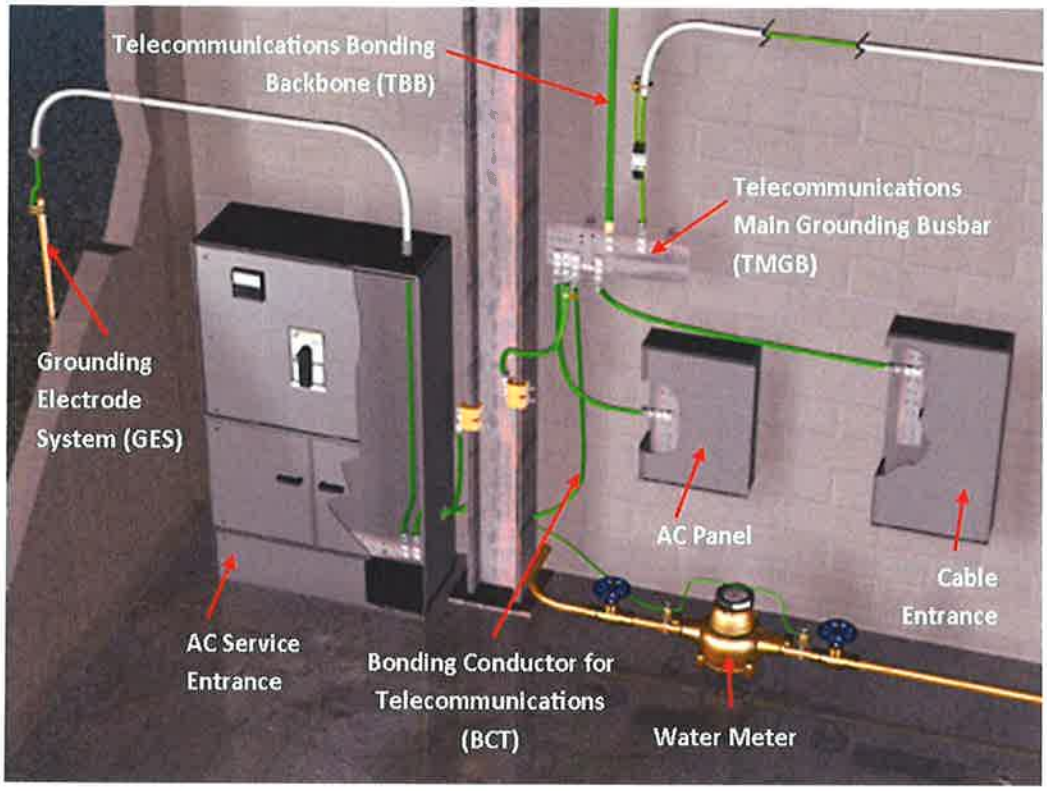
8. Conductor sizing shall be based upon project specification (drawings and notes) for that installation. These sizes are based on TBB length per TIA 607-B recommendations. Contractor shall bring to the attention of the Owner anywhere TBB project specified sizing appears insufficient per the Table below:

Sizing of the TBB	
TBB Length in Linear meters (feet)	TBB Size (AWG)
Less than 4 (13)	6
4-6 (14-20)	4
6-8 (21-26)	3
8-10 (27-33)	2
10-13 (34-41)	1
13-16 (42-52)	1/0
16-20 (53-66)	2/0
20-26 (67-84)	3/0
26-32 (85-105)	4/0
32-38 (106-125)	250 kcmil
38-46 (126-150)	300 kcmil
46-53 (151-175)	350 kcmil
53-76 (176-250)	500 kcmil

76-91 (251-300)	600 kcmil
Greater than 91 (301)	750 kcmil

B. Entrance Facilities and Telecommunications Main Grounding Busbar (TMGB):

1. TMGB shall be located in the entrance facility, near the electrical panel to which it will be bonded but installed to maintain clearances required by applicable electrical codes.
2. TMGB shall be sized according to the anticipated number of bonded connections needed
3. TMGB shall have tinned surface to restrain oxidation and be cleaned and antioxidant paste applied prior to fastening conductors.
4. Connectors on TBB which attach to TMGB shall be of two-hole, long-barrel compression lugs of the LCC series as specified in the "Materials" section of this document.
5. Building steel within six feet of the communications grounding system should be bonded into the system with appropriate hardware listed in "Materials" section of this document.
6. All cables containing a metallic shield or armor shall have that shield properly bonded into the communications grounding system using the appropriately sized Armored Cable Grounding Kit listed in the "Materials" section of this document.
7. The illustration below depicts for reference the general location and layout of the TMGB and associated grounding elements in a typical entrance facility.

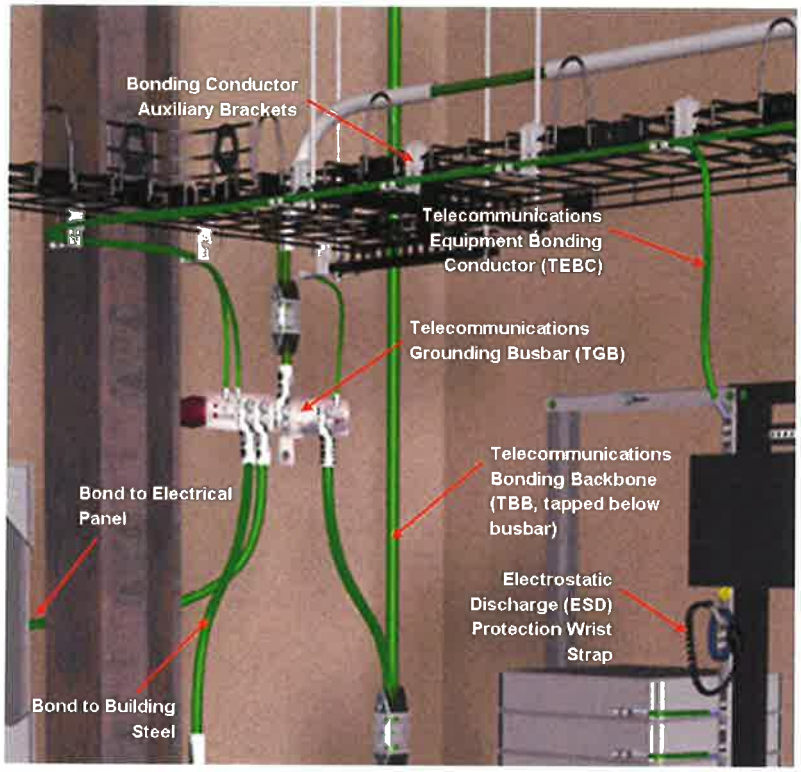


C. Telecommunications Rooms and Telecommunications Grounding Busbar (TGB):

1. Each telecommunications room shall have its own TGB to which equipment and dead steel (building steel and support structures) in that room are bonded.
2. The TGBs shall have a tinned surface to inhibit oxidation and be sized according to the anticipated number of bonded connections that will be needed.
3. TGBs shall be sized according to the anticipated number of bonded connections needed.
4. TMGs shall have tinned surfaces to restrain oxidation and shall be cleaned and have an antioxidant paste applied to both bonding surfaces prior to fastening conductors.
5. Connectors on backbone and rack/cabinet bonding conductors which attach to TGB shall be of two-hole, long-barrel compression lugs as specified in the "Materials" section of this document.
6. Building steel within six feet of the communications grounding system should be bonded into the system with beam clamps and other hardware

appropriate to that purpose listed in "Materials" section of this document.

7. Racks and cabinets shall have individual Rack Bonding Conductors (RBC) bonding to the Telecommunications Equipment Bonding Conductor (TEBC). DAISY CHAINING OR SERIAL CONNECTIONS OF ONE RACK OR CABINET TO ANOTHER WILL NOT BE ACCEPTED.
8. In smaller Telecommunications Rooms (3-5 racks) it is acceptable to have telecommunications equipment bonding conductors (TEBC) that go directly from each individual rack to the TGB. DAISY CHAINING OF RACKS WILL NOT BE ACCEPTED.
9. Rack Bonding Conductors (RBC) or above rack row grounds (TEBC) shall be installed to maintain a minimum of 2" separation from all other types of cable - power or communications.
10. To maintain this segregation of cables some telecommunications rooms may lend themselves to the installation of Auxiliary Conductor Brackets for routing bonding conductors outside of, yet parallel to ladder rack or basket tray. See "Auxiliary Brackets" in "Materials" section of this document.
11. Bonding conductor support systems like auxiliary brackets shall be spaced no further apart than three-foot intervals.
12. All cables containing metallic shielding or armor shall be properly bonded into the communications grounding system using the appropriately sized Armored Cable Grounding Kit listed in the "Materials" section of this document.
13. The illustration below depicts for reference the general location and layout of a typical telecom room and associated bonding connections into the TGB.



