



**COMMONWEALTH OF VIRGINIA  
STANDARD CONTRACT**

Contract No. UCPJMU5960

This contract entered into this 27<sup>th</sup> day of April 2021, by Corsico RF Communications Inc. hereinafter called the "Contractor" and Commonwealth of Virginia, James Madison University called the "Purchasing Agency".

WITNESSETH that the Contractor and the Purchasing Agency, in consideration of the mutual covenants, promises and agreements herein contained, agree as follows:

SCOPE OF CONTRACT: The Contractor shall provide the services to the Purchasing Agency as set forth in the Contract Documents.

PERIOD OF PERFORMANCE: From April 27, 2021 through April 26, 2022 with five one-year renewal options.

The contract documents shall consist of:

- (1) This signed form;
- (2) The following portions of the Request for Proposal FDC-1078 dated June 29, 2020:
  - (a) The Statement of Needs,
  - (b) The General Terms and Conditions,
  - (c) The Special Terms and Conditions together with any negotiated modifications of those Special Conditions;
  - (d) Addendum One, dated July 14, 2020;
  - (e) Addendum Two, dated July 21, 2020;
  - (f) Addendum Three, dated July 24, 2020;
- (3) The Contractor's Proposal dated August 5, 2020 and the following negotiated modification to the Proposal, all of which documents are incorporated herein.
  - (a) Negotiations Summary, dated April 27, 2021.

IN WITNESS WHEREOF, the parties have caused this Contract to be duly executed intending to be bound thereby.

CONTRACTOR:

By: Mark Bowers  
(Signature)

MARK BOWERS  
(Printed Name)

Title: PRESIDENT

PURCHASING AGENCY:

By: [Signature]  
(Signature)

Doug Chester  
(Printed Name)

Title: Buyer Senior

**RFP # FDC-1078, Public Safety Distributed Antenna System  
Negotiation Summary for Corsico RF Communications Inc.**

**April 27, 2021**

1. Parties agree that items within this Negotiation Summary modify RFP# FDC-1078 and the Contractor's response to RFP# FDC-1078 and that this Negotiation Summary takes precedence in conflict.
2. Pricing is as follows:

**Will-call rates:** For unscheduled repairs, maintenance and other unscheduled tasks:

Time & Materials rates apply.

An added 10% will be invoiced for time (labor) for after-hours work. The need for using after-hours labor will be dictated by the urgency of the work.

**Maintenance:** For new systems added to the contract (new = existing systems added to Corsico's maintenance responsibility)

The charges will vary with the state of the system documentation:

For a single DAS with documentation that is the same as, or close to, that which is to be done for new systems per the RFP, there will be a one-time charge at a flat rate of \$900 for the labor to initially verify one system and its documentation. (As best as can be determined, there are 4 current systems that meet this level of adequate documentation.)

For a single system with no or inadequate documentation to the RFP standards, there will be a one-time charge at a flat rate of \$2,100 for the labor to examine, test, and document for one added system. This would include re-engineering the system on paper to ensure we had the proper signal data with which to test the system. (As best as can be determined, there are 7 systems that are at this level of inadequate documentation.)

If assigned all of the existing systems in Appendix F at once, a batch discount from the prices above would be 35% per system. This is due to the higher efficiency of doing batch work.

If any problems for DAS's being added to the maintenance program are found that need correcting or repairing, or if there are significant errors or other problems found in the documentation, then an estimate of the recommended corrections or necessary repairs would be provided for approval. This will follow the Time & Materials Rates.

**Routine yearly maintenance:** Per system after the above charges for getting a DAS into the maintenance program.

The flat rate for this is \$900 per system.

**Additional yearly maintenance per system:**

These are for changes to the system and discrepancies found in system operation during the routine maintenance above.

This time cannot be predicted and so will be performed at the standard Time and Materials Rates.

*MB / FDC*



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**April 27, 2021**

**New DAS added mid-year:**

The maintenance for any new system will be paid for upon installation. After the first year, the second year of maintenance will be pro-rated so as to co-terminate with the maintenance of the other systems on contract.

**Training:**

**For new DAS:**

No charge for an introductory training session on the DAS; this is a courtesy we offer with all new DAS's

This is for up to 2 hours of an on-site 'guided tour' of the actual system with info presented on:

- Log-ins and basic software use
- Placement of equipment
- General cabling and wiring
- Any special conditions

This will follow system acceptance and will be on a mutually agreeable schedule.

**Informal system training on other existing DAS's when adding them to the maintenance program:**

As part of the process of familiarizing and documenting a system being added to the maintenance program, a 2 hour 'guided tour' to JMU personnel will be offered, if requested. This would be at no charge, and would be just like the 'guided tour' of a new DAS as described above.

This would take place after completed the documentation of the DAS, and any corrections needed are addressed.

**Formal training of other types:**

This for training such as RF theory and communications theory of these RF systems, and specific in-depth training on specific equipment, to our own course work.

Quotes will be generated for formal training per requested session at the Time & Materials Labor rates for reasonable preparation time of new material, plus time on-site. This needs to be quoted to a specific need and would be for up to 10 trainees in a classroom setting at JMU.

**Labor rates:**

For new DAS:

Quoted on a per-project basis. The engineering rate will be \$75.00/hour.

1113/FD

**RFP # FDC-1078, Public Safety Distributed Antenna System  
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**April 27, 2021**

**Time and Materials rates:**

Time: \$75.00/hour

Materials: Per the table below

Category of Product	Minimum % Discount from MSRP
<b>Passive components</b>	
Low power splitters, couplers and tappers for passive signal distribution	15%
Coax 1/2" plenum and 7/8" non-plenum	20%
Coax 7/8" plenum	15%
Connectors 1/2" and 7/8"	7%
RG142 3' N jumpers, non low-PIM	20%
OCC Riser-rated armored fiber cables	30%
Wideband Indoor Omni Antenna	10%
Wideband Indoor Directional Antenna	20%
Yagi Antennas	10%
RF combining/filtering equipment	5%
<b>Active Equipment</b>	
Commscope Node A BDA Components	23%
Commscope ERA Fiber Equipment	15%
Solarcraft cabinet (in RFP response)	10%
FXM650-24 UPS module and	10%
100AH AGM UPS battery	20%

3. Contractor will include any shipping charges in unit pricing and not show shipping charges on invoices.
4. Support - Proposed solution(s) must be in new condition for hardware and software. They must be sufficient to meet the needs of the university and be serviceable and supported in the condition sold by the manufacturer for five years from the date of sale or until manufacture suspends a product line, whichever comes first.
5. The requirement for certifications on old equipment is hereby removed.
6. The service plan is as follows:

Initial trouble calls: These calls will be answer as "best effort" with the goal of responding within 24-hours. Phone support time will be allocated as needed to make an initial determination of the problem and the next steps necessary.

Initial site visit: If this is requested or determined to be necessary, this will be 'best effort'. This will be made a priority for the first available person and time.

*14B / FDC*

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**April 27, 2021**

Maximum time to repair: Repair times will be 'best effort', and will be done on a priority basis. Corsico RF will maintain spares stock of passive parts to include coax, connectors and splitters and couplers. Active components replacement will be determined by availability from distributors or manufacturers. If new components are needed, then installation of such parts will be carried out in 5 business days or less from the date of receipt of the part(s) at JMU or Corsico RF.

All support and repairs are at the Time & Materials rates.

7. Special Terms and Conditions KK. and LL. are hereby deleted and replaced with the support plan outlined in Item 4 and Item 6 of this negotiation summary.
8. Special Terms and Conditions W. and UU. are hereby deleted. "Best efforts" will be made to address warranty issues while working with manufactures and their timelines
9. Contractor will send deliveries as FOB destination.
10. In cases of emergency, where non-warranty replacement BDAs or BDA replacement parts are required and not readily available from Corsico's normal supply source, JMU will work with Corsico to find a mutually agreeable solution. This could mean delaying the replacement of defective units until parts are available through Corsico's normal supply chain, Corsico sourcing parts from another source and passing on the additional costs or savings to JMU, JMU sourcing the parts directly through our supply chain, or another agreed to solution, whichever is more economically beneficial to JMU.
11. Should travel be required during the term of this contract (other than initial onsite training), all travel expenses shall be by prior written mutual agreement with Procurement review as a flat fee per scope of work/project/event
12. Contractor agrees that all exceptions taken within their initial response to RFP# FDC-1078 that are not specifically addressed within this negotiation summary are null and void.
13. Contractor has disclosed all potential fees. Additional charges for these items will not be accepted.

*m3 / FDC*

**REQUEST FOR PROPOSAL**  
**RFP# FDC-1078**

**Issue Date:** June 29, 2020  
**Title:** Public Safety Distributed Antenna System (DAS)  
**Issuing Agency:** Commonwealth of Virginia  
James Madison University  
Procurement Services MSC 5720  
752 Ott Street, Wine Price Building  
First Floor, Suite 1023  
Harrisonburg, VA 22807

**Period of Contract:** From Date of Award Through One Year (Renewable)

**Sealed Proposals Will Be Received Until 2:00 PM on July 29, 2020 for Furnishing The Services Described Herein.**

**OPTIONAL PRE-PROPOSAL CONFERENCE CALL on July 14, 2020.** Participation in this pre-proposal conference call is optional; however, pre-registration is required. Pre-register by completing and submitting the **REGISTRATION FORM ON PAGE 1** of this RFP **NO LATER THAN MONDAY, JULY 10, 2020**. See **Special Terms and Conditions, Item II**.

*SEALED PROPOSALS MAY BE MAILED, EXPRESS MAILED, OR HAND DELIVERED DIRECTLY TO THE ISSUING AGENCY SHOWN ABOVE.*

All Inquiries For Information And Clarification Should Be Directed To: Doug Chester, Buyer Senior, Procurement Services, [chestefdr@jmu.edu](mailto:chestefdr@jmu.edu); 540-568-4272; (Fax) 540-568-7935 not later than five business days before the proposal closing date.

**NOTE: THE SIGNED PROPOSAL AND ALL ATTACHMENTS SHALL BE RETURNED.**

In compliance with this Request for Proposal and to all the conditions imposed herein, the undersigned offers and agrees to furnish the goods/services in accordance with the attached signed proposal or as mutually agreed upon by subsequent negotiation.

Name and Address of Firm:

CORSICORF COMMUNICATIONS INC

137 MOUNT VIEW DR

AFTON, VA 22920

Date: AUG 5, 2020

Web Address: www.corsicorf.com

Email: Mark.bowers@corsicorf.com

By: Mark Bowers  
(Signature in Ink)

Name: MARK BOWERS  
(Please Print)

Title: PRESIDENT

Phone: 540-944-7989

Fax #: \_\_\_\_\_

ACKNOWLEDGE RECEIPT OF ADDENDUM: #1 MB #2 MB #3 MB #4 \_\_\_\_\_ #5 \_\_\_\_\_ (please initial)

**CONTRACTOR/SUBCONTRACTOR LICENSE REQUIREMENT:** By my signature on this solicitation, I certify that this firm/individual and subcontractor is properly licensed for providing the goods/services specified. License # 2705100896 Type ESC

**SMALL, WOMAN OR MINORITY OWNED BUSINESS:**

☒ YES; ☐ NO; *IF YES* ⇒ ☒ SMALL; ☐ WOMAN; ☐ MINORITY *IF MINORITY:* ☐ AA; ☐ HA; ☐ ASA; ☐ NW; ☐ Micro

Note: This public body does not discriminate against faith-based organizations in accordance with the *Code of Virginia*, § 2.2-4343.1 or against an offeror because of race, religion, color, sex, national origin, age, disability, or any other basis prohibited by state law relating to discrimination in employment.



**Corsico RF Communications Inc**  
**Response to RFP #FDC-1078**  
**James Madison University**

**Public Safety Distributed Antenna System  
(DAS)**

**Table of Contents**

- Completed RFP Cover Sheet with acknowledgement of Addenda
- This table of contents (unnumbered)
- Proposal Response, including Pricing (Section X), pages 1-50
- RFP Attachment A
- RFP Attachment B

# **Corsico RF Communications Inc – RFP Response**

## **JMU DAS RFP #FDC-1078**

### **Section III Response to: SWAM Qualification**

Certification number 708147. We have been small business qualified in the state of Virginia and have completed our submittals for re-certification on July 22, 2020. However, we have been informed that this process is presently taking an average of 60 days. So we will not likely be re-certified at the time of this proposal submission, but expect that to be completed in late September.

**Section V.B.6 Sales to VASCUPP Member Institutions** in last 12 months: **\$0**

## **Section IV Statement of Needs: Response**

This section of the response is extensive and will follow the RFP outline.

### **4. A. General**

Please note that there is a discussion added at the end of the section 4.B.8 response (Maintenance) for the requested alarm monitoring.

#### **4.A.1 CORSICO RF: COMPANY PROFILE**

Corsico RF Communications Inc is a VA corporation, a VA Class A Contractor, SWaM (Re-Certification in process) and is a family owned and operated small business in Augusta County, VA. We ONLY do DAS work, and 95+% of our work is designing and installing full turnkey DAS systems; the remaining 5% work is engineering design projects for DAS's. Most of our DAS designs are indoor system but we have a long track record with outdoor repeaters, both fiber and over-the air repeaters. As Corsico RF, we have executed about 300 turnkey DAS projects in our 17 years in business. Prior to that, we were directing and designing numerous projects for AT&T and Verizon Wireless in the southeast USA, as employees of a major DAS company. (Allen Telecom, which became the Andrew and then Commscope DAS groups). We have wide experience and contacts in the industry. Our main customers are the 2<sup>nd</sup> tier and rural wireless operators as well as Public Safety work. We interface with the major wireless operators on occasion; we were doing much of the DAS work for AT&T in VA and WV up to about 4-5 years back,

As for industry experience, the principal in our business, Mark Bowers, has been in the DAS business since 1994, starting as a product design engineer on fiber DAS products, then moving on to be a sales engineer and sales manager for one of the largest such companies worldwide. That company was Allen Telecom, which, through 2 acquisitions, is the core of what has become the DAS side of the Commscope DCCS business. We have maintained a good relationship with

#### **(4.A.1 Continued)**

that group, and are Commscope Business Partners. In 2003, Mark formed Corsico RF and has focused on turnkey DAS/repeaters design. We average around \$0.7 Million in revenues annually.

James started his career with Allen Telecom in 2003 as an engineering intern at the repeater/BDA division (Mikom) at the US offices in Garner NC. There he

learned the products and configured them for shipping and assisted in technical support of the products. He joined Corsico RF after university graduation in 2005 and has been with the company ever since as a project manager and design engineer. James now performs most of the design work at Corsico RF.

We have designed and installed active fiber DAS's with Commscope/Andrew, MobileAccess, and JMA-Teko equipment, and passive DAS's with Commscope/Andrew, CSI/Westell, EMR, TX-RX so are conversant with a wide variety of such products. As design engineer on the first general of fiber DAS products sold on a worldwide basis in the 1990's Mark brings an unusually high technical degree of expertise to the business, and so we actually have *more and broader technical expertise* than most of the large DAS companies possess.

**WHAT WE THINK IS VERY CRITICAL TO THE DESIGN OF FUTURE JMU DAS's** is the advent of 700 MHz FirstNet LTE. The signal levels required for high speed data transfer on LTE are a total change from how RSSI has been used for FM and P25 signals. A signal measurement of RSRP is used in LTE systems to determine minimum acceptable signal levels in a design and this greatly changes DAS design when LTE is added. This will be discussed at length below in 4.B.8. ***But what we want to emphasize at this step in our RFP response is that we have been successfully designing and implementing and testing DAS's for LTE use ever since LTE was first deployed in the US in cellular systems.***

#### **(4.A.1 Continued)**

##### **Staff Brief Resumes:**

**Mark Bowers**, President and Chief Engineer – BSEE, Virginia Tech; MSEE Ohio State University. Product design engineer for 15 years, then sales engineer and sales manager for 7 years, then business owner/operator of Corsico RF for the past 17 years. All life training and work has been in RF system, from military to cellular to broadcasting.

**James Bowers**, Project Engineer and Director – BA Business, Radford University. A full career for 15 years in the cellular and Public Safety communications industry, with Commscope and Corsico RF. James is assuming an increasing amount of day-to-day operations and management of Corsico RF.

Please note that our staff is small. But each of us does all things necessary without hesitation. We do all the designing, procurement, installation, site surveys, warehousing, design archiving, and testing. This may seem to be an unusually small crew for all these tasks and we do not have the usual division of labor. However, our customers have found this to be a big advantage in this industry due to:

- Everyone knows every job, and knows every customer and their needs
- Efficiency is very high. Bureaucracy is none. (*No passing the buck here!*)
- Project coordination is tight and efficient
- Overhead is very low and this means we will continue in business even with severe economic downturns
- We have no large overhead to increase pricing
- There is no 'revolving door' of employees to which the customers have to constantly adjust

##### **Pertinent Virginia Licenses and Certifications:**

**Corsico RF Communications Contractors License:** Virginia, Class A, ESC, #2705100896, Expires 11-30-2021,

**Corsico RF Communications SWaM:** Certification number 708147. We have been small business qualified in the state of Virginia and have completed our submittals for re-certification on July 22, 2020. However, we have been informed that this process is presently taking an average of 60 days. So we will not likely be re-certified at the time of this proposal submission, but expect that to be completed in late September.

**4.A.2. Product Certifications** – We currently have certifications in Commscope Fiber DAS Products and the Node A BDA family. Commscope product certifications have been held for 10+ years. If we are awarded this contract, and other products like ADRF are good candidates, we will get all needed certifications that are available.

Beyond that, certifications are a topic of potential concern that we would like to put to rest. We started designing and implementing DAS's of all types many years before certifications were used at all. We have worked with multiple manufacturer's equipment in this field

- Commscope/Andrew
- TX-RX
- CSI-Westell
- JMA Teko
- MobileAccess/Corning
- Dekolink (defunct)
- ADRF (test and technical evaluation in our own shops)

In all cases with all equipment, we have to thoroughly understand the equipment to properly use it and apply. And we maintain technical manuals in our own archives on every piece of equipment that we have used. We have found that our self-training on equipment and high level technical abilities have been a better source of product knowledge than the typical certification course. We realize that sometimes in the modern world, pieces of paper carry weight, but we know that our product knowledge is matched by few and far exceeds most. We already know the questions to ask to be able to use the products properly.

**(4.A.2 Continued)**

**Certificates (See this page and succeeding 2 pages)**



CommScope Proudly Acknowledges

**James Bowers**

For successful completion of

[ND6460] Era & ION-E Installation & Commissioning



Pinder Chahaun  
Training Program Manager

Feb 21, 2019

Course Completion Date  
Certification is valid for two years.



CommScope Proudly Acknowledges

**James Bowers**

For Participation in

**ND6479 Node A Repeater Systems**

A handwritten signature in blue ink, appearing to read 'Paul', is positioned above a horizontal line.

Global Training Director

2/27/2020

Course Completion Date\*

\*This document is for proof of attendance only. Where CommScope offers certification, an appropriate certificate will be awarded.

**4.A.3. Subcontractors** - Subcontractors are used as needed for installation, but only under our direct supervision and control. We usually work with one individual from Bumpass VA, Joseph Rogers, who is a sole proprietor. We have worked with Joe for 12+ years and can vouch for his integrity and careful work. We all have all passed criminal background checks, which are often asked when working in school systems.

**4.A.4. General DAS Tasks to be Performed** – Can, and agree to, do all tasks requested in this section.

**4.A.5. Equipment List (top level)** – Calibrations are upcoming at this time for the Anritsu equipment. Certificates will be available and current for all JMU work.

- Anritsu Spectrum analyzer (332B)
- Anritsu Sweep Equipment (332B)
- Praxym signal generator for penetration loss testing if needed (calibrated to spectrum analyzer for relative measurements)
- Ericsson 995 Fiber splicer (not calibrated)
- Fiber OTDR and power meter (checked locally for accuracy)
- Various test antennas (calibrated to spectrum analyzer as needed)
- Voltmeters (for UPS/Battery work; checked locally for accuracy)

**4.A.6. Work hours** – Fully agreed to.

**4.A.7. Change orders** – Will fully comply. No from is available. We have not ever requested or been asked to execute a change order! We always get the scope 99% right and so leave little to change and thus make things work on budget.

**4.A.8. Billable hours** – Fully agreed to.

**4.A.9. Storage space** – Typically not ever needed. We have storage in Augusta County VA.

**4.A.10. Work area neatness** – Fully agreed to

**4.A.11. Safety and safety training** – Fully agreed to

## **4.B New Installations**

*We have reviewed the processes laid out in this paragraph and see that they reflect our normal standard practices as we have executed projects for years and years. So we feel we are very much 'in-tune' with JMU on how to execute such projects.*

### **4.B.1 Design**

a **Design Ability:** Can design and install to Appendix E in its entirety. Design process info is discussed in a later section.

#### **b Example Projects**

Below is a small representative sampling of our approximately 300 DAS projects completed to date. This ranges from very large systems of 1 million square feet coverage to small building system, and for VHF- UHF, 800 Mhz PS, as well as all cellular bands, and indoor and outdoor repeater sites.

- Western Virginia Regional Jail, Dixie Caverns VA (Roanoke County). This is large jail complex using the Roanoke County 800 MHz PS system (25 channels). This is a large, complex building with high RF losses in the poured and filled-concrete-block walls with re-bar. Our system was a complete analysis and re-design of an originally installed system that had been suffering shortcomings for all 6 years since its installation. That system suffered significant coverage blackouts from time to time. We performed testing and discovered a strong in-band interfere was suppressing the wideband BDA's, and then redesigned the system with a channel selective BDA, and re-engineered the signal distribution for more thorough coverage. The facility was then 100% covered 100% of the time.
- Woodrow Wilson Rehabilitation Center, Anderson Building. Design of new system for Augusta County UHF public Safety radios, as part af the building's overhaul. Phase 1 completed in 2018 and passed 100% with Augusta County PS testing. Phase 2 being completed now, with this originally designed in as an extension of the original DAS, so as to save costs.
- Roanoke County Courthouse and Jail: This was work done on an emergency basis to solve a complete disabling of the existing DAS. We inventoried and reproduced the design information for an older system (like what JMU needs for their existing DAS's), and determined the source of new interference; which was a new Sprint 800 MHz cellular site 1 block away. A retrofit and solution of the cellular interference was designed in 1 day, and a channelized BDA procured and installed. We then changed the signal distribution path, and with one new installed cable, combined what was 2 DAS's (1 for the jail and

#### **(4.B.1 Design continued)**

- one for the courthouse) into 1 DAS, which simplified maintenance and spares for the county.
- Horry Georgetown Technical College, Horry County SC – We designed and installed a complete passive DAS driven by a channel selective BDA for a spread-out set of connected campus buildings, for the 800 MHz trunked Horry County public safety system. The challenges with this design were to:
  - Cover all buildings with one single BDA, which we solved with using a main trunk of 7/8" coax
  - Get adequate donor signal in an area that is notorious for coverage problems due to the numerous long-leaf pine trees
  - Achieve adequate system isolation in a single story building complex, with coverage antennas almost directly below the only location where we determined that there was adequate donor signal; we used a special donor antenna for this site.
- 2 new Augusta County VA elementary schools (2017-2018). We were the design firm for these, working through Lawrence Perry Engineering in Roanoke. These used channel selective BDA's and repeated the Augusta County UHF public safety signals. The main challenges were to locate the donor antennas so as to be able to pick up the available donor sites while maintaining adequate system isolation. All of this had to be done based on site visits and from the paper designs, as we had to complete designs in the building design process. Both installations were successful.
- Carolina Coastal University – HTC Center (basketball area) 800 MHz PS. We designed and installed a passive DAS and BDA system for the local AT&T Wireless affiliate (Horry Telephone Company) for 1900 MHz cellular. We were later asked to overlay the Horry County 800 MHz public safety system onto this same DAS. The DAS had been designed for adequate 1900 MHz coverage, and so was quite adequately for 800 MHz PS. We integrated an 800 MHz PS module into the existing Commscope Node A system, and with a dual band combiner and a new donor antenna for 800 MHz, the 800 MHz PS system was on-air and operational.

A few selected other interesting designs and installations (There are so many!):

- High Point University Multiplex Dorm and activity center – We designed and installed a 4 band cellular fiber DAS for this complex of two 4 story buildings when it was first constructed in 2008-2009. This was commissioned to operate 3 of the 4 major cellular services in the building. In 2019, we retro-fitted the fiber equipment with the newest Commscope fiber DAS, the ION-E system.
- The Medical Center, Bowling Green KY. This is the main hospital in Bowling Green KY. The system is a fiber DAS to cover about 65% of

#### **(4.B.1 Design continued)**

- the hospital, for a single wireless operator, Bluegrass Cellular, which is the Verizon Wireless affiliate in central KY. Our work was to turnkey design, install, and commission the system. Coax total was over 10,000 feet of coax and the antenna count was over 100. Completed in August 2016.
- Grand Marc apartments, Charlottesville, VA. This was a multi-operator fiber DAS in a 300,000 square foot student apartment complex. There were about 80-90 antennas in the system, and the fiber DAS was repeater driven. AT&T and T-Mobile signed into the system, which is what the building owner wanted and expected. Our work was to turnkey design, install, and commission the system. Completed in December of 2012, and this was an urgent project; the owner was losing significant numbers of lease renewals due to the lack of cellular coverage for AT&T and T-Mobile.
- International Home Furnishing Center (IHFC), High Point NC. This is a 3.5 million square foot building that is the heart of the semi-annual Market Week in High point, and we designed and installed a coverage system for about 1 million square feet of that building. (This was a coverage only system, as the outside existing macro signals did not penetrate deep into this huge building at all, despite the sites being just 1 block away!) We eventually upgraded this to a BTS driven high powered fiber fed DAS so that the DAS could provide its own dedicated capacity. The customer was Northstate Communicatoins, the owner/operator of the High Point area portion of the AT&T system in NC. The last upgrade was in 2014, and we did all work turnkey.
- SEC building DAS analysis, Washington DC. This is an engineering-only, small project. It is mentioned to demonstrate our high technical expertise. Extenet was building/expanding the system, and was having severe calls initialization problems after their 3<sup>rd</sup> expansion. We did 2 days of data gathering and on site testing, and 2 days of in-office analysis, and were able to show them what was wrong and give them

#### **(4.B.1 Design continued)**

c **Design Process** - Our design process begins with understanding the goal of the end user and locations that are needed to be covered.

- This entails a site visit and survey so we can gather data on the signal strength for desired channels and potential interferers, also to investigate potential location for equipment and cable paths.
  - In some cases, BDA coverage may only be required for select floors. The end user will have the final decision in these cases.
- If the structure is not yet existent, we still conduct a field signal strength survey; additionally, we use the FCC license search to confirm frequencies and location of the signal source.
  - A further survey will be conducted once the building is fully enclosed (all glass, doors, or other openings) and drywalled to evaluate if any modifications may be needed to the design.

The next step is to begin the design itself, with information gleaned from the survey we plot out rough locations of the antennas and cable paths.

- Use our computerized design tools, that we have been using since 2005, to refine the system design and get a parts count and pricing.
- Once all antenna EIRPs are calculated using our tool, we then apply that to a propagation program to verify coverage levels meet the specification.
- Calculate isolation for the system and uplink noise to the base station.

At this point the customer (JMU) will be presented with this preliminary design and pricing for review and approval. If the structure is new construction we will reevaluate the design after 'building enclosed' survey and present those modifications to the customer for final approval.

**Design process additional discussion:** As part of our design process, we will always compute the base station noise figure rise for any trunked channel base station system like for the 800 Mhz Rockingham County system, without the use of uplink muting in the BDA. This must be done prior to finalizing the design because:

- Getting this wrong and causing base station interference will require reduction of the DAS uplink gain.
- If the BDA does not have uplink gain muting, then this forced uplink BDA gain reduction will cause uplink call quality failures.
- The only solution to that is more indoor antennas and maybe a new BDA.
- Uplink gain muting in a BDA is, in our view, an essential requirement of a BDA for use in a trunked base station Public Safety system. HOWEVER, we want to know that that DAS can work without undue interference to the base stations without the uplink muting. Long term, the interference requirements of the base station system may become more stringent, and we want to start with a solid baseline design rather than using uplink muting as a crutch.

#### **(4.B.1 Design continued)**

- The uplink is the weaker link in these radio systems overall. We have not yet found that iBWave adequately computes uplink performance to see if the system will meet minimum uplink signals to the base station, such as are specified in NFPA 72. We do this separately from the propagation tools with our own spreadsheets based on our knowledge.
- Certain versions of iBWave *may* compute uplink noise to the base station input. (They have been very vague about this capability.) We have had spreadsheets for many years ready made to do this type of computation, based on intimate knowledge of how to do this without depending on a precanned-tool.

**d In-process Surveys and All Subparagraphs** – Fully agreed to; that is what we always do.

#### **4.B.2. Proposed Solutions**

**4.B.2.a.** Agreed to. Support for 5 years is not a problem unless the mfr suspends a product line. (But Commscope is good to offer last time buy opportunities for their products)

**4.B.2.b.** Our design solutions tend to be focused on passive DAS's as much as possible for the lower cost and ease of long term maintenance. This leaves only the BDA as a long term 'wild card' in the system. The passive components tend to change very little over time.

If a unified DAS is need for a group of buildings, or for a very large single building, then we have all the capabilities and experience to design and implement a fiber connected DAS, and have done so for numerous sites.

**4.b.2.c.** Our prime products are the Commscope family of BDA's. The Node A product in particular looks to be a very good choice here, as it will support 800 MHz PS, 700 MHz FirstNet, AND UHF *all in one chassis*. It has all the needed summary alarms on a single contact point for system monitoring through the FAS. It is rated IP65 for environmental requirements. The unit is modular and so repairs can be made faster and more cheaply than with other brands. The only shortcoming is that it is not painted fire-engine red. (But that can be fixed!)

However, we have used all brands and are not 'set-in-stone' on any one brand. So we are flexible to use what JMU feels is best. We would recommend settling on one brand long term for simplification of spares and maintenance, and we also have been very strong advocates of channel selective BDA's for over 10 years for public safety systems. The cases of interference to broadband BDA operation, especially in the 800 MHz band, are growing and growing. For this reason, our alternate choice would be the ADRF product line.

As for fiber DAS products we also tend towards Commscope; they have done the best job or adopting new technologies and their newest family of digitized fiber transport fiber DAS equipment, ION-E is truly an industry leader.

While fiber DAS products do not seem always applicable to situations like at JMU, we wan to point out that they can offer overall, long term cost savings in deploying these systems. The increasing need for channelized BDA's is driving up each system's cost considerably. If you have a group of buildings with fiber connections between them, then it will save cost to use one higher cost, channelized BDA, with an inter-building fiber DAS between the buildings. There is a very high degree of flexibility in using existing, 'already-lit' fiber, and overlaying the existing fiber links with the Commscope ION-E system. This does not require 'dark fiber' connections between the buildings; it is a big step forward.

**4.B.2.d.** Peripheral equipment typical products list. Please note that we are flexible to meet JMU's preference but put an emphasis on quality products not the cheap 'also-ran' products. We feel it is false economy to put in cheap stuff.

- Indoor antennas – Commscope Cellmax or Galtronics Pear s5491i wideband
- 1/2" coax – Commscope/Andrew Helix (plenum, AL4 RPV-50) and matching connectors
- 7/8" coax – RFS and matching connectors
- Splitters and Couplers: Microlab is preferred, but we have found other brands to be quite adequate in this controlled environment
- Surge arrestors – Polyphasor
- Outdoor antennas – Yagi type: Kathrein-Scala or Telewave or similar with welded rod or other solid construction outdoor antennas, not stamped and riveted antennas. We avoid pigtail connectors. We can use a special 700-800 MHz narrow beamwidth panel for interference management.
- UPS units: Alpha or Tripplite
- Batteries: Johnson Controls, Yuasa, or Deka
- Cabinets: DDB or Hoffman or Solarcraft are most often used. We prefer to use cabinets with a separated battery and vented compartment from the electronics, to avoid any chance for hydrogen gas from the battery charging process from being set-off by an electronics failure. This adds costs but, out of an abundance of caution, we don't agree with the common thinking that the out-gassing of AGM batteries is so low as to *never* be an issue. Solarcraft has a good family of cabinets with separated and vented battery compartments.

Due to product availability issues that crop up from time to time, and discontinuance of products, we cannot guarantee a specific brand to be always available. But we have found that this is a mature and ongoing market, with enough manufacturers, that we have always been able to find good product substitutes through the years.

**4.B.2.e.** Certifications for Commscope are included elsewhere in our response. We can obtain others certifications for other products but refer back to our earlier discussion on this matter.

We are not aware of any required distribution agreement for any of these products.

Warranty is all handled through us and follows each manufactures guidelines and requirements, We have never had any warranty request refused. Thought long term manufacturer's warranties exist for the passive parts, passive parts, will be, in essence warranted by us directly.

**4.B.2.f.** There is no minimum square footage for these solutions. The maximum will vary with the building configuration an internal wall losses etc. We completed a design 2 years ago on the new 5 story JMU dorm, using a single 5 W BDA. That is getting close to the largest practical passive BDA driven DAS.

Fiber DAS's can be much larger, and over multiple buildings. The practical limit on those is the cumulative uplink noise figure when adding more and more fiber remotes into the DAS.

**4.B.2.g** Passive DAS prices for 800 MHz PS with 2 to 4 hours UPS roughly average in the \$1 per square foot range with channel selective BDA's but this will vary up and down from that figure. The addition of a UHF band and 700 band of operation usually adds about \$0.50 per square foot. The same coaxial distribution can be used, but with different antennas and splitters/couplers.

Fiber DAS's have unpredictable cost adders. The cost adder is in the base cost of the DAS equipment, plus added fiber if it has to be run.

**Ultimately, there is no fixed answer to cost.** Each system has to be engineered, and many factors influence costs, such as:

- Ease or difficulty of installation
- Phasing of installation with other work
- Building configuration, which effects the complexity and physical distances of the signal distribution
- Existence of direct coverage from the outside that reduces the DAS size

**4.B.2.h** Pricing Structure of Proposed Solutions: See Section X. response

**4.B.2.i Sample Design** A DAS design has been generated and priced to meet the Appendix E sample building for this RFP.

- Pricing for this design is presented in the Section X. response.
- The design is presented here and is discussed below.

**Discussion of our design for the example building:**

This design is based upon 700/800 MHz propagation, with a very important added consideration for FirstNet LTE coverage requirements.

- 800 MHz will be the most stringent design frequency for voice PS communications
- UHF signals experience lower penetration losses, and standard UHF FM communications have a lower minimum signal requirement for meeting signal quality. So 800 MHz P25 coverage will mean that UHF coverage is good.
- ***The design is READY for 700 FirstNet with the simple insertion of one RF module to the BDA, and commissioning/acceptance of the 700 MHz signals. The 700 RSRP signal coverage turns out to be the most stringent requirement on this system and so it HAS to be designed in up front.***
- Important discussion of 700 LTE impact on DAS design; this is critical for 700 MHz FirstNet use.....
  - LTE coverage performance is NOT set by total LTE signal RSSI but by a signal parameter called RSRP (reference signal received power). This is a reference signal embedded as a part of the LTE signaling, from which all LTE signals the LTE signal block are demodulated. RSRP is approximately 27 dB LESS than the total LTE signal RSSI in a 10 MHz wide LTE signal like can be used for FirstNet. The implications of this fact in the actual usable link budget that can be supported in a DAS design is as follows:
  - *The actual power from a BDA that can be used for establishing the link budget for 10 MHz FirstNet LTE is 27 dB lower than the BDA's rated downlink power.* For example, a 1 Watt (+30dBm) output BDA will actually have only +3 dBm for RSRP at its output. The same +30 dBm output BDA for 800 PS with an 11 channel P25 system will have between +16 and +19 dBm per P25 channel at its output. (The variation depends on how each BDA manufacturer derates their BDA output for multiple channels.) So, the LTE RSRP signal power available out of the BDA will be approximately 14 dB LESS for FirstNet LTE than for P25 in the JMU area.
  - When computing the link budget, the 800 MHz P25 and 700 MHz FirstNet signals will get attenuated by almost the same amount in the DAS's distribution loss, so the P25 EIRP from each indoor antenna will still be approximately 14 dB higher than the LTE RSRP EIRP.

#### (4.B.2.i Continued)

- The next step in the link budget is from the indoor antenna to the user device and again, the propagation losses in air and through barriers will be almost identical between 800 MHz P25 and 700MHz FirstNet LTE.
- The final step to understand the LTE link budget is to determine the minimum signal level to the user device that gives acceptable data speeds. From our direct commercial LTE experience for the past 7 years, an RSRP level of -95 dBm at the device is needed for full data speeds of 10's of MBPS. We have seen reference to lower speeds being acceptable for adequate public safety operations; speed numbers in the order of 5 MBPS appear in the literature. Based on this, we think that RSRP at the user device in the range of -100 dBm may be acceptable. That is 5 dB less than the NFPA standards and JMU standard of -95 dBm RSSI for P25.
- ***So the net link budget for coverage by 700 MHz FirstNet RSRP for a 10 MHz LTE signal is going to be approximately at least 8-10 dB LESS than for 800 MHz P25 RSSI. (If the LTE signal bandwidth is 5 MHz, then this becomes at least 5-7 dB LESS link budget.) This has very big implications for DAS designs to be forward compatible for FirstNet.***

#### General Assumptions on the Design:

The assumptions made on the design are the same ones as listed in the RFP 4.B.2.i with the following added assumptions:

- Walls around elevators and stairwells are assumed to be hardened for fire escape path ways; i.e., poured concrete with rebar, or grout-filled concrete block with rebar. The RF signal penetration loss for those dense walls have been conservatively set to 15 dB in our design. This is significantly higher than drywall penetration loss, but must be done for realistic results.
- We have assumed that the example building has a standby power generator and so have quoted a UPS for a 3 hour backup time. (The actual time should be at least 4 hours with a full RF module complement in the Node A.) A wall plug AC power connection is assumed.

#### **(4.B.2.i Continued)**

##### **Routing:**

- No existing penetration from the roof exists.
  - Using JMU's roofers a 2" conduit with weather head would be installed and grounded
- Mounting of the Donor antenna to the façade of the brick penthouse
- Using the IDF Closet 405 for the DAS head end equipment
  - Minimizing the coaxial cable run from the donor antenna
  - Potentially more open room for equipment
- Vertical cable runs would use established routes that meet the JMU requirement for conduit; we have included the conduit cost. If an existing conduit path exists, then we could delete some of the quoted costs.
  - Either installation would have the conduits fire stopped to the current JMU standards
- Horizontal Cable paths would where possible use existing penetrations, or if new penetrations are needed fire stopped to current JMU standards

##### **Components:**

- Until a site survey is conducted it is presumed that this sample or any subsequent new DAS will be for UHF and 700/800 Public Safety
- A single Commscope Node A4 Chassis (NOTE that this DAS design is intentionally set to work with both the Commscope Node A AND the ADRF product set.)
  - Node A+ chassis
  - UHF RF Module and duplexer
  - 700 PS slot is open (For future FirstNet compliance with 700 RF module added later)
  - 800 PS RF Module
  - Combiner card
- Equipment rack
- UPS
  - Cabinet
  - Controller
  - Batteries
- Couplers/tappers will cover all the frequencies specified
- Coverage Antennas will cover all the frequencies specified
- A Pair of Donor Antennas mounted to a single wall mount
  - UHF (yagi quoted as we do not the exact location)
  - 700/800 antenna: assumes 700 PS & 800 PS from the same donor site

#### **(4.B.2.i Continued)**

##### **Discussion of coverage plots and propagation tools:**

The coverage plots (heat maps) presented below are from a propagation tool called iProp. This was written in the 1990's in Czechoslovakia, and uses a model that has been used in iBWave and other modeling programs. (We can provide a comparative plot of iBWave and iProp in the same building, walls losses, EIRP, etc., to show their predictions have been almost identical as far as we have found.) We adopted iProp at least 2 years before iBWave ever existed, and so are early adopters of the use of propagation prediction software.

The main difference that we have observed between iProp and IBWave is not in the modeling but in the post-processing and plotting. IBWave does extensive smoothing of the signals when plotted, and that gives a pleasing look to the plots. iProp does not have this smoothing and only can make the plots smoother-looking with finer signal increments.

Neither plot type is the full reality of RF propagation in a building. The sharp shadowing shown in iProp does not really occur due to signal refraction around studs, doorframes, and other metal objects. The smooth gradual changes shown in iBWave's smoothed plots does not occur either; reflections and the consequent peaks and nulls in signal level actually have an easily measured RSSI variation of 15 dB within a few inches of movement at 800 Mhz, and even more at UHF. We don't take care of these variations with propagation modeling, but in the link budgets and resulting minimum RSSI design specs.

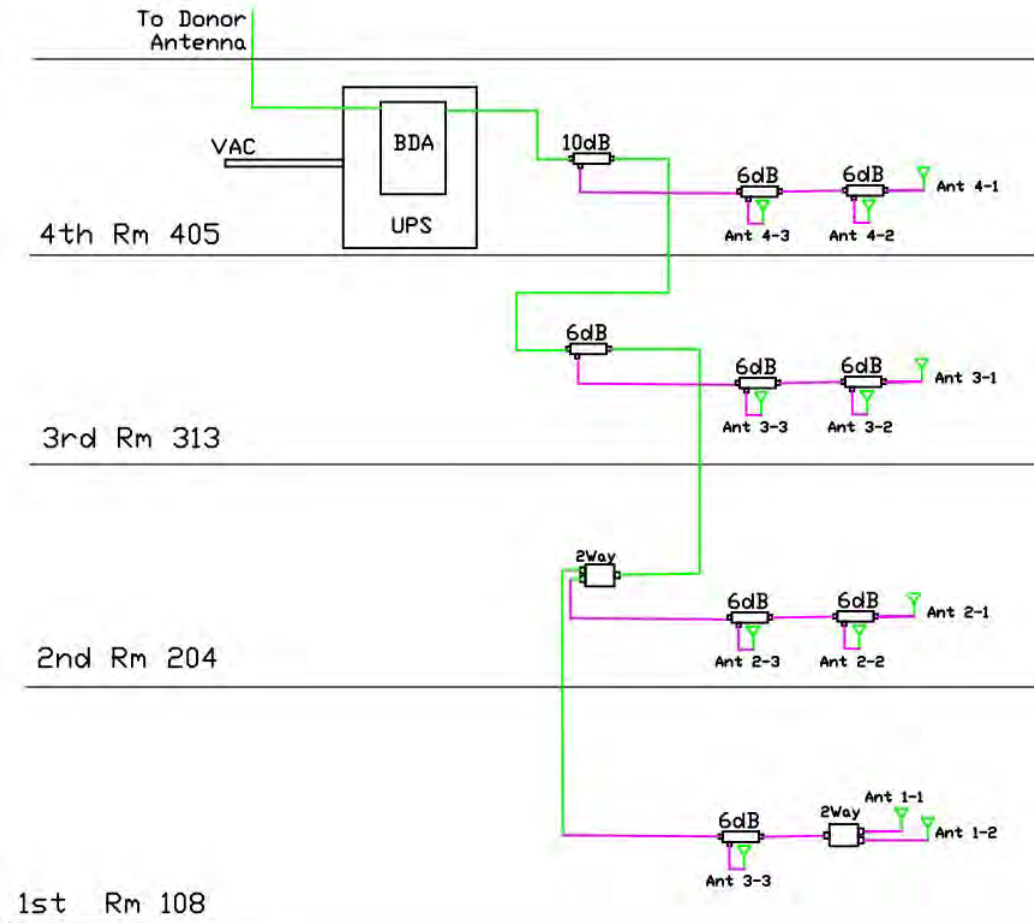
So the plots from all of the propagation tools out there need to be 'taken with a grain of salt'; they are good predictors but never perfectly accurate. Very simplified models of real RF propagation are all that can be run on a PC platform; it would take a Cray super- computer to even come close to a real propagation plot!

In the iProp plots presented below are in 5 dB signal increments; this makes it easier to see the changes in signal level versus a color legend.

**We can do our new design work in either IBWave or IProp.**

## Appendix E Sample Design

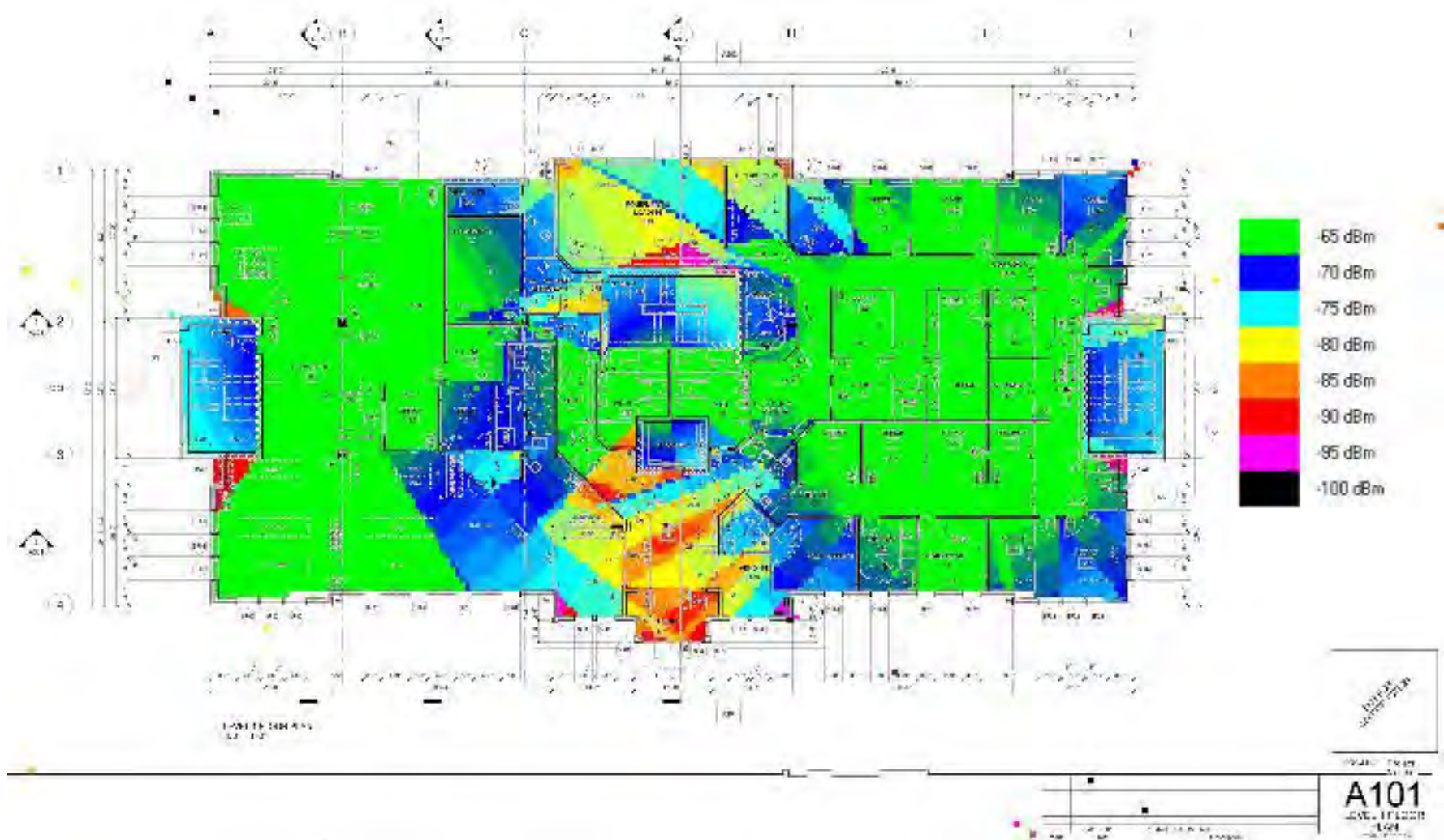
### Schematic:



Corsico RF Communications Inc  
Response to RFP # FDC-1078



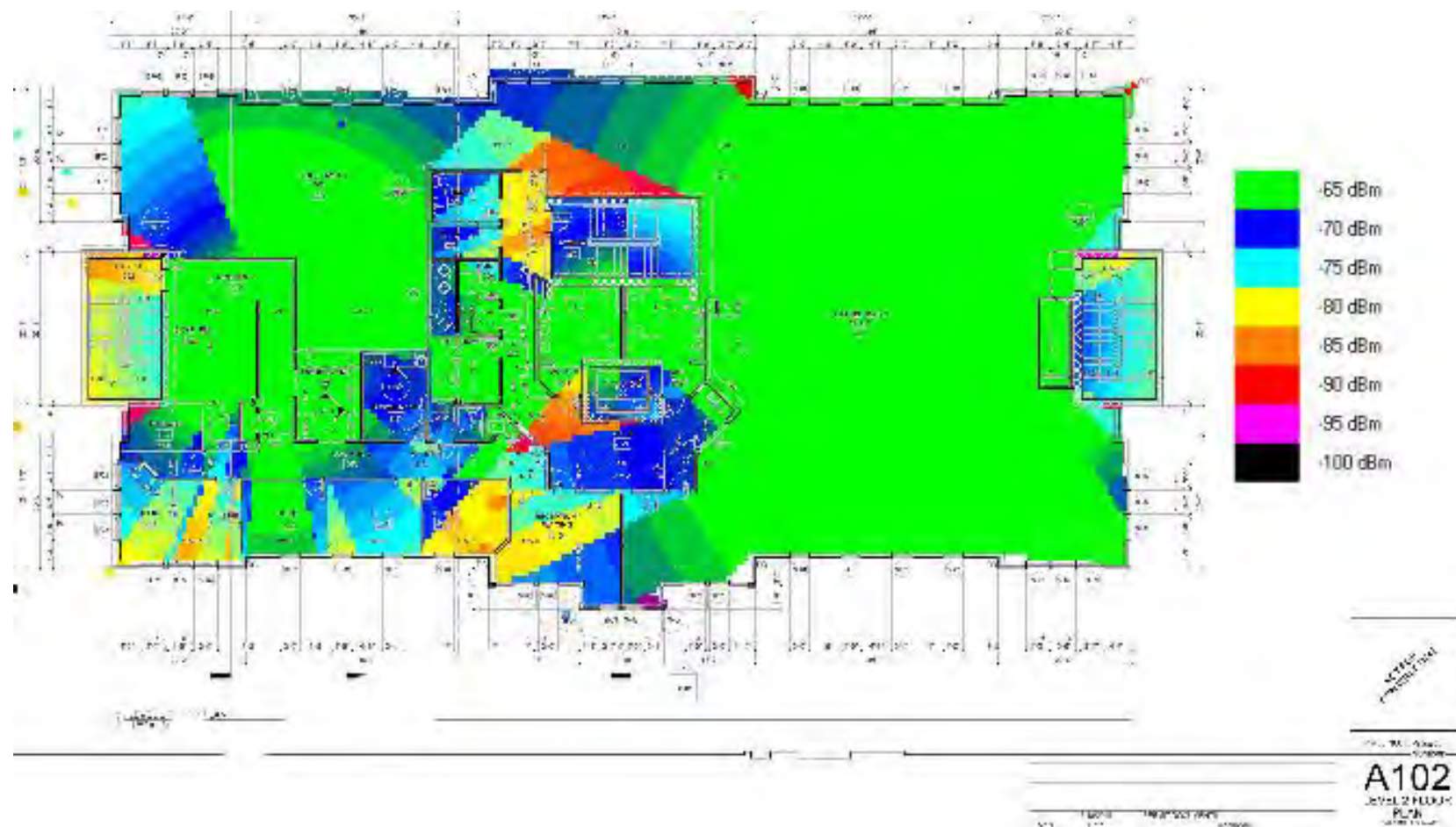
## Appendix E Sample Design First Floor 700/800 Propagation



## Appendix E Sample Design Second FloorLayout



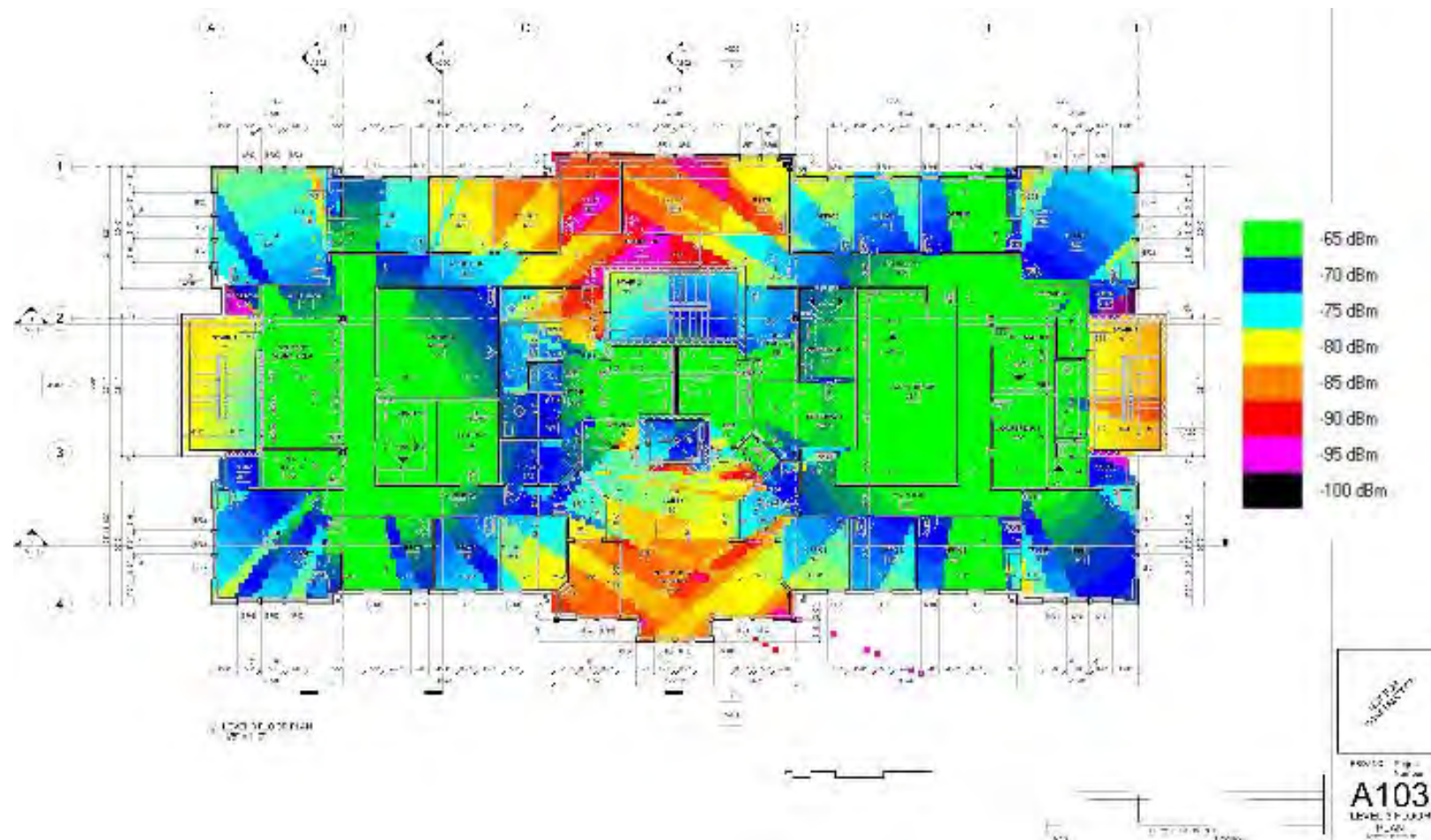
## Appendix E Sample Design Second Floor 700/800 Propagation



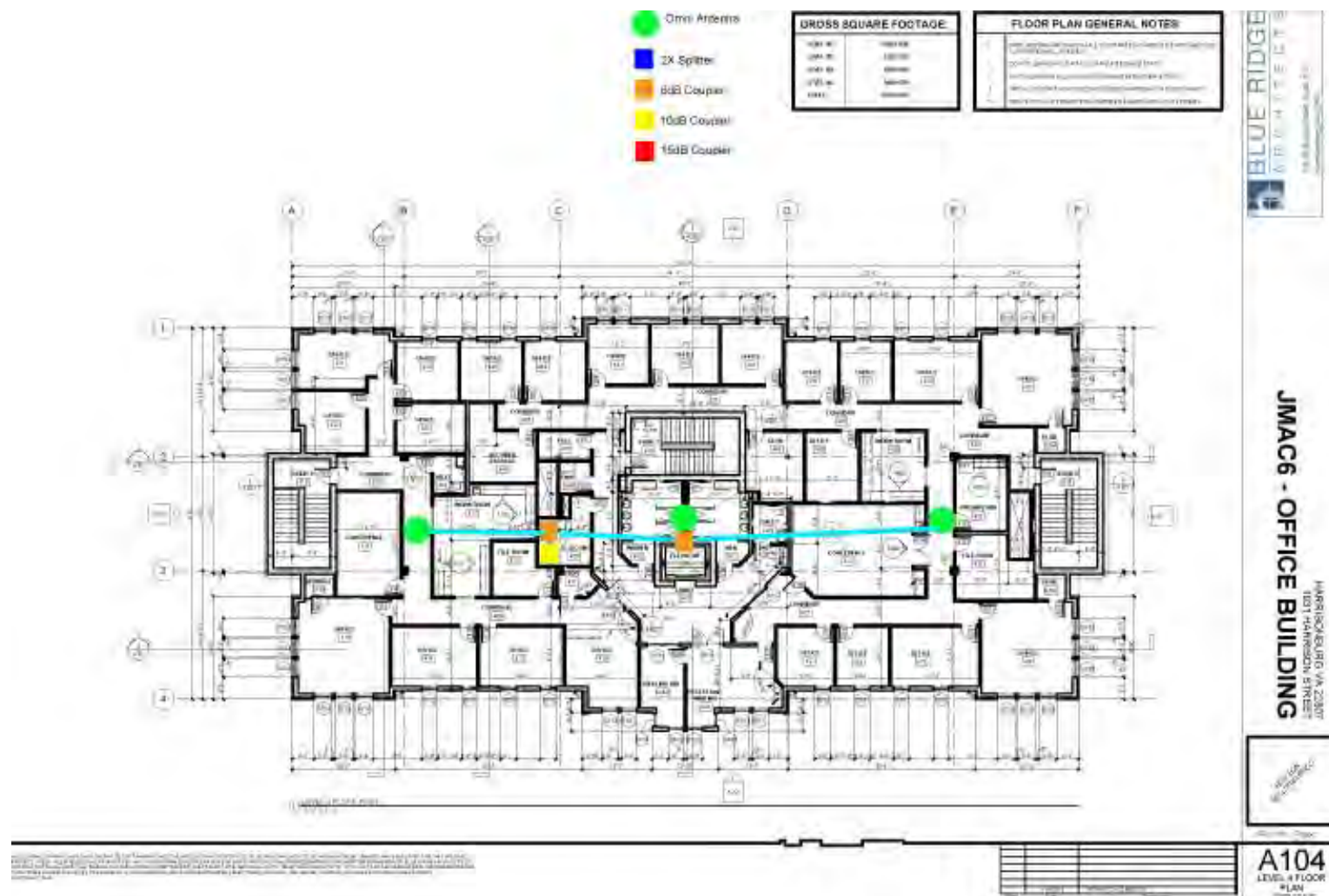
## Appendix E Sample Design Third Floor Layout



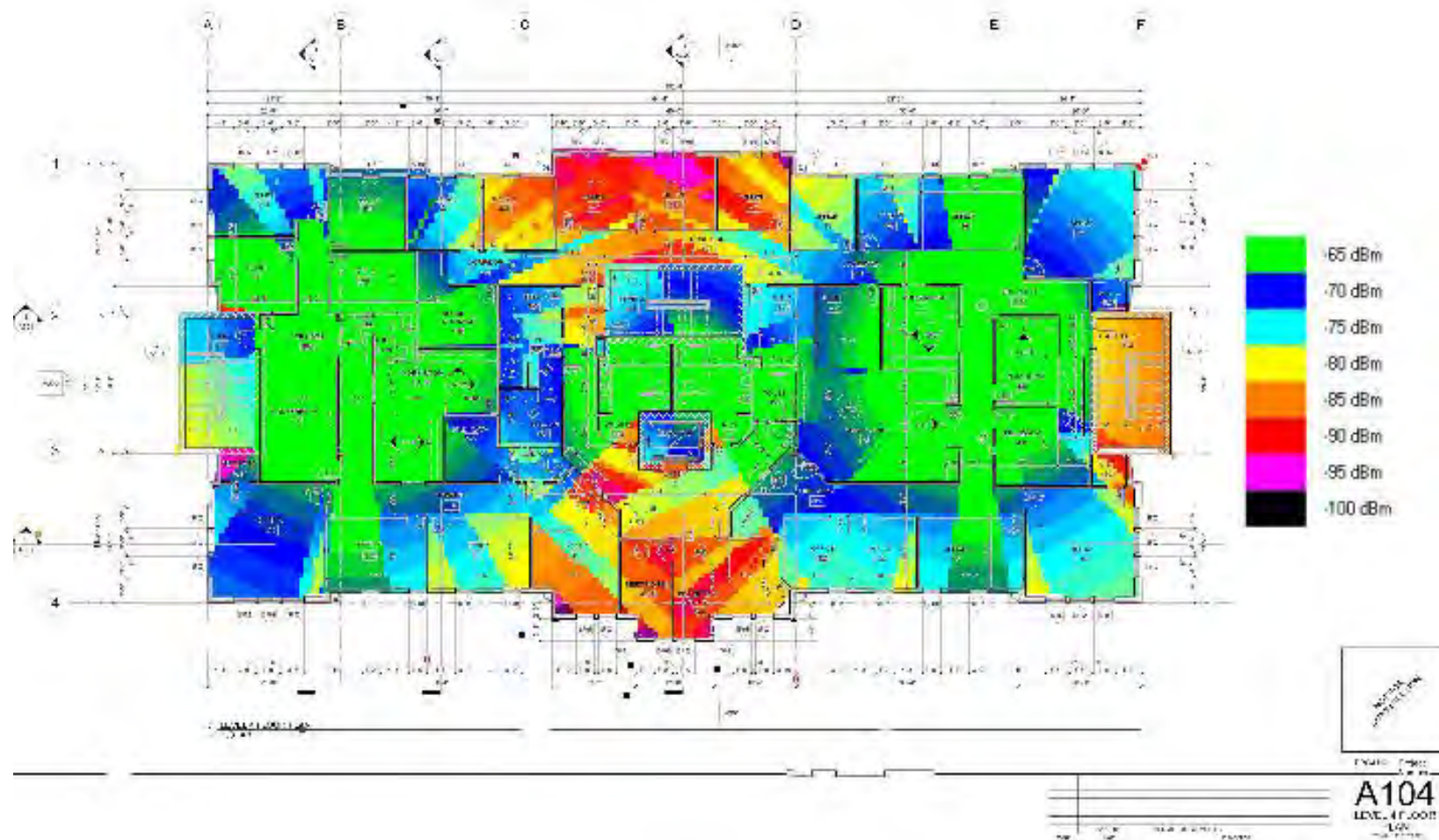
## Appendix E Sample Design Third Floor 700/800 Propagation



## Appendix E Sample Design Fourth Floor Layout



## Appendix E Sample Design Fourth Floor 700/800 Propagation



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#### **4.B.3 System Installation**

- a. Equipment ownership and responsibility – Fully agreed to
- b. Best practices – Fully agreed to
- c. Programming and software – Fully agreed to
- d. Project Coordination – Fully agreed to
- e. Clean-up – Fully agreed to

#### **4.B.4 Commissioning**

All subparagraphs agreed to. This all makes sense to us and is our normal practice. Relative to paragraph 4.B.4.h, please see additional discussion above on base station noise rise computations; this is an important matter.

The present commissioning process in the RFP and JMU specification is for 800 PS and UHF. Note that the 700 FirstNet commissioning will be similar but this needs to be eventually fleshed out and agreed to with JMU. We presently use for LTE RSSI testing, Android Smartphones with LTEDiscovery for commercial LTE testing of RSRP and RSRQ with manual recording, and SpeedTest for speed testing with manual recording. We see no changes needed for tests like sweep testing of lines.

Note that we cannot force the AHJ or public safety radio system owner to provide a test report on uplink noise rise. *Please refer back to our discussion in 4.A.2 on uplink noise and why we see it as critical for this to be COMPUTED as part of the design process.*

#### **4.B.5 Acceptance**

All paragraphs agreed to. If JMU cannot do the IBWC.IBX file conversion, then we will do this with iBWave.

The present acceptance process in the RFP and JMU specification is for 800 PS and UHF. Note that the 700 FirstNet commissioning will be similar but this needs to be eventually fleshed out and agreed to with JMU. We presently use for LTE RSSI testing, Android Smartphones with LTEDiscovery for commercial LTE testing of RSRP and RSRQ with manual recording, and SpeedTest for speed testing with manual recording.

#### **4.B.6 Documentation**

All paragraphs agreed to. If JMU cannot do the IBWC.IBX file conversion, then we will do this with iBWave.

#### **4.B.7 Warranty**

- All provisions of this paragraph agreed to.
- Warranty service in the first year is included in the new system pricing.
- We manage warranty service with the manufacturer(s).
- Please see pricing matrix for optional warranty pricing.

#### **4.B.8 Maintenance**

All provision of this paragraph will be discussed in groups or individually below.

**4.B.8.a,b,c PM and System Test Processes for Existing Systems.** We agree to the JMU Maintenance Plan outlined in 4.B.8.c; this seems like a solid plan.. See pricing section for pricing details. We would augment the JMU plan with the following steps

Our first steps in this process for existing older system without full documentation are as follows:

- Perform a site visit to ascertain the physical plant is all intact and confirm the physical configuration; This includes:
  - Locating and document all equipment including indoor antennas, verifying coupler values and so forth
  - Cable lengths
- Measure BDA downlink output levels
- Return to the office and put the system into the design tools, in order to predict all EIRP values at antennas

Once the above is done, then there is an adequate *design* documentation baseline on which to conduct actual testing. Then we would proceed with the tests and checks outlined in section 4.B.8.c.

**4.B.8.d Certifications:** We would not be able to provide any certifications for old equipment that is no longer in production, or for which there are no certification courses.

#### **4.B.8.e Emergency Services Plan:**

Tier 1: Minor or erratic disruption of DAS (dropped calls, irregular coverage, or excess noise)

- Phone consultation with trained JMU staff to note any equipment Alarms, log in to the BDA, and suggest immediate fixes to address the issue.
- If unable to resolve the issue a Corsico RF representative will arrange a site visit ASAP.
- Inspection of locally effected components.
- Once service is restored, testing in areas effected to be performed, with trained JMU staff or with their approval of final results
- *This is very similar to Tier 2 but is more geared to odd and esoteric problems that may crop up in the DAS's.*

**(4.B.8.e continued)**

Tier 2: Disruptions of DAS that are considered non-critical

- Phone consultation with trained JMU staff to note any equipment Alarms, log in to the BDA, and suggest immediate fixes to address the issue.
- If unable to resolve the issue a Corsico RF representative will arrange a site visit ASAP.
- Inspection of effected components.
- Once service is restored, testing in the DAS's effected areas to be performed with trained JMU staff.

Tier 3: Critical disruption of DAS (Complete or critical DAS failure, active component damage, or lightening damage)

- Phone consultation with trained JMU staff to note any equipment Alarms, log in to the BDA, and suggest immediate fixes to address the issue.
- If unable to resolve the issue a Corsico RF representative will arrange a site visit within 24 hours.
- Replacement of effected components or use of temporary replacement while effected components are repaired
  - **To meet the desired 72 hour restoration of service as described in Special Terms and Conditions section KK and LL, JMU has to agree to and implement a plan of having some level of BDA spares. See 4.B.8.g response below**
- Once service is restored, testing throughout the DAS to be performed with trained JMU staff.

**4.B.8.f Certification Updates:** We always keep up with new products on the market, and will use that in consultation with JMU to determine when new precuts are to be used and obtain the then necessary certifications. We will submit new certifications upon request from JMU.

#### **4.B.8.g Service Logistics**

We are in Augusta County VA, 30 miles away. So we are very readily in the area.

BDA spare(s) should be purchased by JMU, or we can purchase it at the direction of JMU on a separate Purchase Order.

The overall spares plan that we recommend would be as follows: We think that this plan is the least expensive way to approach this.

- We would keep spares for all passive parts like coax, connectors, antennas, etc. This would be part of our normal local inventory and maintained at our expense. Parts used would be charged to JMU only as used. We would need to agree with JMU for anything like a donor antenna to be used as a spare.
- We would recommend a single BDA to be used as a backup BDA for all the existing DAS's. The most universal models would be the Commscope Node A or the ADRF models. If awarded, we will prepare an exact list of the parts for this spare BDA.
- We would install the spare and configure it to match the power/gain of the replaced BDA, when needed, and perform an adequately through RSSI test to confirm operation matches the old BDA.
- The UPS units and batteries listed in the present systems configurations look to be standard parts that are readily available through distribution. We would procure these as needed and invoice to JMU.
- Items like cabinets and other large hardware items are nto likely to need replacement.

**Please note:** We explicitly cannot accept Section VIII, subsections W and UU, Excessive Downtime, for this equipment and systems. The operational availability of this equipment and systems, and repair and replacement, is subject to the Service Logistics discussion above and to the Response Time provisions in the RFP. Availability of replacements and repairs for BDA's and BDA parts, UPS units, and batteries are subject to availability from the manufacturer or distributors. **If the provisions of the Excessive Downtime paragraphs VIII.W and VIII.UU are to be met, then JMU must commit to purchasing spares to be on hand at their facilities or stored at ours.**

**4.B.8.h No response** - No such section in original RFP

#### **4.B.8.i Lightning Damage Repair**

This would follow normal repair procedures and would be invoiced on a Time and Materials basis. It is not possible to give a fixed rate repair for such damage.

#### **4.B.8.j Annual Maintenance Process**

This would follow the part of processes in the RFP for documenting existing systems. We would follow the processes in RFP paragraph 4.B.8.c.

Part of our routine annual maintenance process is to be sure that the active is clean, has clean and proper airflow, and is free from dust that can cause heating and potential equipment damage.

Please see Pricing Section X.2 on Maintenance for detailed discussion of distinguishing routine annual maintenance versus any needed additional maintenance.

Our Anritsu spectrum analyzer would be the primary tool for the annual maintenance signal checks, and the usual practice is to measure the downlink RSSI of the control channel at a fixed distance from each antenna. We typically plot the test results on a plan view of the building and system, but for comparative checks, would generate a tabulation of baseline to measured results in Microsoft Word or Excel. We are open to discuss other formats that would be more convenient to JMU.

#### **4.B.8.x Added discussion on BDA monitoring**

**Please note that much of the below information seems to reflect what JMU already has in place or has in mind. But we wanted to include this discussion for completeness in describing how we view and manage such things.**

We have dealt with this matter before and there are a few hurdles to overcome to make this a seamless activity. To make this adequately 'universal' to deal with the variety of BDA's at JMU, the system needs to be flexible and be generic. We are aware of NOC (Network Operations Center) services for PS radio networks, like offered by Bearcom, but we are not aware that they can offer an adequately 'universal' monitoring and access service for the variety of BDA hardware at JMU.