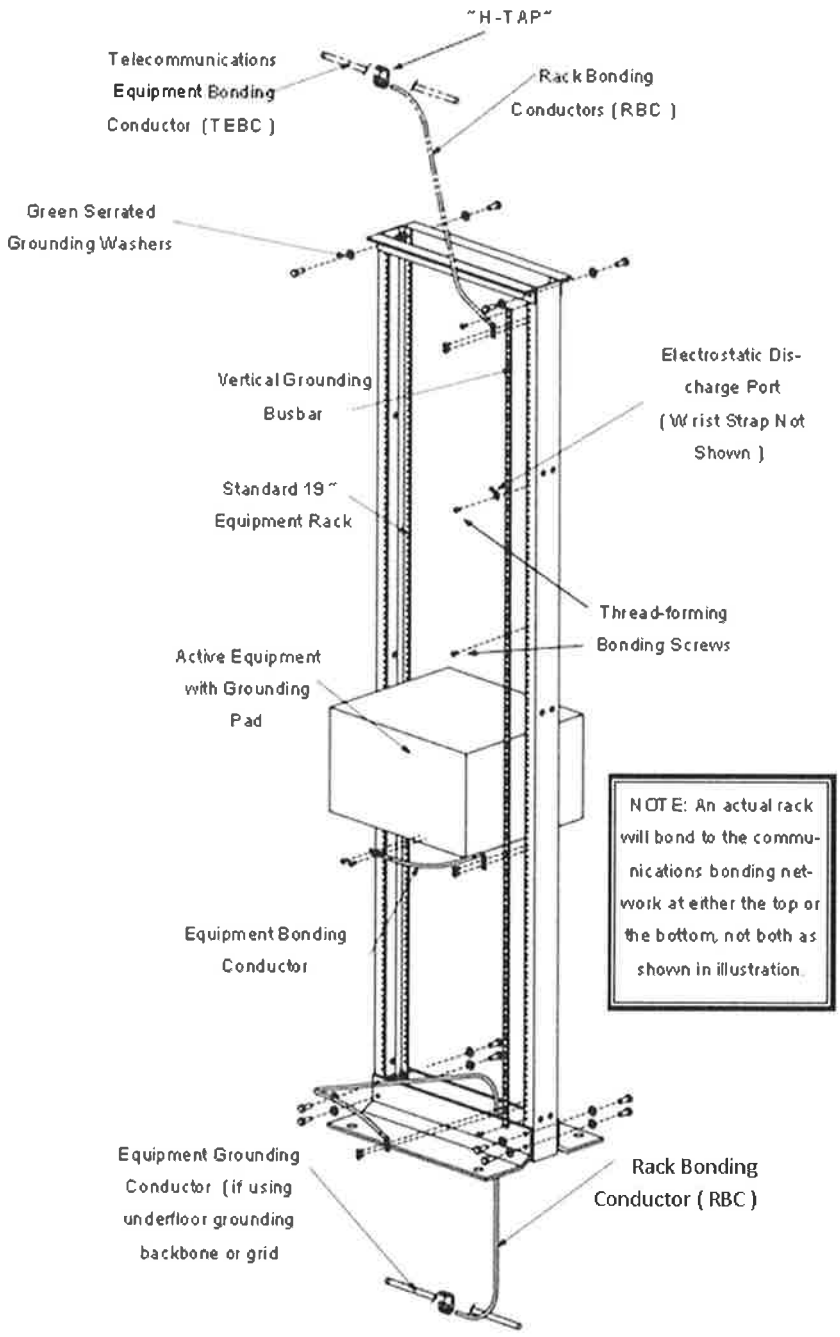
Telecommunications Grounding in Small TR—Note in this illustration individual Telecommunications Equipment Bonding Conductors (TEBC) go direct from rack to the busbar

D. Bonding within Racks and Cabinets:

1. Racks and Cabinets shall be bonded into the communications bonding network with conductors of #6 AWG or larger.
2. Depending on size of the telecommunications room, Rack Bonding Conductors (RBC) may tap into underfloor or overhead grounding conductors, or for smaller TRs (3-5 racks or cabinets), may go directly from the rack to the wall mounted busbar.
3. Racks, cabinets and similar enclosures shall not be attached serially (daisy-chained) but must have individual RBC into the grounding system.
4. Newly installed racks and cabinets shall have vertical grounding busbars installed along one rail to provide clean bonding landing point for all rack mount equipment. For part numbers vertical busbars see "Materials" section of this document. Grounding busbars shall not be isolated from the rack or cabinet.
5. All painted components of racks/cabinets shall be assembled using serrated grounding washers and thread-forming screws to ensure

electrical continuity between the different structural components of the rack/cabinet.

6. Larger equipment (chassis switches) with integral grounding terminals or pads shall be bonded to the vertical busbar with equipment grounding kits attached to those terminals and bonding them to the rack-mounted busbars. For kit part numbers see the "Materials" section of this document.
7. Anywhere two metallic surfaces are to be bonded, contractor shall clean the contact areas of paint or oxidation using abrasive pads and apply film of anti-oxidation compound between surfaces prior to bonding.
8. All cable fittings shall be of two-hole (LCC series) compression-type. Mechanical screw-lugs on racking systems will not be accepted and must be removed and replaced at contractor's expense.
9. All screws used to affix compression lugs to rack-mounted vertical busbars shall be of the thread forming type made specifically for electrical bonding.
10. Smaller equipment (servers, TOR switches) not having integral grounding pads must be bonded to the rack through the equipment mounting flanges using green thread-forming grounding screws with serrations under the head to cut through paint, coatings and oxidation that may be present on the equipment flange. Such equipment shall have minimally one grounding screw per piece of equipment.
11. Existing (installed) racking systems containing live active equipment may be retrofitted for Standards-compliant bonding using rack retrofitting kits listed in the "Materials" section of this document.
12. The following illustration demonstrates how the racks shall be bonded:



3.3. FIELD QUALITY CONTROL

A. On installations confined to a single telecommunications room, the installing contractor shall visually verify continuity of communications bonding system from equipment, through racking systems, to overhead or underfloor backbone to the wall mounted busbar in that telecommunications room.

B. Contractor shall further verify the use of all appropriate bonding accessories in the racking systems such as grounding washers, thread-forming grounding screws and the presence of electro-static discharge ports and wrist straps within reach of all equipment to be maintained.

C. On greenfield (new) projects involving installation of a building-wide telecommunications backbone, installing contractor is further responsible for visually verifying sizing and sound installation of the telecommunications bonding backbone including presence of properly sized and installed grounding equalizer conductors between backbones contained in separate risers.

D. Inspecting Contractor shall verify that any conduit longer than three feet through which a grounding conductor passes is properly bonded to the grounding conductor as described in this document.

E. During inspections contractor shall verify compliance with all stipulations specified in this document and compliance with all regulatory references (Standards and Codes) cited.

F. All opens or gaps in the bonding system during final inspections will be recorded in the inspection report and remedied.

G. During inspections, contractor shall check all grounding and bonding system conductors and connections for tightness and proper installation, including checking proper dies were used on compression taps and fittings by checking embossed die numbers on those connections.

H. the Owner may request a test of 10% of bonded connections within the grounding system with a volt-ohm meter. Resistance tests taken on either side of a compression or exothermic bond shall be less than .2 (2/10) of one ohm in resistance.

   1. Bonded joints to be tested may be random or individually tagged by a representative of the Owner.

I. Contractor shall Test system at bonded points indicated and provide results in report form.

   1. Based upon test results, the Owner reserves the right to request testing on 100% of exothermic and compression bonds within the installed grounding system.

   2. All bonded connections failing the test described above shall be remedied and retested by the installation contractor at contractor's expense.

END OF SECTION

FIRE STOPPING, SMOKE, AND ACOUSTICAL SEALING

REFERENCE

PART 1 - GENERAL

1.1. RELATED DOCUMENTS

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

1.2. SUMMARY

A. This section includes labor, materials and equipment necessary to complete the installation required for the items specified under this Section, including but not limited to:

1. Firestopping of Through Penetrations in Fire Rated Assemblies.

2. Smoke and Acoustical Sealing in Non-Rated Assemblies.

1.3. SUBMITTALS

A. Product Data: Provide manufacturer's standard catalog data for specified products demonstrating compliance with referenced standards and listing numbers of systems in which each product is to be used.

B. Schedule of UL System Drawings for Fire Rated Construction: Submit schedule of all expected opening locations and sizes, penetrating items, and required listed design numbers to seal openings to maintain fire resistance ratings.

C. UL System Drawings for Fire Rated Construction: Furnish copies of all UL Systems identified in schedule above. Include any engineering recommendations.

D. Certificates: Product Certificate of Compliance from the by manufacturer certifying material compliance with applicable code and specified performance characteristics.

E. Installation Instructions: Submit manufacturer's printed installation instructions.

1.4. QUALITY ASSURANCE

A. Products/Systems: Provide firestopping systems that comply with the following requirements:

B. Firestopping tests are performed by a qualified, testing and inspection agency. A qualified testing and inspection agency is UL, or another agency performing testing and follow-up inspection services for firestop system acceptable to authorities having jurisdiction.

C. Firestopping products bear the classification marking of qualified testing and inspection agency.

D. Installer Qualifications: Experience in performing work of this section who is qualified by the firestopping manufacturer as having been provided the

necessary training to install firestop products in accordance with specified requirements.

1.5. DELIVERY, STORAGE, AND HANDLING

A. Deliver in manufacturer's original, unopened, undamaged containers, identification labels intact identifying product and manufacturer, date of manufacture; lot number; shelf life, if applicable; qualified testing and inspection agency's classification marking; and mixing instruction for multi-component products.

B. Handle and store products according to manufacturer's recommendations published in technical materials. Leave products wrapped or otherwise protected and under clean and dry storage conditions until required for installation.

C. Store materials protected from exposure to harmful weather conditions and at temperature and humidity conditions recommended by manufacturer.

1.6. PROJECT CONDITIONS

A. Do not install products when ambient or substrate temperatures are outside limitations recommended by manufacturer.

B. Do not install products when substrates are wet due to rain, frost, condensation, or other causes.

C. Do not use materials that contain flammable solvents.

D. Coordinate construction of openings and penetrating items to ensure that through-penetration firestop systems are installed according to specified requirements.

E. Coordinate sizing of sleeves, openings, core-drilled holes, or cut openings to accommodate through-penetration firestop systems.

F. Schedule installation of firestopping after completion of penetrating item installation but prior to covering or concealing of openings

1.7. PERFORMANCE REQUIREMENTS

A. References:

1. ANSI/TIA-1179-A "Healthcare Facility Telecommunications Infrastructure".
2. ANSI/TIA-EIA-569-D "Telecommunications Pathways and Spaces"
3. ASTM E90, "Standard Test Method for Laboratory Measurement of Airborne Sound Transmission Loss of Building Partitions and Elements".
4. ASTM E814, "Fire Tests of Through Penetration Firestops".
5. CAN/ULC S115, "Standard Method of Fire Tests of Firestops Systems."
6. UL 1479, "Fire Tests of Through Penetration Firestops".

7. National Fire Protection Association (NFPA) – NFPA 101: Life Safety Code.
8. National Fire Protection Association (NFPA) – NFPA 70: National Electrical Code.
9. Underwriters Laboratories Inc. (UL) – Fire Resistance Directory

B. Fire rated cable pathway devices shall be used in fire-rated construction for ALL low-voltage, video, data and voice cabling, optical fiber raceways and certain high-voltage cabling where frequent cable moves, adds and changes may occur. Pathways required for high voltage cabling will be detailed on the prints. Such devices shall:

1. Meet the hourly fire-rating of fire rated wall and or floor penetrated.
2. Be tested for the surrounding construction and cable types involved.
3. Have UL Systems permitting cable loads from; "Zero to 100% Visual Fill." This requirement eliminates need for fill-ratio calculations to be made by cable technicians to ensure cable load is within maximum allowed by UL System.
4. Be "Maintenance-Free", having a corresponding Evaluation Services Report from a Nationally Recognized Third Party Laboratory. Maintenance-Free is defined as; No action required by cabling technician to open and/or close pathway for cable moves, adds or changes, such as, but not limited to:
    a. Opening or closing of doors.
    b. Spinning rings to open or close fabric liner.
    c. Removal and or replacement of any material such as, but not limited to, firestop caulk, putty, pillows, bags, foam muffins, foam, foam plugs, foam blocks, or foam closures of any sort.
    d. Evaluation Services Report (ESR) from an accredited Nationally Recognized Third-party Laboratory certifying compliance with this definition of "Maintenance-Free" and all relevant codes and standards.
5. Pathways shall be engineered such that two or more devices may be ganged together for larger cable capacities.
6. Pathways shall be engineered to be re-enterable so they can be retrofitted and removed from around existing cables without cutting and re-splicing them.
7. Affix adhesive wall label immediately adjacent to devices to communicate to future cable technicians, authorities having jurisdiction and others the manufacturer of the device and the corresponding UL System number installed.

C. Non-rated cable pathway devices shall be used in non-fire-rated construction for all low-voltage, video, data and voice cabling, optical fiber raceways and

certain high-voltage cabling where frequent cable moves, adds and changes may occur. Pathways required for high voltage cabling will be detailed on the prints. Such devices shall:

1. Limit the movement of smoke and sound of wall and or floor penetrated.
2. Restore the STC Rating of the penetrated assembly.
3. Provide L Ratings of greater than 1 CFM when empty and greater than 2.5 CFM at all other loading up to 100 percent.
4. Accommodate cable loads from; "Zero to 100% Visual Fill."
5. Not have inner fabric liner that tightens around and compresses cables tightly together encouraging potential cable damage or interference.
6. Be "Maintenance-Free", maintenance-free is defined as; No action required by cabling technician to open and/or close pathway for cable moves, adds or changes, such as, but not limited to:
    a. Opening or closing of doors.
    b. Spinning rings to open or close fabric liner.
    c. Removal and or replacement of any material such as, but not limited to, firestop caulk, putty, pillows, bags, foam muffins, foam, foam plugs, foam blocks, or foam closures of any sort.
    d. Furnish letter from manufacturer certifying compliance with this definition of "Zero-Maintenance".
7. Pathways shall be engineered such that two or more devices may be ganged together for larger cable capacities.
8. Pathways shall be engineered to be re-enterable so they can be retrofitted and removed from around existing cables without cutting and re-splicing them.
9. Affix adhesive wall label immediately adjacent to devices to communicate to future cable technicians, authorities having jurisdiction and others the manufacturer of the device and the corresponding UL System number installed.

D. As an alternate to using a fire-rated or non-rated cable pathway device for a single or tow low voltage cables (up to an aggregate cross sectional area of 0.52 in. (14mm) O.D.) penetrating one or two-hour, gypsum board/stud wall assemblies or non-rated assemblies, either as a through-penetration or as a membrane-penetration, a fire-rated cable grommet may be substituted. The product shall consist of a molded, two-piece, plenum-rated grommet having a foam fire and smoke sealing membrane that conforms to the outside diameter of the individual cable. The grommet product shall be capable of locking into place to secure the cable penetration within the wall assembly. The grommet

shall be UL Classified and tested to the requirements of ASTM E814 (UL 1479) and CAN/ULC S115.

E. Where non-mechanical pathways must be utilized, such as sealing (caulking) around single or grouped conduits, provide products that upon curing do no re-emulsify, dissolve, leach, breakdown or otherwise deteriorate over time from exposure to atmospheric moisture, sweating pipes, ponding water or other forms of moisture characteristic during or after construction. Provide letter from manufacturer certifying compliance with this section.

F. Cable pathway shall replace conduit sleeves in walls and floors, and the following;

1. When installed individually in floors, devices shall pass through core-drilled or preformed opening utilizing tested floor plates.

2. When multiple units are ganged in floors, devices shall be anchored by means of a tested grid.

3. When installed individually in walls, devices shall pass through core drilled opening utilizing tested wall plates or integrated flanges.

4. When multiple units are ganged in walls, devices shall be anchored by means of a tested adjustable gang bracket.

G. Cable tray shall terminate at each barrier and resume on the other side such that cables pass independently through devices. Cable tray shall be properly supported on each side of the barrier.

PART 2 - PRODUCT

A. General: Use only products that have been tested for specific fire resistance rated construction conditions or acoustical and smoke related requirements conforming to construction assembly type, penetrating item type, annular space requirements, and rating involved for each separate instance.