With that in mind, we look at this problem in a certain way and break it into 3-4 separate areas:

1. Alarm notification to a central entity
2. Alarm notification to service organization
3. Unit access for verification and clarification by service organization
4. Response by service organization

1. Alarm Notification – All of these different BDA and UPS brands have different response field for showing alarm summaries when you access them. And not all will have a have a common command-response method, like SNMP. So writing an automated program to query each unit for health on a regular basis is likely going to be prohibitively expensive for a small set of units like at JMU.

Rather than depend on alarm notification via automated computer access, we would propose to tie each unit into its building's Fire Alarm System (FAS), with a simple 'good/bad' contact closure, which is the one thing that is pretty universal to BDA's and UPS's. FAS's have contact closure monitoring and central reporting for all newer systems.

Such an alarm notification would go to the central FAS monitoring center.

2. Alarm notification to the service organization – This would be a call placed by the Fire System monitoring center(s) or other monitoring personnel to us OR to JMU personnel as a first line of action. It seems like the latter is what is being contemplated by JMU.

**(4.B.8.x continued)**

3, Unit access for verification and clarification by service organization: *This is an optional item* – We would set up either a LAN modem or cellular wireless modem at each BDA. Whichever is done, we would propose to equip each BDA with the same type of modem: either LAN or cellular wireless.

LAN modems would route via the JMU IT system. This may be problematic due to network security matters. Additionally, these BDA's often use fixed IP addresses for access, typically in the range of IP addresses used for building monitoring, and there may be IP address conflicts. We are not expert at these matters, but have run into these very issues at another university. VPN access via the JMU LAN may or may not be allowed.

The 'cleaner' solution for modem access is via cellular wireless modem, with a phone number assigned to each unit. This gets around IP address and network security matters and makes the BDA access independent of the campus network. It does have some long term implications that have to be balanced against these advantages.

- Monthly, ongoing costs for each wireless modem will likely add up to over \$5,000 per year
- Modem support for particular modem devices is not a 'forever' commitment by the cellular wireless operators. So there might be upgrades costs in the future to swap out the whole batch of modems.
- There is the hope that such a modem setup could be migrated to the FirstNet 700 public safety network, whenever that comes to the area. Use of that would have to be negotiated with the AHJ so that is not a 100% clear path for the long-term.

4. Response to a notification would be on the same basis as any other Maintenance response. Whether this would be on a routine or an emergency basis, is per the severity of the outage.

**(4.B.8.x continued)**

**Prices for the above:**

1. Connecting each new BDA and UPS contact alarms to the FAS, or existing system to the FAS when no connection already exists – This price has to be generated for each system. There may be a new module needed for a given FAS, and there will be cabling and integration test costs for each setup. It would be most economical to do this on a single project for all BDA's, to engineer and install the individual solutions and cabling in one batch of work. *We cannot give a fixed cost at this time.*
2. Alarm notification – This depends on the FAS monitoring facilities. If this is a JMU or AHJ function, then the cost would presumably be \$0.
3. Modem access – We will assume that the cellular wireless modem option is used, in order to set the maximal cost. Cost would involve:
  - Modem acquisition, installation, and validation. This requires some engineering for each type of BDA and UPS. *We cannot give a fixed cost at this time.*
  - Monthly modem costs: Very rough estimate is \$40-50 per line
4. Response – See Maintenance Pricing

#### **4.B.8.k Training**

For staff appointed by JMU we will provide:

- A training walk through of each new DAS, or any existing system being added to the maintenance program, identifying head end, donor, and general system components.
  - This will include basic operation of the DAS equipment, and simple diagnostics that can be performed.
  - Additionally, we would provide training to GUI access the BDA, retrieve alarms, and data collection to aid in emergency response diagnosis.
  - This training would be complimentary if included as part of the Commissioning or 'maintenance-add' process.
- Informal training on an individual system outside of the Commissioning process would be priced at the Time and Materials rates, including a hands-on demonstration in the field.
- Formal classroom training on products will be priced as requested, but will follow the Time and Materials rates.

#### **4.B.8.l Pricing – See Pricing Section**

#### **4.B.8.m Compliance to this Maintenance Requirements Section**

We think we are in full technical agreement with JMU, and are certainly in full agreement with the intent and spirit of what JUMU requires.

#### **4.C No response - No such section in RFP**

#### **4.D Other services offered – None**

## Section X. Response: Pricing

This response is broken up along the lines presented in the RFP section.

### **X.1 Will call rates for unscheduled repairs, maintenance and other unscheduled tasks:**

- Time & Materials rates apply
- An added 10% will be invoiced for time (labor) for after-hours work. The need for using after-hours labor will be dictated by the urgency of the work.

### **X.2 Maintenance for new systems added to the contract ('new' meaning existing systems added to our maintenance responsibility)**

- Initial familiarization, examination, test, and documentation when the system is assigned to us
  - This is RFP paragraph 4.B.8.1.b
  - The charges will vary with the state of the system documentation:
    - For a single DAS with documentation that is the same as, or close to, that which is to be done for new systems per the RFP, this is a one time charge at a flat rate of \$900 for the labor to initially verify one system and its documentation. (As best we can determine there are 4 systems that meet this level of adequate documentation.)
    - For a single system with no or inadequate documentation to the RFP standards, this is a one time charge at a flat rate of \$2,100 for the labor to examine, test, and document for one added system. This would include 're-engineering on paper' the system to be sure we had the proper signal data with which to test the system. (As best we can determine there are 7 systems that are at this level of inadequate documentation.)
    - If we are assigned all of the existing systems in Appendix F at once, then the batch discount from the prices above would be 35% per system. This is due to the higher efficiency of doing batch work.
    - If any problems for DAS's being added to the maintenance program are found that need correcting or repairing, or if there are significant errors or other problems found in the documentation, then an estimate of the recommended corrections or necessary repairs would be provided for approval. This will follow the Time & Materials Rates.

**(Section X.2 continued)**

- Routine yearly maintenance per system after the above charges for getting a DAS into the maintenance program.
  - This is generally the RFP 4.B.8.1.c paragraphs 1, 3 through 8, 10, 12 and 13.
  - The flat rate for this is \$900 per system.
  - This assumes that the annual maintenance checks can be scheduled by us for best efficiency. If we are constrained from reasonable scheduling on this work, then we may increase charges.
- Additional yearly maintenance per system
  - This is generally the RFP 4.B.8.1.c paragraphs 2, 9, and 11.
  - These are for changes to the system and discrepancies found in system operation during the routine maintenance above
  - This time cannot be predicted and so will be performed at the standard Time and Materials Rates.

### X.3 Training

- **With new DAS**
  - No charge for an introductory training session on the DAS; this is a courtesy we offer with all new DAS's
  - This is for up to 2 hours of an on-site 'guided tour' of the actual system with info presented on
    - Log-ins and basic software use
    - Placement of equipment
    - General cabling and wiring
    - Any special conditions
    - This will follow system acceptance and will be on a mutually agreeable schedule.
- **Informal system training on other existing DAS's when we are adding them to the maintenance program**
  - As part of the process of familiarizing and documenting a system being added to the maintenance program, we would offer a 2 hour 'guided tour' to JMU personnel if they request it.
    - This would be at no charge, and would be just like the 'guided tour' of a new DAS as described above.
    - This would take place after we have completed the documentation of the DAS, and any corrections needed.
- **Formal training of other types**
  - This for training such as RF theory and communications theory of these RF systems, and specific in-depth training on specific equipment, to our own course work
  - We would quote formal training per requested session at the Time & Materials Labor rates for reasonable preparation time of new material, plus time on-site. This needs to be quoted to a specific need and would be for up to 10 trainees in a classroom setting at JMU.

#### **X.4 Turnkey DAS price for Appendix E Sample DAS**

This pricing is offered as both an example price and an actual price that we would contract today if this was real project. It is based on:

- the assumptions in our response for details on the design above
- the Appendix E example design information provided
- the JMU specifications
- the commissioning and acceptance procedures outlined in the RFP
- good knowledge that we possess of the actual signal conditions at JMU
- good general knowledge of the working conditions in the area

In general, this is how we structure our price responses, in terms of:

- Major equipment (the BDA for 3 bands with 2 channel selective modules)
- Other equipment, listed as 3<sup>rd</sup> party equipment
- Installation labor and miscellaneous pieces and consumables (like cable hangers)
- Engineering labor
- Shipping
- Please note that under current Virginia tax law, Tax Bulletin 17-8, dated July 29, 2107, we understand that such sales are contract sales, not retail sales.

The pricing presented is very accurate as to markups. The proportions of labor and equipment are typical for our projects. The exception is in the BDA, which is higher than average, due to this being multiple bands of channel selective BDA.

**Please note than equipment pricing is subject the change, and all equipment availability is subject to prior sale.**

#### X.4 Turnkey DAS price for Appendix E Sample DAS (continued)

Project Name: JMU Sample Building RFP # FDC-1078

Notes: PS DAS UHF&800 & 700 Ready; Pricing subject to market changes

Materials	Model Number	Qty	MSRP (no tax)	Unit price	Total Price
Node A+ Chassis	7640793-0172	1	\$ 7,592.35	\$ 6,031.85	\$ 6,031.85
800 Trunking Module	7577538-01	1	\$ 6,000.00	\$ 4,719.00	\$ 4,719.00
700 PS module	7577534-01	0	\$ 6,000.00	\$ 4,719.00	\$ -
UHF module	7602541-01	1	\$ 8,312.00	\$ 6,034.57	\$ 6,034.57
UHF dual duplexer passband, 450-460 MHz	7605118-0001	1	\$ 8,312.00	\$ 6,034.57	\$ 6,034.57
800/700 Combiner	7605087	1		\$ 907.50	\$ 907.50
Low/high band combiner	7577520	1		\$ 847.00	\$ 847.00
Cable QN-QN, 1/2 m	7768455-00	4		\$ 42.35	\$ 169.40
Cable QN-QN, 5/8 m	7605399-00	2		\$ 90.75	\$ 181.50
<b>Repeater and accessories</b>		1			<b>\$ 24,925.40</b>
Indoor Antenna, Omni, 380-6000 MHz	PEAR-S5491i	12	\$ 155.00	\$ 140.40	\$ 1,684.80
Yagi Donor, UHF	ANT450Y7-WR	1	\$ 476.25	\$ 439.20	\$ 439.20
Yagi donor, 700-800 MHz	SY450-SF1SNM	1	\$ 660.00	\$ 586.80	\$ 586.80
6dB Tapper 380-2700 MHz	CS05-479-114	9	\$ 60.00	\$ 60.00	\$ 540.00
10dB Tapper 380-2700 MHz	CS05-482-114	1	\$ 60.00	\$ 60.00	\$ 60.00
2X splitter 380-2700 MHz	CS05-494-114	2	\$ 60.00	\$ 60.00	\$ 120.00
Coaxial Cable, 1/2", Plenum	AL4RPV-50	900	\$ 3.10	\$ 2.15	\$ 1,935.00
Coaxial Cable, 1/2", PVC	LDF4-50A	80	\$ 2.30	\$ 1.82	\$ 145.60
Connector, 1/2" Cable, N male	L4TNM-PSA	42	\$ 24.68	\$ 22.10	\$ 928.20
Coaxial Jumper, RG142, 36" NM/NM	CA996-36	12	\$ 42.88	\$ 33.80	\$ 405.60
Lightning Protector, Coaxial, N	IS-NEMP-C2-MA	2	\$ 114.51	\$ 106.25	\$ 212.50
Transient Suppressor, 120 VAC	Isobar-4-Ultra	2	\$ 85.00	\$ 66.30	\$ 132.60
Enclosure, NEMA 3R, Main cabinet, with sep. batt. compartment		1		\$ 1,920.00	\$ 1,920.00
UPS Alpha FXM650-24	FXM650-24	1	\$ 1,150.00	\$ 1,050.00	\$ 1,050.00
Batteries, 12V AGM, 100AH		2	\$ 495.93	\$ 372.38	\$ 744.76
<b>Third Party Equipment</b>		1			<b>\$ 10,905.06</b>

#### X.4 Turnkey DAS price for Appendix E Sample DAS (continued)

<b>Installation Cost</b>		1		\$ 16,703.75	<b>\$ 16,703.75</b>
Corsico Services - Site Survey & Project Design		1			\$ 3,000.00
Corsico Services - Project management		1			\$ -
Corsico Services - Commissioning with documents		1			\$ 2,200.00
Corsico Services - Acceptance with documents		1			\$ 1,200.00
<b>Engineering Services</b>		1			<b>\$ 6,400.00</b>
<b>Shipping</b>		1			<b>\$ 972.09</b>
		1			\$ -
<b>TOTAL PROJECT COST</b>					<b>\$59,906.30</b>

## **X. 5 Other products and services – Warranty on new DAS's**

- Standard and Extended warranty – General provisions
  - First year warranty is at no charge on all parts and labor.
    - The active equipment warranty is the manufacturer's warranty, which we service. The warranty period on a new BDA starts no later than 3 months after we receive it regardless of the state of project completion or project acceptance. (We order the BDA as late in the process as we can due to this.)
    - Warranty on passive parts starts when the system is accepted.
  - Extended warranty is offered on new system's active equipment (BDA and fiber DAS equipment) at a flat rate per year (defined as each 12 month period after acceptance) as follows:
    - Year 2: 4% of active device purchase price
    - Year 3: 6% of active device purchase price
      - (Only available if Year 2 warranty was purchased)
    - Year 4: 8% of active device purchase price
      - (Only available if Years 2 & 3 warranties were purchased)
    - Year 5: 10% of active device purchase price
      - (Only available if Years 2, 3, and 4 warranties were purchased)
    - Year 2-5 Prepaid warranty 24% of active device purchase price
    - Conditions on extended warranty purchase: Extended warranties can only be purchased with a contract for system maintenance of the same number of years' duration. If a prepaid warranty has been purchased and then a maintenance contract is not extended, then the balance of the prepaid warranty will be refunded on the same graduated scaling as the separate year extended warranties above.
  - Warranty on passive parts is our warranty at no charge for up to 5 years. Beyond 5 year, it is manufacturer's warranty on the passive parts.
  - Warranty on batteries is limited to manufacturer's warranty. We do not offer extended battery warranties.
  - For parts and equipment that fail but are no longer produced in an extended warranty period,
    - For obsolescence of passive parts, we will substitute comparable parts.
    - For obsolescence of active equipment which renders the warranty useless, we will refund any extended warranty amount previously paid, and invoice the new product at the Materials rate in the Time & Materials section.

## **X. 5 Other products and services (continued)**

- Damage due to lightning or line power surges is not included.
- Any warranty is for workmanship and parts of the unit itself, not for damage due to factors outside the control of us or the manufacturer. If damage is found to have been caused by other abnormal factors, then there may be charges for repairs despite a warranty. An example is blockage of airflow to the warranted equipment.
- Testing after a warranty repair will be determined by our analysis guided by experience, and will adequate to insure that the effected system parameters like downlink RSSI are re-established to baseline. Any further testing requested will be charged at standard Time & Materials rates.

## **X.6 Labor rates discussion – New DAS**

- Labor rates for a new DAS are set specifically for each new turnkey DAS project. It is based upon matters like efficient installation crew size, and scope and complexity of the engineering work, and thus ultimately has to be quoted on a per-project basis.
  - The engineering rates quoted will average \$75 per hour.
    - The quote lump sum amounts reflect estimated in-office and in-the-field time for each phase of the work.
    - These estimates are done for each new DAS project.
  - The installation pricing shown in the Appendix E Example DAS is very typical of our installation labor for new DAS work, and includes:
    - Labor based on crew size and crew days.
      - The exact mix of crew members and skill levels for each project can vary and so crew-days rates will vary.
      - We use higher skilled personnel to keep the crew small and efficient. Using low skill, cheap labor is more costly.
      - Most of these crew skills and tools are quite specialized and in skill level, fall close to or slightly above electrician work. Our crew rates reflect this.
    - Miscellaneous materials that are impossible to detail in specific line items
    - Special labor like roof penetrations by the roofer for a specific building (done to maintain the roof warranty)

### **X.7 Time and Materials:**

- Time: \$75 per hour
  - Time (labor) is subject to annual increases per CPI as in the RFP terms & conditions.
- Materials: Our cost +
  - 25% for parts under \$1000 (above our cost) + shipping
  - 20% for parts \$1000 and higher (above our cost) + shipping
  - The maximum price would be MSRP + shipping +5.3% for any part. In this way, the customer gets the benefit of any deep discounts from MSRP that we can obtain, and never pays an excessive amount.
  - Please note that under current Virginia tax law, Tax Bulletin 17-8, dated July 29, 2017, we understand that such materials sales are contract sales, not retail sales.

### **X.8 VISA Payments**

We are not currently set up for VISA payments, but have been in the past. However, we are willing to set this up for JMU convenience.

Payments for goods and services under \$10,000 would be subject to a fee of 2.4% of the payment amount. This could vary in the future depending on changes in VISA's terms and conditions.

Offered by Corsico RF Communications Inc

Officer Signature: Mark Bowers

Date: Aug 5, 2020

Title: President

**END OF PROPOSAL**

ATTACHMENT A  
OFFEROR DATA SHEET

TO BE COMPLETED BY OFFEROR

1. QUALIFICATIONS OF OFFEROR: Offerors must have the capability and capacity in all respects to fully satisfy the contractual requirements.
2. YEARS IN BUSINESS: Indicate the length of time you have been in business providing these types of goods and services.

Years 16 Months 10

3. REFERENCES: Indicate below a listing of at least five (5) organizations, either commercial or governmental/educational, that your agency is servicing. Include the name and address of the person the purchasing agency has your permission to contact.

CLIENT	LENGTH OF SERVICE	ADDRESS	CONTACT PERSON/PHONE #
ROANOKE COUNTY	5+ YRS	5725 COVERD, ROANOKE, VA	RODNEY THOMPSON 540-314-9954
TRILEVATE LLC	10+ YRS	8229 BOONE BLVD #120, VIENNA, VA	JOE ROSS 703-639-4202
BLUEGRASS CELLULAR	15 YRS	2902 RING RD, ELIZABETHTOWN, KY	SEAN FOOZER 270-272-7166
HTC	14 YRS	3480 HWY 701N, CONWAY, SC	EACI JEFFERS 843-813-5589
SWIFT	12+ YRS	1621 McDEVITT DR, CULPEPER, VA	MARK EDMOTT 540-903-6163

4. List full names and addresses of Offeror and any branch offices which may be responsible for administering the contract.

CORSICO RF COMMUNICATIONS INC

137 MOUNT VIEW DR

AFTON VA 22920

(NO Branch Offices)

5. RELATIONSHIP WITH THE COMMONWEALTH OF VIRGINIA: Is any member of the firm an employee of the Commonwealth of Virginia who has a personal interest in this contract pursuant to the CODE OF VIRGINIA, SECTION 2.2-3100 - 3131?

☐ YES ☒ NO

IF YES, EXPLAIN:

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## ATTACHMENT B

### Small, Women and Minority-owned Businesses (SWaM) Utilization Plan

**Offeror Name:** CORSIO RF COMMUNICATIONS INC **Preparer Name:** MARK BOWERS

**Date:** 7-29-20

Is your firm a **Small Business Enterprise** certified by the Department of Small Business and Supplier Diversity (SBSD)? Yes ☐ No ☐

If yes, certification number: 708147 Certification date: Renewal entered 7-22-20

Is your firm a **Woman-owned Business Enterprise** certified by the Department of Small Business and Supplier Diversity (SBSD)? Yes ☐ No ☒

If yes, certification number: \_\_\_\_\_ Certification date: \_\_\_\_\_

Is your firm a **Minority-Owned Business Enterprise** certified by the Department of Small Business and Supplier Diversity (SBSD)? Yes ☐ No ☒

If yes, certification number: \_\_\_\_\_ Certification date: \_\_\_\_\_

Is your firm a **Micro Business** certified by the Department of Small Business and Supplier Diversity (SBSD)? Yes ☐ No ☐

If yes, certification number: 708147 Certification date: Applied for 7-22-20

**Instructions:** *Populate the table below to show your firm's plans for utilization of small, women-owned and minority-owned business enterprises in the performance of the contract. Describe plans to utilize SWaMs businesses as part of joint ventures, partnerships, subcontractors, suppliers, etc.*

**Small Business:** "Small business " means a business, independently owned or operated by one or more persons who are citizens of the United States or non-citizens who are in full compliance with United States immigration law, which, together with affiliates, has 250 or fewer employees, or average annual gross receipts of \$10 million or less averaged over the previous three years.

**Woman-Owned Business Enterprise:** A business concern which is at least 51 percent owned by one or more women who are U.S. citizens or legal resident aliens, or in the case of a corporation, partnership or limited liability company or other entity, at least 51 percent of the equity ownership interest in which is owned by one or more women, and whose management and daily business operations are controlled by one or more of such individuals. **For purposes of the SWAM Program, all certified women-owned businesses are also a small business enterprise.**

**Minority-Owned Business Enterprise:** A business concern which is at least 51 percent owned by one or more minorities or in the case of a corporation, partnership or limited liability company or other entity, at least 51 percent of the equity ownership interest in which is owned by one or more minorities and whose management and daily business operations are controlled by one or more of such individuals. **For purposes of the SWAM Program, all certified minority-owned businesses are also a small business enterprise.**

**Micro Business** is a certified Small Business under the SWaM Program and has no more than twenty-five (25) employees AND no more than \$3 million in average annual revenue over the three-year period prior to their certification.

**All small, women, and minority owned businesses must be certified by the Commonwealth of Virginia Department of Small Business and Supplier Diversity (SBSD) to be counted in the SWAM program. Certification applications are available through SBSD at 800-223-0671 in Virginia, 804-786-6585 outside Virginia, or online at <http://www.sbsd.virginia.gov/> (Customer Service).**

**RETURN OF THIS PAGE IS REQUIRED**

## Small, Women and Minority-owned Businesses (SWaM) Utilization Plan

Date Form Completed: 7-29-20

for this Proposal and Subsequent Contract

Address 137 MOUNTVIEW DR, AFTON VA 22920

[illegible]

RETURN OF THIS PAGE IS REQUIRED



# Request for Proposal

## **RFP# FDC-1078**

**Public Safety Distributed Antenna System  
(DAS)**

**June 29, 2020**



# REQUEST FOR PROPOSAL

## RFP# FDC-1078

**Issue Date:** June 29, 2020

**Title:** Public Safety Distributed Antenna System (DAS)

**Issuing Agency:** Commonwealth of Virginia  
James Madison University  
Procurement Services MSC 5720  
752 Ott Street, Wine Price Building  
First Floor, Suite 1023  
Harrisonburg, VA 22807

**Period of Contract:** From Date of Award Through One Year (Renewable)

**Sealed Proposals Will Be Received Until 2:00 PM on July 29, 2020 for Furnishing The Services Described Herein.**

**OPTIONAL PRE-PROPOSAL CONFERENCE CALL on July 14, 2020. Participation in this pre-proposal conference call is optional; however, pre-registration is required. Pre-register by completing and submitting the REGISTRATION FORM ON PAGE 1 of this RFP NO LATER THAN MONDAY, JULY 10, 2020. See Special Terms and Conditions, Item II.**

*SEALED PROPOSALS MAY BE MAILED, EXPRESS MAILED, OR HAND DELIVERED DIRECTLY TO THE ISSUING AGENCY SHOWN ABOVE.*

All Inquiries For Information And Clarification Should Be Directed To: Doug Chester, Buyer Senior, Procurement Services, [chestefd@jmu.edu](mailto:chestefd@jmu.edu); 540-568-4272; (Fax) 540-568-7935 not later than five business days before the proposal closing date.

**NOTE: THE SIGNED PROPOSAL AND ALL ATTACHMENTS SHALL BE RETURNED.**

In compliance with this Request for Proposal and to all the conditions imposed herein, the undersigned offers and agrees to furnish the goods/services in accordance with the attached signed proposal or as mutually agreed upon by subsequent negotiation.