B. Firestop Sealants: Single component latex formulations that upon cure do not re-emulsify during exposure to moisture, the following products are acceptable:

C. Firestop Putty: Intumescent, non-hardening, water resistant putties containing no solvents, inorganic fibers or silicone compounds, the following products are acceptable:

D. Firestop Pillows: Re-enterable, non-curing, mineral fiber core encapsulated on six sides with intumescent coating contained in a flame retardant poly bag, the following products are acceptable:

E. Fire-Rated Cable Grommet: Molded, two-piece grommet with an integral fire and smoke sealing foam membrane for sealing individual cable penetrations through framed wall assemblies. Grommet snaps together around cable and locks tightly into the wall.

F. Fire-Rated Cable Pathways: Device modules comprised of steel pathway with self-adjusting intumescent foam pads allowing 0 to 100 percent cable fill, the following products are acceptable:

G. Smoke and Acoustical Pathways: Device module comprised of a nonmetallic pathway with integral self-adjusting smoke and sound sealing system for cable penetrations through non-fire-resistance rated wall or floor assemblies, the following products are acceptable:

H. Circuit Integrity Wrap: Endothermic Wrap incorporating foil scrim evaluated for protection of cable pathways incorporating mission critical and/or critical life safety circuits, including but not limited to Electrical Metallic Tubing (EMT), Rigid Metallic Conduit (RMC), and/or Cable Tray with a maximum weight of no greater than 1.4 lbs/ft2. The following products are acceptable:

PART 3 - EXECUTION

3.1. EXAMINATION

A. Before beginning installation, verify that substrate conditions previously installed under other sections are acceptable for installation of firestopping in accordance with manufacturer's installation instructions and technical information.

B. Surfaces shall be free of dirt, grease, oil, scale, laitance, rust, release agents, water repellants, and any other substances that may inhibit optimum adhesion.

C. Provide masking and temporary covering to protect adjacent surfaces.

D. Do not proceed until unsatisfactory conditions have been corrected.

3.2. INSTALLATION

A. General: Install systems in accordance with Performance Criteria and in accordance with the conditions of testing and classification as specified in the published design.

B. Manufacturer's Instructions: Comply with manufacturer's instructions for installation of products.

3.3. FIELD QUALITY CONTROL

A. Keep areas of work accessible until inspection by authorities having jurisdiction.

B. Where deficiencies are found, repair firestopping products so they comply with requirements.

3.4. ADJUSTING AND CLEANING

A. Remove equipment, materials, and debris, leaving area in undamaged, clean condition.

B. Clean all surfaces adjacent to sealed openings to be free of excess firestopping materials and soiling as work progresses.

3.5. DOCUMENTATION

A. Place system stickers on each side of wall penetrations.

B. Place a reproduction (photo copy) of the UL System description in a document protector and mount to the wall next to the wall penetration

C. Highlight the section of the system description that list the allowed cable types.

END OF SECTION

TROY SCHOOL DISTRICT

PAGING SYSTEMS

PART 1 - GENERAL

1.1 GENERAL REQUIREMENTS AND SCOPE

A. The Owner is seeking proposals for a 100%, turnkey paging system upgrades for the following buildings. The successful bidder shall be required to design, furnish and install all equipment, accessories, and materials in accordance with these performance specifications and drawings to provide a complete and operating system.

B. Base bid consists of:

1. Testing existing speakers for operability, intelligibility and volume, documentation, and reuse of existing speakers and cabling
2. Replacement of the core paging system and programming (Processor, amplifiers, etc.)
3. Addition of Strobes in common areas as shown on drawings
4. Addition of speakers as shown on drawings
5. Repair/replacement of failed speakers or wiring, based on preinstallation tests, will be via unit pricing and change orders

C. Sites

1. Barnard Elementary School - 3601 Forge Troy, MI 48083
2. Bemis Elementary School - 3571 Northfield Pkwy Troy, MI 48084
3. Costello Elementary School - 1333 Hamman Troy, MI 48085
4. Hamilton Elementary School - 5625 Northfield Pkwy Troy, MI 48098
5. Hill Elementary School - 4600 Forsyth Dr Troy, MI 48085
6. Leonard Elementary School - 4401 Tallman Dr Troy, MI 48085
7. Martell Elementary School - 5666 Livernois Troy, MI 48098
8. Morse Elementary School - 475 Cherry Street Troy, MI 48083
9. Schroeder Elementary School - 3541 Jack Drive Troy, MI 48084
10. Troy Union Elementary School - 1340 East Square Lake Rd Troy, MI 48085
11. Wass Elementary School - 2340 Willard Dr Troy, MI 48085
12. Wattles Elementary School - 3555 Ellenboro Troy, MI 48083
13. Baker Middle School - 1359 Torpey Dr Troy, MI 48083
14. Boulan Park Middle School - 3570 Northfield Pkwy Troy, MI 48084
15. Larson Middle School - 2222 E. Long Lake Rd Troy, MI 48085
16. Smith Middle School - 5835 Donaldson Troy, MI 48085
17. Athens High School - 4333 John R Troy, MI 48085

18. Troy High School - 4777 Northfield Pkwy Troy, MI 48098

1.2 MANDATORY ALTERNATE

A. Former ITT Building – 1522 E. Big Beaver Rd. Troy, MI 48083

1. Core System
2. New Speakers
3. New Wiring
4. All accessories

1.3 PAGING SYSTEM

A. The paging system shall be new, of modern design, and current standard production of the manufacturer.

B. The new paging system must work with the District's Local Area Network.

C. The system must be IP based between each site (system headend equipment) for administration and analog from the site's headend equipment to broadcast devices (speakers, horns, etc.). The system shall be capable of being networked in the future between the buildings.

1. Programming, administration and maintenance of the system shall be via the District's LAN using a standard PC (Provided by the District).
2. District staff shall be able to accomplish all programming, administration and maintenance from the main site (Administration) as well as locally at the building.

D. The contractor is responsible for:

1. Pre-installation speaker tests
2. Final system design
3. Provision of all labor and hardware, equipment, servers, software, wiring and speakers (as needed) required for a complete, 100% turn-key solution.
4. User programming/zoning reviews and any additional required data gathering
5. Configuration and programming, including installation of software on user's PCs and bell schedules
6. Post installation tests
7. System recommendations to meet the Owner's requirements, as outlined in this document.

E. The Bidder's proposal must also state in detail the extent to which the quoted system meets, exceeds, or fails to meet the following requirements. Provide as part of the bid proposal, a complete bill of materials, including catalog cuts and equipment configurations.

F. The Contractor shall provide the services necessary to design, furnish, install, test, train, and to provide maintenance to support the paging system conforming to acceptable industry standards. All work shall be in accordance with the intent of the specifications, and as required herein, to leave the paging system 100% complete and in satisfactory operating condition, excluding those items listed under "Work by Others."

1. Pretest system
2. Replace system head-end in each building and demo unused equipment
3. Reuse wiring as practical
4. Reuse speakers
5. Add or replace speakers as indicated
6. Add paging interrupt ("ducking") to rooms with existing sound lift systems
7. Integrate program audio and paging interrupt in rooms without sound lift systems

1.4 RELATED DOCUMENTS

A. Drawings and general provisions of Contract apply to this Section.

1.5 APPLICABLE CODES AND STANDARDS

A. All devices of the system shall be listed by UL (Underwriters Laboratory). All components of the system shall bear the UL label.

B. The system shall be installed in strict accordance with all the requirements of the NEC.

C. The system shall be installed in strict accordance with the requirements of the Americans with Disabilities Act (ADA).

D. The system shall be installed in strict accordance with the requirements of all other applicable codes as well as all Federal, State and local codes.

1.6 SUMMARY

A. Troy School District is installing a new, "state of the art" centralized paging system. The building shall have a stand-alone system that is capable of being networked via the District WAN to the system headend at the administration building. Each building system shall be able to be remotely accessed via the District WAN for administration. The new solution must allow building systems to communicate with a main system via SM optical fiber using IP protocol. Operation within each building will be analog to end points (speakers, etc.) and IP to strobes.

B. All instructional areas or areas with program audio that will be broadcast over paging speakers shall be provided with a means to input program audio with a paging interrupt to override program audio during pages.

1. Re-use existing sound lift systems, provide paging interrupts as necessary
2. For spaces using the Dukane CCP inputs for program audio, add amplifiers with paging interrupts for program audio to bypass the CCP

1.7 EXISTING SITE CONDITIONS

A. Troy High School has an existing Bogen paging system. The contractor shall remove all head end equipment and unused wiring in the building's IT room.