Name and Address of Firm:

By: \_\_\_\_\_  
(Signature in Ink)

Name: \_\_\_\_\_  
(Please Print)

Date: \_\_\_\_\_ Title: \_\_\_\_\_

Web Address: \_\_\_\_\_ Phone: \_\_\_\_\_

Email: \_\_\_\_\_ Fax #: \_\_\_\_\_

ACKNOWLEDGE RECEIPT OF ADDENDUM: #1\_\_\_\_\_ #2\_\_\_\_\_ #3\_\_\_\_\_ #4\_\_\_\_\_ #5\_\_\_\_\_ (please initial)

**CONTRACTOR/SUBCONTRACTOR LICENSE REQUIREMENT:** By my signature on this solicitation, I certify that this firm/individual and subcontractor is properly licensed for providing the goods/services specified. License # \_\_\_\_\_ Type \_\_\_\_\_

SMALL, WOMAN OR MINORITY OWNED BUSINESS:

ÿ YES; ÿ NO; *IF YES* ÿ SMALL; ÿ WOMAN; ÿ MINORITY *IF MINORITY:* ÿ AA; ÿ HA; ÿ AsA; ÿ NW; ÿ Micro

**Note:** This public body does not discriminate against faith-based organizations in accordance with the *Code of Virginia*, § 2.2-4343.1 or against an offeror because of race, religion, color, sex, national origin, age, disability, or any other basis prohibited by state law relating to discrimination in employment.

# ***REQUEST FOR PROPOSAL***

***RFP # FDC-1078***

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# OPTIONAL PRE-PROPOSAL CONFERENCE CALL REGISTRATION FORM

## Pre-Registration is Required

**PRE-REGISTER FOR THE PRE-PROPOSAL CONFERENCE CALL BY COMPLETING THIS FORM AND RETURN TO DOUG CHESTER BY EMAIL TO [chestefd@jmu.edu](mailto:chestefd@jmu.edu) OR BY FAX TO 540-568-7935 BY 5:00 PM on July 10, 2020.**

RFP NUMBER: **FDC-1078**

PROJECT TITLE: **Public Safety Distributed Antenna System (DAS)**

CONFERENCE CALL DATE & TIME: **July 14, 2020 @ 10:00 AM EST.**

CALL-IN PHONE NUMBER: Call information will be provided to each registered offeror following their registration.

### **SPECIFY OFFEROR EMAIL TO RECEIVE CALL-IN INFORMATION:**

Email: \_\_\_\_\_

AGENDA: A pre-proposal conference will be held to go over key portions of the RFP and to answer questions offerors may have in regards.

COMPANY NAME: \_\_\_\_\_

ADDRESS: \_\_\_\_\_

\_\_\_\_\_

TELEPHONE NUMBER: \_\_\_\_\_ FAX NUMBER: \_\_\_\_\_

LIST THE NAME, TITLE, AND PHONE NUMBER OF THE INDIVIDUALS WHO WILL BE PARTICIPATING IN THE PRE-PROPOSAL CONFERENCE CALL.

Name	Title	Phone Number

## **I. PURPOSE**

The purpose of this Request for Proposal (RFP) is to solicit sealed proposals from qualified sources to enter into a contract to provide Public Safety Distributed Antenna System (PS DAS) installation and maintenance services for James Madison University (JMU), an agency of the Commonwealth of Virginia. Initial contract shall be for one (1) year with an option to renew for five (5) additional one-year periods.

## **II. BACKGROUND**

James Madison University (JMU) is a comprehensive public institution in Harrisonburg, Virginia with an enrollment of approximately 22,000 students and more than 4,000 faculty and staff. There are over 600 individual departments on campus that support seven (7) academic divisions. The University offers over 120 majors, minors, and concentrations. Further information about the University can be found at the following website: [www.jmu.edu](http://www.jmu.edu).

The JMU Telecommunications Department is responsible for providing and maintaining all voice and video communications for campus facilities as well as installing and terminating the physical layer of the data communication network. The department is also responsible for managing and coordinating all Radio Frequency related activities on campus.

The university is committed to being a safe place to work and learn and has determined to install infrastructure and equipment to support public safety communications in new buildings and major renovations. PS DAS of various manufacture and design are currently installed in eleven buildings on campus. Installed systems support not only public safety functionality but also day to day operational radio use by university staff in both 800MHZ and 450MHZ frequencies. (See Attachment F – JMU DAS Inventory).

## **III. SMALL, WOMAN-OWNED AND MINORITY PARTICIPATION**

It is the policy of the Commonwealth of Virginia to contribute to the establishment, preservation, and strengthening of small businesses and businesses owned by women and minorities, and to encourage their participation in State procurement activities. The Commonwealth encourages contractors to provide for the participation of small businesses and businesses owned by women and minorities through partnerships, joint ventures, subcontracts, and other contractual opportunities. Attachment B contains information on reporting spend data with subcontractors.

## **IV. STATEMENT OF NEEDS**

James Madison University desires to partner with a Contractor or multiple Contractors to install and maintain new Public Safety Distributed Antenna Systems (PS DAS), maintain existing PS DAS systems, and provide other Will-Call services related to the installation, maintenance, and repair of PS DAS systems. Offerors and any Offeror subcontractors must provide manufacture and industry certifications, and have a verifiable track record of skill and proficiency in providing the desired services.

Labor will be solicited as the needs of the University dictate. This could be in the form of requesting a quote for a job in total or labor to supplement ongoing maintenance efforts including emergency repairs. For jobs that require a proposal submittal, the Offeror should carefully consider the amount and character of the work to be done, as well as the difficulties involved in its proper execution. Offeror should include in their proposal all costs deemed necessary to cover all contingencies essential to successfully installing the specified solution. Any cost not specifically itemized in the

proposal shall not be incurred unless specifically agreed upon, in writing. No claims for compensation will be considered or allowed for extra work resulting from oversight of any existing conditions on the part of the Offeror. Acceptance shall be subject to completion of all work, successful post-installation testing yielding the specified pass ratings, and receipt of all deliverables.

**JMU Requests Offeror to provide optional pricing for vendor monitoring of on-campus DAS Systems.**

A. General

Describe in detail Offeror's approach to each of the following items. Provide as much detail as required to adequately respond and/or state Offeror's willingness to comply. Failure to provide responses to the items below may result in rejection and return of the proposal.

1. Provide a concise description of your organization. Include information on general organization, staffing, and experience in maintaining and upgrading systems/networks of comparable size. Include references and contact information in Attachment A "Offeror Data Sheet".
2. Provide a list of certifications/qualifications for permanent staff members that may be assigned to perform work at James Madison University.
3. If intending to use subcontractors in the fulfilment of any part of the contract, indicate the part(s) where subcontractors will be used, provide a list of subcontractors, and provide references.
4. Indicate Offeror's ability to furnish all necessary labor, supervision, tools, labeling and other equipment, testing and certification devices, to install, maintain, and repair PS DAS Systems.
5. Provide a list of equipment owned by the Offeror and/or Offeror's subcontractors to be used in fulfilling the contract. Include any calibration certificates.
6. Normal working hours for JMU are from 8:00 a.m. to 5:00 p.m., Monday through Friday, except observed holidays. Capital construction projects may require that the selected Contractor work a flexible schedule which may be defined by the General Contractor of that capital construction project. This may include, but is not limited to, a flexible work day or a flexible work week in order to meet fluctuating deadlines. **State Offeror's ability to meet these requirements.**
7. Changes to scope can only be initiated and/or issued by JMU Telecom, and must be tracked via a formal change order process. Invoices shall only be satisfied for the original scope of work and approved change orders. Invoices must include copies of the executed change order. **Describe Offeror's process for change orders and provide a copy of your standard change order form.**
8. Hours for work performed under this contract shall be paid only for productive time on the job site. Time spent for transportation of workers, handling and delivery of Contractor owned or rental equipment, and breaks for lunch or other time the employees are away from the job site is not chargeable. **State Offeror's ability to meet these requirements.**

9. JMU can provide secured space for advanced shipping and staging of project material. The Offeror is responsible maintaining inventory of project material through to completion of the project and for transporting material from JMU storage facility to the job site. **State Offeror's ability to meet these requirements.**
10. Maintain project sites to be clean and tidy throughout the workday. Debris generated by the Offeror is picked up and lawfully disposed of at the conclusion of each workday. Offeror may be responsible for removing and laying aside ceiling tiles during the installation, depending upon the scope of work. Offeror shall place ceiling tiles back in place by the end of each workday. **State Offeror's ability to meet these requirements.**
11. Initiate, maintain, and supervise all safety precautions and programs in connection with the work. This includes attending required safety training by JMU or its General Contractors and adherence to OSHA standards including, but not limited to, confined space procedures. **State Offeror's ability to meet these requirements.**

## B. New Installations

At some point during the life of the contract, JMU will purchase one or more PS DAS solutions. The purchases will coincide with and be procured through the university's Capital Construction process. A specific New System quote will be requested at that time. While all of the PS DAS solutions on campus to date have been Passive systems, JMU Telecommunications Department is not predisposed to, and has no preference for, any particular type of system (active or passive) or manufacturer model or brand. Offerors are encouraged to present as many strategies and products for meeting the stated needs as they desire. Offerors who wish to submit multiple strategies or products should indicate which strategy and product(s) best meet the needs stated and note the Offeror's best capability. Offerors are strongly encouraged to take great effort to point out best practices and solution feature sets that distinguish the Offeror and their proposed solution(s) from the competition.

### 1. Design

Offerors(s) will be asked to turnkey design, install, and commission PS DAS in accordance with JMU's standardized PS DAS design specifications. See Attachment E.

Any variances, discrepancies, or additional requirements from this standardized specification for JMU DAS/BDA Systems will be addressed in the corresponding sections of a separate but specific site related Scope of Work which will be issued prior to the time of procurement for any DAS/BDA design for new building, building refresh or system upgrade.

- a. State Offeror's ability to design and install systems to the design specs as indicated in attachment E.
- b. Provide examples of work performed that indicate Offeror is capable of providing the services requested. Include relevant certifications.
- c. Detail Offeror's design process. Include tool sets used and state deliverables beyond those required in JMU's design specification.
- d. During design and periodically throughout construction, acknowledge that Offeror shall commit to perform regular site surveys in order to:

1. Understand existing and/or changing site conditions, nearby DAS systems and the local RF environment to anticipate possible impacts to the future system design and to eliminate unforeseen conditions;
2. Understand any limitations associated with antenna mounting, cable routing, equipment spaces and placement, and power outlets;
3. Inspect condition of equipment grounding equipment;
4. Understand on-site signal levels within the building as the structure is enclosed;
5. Collect all necessary physical site information.

**6. State your ability to meet these design conditions.**

**2. Proposed Solution(s)**

- a. Proposed solution(s) must be in new condition for hardware and software. They must be sufficient to meet the needs of the university and be serviceable and supported in the condition sold by the manufacturer for five years from the date of sale.
- b. State as succinctly as possible the overall strategy(s), solution(s), etc. that Offeror is proposing to provide under this contract.
- c. Provide a list of base manufacturer(s) and model(s) you are proposing under this contract.
  1. Indicate whether proposed solution(s) is an Active or Passive system.
- d. Provide a list of any peripheral components you are proposing under this contract.
- e. Provide a letter of certification from the manufacturer authenticating the Offeror's and or Offer's subcontractor's qualifications and authorization to sell, distribute, install, warranty and service for all proposed solutions and peripherals.
- f. For each proposed solution(s), provide minimum and maximum area of coverage in square feet.
- g. For each proposed solution, provide average installed cost per square foot and detail price point breaks where costs per square foot coverage is impacted by economy of scale.
- h. In Pricing Structure of proposed solutions, indicate MSRP pricing and JMU discounted pricing for each proposed solution. Indicate Installation labor rates and how installation labor is calculated.
- i. Using proposed pricing structure, provide a sample quote for a solution providing PS DAS to all stories of a representative four story, 40,000 square foot building (See Attachment E – Sample Building Drawing).

Assume the following:

- Line of sight to donor source exists

- EPDM Roofing
- Brick Exterior
- Low E Glass Exterior Windows
- Steel Frame w/Metal Studs
- Standard Sheet Rock Wall Finish
- Concrete Floors
- RSSI Readings on the roof for required frequencies is -85 dB.
- RSSI throughout the interior of the building are -120dB.

j. **State your ability to meet these proposed solution(s) conditions.**

3. System Installation. **Acknowledge agreement to each of the following:**

- a. All equipment and materials shall remain the responsibility of the contractor until it is permanently installed and the installation approved by JMU the Authority Having Jurisdiction.
- b. Contractor commits to using industry, manufacturer, and JMU installation best practices during the fulfillment of this contract. Should a conflict arise, Contractor agrees to work with JMU to determine and adopt the higher standard.
- c. Contractor acknowledges that any required programming, alignment, and service software shall be supplied. All programming software shall be the latest version and be licensed to JMU.
- d. Prior to the commencement of site work, Contractor shall coordinate with the JMU IT Telecom Project Manager, to assure compliance with any special provisions applicable to the site. I.E. Safety Training, etc.
- e. All rubbish and debris associated with site preparation, unpacking of shipping material, and/or the installations related to this project, shall be removed from the premises daily by the Contractor.

4. Commissioning

Commissioning and Commission Testing is conducted by the Contractor with results submitted to JMU PM and JMU ITT for validation through inspections and verification performed by JMU FM and JMU ITT in cooperation with JMUPD and AHJ. At a minimum JMU has identified the following activities to be conducted as part of system commissioning.

**State Offerors ability to comply with and perform the following. Provide any additional recommended commissioning testing procedures/activities. Provide a sample of Offeror's standard commissioning document(s).**

- a. JMU may be required to use a specific commissioning document(s) as dictated by the Commonwealth of Virginia or JMU's Capital Planning and Construction program manager. **State Offeror's willingness to use that document.**
- b. Hardware Installations will be subject to inspection by JMU PM, JMU ITT and JMU FM Engineering for compliance with this specification. **State Offeror's acknowledgement of this condition.**

- c. The Contractor will be required to provide current documentation of the results of their BER testing of the as-built system at the time of the system commissioning to JMU ITT for system as-built archives in IBWC/IBX file format both WITH and WITHOUT grid overlays. IBWC files will show DAS hardware locations and designators. **State Offeror's acknowledgement of this this requirement.**
- d. Test all coax runs after connectors have been installed for return loss to the following specification:
  - 1. -25 dB return loss or lower across the frequency band of 450 to 862 MHz, with a precision 50 ohm load terminating the coax under test at the far end of each coax tested.
  - 2. Tabulate test results and plots for submission for approval.
  - 3. Tune repeater for gain and channel and filter bandwidth settings. For 800 MHz frequencies, narrowband, minimal delay filter mode is to be employed; filter bandwidth is to be 50 kHz, 31 second delay. Narrow bandwidths shall be used for UHF as well. Determine and install any uplink overload attenuators beyond any shown on the drawings to avoid uplink front end overload (-30 dBm peak uplink signals into repeater). Document all settings for submittal as part of the maintenance baseline document. Note that particular care needs to be taken to not radiate excess uplink noise back to the 800 MHz BTS site. Uplink noise figure of the BTS from this repeater shall be increased by less than 0.2 dB OR by a LOWER amount if required by the AHJ. The use of the uplink muting feature in the repeater may be required.
  - 4. Measure and record isolation between indoor antennas and outdoor antenna for both UHF and 800 MHz bands. Document for submittal as part of the maintenance baseline document.
  - 5. Record input spectrum from donor antenna on spectrum analyzer showing at least one channel in the active state in both UHF and 800 MHz systems, to show input downlink power levels. Use the spectrum analyzer on Max Hold for at least 30 minutes to detect any other strong potential interfering signals coming in from the donor antennas. (Cellular signals in the 862-894 MHz range are of particular concern and must be documented.) Document for submittal as part of the maintenance baseline document.
  - 6. Record repeater downlink output spectrum on spectrum analyzer showing at least one Harrisonburg-Rockingham County system channel in the active state, to show output downlink power levels. Document for submittal as part of the maintenance baseline document.
- e. Call quality tests must be met with the final system gain settings.
  - 1. If settings are changed after the call quality tests by more than 3 dB (to meet 800 MHz base site noise figure requirement as an example), then the call quality acceptance test procedure must be repeated. **State Offeror's acknowledgement of this requirement.**
- f. Downlink Coverage Levels - The facility shall be tested for coverage levels and to insure proper system settings and connections as follows:

1. A test antenna and spectrum analyzer shall be used to measure control channel power radiated from each of the system's indoor antennas for the 800 MHz system. The test antenna brand/model must be documented, and may be a test antenna with known gain, or the same antenna as specified for indoor omnidirectional antennas in this specification and is to be connected to the spectrum analyzer input via short jumper with loss of < 0.5 dB at 850 MHz.
  2. For indoor system antennas within 10' of the floor level, the test antenna shall be placed in as clear an area as possible at distance of 10' +/- 1' from the system antenna under test, and as close to the same horizontal plane as the antenna under test, and no more than 3' below the antenna under test. The level of the control channel on the spectrum analyzer shall be recorded.
  3. For indoor system antennas that are more than 10' above the floor, make the measurement at a location where the test antenna is within the specified vertical beam width of the antenna under test. Record both the spectrum analyzer reading and the horizontal distance between the test antenna and the system antenna under test. Note the test location in sufficient detail so that the test can be repeated as part of maintenance measurements.
  4. Care must be taken in spectrum analyzer bandwidth, detection, and sweep speed settings, as well as test antenna polarization, to ensure that the digital control channel levels are accurately displayed. 'Max hold' shall be used for recording the levels in systems that do not employ a control channel.
  5. These spectrum analyzer results must be compared with the computed EIRP from the systems antennas plus computed distance loss. Any deviation more than +/- 10 dB requires investigation as to the cause, and rectification of any problems found. Any antenna requiring fixes to meet this requirement must be re-tested after any repairs.
  6. These spectrum analyzer test results, along with the computed EIRP's from each antenna, are to be submitted as part of the final documentation. They can be in tabular or building plan view format. Note any non-standard test locations in sufficient detail so that the test can be repeated as part of maintenance measurements.
- g. Interferer and Repeater Filtering Tests:
1. Provide spectrum analyzer readings for the main repeater output in the downlink direction, showing any strong in-band signals that are not part of the JMU UHF system or the Harrisonburg-Rockingham County Regional 800 MHz trunked system. For the UHF band, use of Max Hold for at least 30 minutes during the hours of 8 AM to 5 PM local time is required for this test. For the 800 MHz band, show the frequency range of 851-894 MHz for at least 30 minutes in the same time period. A coupler on the repeater output may be used to prevent spectrum analyzer damage; the value of any such coupler used must be documented.
  2. Use of the repeaters internal spectrum analyzer function is not acceptable for these tests. However, such plots can be included as supplementary information.
- h. Uplink Noise Figure Checks for 800 MHz Base Station sites.

1. Confirmation from the AHJ must be received that no excess increase in uplink noise figure at the base station sites is being received after this DAS is put into operation. Target increase is to be less than 0.2 dB OR by a LOWER amount if required by the AHJ. ATP call quality tests must be met with the final uplink gain settings.

i. **State Offeror's acknowledgement of these commissioning requirements.**

5. Acceptance

User Acceptance Testing is performed by JMU ITT, JMUPD, and the AHJ to be approved by JMU ITT, AHJ & VSFM with documentation provided by Offeror and JMU PM.

Contractor shall coordinate testing with the, JMU IT Project Manager ONLY.

Testing team will include representatives from the Contractor, JMU IT Telecom, JMU Police & Safety, and Local Public Safety Providers (AHJ) including HRECC to ensure acceptable coverage and delivered audio quality to UHF & 800 Mhz System Users that operate within the coverage area.

JMU ITT will utilize their PCTel SeeGull IBFlex RF Scanner when available to test and document DAS coverage and signal strength in facility and/or manual perform Call Quality Tests as necessary to verify coverage area and actual signal strength meets established levels and Delivered Audio Quality (DAQ) specifications for acceptance by JMU and AHJ.

JMU ITT will use facility floorplan files provided by offeror in IBWC/IBX file format with grid overlays used to test general areas and to designate critical coverage areas.

JMU acknowledges that DAQ testing is subjective, but believes there is clear distinction between the levels of DAQ as defined. JMU will work with all evaluators to form consensus of delivered DAQ.

At a minimum JMU has identified the following user acceptance testing activities. **Based on Offeror's proposed solution, provide any additional recommended procedures.**

a. Call Quality Tests are to be conducted as follows:

1. Call Quality tests are to be conducted in all areas of the facility.
  - Most areas are to be tested as grid areas.
  - Critical individual spaces smaller than the grid size but larger than closets, are to be tested individually.
  - Testing may be done by individual room if their size and usage dictates and/or if building design makes it necessary to document specific room coverage.
  - Side halls (<20' long) may be tested as part of the grid.

2. Grid tested areas: Test point number and location.
  - Divide the grid tested areas into grid spaces sized 20' x 20' for confined individual office or academic spaces or 50' x 50' for general use open air arenas and parking structures or another pre-approved grid size) Each grid space is to be tested in its approximate center, and the test call within a grid space must exceed DAQ 3.4 for the grid space to pass.
  - Call quality of minimum DAQ 3.4 is to be recorded in each test grid area for both 800 Mhz and UHF on a DAQ Scale Score rating (i.e. – 3.4 or 4.0).
  - Propagated 800 Mhz Signal Strength at each test site should also be recorded in -dBm as indicated on Radios used for testing or Spectrum Analyzer.
3. Hallway testing: Test point numbers and locations.
  - Each major connecting hallway is to be tested every 30' along its length. Test in the center of the hall, and each test call at a hall test point must exceed DAQ 3.4 for the location to pass.
4. If a call fails in a grid space or individual area, then that grid space or individual area is to be re-tested in the center of smaller areas of approximately 10' x 10' each. The whole grid space or area is to be recorded as failed if this test fails in 2 or more of the 4 quadrants.
5. The system passes if the average of 95% or more of the test locations pass at a DAQ 4.0. If the system does not meet the targeted 95% requirement for DAQ 4.0. JMU ITT will have the option of accepting the system if it meets minimum of at least a DAQ 3.4 as required by AHJ, but must sign a letter of variance explaining why DAQ 4.0 was not achieved or JMU ITT may require the contractor to make necessary improvements to the system to achieve the overall DAQ 4.0 as specified in JMU's initial requirements.
6. Any calls that do not go through due to a system busy condition are not counted as pass or fail.
7. Call quality tests are to be conducted with multiple radios (4) provided by the AHJ that are in known good operating condition, and that meet specified power output, frequency accuracy, and receive sensitivity, and shall include at least one portable radio operated on-site in the test grid on 800 Mhz JMU ADM, a second portable radio on-site in close proximity to the test grid on JMU UHF ADMIN frequency, a third portable or mobile radio operated off-site operating on 800 Mhz JMU ADM and a radio console or remote control station operated from a communications center on the 800 Mhz JMU ADM talk group and on UHF JMU ADMIN.
  - This methodology will allow the multiple evaluators to test and record DAQ across both bandwidths simultaneously through the established gateway that links the two together.
  - Baseline testing should be done on each individual talkgroup/frequency, 800 Mhz (JMU ADM) and JMU UHF (ADMIN-R) to ensure that gatewayed

DAQ is representative of the DAQ on each talkgroup/frequency if tested individually.