B. All other buildings have an existing Dukane MCS – 350 Modular Communication System. The contractor shall remove all head end equipment and unused wiring in each building's IT room.

1. All paging wiring shall be removed from and bypass the Dukane CCPs in the classroom.

C. Sound lift or other in room audio integration

1. See Attachment 1 for information per building

D. Speakers

1. Flush mounted in ceiling tiles, surface or flush mounted wall speakers where indicated, horns and other flush mounted outdoor speakers

a. Replace like-with-like speaker types except as indicated – I.e. in-tile speakers replace with in-tile speakers

b. In buildings with without systems existing use 2'x2' lay-in speaker assemblies (I.e. – Former ITT building alternate)

1.8 ADMINISTRATIVE REQUIREMENTS

A. Co-ordination: Co-ordinate work of this Section with communications and electronics work and with work of other trades for proper time and sequence to avoid construction delays.

B. Pre-installation (Kick-off) Meeting: Convene pre-installation meeting after Award of Contract and before starting work of this Section to verify project requirements, final system design, schedule, coordination with other construction trades and to review manufacturer's written installation instructions.

C. Notify attendees two weeks prior to meeting and ensure meeting attendees include as minimum:

1. Owner

2. Consultant

3. Subcontractor

D. Ensure meeting agenda includes review of methods and procedures related to insulation installation including co-ordination with related work.

E. Record meeting proceedings including corrective measures and other actions required to ensure successful completion of work and distribute to each attendee within 1 week of meeting.

1.9 SUBMITTALS

A. Pre-installation

1. System-wide design schematics

2. Shop drawings: These drawings shall include the manufacturers' specification sheets, including all component parts
3. Wiring diagrams, detailing wiring for power, signal, and control
4. Data sheets of proposed equipment
    a. All material and/or equipment necessary for the proper operation of the system, even if not specifically identified in the contract documents, shall be deemed part of this contract

B. Post installation

1. Post installation test results and reports as indicated herein
2. As-built drawings: They should include up-to-date drawings including any changes made to the system during installation. Circuit diagrams and other information necessary for the proper operation and maintenance of the system shall be included
3. Submit a certificate of completion of installation and service training
4. Manuals, Maintenance and Operations information
5. Warranty information

1.10 QUALITY ASSURANCE

1. All items of equipment shall be designed by the manufacturer to function as a complete system and shall be accompanied by the manufacturer's complete service notes and drawings detailing all interconnections.
2. The Vendor shall be an established communications and electronics Vendor that has had and currently maintains a locally run and operated business for at least three (3) years. The Vendor shall utilize a duly authorized distributor of the equipment supplied for this project location with full manufacturer's warranty privileges.
3. The Vendor shall show satisfactory evidence, upon request, that the Vendor maintains a fully equipped service organization capable of furnishing adequate inspection and service to the system. The Vendor shall maintain at his facility the necessary spare parts in the proper proportion as recommended by the manufacturer to maintain and service the equipment being supplied.
4. Electrical Component Standard: Provide work complying with applicable requirements of NFPA 70 "National Electrical Code" including, but not limited to:
    a. Article 250, Grounding.
    b. Article 300, Part A. Wiring Method.
    c. Article 310, Conductors for General Wiring.
    d. Article 725, Remote Control, Signaling Circuits.
    e. Article 800, Communication Systems.

5. Installation and startup of all systems shall be under the direct supervision of a local Vendor regularly engaged in installation, repair, and maintenance of such systems. The Vendor shall be accredited by the proposed equipment manufacturers.

6. The Vendor providing equipment shall be responsible for providing all specified equipment and mentioned services for all equipment as specified herein. The Vendor must be a local authorized distributor of all specified equipment for single source of responsibility and shall provide documents proving such. The Vendor must provide written proof that the Vendor is adequately staffed with factory-trained technicians for all of the specified equipment. The Vendor must have established business for and currently be providing all services for the equipment.

7. The Vendor shall guarantee availability of local service by factory-trained personnel of all specified equipment from an authorized distributor of all equipment specified under this section. Maintenance shall be provided at no cost to the purchaser for a period of one (1) year (parts and labor) from date of acceptance unless damage or failure is caused by misuse, abuse, neglect, or accident. Additionally, all manufacturer supplied products must be covered by five (5) year (parts only) limited warranty from the date of acceptance.

8. The Vendor shall, at the Owner's request, make available a service contract offering continuing factory authorized service of the system after the initial warranty period.

9. The Vendor is encouraged to visit the sites and familiarize themselves with the existing conditions and field requirements prior to submitting a proposal.

10. The Vendor is responsible for all cost associated with proper installation, termination, configuration, programming, impedance and load matching of all system components.

1.11 DELIVERY, STORAGE, AND HANDLING

A. Deliver products in factory boxes. Store in clean, dry space in original boxes. Protect products from fumes and construction traffic. Handle carefully to avoid damage. The District will not accept deliveries or store equipment.

B. Contractor shall provide off-site storage – the district will not accept deliveries or provide storage. The Contractor shall deliver to sites as equipment is needed for the installation.

1.12 IN-SERVICE TRAINING

A. The Vendor shall provide training with this system. These sessions shall be broken into segments that will facilitate the training of individuals in the operation of this system. Operators Manuals and Users Guides shall be provided at the time of this training.

B. The contractor shall supply up to 4 hours of onsite user training. User training shall consist of operation of all system functions and scheduling software.

C. The contractor shall supply up to 2 hours of technical training for District Technology staff for routine administration, maintenance and troubleshooting

D. The user shall have access to telephone support from the manufacturer at no additional cost for the life of the product.

PART 2 - PRODUCTS

2.1 GENERAL

A. The intent of this performance specification is to establish a standard of quality, function and features. It is the responsibility of the bidder to ensure that the proposed product meets or exceeds every standard, feature and functionality set forth in these specifications.

B. The Vendor for this work shall be held to have read all Bidding Requirements, the General Requirements, and Contract Proposal Forms; and in the execution of this work, he will be bound by all of the conditions and requirements therein.

C. The Vendor shall be responsible for providing a complete functional system including all necessary components whether indicated in this specification or not.

D. In preparing the bid, the bidder should consider the following:

1. No claim will be made against the Owner for any costs incurred by the bidder for any equipment demonstrations which the Owner requests.

2. Any prior approval of an alternate system does not automatically exempt the Vendor from the intent of these specifications. Failure to comply with the operational and functional intent of these specifications may result in the total removal of the alternate system at the expense of the Vendor.

2.2 MATERIAL

A. Paging Platform

1. Valcom Class Connection

a. No substitutions allowed

B. NETWORKED TRUNK PORT – ValCom VE8021AR

1. Gateway device between a SIP telephone system and the Valcom paging system

C. Lay in Ceiling Speakers

1. ValCom 2' x 2' Lay- in Speaker Model V-9062 Talk Back (Classrooms)

2. ValCom 2' x 2' Lay- in Speaker Model V-9021 One-way (Public Areas)

D. Surface mounted Wall Speakers - Valcom Model V-1052C

E. Replacement in-tile classroom speakers - Model V-1060A

F. Replacement in-tile public area speakers -Model V1020C

G. Paging Horns - Clarity Model SX–Series

H. Strobes –

1. IP – ValCom Model VIP-999A

I. Classroom Amplifier (for PC input) with Voice Activated Ducking Relay

1. Speco PBM 30 or approved equal

J. Classroom Amplifier (for PC input)

1. Hall Research AMP – 4840 or approved equal

K. Voice Activated Relay

1. Bogen VAR1 or approved equal

2.3 PAGING SYSTEM DESCRIPTION

A. Only systems designed primarily as a paging system shall be considered. Safety features shall include but not be limited to; priority-based access to voice functions, emergency paging, emergency call-in, PC based call-in, pre-recorded emergency announcements, external and internal telephone access, integrated video surveillance, and optional district wide communication functions. Paging systems, traditional school intercom systems, or any system that does not include the above minimum features shall not be considered.

B. The system is ultimately intended to operate as single premise district-wide solution. However, if communications with the system head-end is lost, the system shall work as a stand-alone system in each building until communication with the Owner's time server is reestablished. The current requirement for each building is to operate standalone, Bidders may provide a voluntary alternate to implement a districtwide network system.