- Contractor/Designer shall work through the JMU PM to provide electronic and hard copies of the Building Plan with Grid Overlay Test Recording Sheets to JMU ITT, JMUPD, AHJ, and VSFM at least 48 hours before the scheduled ATP.
- Building Plan with Grid Overlay Test Recording Sheets shall preferably be formatted and printed on 8.5" x 11" paper sheets as a representation of the corresponding floor plan to include assigned room numbers on the floorplan layer with font and lines printed in medium (50%) GREY.
- Multiple sheets per structure level/section are acceptable if the structures size requires blow-up views to be able to clearly record ATP results.
- Grid blocks (representing grid tested spaces sized 20' x 20' for confined individual office or academic spaces or 50' x 50' for general use open air arenas and parking structures or other pre-approved grid size) on the Test Scoring Sheets should be no smaller than 1/2" x 1/2" square and consist of outlines and font printed in RED for grid blocks that encompass any Designated Critical Coverage Areas and BLUE for all other grid blocks that encompass General Coverage Areas.
- Grid blocks shall be numbered sequentially starting in the upper left corner of the sheet and increasing from Left to Right across the rows, and from Top to Bottom as rows continue down the grid overlay on the page.
- Each DAS GRID TEST LOG SHEET will need a Header to include:  
Building Name; Floor Represented; Grid Numbers Included on this Particular Page; Blank for Evaluators Name; Blank for Evaluators Location & Method (i.e. - On-site 800 Mhz, On-Site UHF, Remote 800 Mhz, Remote UHF, JMUPD Console 800, JMU Stadium Console UHF, etc.) Blank for Date Test Performed.
- Each Evaluator will use the following format to transmit audio starting with the On-Site 800 Evaluator:
  1. "ON-SITE 800 TRANSMITTING, TEST, TEST, X FLOOR, GRID #"
  2. "ON-SITE UHF TRANSMITTING, TEST, TEST, X FLOOR, GRID #"
  3. "REMOTE 800 TRANSMITTING, TEST, TEST, X FLOOR, GRID #"
  4. "REMOTE UHF TRANSMITTING, TEST, TEST, X FLOOR, GRID #"
  5. "CONSOLE 800 TRANSMITTING, TEST, TEST, X FLOOR, GRID #"
  6. "CONSOLE UHF TRANSMITTING, TEST, TEST, X FLOOR, GRID #"
- Each evaluator will record their overall perceived DAQ quality test results in the specified grid block on their copy of the DAS GRID TEST LOG SHEET which corresponds to the grids on the Building Plan with Grid Overlay in the following format DAQ: 3.4 or 4.0; RSSI -dBm Mhz Signal Strength 82 or 95, 121, etc.).

- Any unusual call quality issues other than the prescribed DAQ / RSSI shall be thoroughly documented and reported to JMU PM, JMU ITT and the AHJ with a complete description of the symptoms, test conditions and include any recommended remedial actions that could or should be taken to resolve the issue.
- JMU ITT and the AHJ may allow alternative testing using RSSI and DAQ results from test TX/RX individually on designated 800 Mhz Talkgroups and UHF 450 frequencies or through established system gateways that will link specific frequencies and talkgroups and recorded in JMU ITT's PCTel SeaGull IBflex RF DAS Testing Unit.

**8. State Offeror's acknowledgement of these acceptance and testing requirements.**

**6. Documentation**

State Offeror's ability to provide/perform the following.

- Provide a detailed materials list and inventory of all installed equipment to include: Manufacturer; Model; Serial Number; Installation Date; Physical Address of all equipment to include Room Number or Descriptive Location on within the Interior or on the Exterior of Structure; Specify RX & TX Frequencies tuned to boost. Materials list should also include: JMU Building Name; 911 Street Address, Installing Vendor/Representative Name, Address and Contact Info; Maintenance/Warranty Vendor Name, Address and Contact info.
- Provide labelled digital images of all: Radio Repeaters; Signal Boosters; Different Antennae Types Deployed Internally and Externally; Equipment Cabinets; Roof Penetrations; Equipment Supporting Battery or UPS Hardware and Equipment Ground Connections.
- Provide comprehensive As-Built Diagrams in MS Visio or another approved format. Should also be included in IBCW/IBX floorplan files provided to JMU ITT when Commissioning and Acceptance Testing is performed.
- Provide electronic and hard copies of the Building Plans to included DAS Hardware Designations and Locations WITH and WITHOUT acceptable Grid Overlay in both IBCW/IBX and PDF File formats Testing and Recording to JMU ITT as specified in the Commissioning & Acceptance Testing Procedures Section of this policy at least 48 working hours prior to any type of Inspection or Testing.
- Provide supporting Spectrum Analyzer Graph and Report Print Outs from all tests and final inspections performed in electronic PDF format to demonstrate design progression and final as-delivered levels. Signal Strength Propagation coverage maps (i.e. - Heat Maps) shall be kept on file with JMU ITT RF Documentation from original acceptance of the installed system. These may be used for future comparison in the event of signal degradation, system failure, or future system refresh to compare differences or similarities.
- Provide all design propagation maps in electronic PDF format during design and testing phases of the project and shall be kept on file with JMU ITT RF

Documentation. These may be pulled out and compared to current RSSI signal strength conditions to see if something has degraded or changed to compare difference or similarities.

- g. Final acceptance will be granted once the all public safety authorities (JMU & Local AHJ) approve the performance of the DAS for public safety, first responders, daily users, and JMU accepts the DAS for use with their radio system, all punch list items have been completed and all documentation has been submitted and approved by JMU IT Telecom.

**h. State Offeror's acknowledgement of these documentation requirements.**

**7. Warranty**

Costs associated with base warranty and options shall be itemized and included in the pricing section of any design proposals for DAS installations at JMU.

**a. Acknowledge Offeror's ability to provide the following or suggest alternative. Indicate costs in Pricing Schedule Section X.**

- 1. All labor and equipment furnished, including hardware and software components, shall be fully warranted to be free from defects in material and workmanship for a period of one (1) year from the date of final acceptance.
  - 2. Provide optional annual costs for an extended equipment and software warranty for years two through five.
  - 3. Provide an extended prepaid warranty option covering five years of warranty.
- b. All preventive maintenance necessary for the system and its components shall be performed during the warranty period. This maintenance shall be limited to the hardware, software and firmware furnished by the Contractor.

**c. State Offeror's acknowledgement of these warranty requirements.**

**8. Maintenance**

The university has PS DAS installed in eleven buildings across campus. See Attachment F. The university intends to enter into a maintenance agreement for these existing systems and any system(s) purchased under this contract that move beyond warranty.

- 1. JMU expects such maintenance to be performed at regularly scheduled intervals in accordance with the recommendations of the manufacturer at a minimum. Offeror shall perform the agreed-upon preventive maintenance once annually during the original warranty period, during the entire life of any active extended maintenance contract with that contractor, or as often as recommended by the manufacturer in accordance with [REF: NFPA 1221, 11.3.9], whichever is more stringent.

Any potential costs associated with this type of support or service that will be the responsibility of JMU shall be clearly and individually identified in the pricing section of any proposals to provide DAS related Hardware or Services.

- a. State Offeror's ability and willingness to support the installed systems found on Attachment F.
- b. Provide a detailed description(s) of Offeror's maintenance plan(s) /options. **Ensure that the costs of the plan(s) are easily identifiable in Pricing Schedule Section X. Identify whether materials are included in the plan costs.**
  1. Indicate how maintenance costs are calculated for adding systems/locations to the plan and timing for making those adjustments to the plan.
- c. Include a schedule of maintenance tasks to be performed under each option. JMU has identified that at a minimum the plan should include the following tasks.
  1. Review any reports of degraded service since last test.
  2. Resolve nuisance malfunctions and/or failures. These are recurring operational or functional problems that prevent systems and/or equipment from providing the degree of reliability and services specified at the time of procurement or usefulness necessary for JMU operations, or cause JMU to assign significant resources to resolve on three or more occasions, on similar models of equipment. Such problems can be caused by software, firmware or hardware that is faulty or improperly designed, engineered, manufactured, installed or configured. It does not include degraded operation, which could be resolved through additional optimization within the term of the initial contract.
  3. Inspect All infrastructure hardware for signs of damage or malfunctions.
  4. Inspect All external antennas, cabling and grounds for signs of weathering, deterioration, or damage.
  5. Test all UPS batteries to ensure that they hold for prescribed durations, replace as necessary.
  6. Perform local and or remote manufacturer-recommended software and firmware updates.
  7. Conduct RSSI – Radio Signal Strength Indicator Testing either with a portable radio or spectrum analyzer in all areas listed as Critical Coverage Areas documenting current RSSI levels and all test locations.
  8. Perform spot testing throughout at least 25% of the remainder of the General Coverage Areas of the structure documenting current RSSI levels and all test locations.
  9. Conduct Full Grid RSSI level testing on any areas of the structure that may have been modified or had significant changes in usage or equipment present since last Maintenance/Warranty Test was conducted.
  10. Compare the results of current testing with RSSI documentation from original acceptance testing and last maintenance/warranty testing and/or any JMU ITT PCTel SeaGull IBflex RF DAS Testing Documentation to identify any discrepancies or variations in coverage.

11. Use results of testing to identify any areas that need hardware tuning, repair, or upgrades to meet required standards of coverage.
  12. Document any tuning, repairs, modifications or replacements to the system conducted as a result of this test.
  13. Submit all documentation to JMU ITT for DAS System Archive file.
- d. Provide a letter of certification from the manufacturer(s) authenticating the Offeror's and Offer's subcontractor's qualifications for warranty and maintenance services of systems noted in Attachment F and for any solutions proposed under this contract.
  - e. Define and provide Offeror's proposed service level agreement for providing emergency services to JMU. Define what constitutes an emergency. Include escalation procedures and contact information.
  - f. State Offeror's plan for ensuring technician certifications are kept up to date with changing technology and JMU's evolving environment.
  - g. The swift restoration of service is paramount to business continuity. Often that depends on replacing parts or dispatching personnel.
    1. List the location(s) of the nearest service center(s) having qualified technicians and containing repair parts for the JMU systems under contract.
    2. Describe the parts in stock in the local warehouse and available to JMU.
    3. Indicate those parts and quantities recommended to be stocked on campus as well as those to be stocked in the warehouse.
    4. If a required part is not immediately available on site or in the local warehouse, describe the approach for providing the part to JMU.
  - i. Describe Offeror's standard policy and any options available for covering lightening damaged equipment.
  - j. JMU requires annual performance testing and benchmarking against acceptance testing results for existing systems and for all new systems procured under this contract.
    1. Please describe your method for performing, documenting and providing test results. Include brand name of test equipment and identify the formats for presenting test results i.e. MS Word, PDF, MS Excel, etc.
  - k. Indicate for each existing or proposed PS DAS system/solution the availability of training for JMU personnel. Describe available training methods and state specific training locations. **State associated costs in Section X. Pricing Schedule.**
  - l. **In Pricing Schedule Section X, provide Time and Material (Will Call) pricing for providing services not covered under warranty or maintenance.** Include all costs the university should expect to incur.
  - m. **State Offeror's acknowledgement of these maintenance requirements.**

D. Other Services

Describe in detail any other products or services you are authorized to provide to JMU. Indicate whether these products/services are provided in-house or through third party partners. Provide manufacturer/provider letters of authorization. Detail pricing in Section X. Pricing Schedule

## V. PROPOSAL PREPARATION AND SUBMISSION

A. GENERAL INSTRUCTIONS

**To ensure timely and adequate consideration of your proposal, offerors are to limit all contact, whether verbal or written, pertaining to this RFP to the James Madison University Procurement Office for the duration of this Proposal process. Failure to do so may jeopardize further consideration of Offeror's proposal.**

1. RFP Response: In order to be considered for selection, the **Offeror shall submit a complete response to this RFP**; and shall submit to the issuing Purchasing Agency:
  - a. **One (1) original and four (4) copies** of the entire proposal, INCLUDING ALL ATTACHMENTS. Any proprietary information should be clearly marked in accordance with 3.f. below.
  - b. **One (1) electronic copy in WORD format or searchable PDF (*flash drive*)** of the entire proposal, INCLUDING ALL ATTACHMENTS. Any proprietary information should be clearly marked in accordance with 3.f. below.
  - c. Should the proposal contain **proprietary information**, provide **one (1) redacted hard copy** of the proposal and all attachments with **proprietary portions removed or blacked out**. This copy should be clearly marked "*Redacted Copy*" on the front cover. The classification of an entire proposal document, line item prices, and/or total proposal prices as proprietary or trade secrets is not acceptable. JMU shall not be responsible for the Contractor's failure to exclude proprietary information from this redacted copy.

No other distribution of the proposal shall be made by the Offeror.

2. The version of the solicitation issued by JMU Procurement Services, as amended by an addendum, is the mandatory controlling version of the document. Any modification of, or additions to, the solicitation by the Offeror shall not modify the official version of the solicitation issued by JMU Procurement services unless accepted in writing by the University. Such modifications or additions to the solicitation by the Offeror may be cause for rejection of the proposal; however, JMU reserves the right to decide, on a case-by-case basis in its sole discretion, whether to reject such a proposal. If the modification or additions are not identified until after the award of the contract, the controlling version of the solicitation document shall still be the official state form issued by Procurement Services.
3. Proposal Preparation
  - a. Proposals shall be signed by an authorized representative of the Offeror. All information requested should be submitted. Failure to submit all information requested

may result in the purchasing agency requiring prompt submissions of missing information and/or giving a lowered evaluation of the proposal. Proposals which are substantially incomplete or lack key information may be rejected by the purchasing agency. Mandatory requirements are those required by law or regulation or are such that they cannot be waived and are not subject to negotiation.

- b. Proposals shall be prepared simply and economically, providing a straightforward, concise description of capabilities to satisfy the requirements of the RFP. Emphasis should be placed on completeness and clarity of content.
- c. Proposals should be organized in the order in which the requirements are presented in the RFP. All pages of the proposal should be numbered. Each paragraph in the proposal should reference the paragraph number of the corresponding section of the RFP. It is also helpful to cite the paragraph number, sub letter, and repeat the text of the requirement as it appears in the RFP. If a response covers more than one page, the paragraph number and sub letter should be repeated at the top of the next page. The proposal should contain a table of contents which cross references the RFP requirements. Information which the offeror desires to present that does not fall within any of the requirements of the RFP should be inserted at the appropriate place or be attached at the end of the proposal and designated as additional material. Proposals that are not organized in this manner risk elimination from consideration if the evaluators are unable to find where the RFP requirements are specifically addressed.
- d. As used in this RFP, the terms “must”, “shall”, “should” and “may” identify the criticality of requirements. “Must” and “shall” identify requirements whose absence will have a major negative impact on the suitability of the proposed solution. Items labeled as “should” or “may” are highly desirable, although their absence will not have a large impact and would be useful, but are not necessary. Depending on the overall response to the RFP, some individual “must” and “shall” items may not be fully satisfied, but it is the intent to satisfy most, if not all, “must” and “shall” requirements. The inability of an offeror to satisfy a “must” or “shall” requirement does not automatically remove that offeror from consideration; however, it may seriously affect the overall rating of the offeror’s proposal.
- e. Each copy of the proposal should be bound or contained in a single volume where practical. All documentation submitted with the proposal should be contained in that single volume.
- f. Ownership of all data, materials and documentation originated and prepared for the State pursuant to the RFP shall belong exclusively to the State and be subject to public inspection in accordance with the Virginia Freedom of Information Act. Trade secrets or proprietary information submitted by the offeror shall not be subject to public disclosure under the Virginia Freedom of Information Act; however, the offeror must invoke the protection of Section 2.2-4342F of the Code of Virginia, in writing, either before or at the time the data is submitted. The written notice must specifically identify the data or materials to be protected and state the reasons why protection is necessary. The proprietary or trade secret materials submitted must be identified by some distinct method such as highlighting or underlining and must indicate only the specific words, figures, or paragraphs that constitute trade secret or proprietary information. The classification of an entire proposal document, line item prices and/or total proposal prices as proprietary or trade secrets is not acceptable and will result in rejection and return of the proposal.

4. Oral Presentation: Offerors who submit a proposal in response to this RFP may be required to give an oral presentation of their proposal to James Madison University. This provides an opportunity for the Offeror to clarify or elaborate on the proposal. This is a fact-finding and explanation session only and does not include negotiation. James Madison University will schedule the time and location of these presentations. Oral presentations are an option of the University and may or may not be conducted. Therefore, proposals should be complete.

**B. SPECIFIC PROPOSAL INSTRUCTIONS**

Proposals should be as thorough and detailed as possible so that James Madison University may properly evaluate your capabilities to provide the required services. Offerors are required to submit the following items as a complete proposal:

1. Return RFP cover sheet and all addenda acknowledgements, if any, signed and filled out as required.
2. Plan and methodology for providing the goods/services as described in Section IV. Statement of Needs of this Request for Proposal.
3. A written narrative statement to include, but not be limited to, the expertise, qualifications, and experience of the firm and resumes of specific personnel to be assigned to perform the work.
4. Offeror Data Sheet, included as *Attachment A* to this RFP.
5. Small Business Subcontracting Plan, included as *Attachment B* to this RFP. Offeror shall provide a Small Business Subcontracting plan which summarizes the planned utilization of Department of Small Business and Supplier Diversity (SBSD)-certified small businesses which include businesses owned by women and minorities, when they have received Department of Small Business and Supplier Diversity (SBSD) small business certification, under the contract to be awarded as a result of this solicitation. This is a requirement for all prime contracts in excess of \$100,000 unless no subcontracting opportunities exist.
6. Identify the amount of sales your company had during the last twelve months with each VASCUPP Member Institution. A list of VASCUPP Members can be found at: [www.VASCUPP.org](http://www.VASCUPP.org).
7. Proposed Cost. See Section X. Pricing Schedule of this Request for Proposal.

## **VI. EVALUATION AND AWARD CRITERIA**

**A. EVALUATION CRITERIA**

Proposals shall be evaluated by James Madison University using the following criteria:

1. Quality of products/services offered and suitability for intended purposes
2. Qualifications and experience of Offeror in providing the goods/services
3. Specific plans or methodology to be used to perform the services

4. Participation of Small, Women-Owned, & Minority (SWaM) Businesses
5. Cost

Allocation of points for evaluation criteria will be published to the eVA solicitation posting prior to the closing date and time.

- B. AWARD TO MULTIPLE OFFERORS: Selection shall be made of two or more offerors deemed to be fully qualified and best suited among those submitting proposals on the basis of the evaluation factors included in the Request for Proposals, including price, if so stated in the Request for Proposals. Negotiations shall be conducted with the offerors so selected. Price shall be considered, but need not be the sole determining factor. After negotiations have been conducted with each offeror so selected, the agency shall select the offeror which, in its opinion, has made the best proposal, and shall award the contract to that offeror. The Commonwealth reserves the right to make multiple awards as a result of this solicitation. The Commonwealth may cancel this Request for Proposals or reject proposals at any time prior to an award, and is not required to furnish a statement of the reasons why a particular proposal was not deemed to be the most advantageous. Should the Commonwealth determine in writing and in its sole discretion that only one offeror is fully qualified, or that one offeror is clearly more highly qualified than the others under consideration, a contract may be negotiated and awarded to that offeror. The award document will be a contract incorporating by reference all the requirements, terms and conditions of the solicitation and the contractor's proposal as negotiated.

## **VII. GENERAL TERMS AND CONDITIONS**

- A. PURCHASING MANUAL: This solicitation is subject to the provisions of the Commonwealth of Virginia's Purchasing Manual for Institutions of Higher Education and Their Vendors and any revisions thereto, which are hereby incorporated into this contract in their entirety. A copy of the manual is available for review at the purchasing office. In addition, the manual may be accessed electronically at <http://www.jmu.edu/procurement> or a copy can be obtained by calling Procurement Services at (540) 568-3145.
- B. APPLICABLE LAWS AND COURTS: This solicitation and any resulting contract shall be governed in all respects by the laws of the Commonwealth of Virginia and any litigation with respect thereto shall be brought in the courts of the Commonwealth. The Contractor shall comply with applicable federal, state and local laws and regulations.
- C. ANTI-DISCRIMINATION: By submitting their proposals, offerors certify to the Commonwealth that they will conform to the provisions of the Federal Civil Rights Act of 1964, as amended, as well as the Virginia Fair Employment Contracting Act of 1975, as amended, where applicable, the Virginians With Disabilities Act, the Americans With Disabilities Act and §10 of the Rules Governing Procurement, Chapter 2, Exhibit J, Attachment 1 (available for review at <http://www.jmu.edu/procurement>). If the award is made to a faith-based organization, the organization shall not discriminate against any recipient of goods, services, or disbursements made pursuant to the contract on the basis of the recipient's religion, religious belief, refusal to participate in a religious practice, or on the basis of race, age, color, gender or national origin and shall be subject to the same rules as other organizations that contract with public bodies to account for the use of the funds provided; however, if the faith-based organization segregates public funds into separate accounts, only the accounts and

programs funded with public funds shall be subject to audit by the public body. (*§6 of the Rules Governing Procurement*).

In every contract over \$10,000 the provisions in 1. and 2. below apply:

1. During the performance of this contract, the contractor agrees as follows:
    - a. The contractor will not discriminate against any employee or applicant for employment because of race, religion, color, sex, national origin, age, disability, or any other basis prohibited by state law relating to discrimination in employment, except where there is a bona fide occupational qualification reasonably necessary to the normal operation of the contractor. The contractor agrees to post in conspicuous places, available to employees and applicants for employment, notices setting forth the provisions of this nondiscrimination clause.
    - b. The contractor, in all solicitations or advertisements for employees placed by or on behalf of the contractor, will state that such contractor is an equal opportunity employer.
    - c. Notices, advertisements, and solicitations placed in accordance with federal law, rule, or regulation shall be deemed sufficient for the purpose of meeting these requirements.
  2. The contractor will include the provisions of 1. Above in every subcontract or purchase order over \$10,000, so that the provisions will be binding upon each subcontractor or vendor.
- D. ETHICS IN PUBLIC CONTRACTING: By submitting their proposals, offerors certify that their proposals are made without collusion or fraud and that they have not offered or received any kickbacks or inducements from any other offeror, supplier, manufacturer or subcontractor in connection with their proposal, and that they have not conferred on any public employee having official responsibility for this procurement transaction any payment, loan, subscription, advance, deposit of money, services or anything of more than nominal value, present or promised, unless consideration of substantially equal or greater value was exchanged.
- E. IMMIGRATION REFORM AND CONTROL ACT OF 1986: By entering into a written contract with the Commonwealth of Virginia, the Contractor certifies that the Contractor does not, and shall not during the performance of the contract for goods and services in the Commonwealth, knowingly employ an unauthorized alien as defined in the federal Immigration Reform and Control Act of 1986.
- F. DEBARMENT STATUS: By submitting their proposals, offerors certify that they are not currently debarred by the Commonwealth of Virginia from submitting proposals on contracts for the type of goods and/or services covered by this solicitation, nor are they an agent of any person or entity that is currently so debarred.
- G. ANTITRUST: By entering into a contract, the contractor conveys, sells, assigns, and transfers to the Commonwealth of Virginia all rights, title and interest in and to all causes of action it may now have or hereafter acquire under the antitrust laws of the United States and the Commonwealth of Virginia, relating to the particular goods or services purchased or acquired by the Commonwealth of Virginia under said contract.

- H. MANDATORY USE OF STATE FORM AND TERMS AND CONDITIONS RFPs: Failure to submit a proposal on the official state form provided for that purpose may be a cause for rejection of the proposal. Modification of or additions to the General Terms and Conditions of the solicitation may be cause for rejection of the proposal; however, the Commonwealth reserves the right to decide, on a case by case basis, in its sole discretion, whether to reject such a proposal.
- I. CLARIFICATION OF TERMS: If any prospective offeror has questions about the specifications or other solicitation documents, the prospective offeror should contact the buyer whose name appears on the face of the solicitation no later than five working days before the due date. Any revisions to the solicitation will be made only by addendum issued by the buyer.
- J. PAYMENT:
1. To Prime Contractor:
    - a. Invoices for items ordered, delivered and accepted shall be submitted by the contractor directly to the payment address shown on the purchase order/contract. All invoices shall show the state contract number and/or purchase order number; social security number (for individual contractors) or the federal employer identification number (for proprietorships, partnerships, and corporations).
    - b. Any payment terms requiring payment in less than 30 days will be regarded as requiring payment 30 days after invoice or delivery, whichever occurs last. This shall not affect offers of discounts for payment in less than 30 days, however.
    - c. All goods or services provided under this contract or purchase order, that are to be paid for with public funds, shall be billed by the contractor at the contract price, regardless of which public agency is being billed.
    - d. The following shall be deemed to be the date of payment: the date of postmark in all cases where payment is made by mail, or the date of offset when offset proceedings have been instituted as authorized under the Virginia Debt Collection Act.
    - e. Unreasonable Charges. Under certain emergency procurements and for most time and material purchases, final job costs cannot be accurately determined at the time orders are placed. In such cases, contractors should be put on notice that final payment in full is contingent on a determination of reasonableness with respect to all invoiced charges. Charges which appear to be unreasonable will be researched and challenged, and that portion of the invoice held in abeyance until a settlement can be reached. Upon determining that invoiced charges are not reasonable, the Commonwealth shall promptly notify the contractor, in writing, as to those charges which it considers unreasonable and the basis for the determination. A contractor may not institute legal action unless a settlement cannot be reached within thirty (30) days of notification. The provisions of this section do not relieve an agency of its prompt payment obligations with respect to those charges which are not in dispute (*Rules Governing Procurement, Chapter 2, Exhibit J, Attachment 1 § 53; available for review at <http://www.jmu.edu/procurement>*).

2. To Subcontractors:
    - a. A contractor awarded a contract under this solicitation is hereby obligated:
      - (1) To pay the subcontractor(s) within seven (7) days of the contractor's receipt of payment from the Commonwealth for the proportionate share of the payment received for work performed by the subcontractor(s) under the contract; or
      - (2) To notify the agency and the subcontractors, in writing, of the contractor's intention to withhold payment and the reason.
    - b. The contractor is obligated to pay the subcontractor(s) interest at the rate of one percent per month (unless otherwise provided under the terms of the contract) on all amounts owed by the contractor that remain unpaid seven (7) days following receipt of payment from the Commonwealth, except for amounts withheld as stated in (2) above. The date of mailing of any payment by U. S. Mail is deemed to be payment to the addressee. These provisions apply to each sub-tier contractor performing under the primary contract. A contractor's obligation to pay an interest charge to a subcontractor may not be construed to be an obligation of the Commonwealth.
  3. Each prime contractor who wins an award in which provision of a SWAM procurement plan is a condition to the award, shall deliver to the contracting agency or institution, on or before request for final payment, evidence and certification of compliance (subject only to insubstantial shortfalls and to shortfalls arising from subcontractor default) with the SWAM procurement plan. Final payment under the contract in question may be withheld until such certification is delivered and, if necessary, confirmed by the agency or institution, or other appropriate penalties may be assessed in lieu of withholding such payment.
  4. The Commonwealth of Virginia encourages contractors and subcontractors to accept electronic and credit card payments.
- K. PRECEDENCE OF TERMS: Paragraphs A through J of these General Terms and Conditions and the Commonwealth of Virginia Purchasing Manual for Institutions of Higher Education and their Vendors, shall apply in all instances. In the event there is a conflict between any of the other General Terms and Conditions and any Special Terms and Conditions in this solicitation, the Special Terms and Conditions shall apply.
- L. QUALIFICATIONS OF OFFERORS: The Commonwealth may make such reasonable investigations as deemed proper and necessary to determine the ability of the offeror to perform the services/furnish the goods and the offeror shall furnish to the Commonwealth all such information and data for this purpose as may be requested. The Commonwealth reserves the right to inspect offeror's physical facilities prior to award to satisfy questions regarding the offeror's capabilities. The Commonwealth further reserves the right to reject any proposal if the evidence submitted by, or investigations of, such offeror fails to satisfy the Commonwealth that such offeror is properly qualified to carry out the obligations of the contract and to provide the services and/or furnish the goods contemplated therein.
- M. TESTING AND INSPECTION: The Commonwealth reserves the right to conduct any test/inspection it may deem advisable to assure goods and services conform to the specifications.

- N. ASSIGNMENT OF CONTRACT: A contract shall not be assignable by the contractor in whole or in part without the written consent of the Commonwealth.
- O. CHANGES TO THE CONTRACT: Changes can be made to the contract in any of the following ways:
1. The parties may agree in writing to modify the scope of the contract. An increase or decrease in the price of the contract resulting from such modification shall be agreed to by the parties as a part of their written agreement to modify the scope of the contract.
  2. The Purchasing Agency may order changes within the general scope of the contract at any time by written notice to the contractor. Changes within the scope of the contract include, but are not limited to, things such as services to be performed, the method of packing or shipment, and the place of delivery or installation. The contractor shall comply with the notice upon receipt. The contractor shall be compensated for any additional costs incurred as the result of such order and shall give the Purchasing Agency a credit for any savings. Said compensation shall be determined by one of the following methods:
    - a. By mutual agreement between the parties in writing; or
    - b. By agreeing upon a unit price or using a unit price set forth in the contract, if the work to be done can be expressed in units, and the contractor accounts for the number of units of work performed, subject to the Purchasing Agency's right to audit the contractor's records and/or to determine the correct number of units independently; or
    - c. By ordering the contractor to proceed with the work and keep a record of all costs incurred and savings realized. A markup for overhead and profit may be allowed if provided by the contract. The same markup shall be used for determining a decrease in price as the result of savings realized. The contractor shall present the Purchasing Agency with all vouchers and records of expenses incurred and savings realized. The Purchasing Agency shall have the right to audit the records of the contractor as it deems necessary to determine costs or savings. Any claim for an adjustment in price under this provision must be asserted by written notice to the Purchasing Agency within thirty (30) days from the date of receipt of the written order from the Purchasing Agency. If the parties fail to agree on an amount of adjustment, the question of an increase or decrease in the contract price or time for performance shall be resolved in accordance with the procedures for resolving disputes provided by the Disputes Clause of this contract or, if there is none, in accordance with the disputes provisions of the Commonwealth of Virginia Purchasing Manual for Institutions of Higher Education and their Vendors. Neither the existence of a claim nor a dispute resolution process, litigation or any other provision of this contract shall excuse the contractor from promptly complying with the changes ordered by the Purchasing Agency or with the performance of the contract generally.
- P. DEFAULT: In case of failure to deliver goods or services in accordance with the contract terms and conditions, the Commonwealth, after due oral or written notice, may procure them from other sources and hold the contractor responsible for any resulting additional purchase and administrative costs. This remedy shall be in addition to any other remedies which the Commonwealth may have.
- Q. INSURANCE: By signing and submitting a proposal under this solicitation, the offeror certifies that if awarded the contract, it will have the following insurance coverage at the time the contract is awarded. For construction contracts, if any subcontractors are involved, the

subcontractor will have workers' compensation insurance in accordance with § 25 of the Rules Governing Procurement – Chapter 2, Exhibit J, Attachment 1, and 65.2-800 et. Seq. of the Code of Virginia (available for review at <http://www.jmu.edu/procurement>) The offeror further certifies that the contractor and any subcontractors will maintain these insurance coverages during the entire term of the contract and that all insurance coverage will be provided by insurance companies authorized to sell insurance in Virginia by the Virginia State Corporation Commission.

**MINIMUM INSURANCE COVERAGES AND LIMITS REQUIRED FOR MOST CONTRACTS:**

1. **Workers' Compensation:** Statutory requirements and benefits. Coverage is compulsory for employers of three or more employees, to include the employer. Contractors who fail to notify the Commonwealth of increases in the number of employees that change their workers' compensation requirement under the Code of Virginia during the course of the contract shall be in noncompliance with the contract.
  2. **Employer's Liability:** \$100,000
  3. **Commercial General Liability:** \$1,000,000 per occurrence and \$2,000,000 in the aggregate. Commercial General Liability is to include bodily injury and property damage, personal injury and advertising injury, products and completed operations coverage. The Commonwealth of Virginia must be named as an additional insured and so endorsed on the policy.
  4. **Automobile Liability:** \$1,000,000 combined single limit. *(Required only if a motor vehicle not owned by the Commonwealth is to be used in the contract. Contractor must assure that the required coverage is maintained by the Contractor (or third party owner of such motor vehicle.)*
- R. **ANNOUNCEMENT OF AWARD:** Upon the award or the announcement of the decision to award a contract over \$100,000, as a result of this solicitation, the purchasing agency will publicly post such notice on the DGS/DPS eVA web site ([www.eva.virginia.gov](http://www.eva.virginia.gov)) for a minimum of 10 days.
- S. **DRUG-FREE WORKPLACE:** During the performance of this contract, the contractor agrees to (i) provide a drug-free workplace for the contractor's employees; (ii) post in conspicuous places, available to employees and applicants for employment, a statement notifying employees that the unlawful manufacture, sale, distribution, dispensation, possession, or use of a controlled substance or marijuana is prohibited in the contractor's workplace and specifying the actions that will be taken against employees for violations of such prohibition; (iii) state in all solicitations or advertisements for employees placed by or on behalf of the contractor that the contractor maintains a drug-free workplace; and (iv) include the provisions of the foregoing clauses in every subcontract or purchase order of over \$10,000, so that the provisions will be binding upon each subcontractor or vendor.  
For the purposes of this section, "drug-free workplace" means a site for the performance of work done in connection with a specific contract awarded to a contractor, the employees of whom are prohibited from engaging in the unlawful manufacture, sale, distribution, dispensation, possession or use of any controlled substance or marijuana during the performance of the contract.
- T. **NONDISCRIMINATION OF CONTRACTORS:** An offeror, or contractor shall not be discriminated against in the solicitation or award of this contract because of race, religion, color, sex, national origin, age, disability, faith-based organizational status, any other basis

prohibited by state law relating to discrimination in employment or because the offeror employs ex-offenders unless the state agency, department or institution has made a written determination that employing ex-offenders on the specific contract is not in its best interest. If the award of this contract is made to a faith-based organization and an individual, who applies for or receives goods, services, or disbursements provided pursuant to this contract objects to the religious character of the faith-based organization from which the individual receives or would receive the goods, services, or disbursements, the public body shall offer the individual, within a reasonable period of time after the date of his objection, access to equivalent goods, services, or disbursements from an alternative provider.

- U. eVA BUSINESS TO GOVERNMENT VENDOR REGISTRATION, CONTRACTS, AND ORDERS: The eVA Internet electronic procurement solution, website portal [www.eVA.virginia.gov](http://www.eVA.virginia.gov), streamlines and automates government purchasing activities in the Commonwealth. The eVA portal is the gateway for vendors to conduct business with state agencies and public bodies. All vendors desiring to provide goods and/or services to the Commonwealth shall participate in the eVA Internet eprocurement solution by completing the free eVA Vendor Registration. All offerors must register in eVA and pay the Vendor Transaction Fees specified below; failure to register will result in the proposal being rejected. Vendor transaction fees are determined by the date the original purchase order is issued and the current fees are as follows:

Vendor transaction fees are determined by the date the original purchase order is issued and the current fees are as follows:

1. For orders issued July 1, 2014 and after, the Vendor Transaction Fee is:
  - a. Department of Small Business and Supplier Diversity (SBSD) certified Small Businesses: 1% capped at \$500 per order.
  - b. Businesses that are not Department of Small Business and Supplier Diversity (SBSD) certified Small Businesses: 1% capped at \$1,500 per order.
2. For orders issued prior to July 1, 2014 the vendor transaction fees can be found at [www.eVA.virginia.gov](http://www.eVA.virginia.gov).
3. The specified vendor transaction fee will be invoiced by the Commonwealth of Virginia Department of General Services approximately 60 days after the corresponding purchase order is issued and payable 30 days after the invoice date. Any adjustments (increases/decreases) will be handled through purchase order changes.

- V. AVAILABILITY OF FUNDS: It is understood and agreed between the parties herein that the Commonwealth of Virginia shall be bound hereunder only to the extent of the funds available or which may hereafter become available for the purpose of this agreement.

- W. PRICING CURRENCY: Unless stated otherwise in the solicitation, offerors shall state offered prices in U.S. dollars.

- X. E-VERIFY REQUIREMENT OF ANY CONTRACTOR: Any employer with more than an average of 50 employees for the previous 12 months entering into a contract in excess of \$50,000 with James Madison University to perform work or provide services pursuant to such contract shall register and participate in the E-Verify program to verify information and work authorization of its newly hired employees performing work pursuant to any awarded contract.

## VIII. SPECIAL TERMS AND CONDITIONS

- A. AUDIT: The Contractor hereby agrees to retain all books, records, systems, and other documents relative to this contract for five (5) years after final payment, or until audited by the Commonwealth of Virginia, whichever is sooner. The Commonwealth of Virginia, its authorized agents, and/or State auditors shall have full access to and the right to examine any of said materials during said period.
- B. CANCELLATION OF CONTRACT: James Madison University reserves the right to cancel and terminate any resulting contract, in part or in whole, without penalty, upon 60 days written notice to the contractor. In the event the initial contract period is for more than 12 months, the resulting contract may be terminated by either party, without penalty, after the initial 12 months of the contract period upon 60 days written notice to the other party. Any contract cancellation notice shall not relieve the contractor of the obligation to deliver and/or perform on all outstanding orders issued prior to the effective date of cancellation.
- C. IDENTIFICATION OF PROPOSAL ENVELOPE: The signed proposal should be returned in a separate envelope or package, sealed and identified as follows:

From: \_\_\_\_\_

_____	_____	_____	_____
Name of Offeror	Due Date	Time	
_____		_____	
Street or Box No.		RFP #	
_____		_____	
City, State, Zip Code		RFP Title	
_____			
Name of Purchasing Officer:			

The envelope should be addressed as directed on the title page of the solicitation.

The Offeror takes the risk that if the envelope is not marked as described above, it may be inadvertently opened and the information compromised, which may cause the proposal to be disqualified. Proposals may be hand-delivered to the designated location in the office issuing the solicitation. No other correspondence or other proposals should be placed in the envelope.

- D. LATE PROPOSALS: To be considered for selection, proposals must be received by the issuing office by the designated date and hour. The official time used in the receipt of proposals is that time on the automatic time stamp machine in the issuing office. Proposals received in the issuing office after the date and hour designated are automatically non responsive and will not be considered. The University is not responsible for delays in the delivery of mail by the U.S. Postal Service, private couriers, or the intra university mail system. It is the sole responsibility of the Offeror to ensure that its proposal reaches the issuing office by the designated date and hour.
- E. UNDERSTANDING OF REQUIREMENTS: It is the responsibility of each offeror to inquire about and clarify any requirements of this solicitation that is not understood. The University will not be bound by oral explanations as to the meaning of specifications or language contained in this solicitation. Therefore, all inquiries deemed to be substantive in nature must be in writing and submitted to the responsible buyer in the Procurement Services Office. Offerors must ensure that written inquiries reach the buyer at least five (5) days prior to the time set for receipt of offerors proposals. A copy of all queries and the respective response will be provided in the form of an addendum to all offerors who have indicated an interest in responding to this

solicitation. Your signature on your Offer certifies that you fully understand all facets of this solicitation. These questions may be sent by Fax to 540/568-7935.

- F. RENEWAL OF CONTRACT: This contract may be renewed by the Commonwealth for a period of five (5) successive one year periods under the terms and conditions of the original contract except as stated in 1. and 2. below. Price increases may be negotiated only at the time of renewal. Written notice of the Commonwealth's intention to renew shall be given approximately 90 days prior to the expiration date of each contract period.
1. If the Commonwealth elects to exercise the option to renew the contract for an additional one-year period, the contract price(s) for the additional one year shall not exceed the contract price(s) of the original contract increased/decreased by no more than the percentage increase/decrease of the other services category of the CPI-W section of the Consumer Price Index of the United States Bureau of Labor Statistics for the latest twelve months for which statistics are available.
  2. If during any subsequent renewal periods, the Commonwealth elects to exercise the option to renew the contract, the contract price(s) for the subsequent renewal period shall not exceed the contract price(s) of the previous renewal period increased/decreased by more than the percentage increase/decrease of the other services category of the CPI-W section of the Consumer Price Index of the United States Bureau of Labor Statistics for the latest twelve months for which statistics are available.
- G. SUBMISSION OF INVOICES: All invoices shall be submitted within sixty days of contract term expiration for the initial contract period as well as for each subsequent contract renewal period. Any invoices submitted after the sixty day period will not be processed for payment.
- H. OPERATING VEHICLES ON JAMES MADISON UNIVERSITY CAMPUS: Operating vehicles on sidewalks, plazas, and areas heavily used by pedestrians is prohibited. In the unlikely event a driver should find it necessary to drive on James Madison University sidewalks, plazas, and areas heavily used by pedestrians, the driver must yield to pedestrians. For a complete list of parking regulations, please go to [www.jmu.edu/parking](http://www.jmu.edu/parking); or to acquire a service representative parking permit, contact Parking Services at 540.568.3300. The safety of our students, faculty and staff is of paramount importance to us. Accordingly, violators may be charged.
- I. COOPERATIVE PURCHASING / USE OF AGREEMENT BY THIRD PARTIES: It is the intent of this solicitation and resulting contract(s) to allow for cooperative procurement. Accordingly, any public body, (to include government/state agencies, political subdivisions, etc.), cooperative purchasing organizations, public or private health or educational institutions or any University related foundation and affiliated corporations may access any resulting contract if authorized by the Contractor.

Participation in this cooperative procurement is strictly voluntary. If authorized by the Contractor(s), the resultant contract(s) will be extended to the entities indicated above to purchase goods and services in accordance with contract terms. As a separate contractual relationship, the participating entity will place its own orders directly with the Contractor(s) and shall fully and independently administer its use of the contract(s) to include contractual disputes, invoicing and payments without direct administration from the University. No modification of this contract or execution of a separate agreement is required to participate; however, the participating entity and the Contractor may modify the terms and conditions of this contract to accommodate specific governing laws, regulations, policies, and business goals

required by the participating entity. Any such modification will apply solely between the participating entity and the Contractor.

The Contractor will notify the University in writing of any such entities accessing this contract. The Contractor will provide semi-annual usage reports for all entities accessing the contract. The University shall not be held liable for any costs or damages incurred by any other participating entity as a result of any authorization by the Contractor to extend the contract. It is understood and agreed that the University is not responsible for the acts or omissions of any entity and will not be considered in default of the contract no matter the circumstances.

Use of this contract(s) does not preclude any participating entity from using other contracts or competitive processes as needed.

J. SMALL BUSINESS SUBCONTRACTING AND EVIDENCE OF COMPLIANCE:

1. It is the goal of the Commonwealth that 42% of its purchases are made from small businesses. This includes discretionary spending in prime contracts and subcontracts. All potential offerors are required to submit a Small Business Subcontracting Plan. Unless the offeror is registered as a Department of Small Business and Supplier Diversity (SBSD)-certified small business and where it is practicable for any portion of the awarded contract to be subcontracted to other suppliers, the contractor is encouraged to offer such subcontracting opportunities to SBSD-certified small businesses. This shall not exclude SBSD-certified women-owned and minority-owned businesses when they have received SBSD small business certification. No offeror or subcontractor shall be considered a Small Business, a Women-Owned Business or a Minority-Owned Business unless certified as such by the Department of Small Business and Supplier Diversity (SBSD) by the due date for receipt of proposals. If small business subcontractors are used, the prime contractor agrees to report the use of small business subcontractors by providing the purchasing office at a minimum the following information: name of small business with the SBSD certification number or FEIN, phone number, total dollar amount subcontracted, category type (small, women-owned, or minority-owned), and type of product/service provided. **This information shall be submitted to: JMU Office of Procurement Services, Attn: SWAM Subcontracting Compliance, MSC 5720, Harrisonburg, VA 22807.**
2. Each prime contractor who wins an award in which provision of a small business subcontracting plan is a condition of the award, shall deliver to the contracting agency or institution with every request for payment, evidence of compliance (subject only to insubstantial shortfalls and to shortfalls arising from subcontractor default) with the small business subcontracting plan. **This information shall be submitted to: JMU Office of Procurement Services, SWAM Subcontracting Compliance, MSC 5720, Harrisonburg, VA 22807.** When such business has been subcontracted to these firms and upon completion of the contract, the contractor agrees to furnish the purchasing office at a minimum the following information: name of firm with the Department of Small Business and Supplier Diversity (SBSD) certification number or FEIN number, phone number, total dollar amount subcontracted, category type (small, women-owned, or minority-owned), and type of product or service provided. Payment(s) may be withheld until compliance with the plan is received and confirmed by the agency or institution. The agency or institution reserves the right to pursue other appropriate remedies to include, but not be limited to, termination for default.
3. Each prime contractor who wins an award valued over \$200,000 shall deliver to the contracting agency or institution with every request for payment, information on use of subcontractors that are not Department of Small Business and Supplier Diversity (SBSD)-

certified small businesses. When such business has been subcontracted to these firms and upon completion of the contract, the contractor agrees to furnish the purchasing office at a minimum the following information: name of firm, phone number, FEIN number, total dollar amount subcontracted, and type of product or service provided. **This information shall be submitted to: JMU Office of Procurement Services, Attn: SWAM Subcontracting Compliance, MSC 5720, Harrisonburg, VA 22807.**

- K. AUTHORIZATION TO CONDUCT BUSINESS IN THE COMMONWEALTH: A contractor organized as a stock or nonstock corporation, limited liability company, business trust, or limited partnership or registered as a registered limited liability partnership shall be authorized to transact business in the Commonwealth as a domestic or foreign business entity if so required by Title 13.1 or Title 50 of the Code of Virginia or as otherwise required by law. Any business entity described above that enters into a contract with a public body shall not allow its existence to lapse or its certificate of authority or registration to transact business in the Commonwealth, if so required under Title 13.1 or Title 50, to be revoked or cancelled at any time during the term of the contract. A public body may void any contract with a business entity if the business entity fails to remain in compliance with the provisions of this section.
- L. PUBLIC POSTING OF COOPERATIVE CONTRACTS: James Madison University maintains a web-based contracts database with a public gateway access. Any resulting cooperative contract/s to this solicitation will be posted to the publicly accessible website. Contents identified as proprietary information will not be made public.
- M. CRIMINAL BACKGROUND CHECKS OF PERSONNEL ASSIGNED BY CONTRACTOR TO PERFORM WORK ON JMU PROPERTY: The Contractor shall obtain criminal background checks on all of their contracted employees who will be assigned to perform services on James Madison University property. The results of the background checks will be directed solely to the Contractor. The Contractor bears responsibility for confirming to the University contract administrator that the background checks have been completed prior to work being performed by their employees or subcontractors. The Contractor shall only assign to work on the University campus those individuals whom it deems qualified and permissible based on the results of completed background checks. Notwithstanding any other provision herein, and to ensure the safety of students, faculty, staff and facilities, James Madison University reserves the right to approve or disapprove any contract employee that will work on JMU property. Disapproval by the University will solely apply to JMU property and should have no bearing on the Contractor's employment of an individual outside of James Madison University.
- N. INDEMNIFICATION: Contractor agrees to indemnify, defend and hold harmless the Commonwealth of Virginia, its officers, agents, and employees from any claims, damages and actions of any kind or nature, whether at law or in equity, arising from or caused by the use of any materials, goods, or equipment of any kind or nature furnished by the contractor/any services of any kind or nature furnished by the contractor, provided that such liability is not attributable to the sole negligence of the using agency or to failure of the using agency to use the materials, goods, or equipment in the manner already and permanently described by the contractor on the materials, goods or equipment delivered.
- O. ADDITIONAL GOODS AND SERVICES: The University may acquire other goods or services that the supplier provides than those specifically solicited. The University reserves the right, subject to mutual agreement, for the Contractor to provide additional goods and/or services under the same pricing, terms, and conditions and to make modifications or enhancements to the existing goods and services. Such additional goods and services may include other products, components, accessories, subsystems, or related services that are newly

introduced during the term of this Agreement. Such additional goods and services will be provided to the University at favored nations pricing, terms, and conditions.