C. It is intended to reuse the existing paging cabling and analog speakers to the extent possible in each building.

2.4 PAGING SYSTEM FUNCTIONALITY AND FEATURES

A. The system shall minimally be zoned to allow communication with:

1. Specific classrooms or spaces (i.e. - office suites, staff areas, kitchen, gymnasium etc.)

2. Groups of classrooms or spaces (i.e. - office suites, staff areas, etc.)

3. Corridors and/or exterior only

B. The system shall be able to provide different volume levels based upon the space usage using dedicated amplifiers and/or programming.

C. One-way voice paging from any telephone station to a zone, group of zones, or all zones (Determined by telephone system access) and one-way voice paging to a user defined temporary (on the fly) group zone.

D. Priority paging from selected telephone stations to a zone, group of zones, or all zones.

E. Distribution of emergency announcement(s) from any authorized telephone to all areas furnished with a loudspeaker. Emergency announcements shall have the highest system priority.

F. One-way priority override voice paging to all zones from a microphone.

G. Distribution of general announcements from any administrative telephone, staff telephone, or room/office telephone. The system shall be capable of providing all-call, group call, multiple group call, or dial-on-the-fly page groups.

1. Provide 4-digit architectural numbering for each zone.

H. Distribution of pre-recorded or pre-programmed messages, tones and alarms

1. The paging system shall provide for a minimum of four (4) Owner pre-recorded voice messages in addition to any system pre-programmed messages, accessible by pushing a preprogrammed button on the administrative telephone or a code from a standard telephone or PC command.

2. Automatic or manually activated tones and alarms (i.e.- bell schedule, emergency tones, etc.)

I. Capable of supporting speakers at the appropriate sound level up to a maximum of 2700 feet from the central cabinet.

1. Appropriate sound level shall mean 6-10 dB SPL above ambient noise levels during normal operations in each space

J. Shall be software assignable to any or all of 72 (seventy-two) paging groups.

K. Provide unlimited time tone schedules/unlimited events with the ability to automatically administer 8 (eight) or more schedules at any given time. Each scheduled event shall be capable of utilizing any one of 9 (nine) user defined internal tones/auxiliary sources. Automatically administered schedules shall be capable of simultaneous operation. Schedule administration, modification and creation functions must be available through administration PC software.

L. System functionality must include the capability to manually distribute up to 5 (five) emergency alert tones via pushbuttons, contact closure, or dial up tones from any administrative telephone. These tones shall be customizable with respect to cadence, type and duration. Dial up tones must only be accessible by authorized users.

M. Each building paging system shall allow for a numerous/time/program zones that can be assigned and configured as desired. Specify the quantity in your proposed solution.

N. Zone/area loudspeakers must have the flexibility to be programmed as an off-limit paging zone that may be programmed daily or hourly as not to receive normal pages or normal tones. These zones shall still receive emergency pages and emergency tones. System shall be able to add any zone at any time to this off-limit paging zone.

O. The system shall have the ability to control all system relays. Relays shall be DTMF controlled, automatically cycle at a programmed time of day, follow time schedule events, follow time group events, follow security calls, and follow emergency and ADA

calls. All relays must be software programmable with the flexibility to change as required.

P. Class of Service, with day and night programmable modes. Each day of the week shall have the ability to be programmed for different times to allow flexibility.

Q. The paging system shall interface with classroom teacher device (PC etc.) program audio, in that program audio will be broadcast over paging speakers and will allow paging over-ride.

1. Classroom program audio is currently being inputted into the Dukane MCS 350 CCP. These panels are aging with some inoperable. The intent is to remove all paging cabling and components from these panels.
2. Some Elementary School classroom's program audio use existing sound lifts within the room – these will be reused. Those units without a Voice Activated Relay Ducking component will have this component or features added.
3. The contractor is required to provide a program audio amplification (30W min) and paging override (ducking) solution for a standard 3.5 mm unbalanced audio jack carrying program audio. Provide all components, mounting brackets, cabling, plastic raceway and all other accessories required. The solution shall not incorporate any portion of the CCP panel.

2.5 PAGING SYSTEM HEADEND

A. Microprocessor based system capable of handling up to 360 zones. A zone is defined as a speaker output/contact closure combination. A zone output shall support one-way speakers and a closure output to activate strobes, and other ancillary devices.

B. System shall provide a contact closure associated with each one-way page zone for activation of strobes and other ancillary devices.

C. System shall be modular in design and capable of expanding in increments of 24 one-way page zones at a time allowing for budget flexibility and expandability.

D. The system shall provide a built in Ethernet port on the CPU for network connectivity over the LAN/WAN for system setup, programming, and system changes. This port shall also be utilized for the administration software for easy and simple access to the system for daily, weekly, monthly, and yearly changes.

1. The system shall have a Windows® based PC administration programming tool which allows the administrative personnel to easily manage audio sources, schedules, paging groups, zone changes, time updates, holiday schedules and day/night mode operation from their desktop PC.
2. Provide off-site programming of the system via standard web browser.

E. The Paging system shall operate via a GUI based PC based application. The PC application shall allow for emergency paging, normal paging, intercom, activation of any system/user tone, schedule changes, program distribution, call-in management, and on the fly room exclusion.

F. The paging system shall be provided with management software for programming and scheduling of bells and tones at each building, which can be accessed and modified locally over the network, from the Administration building or a standard web browser off-site

1. The Paging system shall use a PC based GUI scheduling tool for schedules and tone management. This tool shall not allow access to any system configuration controls. This tool shall not prevent the Paging system from operating when being used. This tool shall allow the user to schedule events and manage tones over the local LAN/WAN and the Internet. It shall not be required to be directly connected to the central system to use this tool.

G. The Paging system shall have a built in 30-day log of every system function and access.

H. Diagnostics

1. The Paging system shall have a built-in real-time system diagnostics application, which shall allow for system diagnostics, system log access firmware updates, and programming over the local LAN/WAN or over the Internet.

2. The system shall also be capable of determining basic circuit faults.

I. Programmable features shall be stored in non-volatile memory and shall not be lost due to power failures.

J. The system shall provide an RS-232 port, which will give ability to monitor operations and functions of the systems, additionally the system shall contain natively RS232, RS485, USB, and Ethernet ports for communication to any third-party system.

K. System shall also be connected to existing and new one-way speakers and horns. An unlimited quantity of one-way speakers and horns may be connected to each zone.

L. Provide a minimum of 8 (eight) unrestricted audio paths for administrative phones, program material, time tone distribution, and paging.

M. Provide a minimum of 6 (six) software programmable pushbutton inputs that can be used to activate tones, emergency tones, time tones, schedules, set system time, force a holiday schedule, door entry, etc.

N. Provide a minimum of 8 (eight) software programmable output contact closures which can be activated manually to turn on cameras, unlock doors, emergency lockdown, etc., or automatically via Master Time Control Center.

O. The Paging system shall contain a minimum of three (3) dry contacts and three (3) general purpose inputs for third party system integration. It shall be possible to expand inputs or outputs to any number needed.

2.6 PAGING SYSTEM MASTER CLOCK

A. The Paging system's integral master clock shall be synchronized with the District's Network Time Sever (NTP).

B. The Paging system master clock shall provide for automatic daylight-saving time adjustment with leap year programming.

C. The Paging system master clock shall support unlimited schedules with unlimited events on said schedules.

D. The Paging system master clock shall be calendar based capable of future event programming at least 10 years in the future.

E. The Paging system master clock shall allow for scheduling tone events, output events, program source events, and video camera events.

2.7 TELEPHONE SYSTEM INTEGRATION

A. The Paging system shall integrate with the existing Mitel Connect VoIP system via SIP for paging through the telephone handset.

B. Each building shall have the ability for "night ringing"; a broadcast notification to all zones for after-hours telephone calls into the building.

2.8 TONES AND SOURCES

A. The Paging system shall have tones available for bells, reminders, and other events. Specify in your narrative quantity available.

B. The Paging system shall support WAV type audio files. The user shall be able to add 25+ custom WAV files for use as pre-recorded announcements, bells, reminders, pre-announce tones, or any other system tone.

C. Ability to provide pre-alert tone to zones for general announcements.

D. Ability to produce user defined tone signals for time tones or emergency tones.

E. Ability to select the tone on an all-call basis from any, or selected, administrative telephones.

F. Ability to program and control the built-in master clock with 1024 events and unlimited time schedules with multiple time groups.

G. Shall provide preannounce and privacy tones that are software programmable.

H. Distribution of discreet signal tones to a zone, group of zones, or all zones.

I. Program sources shall include music, recorded speech or signals or digital audio messaging units (programmable)

2.9 WIRES AND CABLING

A. System speakers shall be capable of utilizing UTP 3/5/5e/6-telecom/data as well as standard paging wiring for installation, thus allowing for only one type of wiring infrastructure within the facility.

B. Emergency / Priority Announcements

1. System shall provide Emergency Synthesized Voice Announce.

2. Provide facilities for up to 7 (seven) call-in priority levels. Each zone call in switch shall be assignable to any one or two of these priority levels. The call button priority levels shall have the capacity to change state on a time of day basis. The priority levels shall be as follows:

a. Normal
b. Security
c. Normal/Emergency
d. Urgent/Emergency
e. Overhead Ring
f. Emergency Only
g. Ignore

3. Call in switch priority levels shall determine call queue placement. Emergency calls will be answered first; urgent calls second and normal calls last.

4. The Paging system shall operate under the following audio priority scheme.

   a. An emergency page suspends all other audio

   b. An emergency tone suspends all other audio except the above

   c. A normal page suspends all other audio except the above

   d. A tone suspends all other audio except the above

   e. A program source audio event suspends nothing

   f. Interrupted lower priority functions shall be restored after conclusion of the higher priority function.

5. The Paging system shall allow for any connected and programmed telephone to place an emergency voice paging announcement.

2.10 CLASSROOM PROGRAM AUDIO INTEGRATION

A. An in-room amplifier shall be used to power classroom program audio to the paging speaker(s) within the classroom. Audio will be provided via a 3.5mm unbalanced audio connection. The amplifier shall have volume control and a power Indicator showing when the amplifier is powered on.

B. The amplifier shall have the ability to accept an input from a 25/70 volt paging system, and cause the program audio from the amplifier to mute when paging audio is sensed on that line. The amplifier shall be of an energy savings design, and automatically go into a lower power state when there is no audio present. The amplifier shall be of a low-profile design, mounted horizontally on a contractor provided shelf or mount.

   1. Alternately a separate paging Voice Activated Relay (override/ducking) device may be used in conjunction with the amplifier.

      a. Voice Activated Relay shall include all power supplies, connectivity, etc.

C. The amplifier shall meet the following specification:

   a. Audio Power: 30 Watts RMS minimum

   b. THD < 1% 50 Hz to 15 kHz

   c. Frequency Response: 50 Hz to 15 kHz.

   d. Power Requirements: 110VDC, Power Supply shall be included

e. Includes power supply, cables, adapters to 3.5mm female input if required, etc.

2.11 Contractor to provide Panduit LD series surface mount raceway to conceal wires from ceiling to amplifier location at teacher's PC.

2.12 WARRANTY

A. The manufacturer shall provide a five-year warranty against defects in material and workmanship. All materials shall be provided at no expense to the owner during the warranty period. The warranty period shall begin on the date of acceptance by the owner/engineer. Any warranty less than five years shall not be considered.

B. Provide Software Assurance (Software service packs) during the warranty period at no additional cost. This shall include software updates and the labor to install them.

C. The Communication Contractor supplying the equipment shall show satisfactory evidence, upon request, that they maintain a fully equipped service organization capable of furnishing adequate inspection and service to the system, including replacement parts. The vendor shall be prepared to offer a service contract for the maintenance of the system after the guarantee period. The bidder shall produce evidence that they have a fully experienced and established service organization for at least five years and proven satisfactory installations during that time.

PART 3 - EXECUTION

3.1 EXAMINATION AND PREINSTALLATION TESTS

A. Pretest all classrooms, corridors, non-classroom spaces, miscellaneous locations and outdoor locations for volume, operability and intelligibility of each speaker.

B. Provide recommendations to the Owner/Consultant for replacement or correction of unsatisfactory speakers and revision of specific area coverage (increase or decrease) based on this review and best practices.

3.2 INSTALLATION

A. Contractor will coordinate work hours with the Construction Manager

B. New cabling shall follow requirements of cabling section.

C. Surface mounted raceway to be installed with both double-back tape and screw anchors (2"-4" from ends of each section, for longer sections additional anchors minimally 24" apart)

1. Provide all end caps, corners pieces, etc. for a clean and aesthetically pleasing appearance.

3.3 PROGRAMMING

A. Upon completion of the installation the contractor shall meet with owner to go over all aspects of programming. Programming shall be performed as follows

1. Tone distribution

2. Audio WAV file distribution

3. Room dialing configuration
4. Page zone assignment
5. Emergency page assignment/Tone
6. Telephone system integration, including any reprogramming required during telephone system placement.

B. Once all programming has been completed the contractor shall have as part of their bid to perform one additional trip to make any changes the owner may have. This shall be part of the bid documents.

3.4 FIELD QUALITY ASSURANCE

A. Vendor Field Service:

1. Provide services of a service representative for this project location to supervise the field assembly and connection of components and the pre-testing, testing, and adjustment of the system.

B. Inspection

1. Make observations to verify that units and controls are properly labeled, mounted properly, all equipment is plumb and level.

C. Testing:

1. Rectify deficiencies indicated by tests and completely re-test work affected by such deficiencies at the Vendor's expense. Verify by the system test that the total system meets the specifications and complies with applicable standards.

3.5 CLEANING AND PROTECTION

A. Prior to final acceptance, clean system components

B. Provide adequate protection to Owner facilities to protect from damage.

C. All spaces associated with this work shall be left clean at the end of each day's work, and at the end of the project. Trash, boxes, packing material, debris and litter shall be removed daily and disposed of

1. Large quantities (I.e.- equipment boxes and packing material) shall be disposed of off-site

D. Restoration of, or compensation for, damage to the facility or Owner's contents by the Vendor is the Vendor's sole responsibility. Examples include paint, wall and ceiling damage.

3.6 TESTING AND COMMISSIONING

A. Upon completion of the installation, the system devices shall be fully tested for proper connectivity and operation with the Owner's time server. Demonstrate the same to the Owner or Owner's Representative (PSC) for final acceptance.

B. Train Owner's maintenance personnel in the procedures and schedules involved in operating, troubleshooting, servicing, and preventative maintenance of the system. Operators Manuals and Users Guides shall be provided at the time of this training.

C. Schedule training with Owner through the PSC, with at least seven (7) days advance notice

3.7 DOCUMENTATION

A. Provide the following minimum closeout documentation:

1. As indicated in Part "Submittals" above
2. Final "System Test Report" in excel format showing post installation test readings.
3. "As-built" system schematics for all buildings and overall system.
4. Warranty documents as required herein.

END OF SECTION

TROY SCHOOL DISTRICT

ATTACHMENT 1

EXISTING AUDIO SYSTEMS IN DISTRICT CLASSROOMS

EXHIBIT 1 SAMPLE CONTRACT

CONVERGENT
TECHNOLOGY PARTNERS

Convergent Technology Partners
6197 Miller Rd, Suite 4
Swartz Creek, MI 48473
810-720-3820
Fax 810-720-3886

E-mail: info@ctpartners.net
Website: www.ctpartners.net

ADDENDUM

Client / Address	Troy School District 4420 Livernois, Troy MI	Project / Location	District -wide Paging Systems
Date Issued	January 30, 2020	Project Number	9899

A1-1 NOTICE: The bid documents are amended herein which adds to and/or supersedes conflicting or additional information in the Request for Proposal.

1. Work covered by this Addendum shall be subject to the Introduction, Terms and Conditions and Technical Specifications.
2. Acknowledge this Addendum on the Cost Analysis Worksheet and include the cost of the work herein specified in the Bid.
3. Notice: The required electronic copies of the proposal must be in every way a duplicate of the hard copy. Provide the electronic copy in separate PDFs by tabular section as required by the hard copy. Failure to provide a duplicate of all information in both formats will be grounds for non-compliance and disqualification.

A1-2 Pre-bid Meeting and Site Survey

1. Schedule of Events reviewed
2. **BOM with installed price and all other forms (filled out completely and accurately) are required to be submitted with bid, for bid to be considered compliant**
3. Final addendum to be released on or before February 12, 2020
4. Clarification and communication: Send to – ehelsel@ctpartners.net – note RFP in subject line
5. Replace Supplemental A – Cost Analysis Worksheet with reissued Supplemental A
6. Replace Supplemental B - Unit Pricing Sheet with reissued Supplemental B
7. Replace Supplemental C - Alternates Form with reissued Supplemental C
8. Sketches with building additions and speakers issued
9. Pre-bid meeting sign in sheet attached

A1-3 Notes, Questions and Answers to date

1. Contractor to remove and dispose of Dukane MCS headend equipment offsite
2. The owner will retain the Bogen system after Contractor removes system from Troy High School
3. Speakers are 25V with talk-back capability in classrooms, 1-way 70V in common areas
4. Sketches with building additions not in original drawing set issued
5. Pre-testing:

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4. Clarification and communication: Send to – ehelsel@ctpartners.net – note RFP in subject line
5. Replace Supplemental A – Cost Analysis Worksheet with reissued Supplemental A
6. Replace Supplemental B - Unit Pricing Sheet with reissued Supplemental B
7. Replace Supplemental C - Alternates Form with reissued Supplemental C
8. Sketches with building additions and speakers issued
9. Pre-bid meeting sign in sheet attached

A1-3 Notes, Questions and Answers to date

1. Contractor to remove and dispose of Dukane MCS headend equipment offsite
2. The owner will retain the Bogen system after Contractor removes system from Troy High School
3. Speakers are 25V with talk-back capability in classrooms, 1-way 70V in common areas
4. Sketches with building additions not in original drawing set issued
5. Pre-testing:

a. Testing of all paging speakers and documentation of readings is required prior to replacement, Speakers identified as nonoperational or areas identified as needing additional beyond what was shown will use unit pricing
b. Testing procedure shall be the same for all buildings. Testing procedures shall be documented and submitted for approval by Convergent, approval is required prior to start of tests

6. Contractor is required to install ValCom system software on one owner provided PC per building
7. Bell schedules for each building are not required to be programmed as bell schedules are programmed on the Sapling synchronized clock system
    a. Contractor to reestablish dry contact closure from Sapling to Paging system
8. Each new paging system must be fully integrated with the existing district telephone system – Mitel Connect - using a SIP connection. All labor and material for this integration must be included in the bid response. Coordination of this shall be with owner.
    a. Part number for SIP adapter is indicated in specifications
9. IP Strobes will be added to the areas indicated on drawings, final placement in these areas to be determined by owner prior to installation – note the existing speaker system is analog and as the strobes are IP, they will require category 5e cabling to be installed for each – terminate on existing Cat5e or Cat6 panels
    a. Added 24-port Cat6 patch panel to unit pricing in the event of no space on existing patch panel
10. No system will be inoperable during hours of instruction – outages during the school year must be coordinated and approved by the owner and that buildings administration at least one week in advance
11. After-hour work during the school year will be allowed with owner approval, see also Troy School District calendar available online and will also be included in addendum one, for days school is not in session
12. Provide with proposal proposed schedule showing after hours and "school out of session" work, indicate type of building per work session. Note work in the High Schools likely will not be feasible when school is in session.
13. Bidder proposal response shall include all costs of man lifts or other specialized equipment required for high ceiling areas. Manlifts shall have non-marking tires. Manlift use shall be coordinated with the owner to avoid conflicts with afterschool activities.
14. Bidder proposal response shall also include the deductive cost of manlifts if manlift is provided by the owner on the reissued Alternate Form
15. For the purposes of this RFP response assume all speakers have dual 25/70 voltage input; speakers identified during the system implementation that are 70 V only will be addressed using the 70 V to 25 V line matching transformer unit price
16. **Classroom Installation Clarification:**
    a. All buildings except Troy High and Athens High: Fish low paging cable down CCP Formica chase into CCP box and out to wall mounted amplifier on side of chase. Use power outlet inside CCP panel for amplifier – fish low voltage power cable to amplifier. In-ceiling paging speakers to be used for local audio also.
    b. **NOTE: At both Athens and Troy High Schools in-room ceiling paging speakers will <u>not</u> be used for in-room local audio. However, the ducking requirement still applies.**

i. Troy High and Athens High: Provide and mount plastic surface mount raceway adjacent to V4000 raceway, mount amplifier adjacent to input plate for Smart Panels or Screens

ii. Provide a wall mounted speaker at 7' AFF adjacent to new vertical raceway for local audio.

iii. Speaker to be JBL Control 52 or equal

iv. Provide for 67 speakers at Troy High School and 77 speakers at Athens High School

Attachments:

1. Attachment 1 (not included in original RFP documents)
2. Supplemental A - Revised Cost Analysis Worksheet
3. Supplemental B – Unit Pricing
4. Supplemental C – Alternates
5. Building addition sketches
6. 2019-2020 TSD School Calendar

End of Addendum 1

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ADDENDUM 2

Client / Address	Troy School District 4420 Livernois, Troy MI	Project / Location	District -wide Paging Systems
Date Issued	February 6, 2020	Project Number	9899

A2-1 NOTICE: The bid documents are amended herein which adds to and/or supersedes conflicting or additional information in the Request for Proposal.

1. Work covered by this Addendum shall be subject to the Introduction, Terms and Conditions and Technical Specifications.
2. Acknowledge this Addendum on the Cost Analysis Worksheet and include the cost of the work herein specified in the Bid.
3. Notice: The required electronic copies of the proposal must be in every way a duplicate of the hard copy. Provide the electronic copy in separate PDFs by tabular section as required by the hard copy. Failure to provide a duplicate of all information in both formats will be grounds for non-compliance and disqualification.

A2-2 Revisions

1. Replace Schedule of Events with revised Schedule of Events (attached) for new completion date of Dec 30, 2020
2. Administrative Handset
    a. Provide, install and program one (1) Administrative Handset (ValCom Model VEADP3) in each building's main office
    b. Administrative Handset shall be wired directly to the paging system to allow system operation during a network outage
3. Replace unit ricing sheet with revised unit pricing sheet attached with updated part numbers for UP1 – UP5 and UP14 (attached)

A2-3 Questions and Answers to date

1. None

Attachments:

1. Schedule of Events
2. Supplemental B – Unit Pricing

End of Addendum 2

SCHEDULE OF EVENTS

The following is a projected schedule of events for this project. The schedule may change depending upon the results of the responses and a final schedule will be established prior to contracting with the Contractor.

EVENT	DATE
Bid Release	Jan 27, 2020
Mandatory Pre-bid meeting Date and time – 10:00 A.M. Larson Middle School, 2222 E. Long Lake Rd, Troy, MI 48085	Jan 30, 2020
Final Date and time for Questions - 12:00 P.M. EDT	Feb 6, 2020
Bid Due Date/time – 11:00 A.M.	Feb 18, 2020
Public Opening – Immediately after due date/time	
Contract Award	Mar 17, 2020
Project Kickoff – week of	Mar 23, 2020
Earliest Project Start Date	Mar 30, 2020
Project Completion and Closeout	Dec 30, 2020

TROY SCHOOL DISTRICT

UNIT PRICING

SUPPLENTAL B

All bid proposals shall include a detailed Bill of Materials that notes each item, part number, and installed unit price. Provide this Bill of Materials, attached to and submitted with the Bid Proposal. Bill of Materials pricing will be used for price revisions prior to award.

Provide installed unit pricing, which shall be considered firm pricing during the contract period and not subject to change, will be used to determine costs for additions and deletions during the contract period (after award). All unit pricing shall include all labor, materials, licenses, software, fees etc. The Owner reserves the right to adjust any or all quantities at any time.

UP #	Description	Model/ PN	Installed	Material only cost
UP1	ValCom 2' x 2' Lay- in Speaker (Classrooms)	Model VE522B-2	$	$
UP2	ValCom 2' x 2' Lay- in Speaker (Common Areas)	Model VE522B-2	$	$
UP3	Surface mounted Wall Speakers	Model S-504	$	$
UP4	Replacement in-tile classroom speakers	Model S-500VC	$	$
UP5	Replacement in-tile common area speakers	Model S-500VC	$	$
UP6	Paging Horns	Clarity Model SX–Series	$	$
UP7	Administrative Handset	ValCom Model VEADP3	$	$
UP8	External Microphone and associated equipment	ValCom model V – 400	$	$
UP9	Classroom Audio integration: amplifier, PA override, associated cable, mounts and raceway (per classroom)		$	$
UP10	70V to 25V Line Matching Transformer		$	$
UP11	Hourly rate to troubleshoot existing malfunctioning speakers		$	
UP12	Paging interrupt unit		$	$
UP13	Classroom amplifier			$

UP13	Amplifier and paging interrupt for classroom program audio		$	
UP14	Analog Strobe	ValCom VIP-998-AM	$	