- P. ADVERTISING: In the event a contract is awarded for supplies, equipment, or services resulting from this proposal, no indication of such sales or services to James Madison University will be used in product literature or advertising without the express written consent of the University. The contractor shall not state in any of its advertising or product literature that James Madison University has purchased or uses any of its products or services, and the contractor shall not include James Madison University in any client list in advertising and promotional materials without the express written consent of the University.
- Q. ELECTRICAL EQUIPMENT STANDARDS: All equipment/material shall conform to the latest issue of all applicable standards as established by National Electrical Manufacturer's Association (NEMA), American National Standards Institute (ANSI), and Occupational Safety & Health Administration (OSHA). All equipment and material, for which there are OSHA standards, shall bear an appropriate label of approval for use intended from a Nationally Recognized Testing Laboratory (NRTL).
- R. PRIME CONTRACTOR RESPONSIBILITIES: The contractor shall be responsible for completely supervising and directing the work under this contract and all subcontractors that he may utilize, using his best skill and attention. Subcontractors who perform work under this contract shall be responsible to the prime contractor. The contractor agrees that he is as fully responsible for the acts and omissions of his subcontractors and of persons employed by them as he is for the acts and omissions of his own employees.
- S. SUBCONTRACTS: No portion of the work shall be subcontracted without prior written consent of the purchasing agency. In the event that the contractor desires to subcontract some part of the work specified herein, the contractor shall furnish the purchasing agency the names, qualifications and experience of their proposed subcontractors. The contractor shall, however, remain fully liable and responsible for the work to be done by its subcontractor(s) and shall assure compliance with all requirements of the contract.
- T. CONTINUITY OF SERVICES: The Contractor recognizes that the services under this contract are vital to the Agency and must be continued without interruption and that, upon contract expiration, a successor, either the Agency or another contractor, may continue them. The Contractor agrees:
1. To exercise its best efforts and cooperation to effect an orderly and efficient transition to a successor;
  2. To make all Agency owned facilities, equipment, and data available to any successor at an appropriate time prior to the expiration of the contract to facilitate transition to successor; and
  3. That the Agency Contracting Officer shall have final authority to resolve disputes related to the transition of the contract from the Contractor to its successor.

The Contractor shall, upon written notice from the Contract Officer, furnish phase-in/phase-out services for up to ninety (90) days after this contract expires and shall negotiate in good faith a plan with the successor to execute the phase-in/phase-out services. This plan shall be subject to the Contract Officer's approval.

The Contractor shall be reimbursed for all reasonable, pre-approved phase-in/phase-out costs (i.e., costs incurred within the agreed period after contract expiration that result from phase-in,

phase-out operations) and a fee (profit) not to exceed a pro rata portion of the fee (profit) under this contract. All phase-in/phase-out work fees must be approved by the Contract Officer in writing prior to commencement of said work.

- U. NEW EQUIPMENT: Unless otherwise expressly stated in this solicitation, any equipment furnished under the contract shall be new, unused equipment.
- V. REPAIR PARTS: In the event that the performance of maintenance services under the contract results in a need to replace defective parts, such items may only be replaced by new parts. In no instance shall the contractor be permitted to replace defective items with refurbished, remanufactured, or surplus items without prior written authorization of the Commonwealth.
- W. EXCESSIVE DOWNTIME: Equipment or software furnished under the contract shall be capable of continuous operation. Should the equipment or software become inoperable for a period of more than 24 hours, the contractor agrees to pro-rate maintenance charges to account for each full day of in operability. The period of in operability shall commence upon initial notification. In the event the equipment or software remains inoperable for more than two (2) consecutive calendar days, the contractor shall promptly replace the equipment or software at no charge upon request of the procuring agency. Such replacement shall be with new, unused product(s) of comparable quality, and must be installed and operational within two (2) days following the request for replacement.
- X. WORK SITE DAMAGES: Any damage to existing utilities, equipment or finished surfaces resulting from the performance of this contract shall be repaired to the Commonwealth's satisfaction at the contractor's expense.
- Y. WARRANTY (COMMERCIAL): The contractor agrees that the goods or services furnished under any award resulting from this solicitation shall be covered by the most favorable commercial warranties the contractor gives any customer for such goods or services and that the rights and remedies provided therein are in addition to and do not limit those available to the Commonwealth by any other clause of this solicitation. A copy of this warranty should be furnished with the proposal.
- Z. WARRANTY AGAINST SHUTDOWN DEVICES: The contractor warrants that the equipment and software provided under the contract shall not contain any lock, counter, CPU reference, virus, worm, or other device capable of halting operations or erasing or altering data or programs. Contractor further warrants that neither it, nor its agents, employees, or subcontractors shall insert any shutdown device following delivery of the equipment and software.
- AA. QUALIFIED REPAIR PERSONNEL: All warranty or maintenance services to be performed on the items specified in this solicitation as well as any associated hardware or software shall be performed by qualified technicians properly authorized by the manufacturer to perform such services. The Commonwealth reserves the right to require proof of certification prior to award and at any time during the term of the contract.
- BB. STANDARDS OF CONDUCT: The work site will be occupied by students and University Personnel during the times work is performed. Contractor and Contractor's personnel shall exercise a particularly high level of discipline, safety and cooperation at all times while on the job site. The Contractor shall be responsible for controlling employee conduct, for assuring that its employees are not boisterous or rude, and assuring that they are not engaging in any destructive or criminal activity. The Contractor is also responsible for ensuring that its employees do not disturb papers on desks, open desk drawers, cabinets, or briefcases, or use

State phones, and the like, except as authorized. The University reserves the right to request alternate personnel without cause. The Contractor shall accommodate any requests made in a timely manner.

- CC. KEYS: If the Contractor is given keys for this project, it is the Contractor's responsibility to return the keys when the contract is terminated, as well as for the safekeeping of the keys during the contract period. The Contractor shall not loan or duplicate the keys, and must report lose or stolen keys to JMU Telecom Director immediately. In the event the Contractor loses the keys, they will be charged for the replacement of the keys and any locks which are rekeyed or replaced.
- DD. RELOCATION OF EQUIPMENT: Should it become necessary to move equipment covered by the contract to another location, the Commonwealth reserves the right to do so at its own expense. If contractor supervision is required, the Commonwealth will provide prior written notice of the move at least thirty days in advance, in which case the contractor shall provide the required services and be reasonably compensated by the Commonwealth. Both the compensation to be paid and any adjustment to the maintenance terms resulting from the move shall be as mutually agreed between the parties. Regular maintenance charges shall be suspended on the day the equipment is dismantled and resume once the equipment is again certified ready for operational use.
- EE. PRODUCT SUBSTITUTION: During the term of any contract resulting from this solicitation, the Contractor is not authorized to substitute any item for that product and/or software identified in the solicitation without the prior written consent of the Contracting Officer whose name appears on the front of this solicitation, or their designee.
- FF. SERVICE REPORTS: Upon completion of any maintenance call, the contractor shall provide the agency with a signed service report that includes, at a minimum: a general statement as to the problem, action taken, any materials or parts furnished or used, and the number of hours required to complete the repairs.
- GG. OPERATIONAL COMPONENTS: Unless otherwise requested in the solicitation, stated equipment prices shall include all cables, connectors, interfaces, documentation for all components, and any other items necessary for full systems operation at the user site. This does not include consumable supplies such as paper, tapes, disks, etc., unless such supplies are expressly identified in the pricing schedule.
- HH. OPTIONAL PRE-PROPOSAL CONFERENCE CALL: An optional pre-proposal conference call will be held at 10:00 a.m. on Tuesday, July 14, 2020. Pre-registration is required by completing the registration form on Page 1 of this RFP and returning it to Doug Chester ([chestefd@jmu.edu](mailto:chestefd@jmu.edu) or fax to 540-568-7935) by 5:00 on July 10, 2020. Call in information for the pre-proposal conference call will be provided to each registered offeror following their registration.

The purpose of this conference is to allow potential offerors an opportunity to present questions and obtain clarification relative to any facet of this solicitation. While call-in for this conference will not be a prerequisite to submitting a proposal, offerors who intend to submit a proposal are encouraged to register and participate. Any changes resulting from this conference will be issued in a written addendum to the solicitation.

IF YOU ARE AN INDIVIDUAL WITH A DISABILITY WITH NEED OF REASONABLE ACCOMMODATIONS TO PARTICIPATE IN THIS ACTIVITY, PLEASE NOTIFY DOUG CHESTER AT 540-568-4272 NO LATER THAN 5:00 P.M. ON Friday July 10, 2020.

- II. EXTRA CHARGES NOT ALLOWED: The pricing shall be for complete installation ready for the Commonwealth's use, and shall include all applicable freight and installation charges; extra charges will not be allowed.
- JJ. RENEWAL OF MAINTENANCE: Maintenance of the hardware or software specified in the resultant contract may be renewed by the mutual written agreement of both parties for additional one-year periods, under the terms and conditions of the original contract except as noted herein. Price changes may be negotiated at time of renewal; however, in no case shall the maintenance costs for a succeeding one-year period exceed the prior year's contract price(s), increased or decreased by more than the percentage increase or decrease in the other services category of the CPI-W section of the US Bureau of Labor Statistics Consumer Price Index, for the latest twelve months for which statistics are available.
- KK. SERVICE PERIOD (EXTENDED): Due to the criticality of the applications for which the equipment and/or software is purchased, the contractor shall provide 24 hours a day, 7 days a week, maintenance support, including state holidays. On-site response time shall be within 12-24 hours following initial notification. All necessary repairs or corrections shall be completed within 72 hours of the initial notification.
- LL. SERVICE PERIOD (ROUTINE): Contractor shall provide 24-hour toll free phone support with a 24 hour return call response time. On-site maintenance services shall carry a 12-24 hour response time following initial notification and be available during the normal working hours of 8 A.M. to 5 P.M. Monday through Friday, excluding state holidays. All necessary repairs or corrections shall be completed within 72 hours of the initial notification.
- MM. CONTRACTOR REGISTRATION: If a contract for construction, removal, repair or improvement of a building or other real property is for \$120,000 or more, or if the total value of all such contracts undertaken by bidder/offeror within any 12-month period is \$750,000 or more, the bidder/offeror is required under Title 54.1-1100, Code of Virginia (1950), as amended, to be licensed by the State Board of Contractors a "CLASS A CONTRACTOR." If such a contract is for \$10,000 or more but less than \$120,000, or if the total value of all such contracts undertaken by bidder/offeror within any 12-month period is \$150,000 or more, but less than \$750,000 or more, the bidder/offeror is required to be licensed as a "CLASS B CONTRACTOR." If such a contract is over \$1,000 but less than \$10,000, or if the contractor does less than \$150,000 in business in a 12-month period, the bidder/offeror is required to be licensed as a "CLASS C CONTRACTOR." The board shall require a master tradesmen license as a condition of licensure for electrical, plumbing and heating, ventilation and air conditioning contractors. The bidder/offeror shall place on the outside of the envelope containing the bid/proposal and shall place in the bid/proposal over his signature whichever of the following notations is appropriate, inserting his contractor license number:

Licensed Class A Virginia Contractor No. \_\_\_\_\_ Specialty \_\_\_\_\_  
 Licensed Class B Virginia Contractor No. \_\_\_\_\_ Specialty \_\_\_\_\_  
 Licensed Class C Virginia Contractor No. \_\_\_\_\_ Specialty \_\_\_\_\_

If the bidder/offeror shall fail to provide this information on his bid/proposal or on the envelope containing the bid/proposal and shall fail to promptly provide said contractor license number to the Commonwealth in writing when requested to do so before or after the opening of bids/proposals, he shall be deemed to be in violation of § 54.1-1115 of the Code of Virginia (1950), as amended, and his bid/proposal will not be considered.

If a bidder/offeror shall fail to obtain the required license prior to submission of his bid/proposal, the bid/proposal shall not be considered.

- NN. DELIVERY AND STORAGE: It shall be the responsibility of the contractor to make all arrangements for delivery, unloading, receiving and storing materials in the building during installation. The owner will not assume any responsibility for receiving these shipments. Contractor shall check with the owner and make necessary arrangements for security and storage space in the building during installation.
- OO. FINAL INSPECTION: At the conclusion of the work, the contractor shall demonstrate to the authorized owner's representative that the work is fully operational and in compliance with contract specifications and codes. Any deficiencies shall be promptly and permanently corrected by the contractor at the contractor's sole expense prior to final acceptance of the work.
- PP. MAINTENANCE MANUALS: The contractor shall provide with each piece of equipment an operations and maintenance manual with wiring diagrams, parts list, and a copy of all warranties.
- QQ. INSTALLATION: All items must be assembled and set in place, ready for use. All crating and other debris must be removed from the premises.
- RR. AS BUILT DRAWINGS: The contractor shall provide the Commonwealth a clean set of reproducible "as built" drawings and wiring diagrams, marked to record all changes made during installation or construction. The contractor shall also provide the Commonwealth with maintenance manuals, parts lists and a copy of all warranties for all equipment. All "as built" drawings and wiring diagrams, maintenance manuals, parts lists and warranties shall be delivered to the Commonwealth upon completion of the work and prior to final payment.
- SS. CONTRACTOR'S TITLE TO MATERIALS: No materials or supplies for the work shall be purchased by the contractor or by any subcontractor subject to any chattel mortgage or under a conditional sales or other agreement by which an interest is retained by the seller. The contractor warrants that he has clear title to all materials and supplies for which he invoices for payment.
- TT. WARRANTY AGAINST SHUTDOWN DEVICES: The contractor warrants that the equipment and software provided under the contract shall not contain any lock, counter, CPU reference, virus, worm, or other device capable of halting operations or erasing or altering data or programs. Contractor further warrants that neither it, nor its agents, employees, or subcontractors shall insert any shutdown device following delivery of the equipment and software.
- UU. EXCESSIVE DOWNTIME: Equipment or software furnished under the contract shall be capable of continuous operation. Should the equipment or software become inoperable for a period of more than 24 hours, the contractor agrees to pro-rate maintenance charges to account for each full day of in operability. The period of in operability shall commence upon initial notification. In the event the equipment or software remains inoperable for more than two (2) consecutive calendar days, the contractor shall promptly replace the equipment or software at no charge upon request of the procuring agency. Such replacement shall be with new, unused product(s) of comparable quality, to be installed and operational within a reasonable and mutually agreed to timeframe.

## **IX. METHOD OF PAYMENT**

The contractor will be paid on the basis of invoices submitted in accordance with the solicitation and any negotiations. James Madison University recognizes the importance of expediting the payment process for our vendors and suppliers. We are asking our vendors and suppliers to enroll in the Wells Fargo Bank single use Commercial Card Number process or electronic deposit (ACH) to your bank account so that future payments are made electronically. Contractors signed up for the Wells Fargo Bank single use Commercial Card Number process will receive the benefit of being paid in Net 15 days. Additional information is available online at:

<http://www.jmu.edu/financeoffice/accounting-operations-disbursements/cash-investments/vendor-payment-methods.shtml>

## **X. PRICING SCHEDULE**

The offeror shall provide pricing for all products and services included in proposal indicating one-time and on-going costs. The resulting contract will be cooperative and pricing shall be inclusive for the attached Zone Map, of which JMU falls within Zone 2.

Pricing items to provide information for:

- Pricelist with MSRP and JMU discount for will call work for services not covered under warranty or maintenance.
- Pricing for any training associated with proposed solutions.
- Detailed information on how maintenance cost will be calculated for adding systems/locations.
- Provide labor rates for the various types of work necessary to meet the needs of the work outlined in this RFP. Include rates for work done outside of normal business hours.
- Pricing for a turnkey design, install, and commission PS DAS in accordance with JMU's standardized PS DAS design specifications. See Attachment E.
- Pricing for any other products or services you offer in addition to those outlined in this RFP.

Specify any associated charge card processing fees, if applicable, to be billed to the university. Vendors shall provide their VISA registration number when indicating charge card processing fees. Any vendor requiring information on VISA registration may refer to

<https://usa.visa.com/support/small-business/regulations-fees.html> and for questions <https://usa.visa.com/dam/VCOM/global/support-legal/documents/merchant-surcharging-qa-for-web.pdf>.

## **XI. ATTACHMENTS**

Attachment A: Offeror Data Sheet

Attachment B: Small, Women, and Minority-owned Business (SWaM) Utilization Plan

Attachment C: Standard Contract Sample

Attachment D: Zone Map

Attachment E: Sample Building Drawing

Attachment F: JMU DAS Inventory

## ATTACHMENT A

### OFFEROR DATA SHEET

#### TO BE COMPLETED BY OFFEROR

1. **QUALIFICATIONS OF OFFEROR:** Offerors must have the capability and capacity in all respects to fully satisfy the contractual requirements.
2. **YEARS IN BUSINESS:** Indicate the length of time you have been in business providing these types of goods and services.

Years \_\_\_\_\_ Months \_\_\_\_\_

3. **REFERENCES:** Indicate below a listing of at least five (5) organizations, either commercial or governmental/educational, that your agency is servicing. Include the name and address of the person the purchasing agency has your permission to contact.

CLIENT	LENGTH OF SERVICE	ADDRESS	CONTACT PERSON/PHONE #
--------	-------------------	---------	---------------------------


4. List full names and addresses of Offeror and any branch offices which may be responsible for administering the contract.


5. **RELATIONSHIP WITH THE COMMONWEALTH OF VIRGINIA:** Is any member of the firm an employee of the Commonwealth of Virginia who has a personal interest in this contract pursuant to the [CODE OF VIRGINIA](#), SECTION 2.2-3100 – 3131?

[ ] YES [ ] NO

IF YES, EXPLAIN: \_\_\_\_\_


## ATTACHMENT B

### Small, Women and Minority-owned Businesses (SWaM) Utilization Plan

**Offeror Name:** \_\_\_\_\_ **Preparer Name:** \_\_\_\_\_

**Date:** \_\_\_\_\_

Is your firm a **Small Business Enterprise** certified by the Department of Small Business and Supplier Diversity (SBSD)? Yes \_\_\_\_\_ No \_\_\_\_\_

If yes, certification number: \_\_\_\_\_ Certification date: \_\_\_\_\_

Is your firm a **Woman-owned Business Enterprise** certified by the Department of Small Business and Supplier Diversity (SBSD)? Yes \_\_\_\_\_ No \_\_\_\_\_

If yes, certification number: \_\_\_\_\_ Certification date: \_\_\_\_\_

Is your firm a **Minority-Owned Business Enterprise** certified by the Department of Small Business and Supplier Diversity (SBSD)? Yes \_\_\_\_\_ No \_\_\_\_\_

If yes, certification number: \_\_\_\_\_ Certification date: \_\_\_\_\_

Is your firm a **Micro Business** certified by the Department of Small Business and Supplier Diversity (SBSD)? Yes \_\_\_\_\_ No \_\_\_\_\_

If yes, certification number: \_\_\_\_\_ Certification date: \_\_\_\_\_

**Instructions:** *Populate the table below to show your firm's plans for utilization of small, women-owned and minority-owned business enterprises in the performance of the contract. Describe plans to utilize SWAMs businesses as part of joint ventures, partnerships, subcontractors, suppliers, etc.*

**Small Business:** "Small business " means a business, independently owned or operated by one or more persons who are citizens of the United States or non-citizens who are in full compliance with United States immigration law, which, together with affiliates, has 250 or fewer employees, or average annual gross receipts of \$10 million or less averaged over the previous three years.

**Woman-Owned Business Enterprise:** A business concern which is at least 51 percent owned by one or more women who are U.S. citizens or legal resident aliens, or in the case of a corporation, partnership or limited liability company or other entity, at least 51 percent of the equity ownership interest in which is owned by one or more women, and whose management and daily business operations are controlled by one or more of such individuals. **For purposes of the SWAM Program, all certified women-owned businesses are also a small business enterprise.**

**Minority-Owned Business Enterprise:** A business concern which is at least 51 percent owned by one or more minorities or in the case of a corporation, partnership or limited liability company or other entity, at least 51 percent of the equity ownership interest in which is owned by one or more minorities and whose management and daily business operations are controlled by one or more of such individuals. **For purposes of the SWAM Program, all certified minority-owned businesses are also a small business enterprise.**

**Micro Business** is a certified Small Business under the SWaM Program and has no more than twenty-five (25) employees **AND** no more than \$3 million in average annual revenue over the three-year period prior to their certification.

**All small, women, and minority owned businesses must be certified by the Commonwealth of Virginia Department of Small Business and Supplier Diversity (SBSD) to be counted in the SWAM program. Certification applications are available through SBSD at 800-223-0671 in Virginia, 804-786-6585 outside Virginia, or online at <http://www.sbsd.virginia.gov/> (Customer Service).**

***RETURN OF THIS PAGE IS REQUIRED***

**ATTACHMENT B (CNT'D)**  
Small, Women and Minority-owned Businesses (SWaM) Utilization Plan

Procurement Name and Number: \_\_\_\_\_

Date Form Completed: \_\_\_\_\_

Listing of Sub-Contractors, to include, Small, Woman Owned and Minority Owned Businesses  
for this Proposal and Subsequent Contract

Offeror / Proposer:

\_\_\_\_\_  
Firm

\_\_\_\_\_  
Address

\_\_\_\_\_  
Contact Person/No.

Sub-Contractor's Name and Address	Contact Person & Phone Number	SBSD Certification Number	Services or Materials Provided	Total Subcontractor Contract Amount (to include change orders)	Total Dollars Paid Subcontractor to date (to be submitted with request for payment from JMU)

*(Form shall be submitted with proposal and if awarded, again with submission of each request for payment)*

***RETURN OF THIS PAGE IS REQUIRED***

ATTACHMENT C



**COMMONWEALTH OF VIRGINIA  
STANDARD CONTRACT**

Contract No. \_\_\_\_\_

This contract entered into this \_\_\_\_\_ day of \_\_\_\_\_, 20\_\_\_\_, by \_\_\_\_\_ hereinafter called the "Contractor" and Commonwealth of Virginia, James Madison University called the "Purchasing Agency".

WITNESSETH that the Contractor and the Purchasing Agency, in consideration of the mutual covenants, promises and agreements herein contained, agree as follows:

**SCOPE OF CONTRACT:** The Contractor shall provide the services to the Purchasing Agency as set forth in the Contract Documents.

**PERIOD OF PERFORMANCE:** From \_\_\_\_\_ through \_\_\_\_\_

The contract documents shall consist of:

- (1) This signed form;
- (2) The following portions of the Request for Proposals dated \_\_\_\_\_:
  - (a) The Statement of Needs,
  - (b) The General Terms and Conditions,
  - (c) The Special Terms and Conditions together with any negotiated modifications of those Special Conditions;
  - (d) List each addendum that may be issued
- (3) The Contractor's Proposal dated \_\_\_\_\_ and the following negotiated modification to the Proposal, all of which documents are incorporated herein.
  - (a) Negotiations summary dated \_\_\_\_\_.

IN WITNESS WHEREOF, the parties have caused this Contract to be duly executed intending to be bound thereby.

**CONTRACTOR:**

**PURCHASING AGENCY:**

By: \_\_\_\_\_  
(Signature)

By: \_\_\_\_\_  
(Signature)

\_\_\_\_\_  
(Printed Name)

\_\_\_\_\_  
(Printed Name)

Title: \_\_\_\_\_

Title: \_\_\_\_\_

## ATTACHMENT D

### Zone Map



## Virginia Association of State College & University Purchasing Professionals (VASCUPP)

### List of member institutions by zones

<u>Zone 1</u> George Mason University (Fairfax)	<u>Zone 2</u> James Madison University (Harrisonburg)	<u>Zone 3</u> University of Virginia (Charlottesville)
<u>Zone 4</u> University of Mary Washington (Fredericksburg)	<u>Zone 5</u> College of William and Mary (Williamsburg) Old Dominion University (Norfolk)	<u>Zone 6</u> Virginia Commonwealth University (Richmond)
<u>Zone 7</u> Longwood University (Farmville)	<u>Zone 8</u> Virginia Military Institute (Lexington) Virginia Tech (Blacksburg) Radford University (Radford)	<u>Zone 9</u> University of Virginia - Wise (Wise)



**July 14, 2020**

**ADDENDUM NO.: One**

**TO ALL OFFERORS:**

**REFERENCE:** Request for Proposal No: **RFP# FDC-1078**  
Dated: June 29, 2020  
Commodity: Public Safety Distributed Antenna System  
RFP Closing On: **July 29, 2020 @ 2:00pm**

Please note the clarifications and/or changes made on this proposal program:

The JMU Public Safety Distributed Antenna System Specification document is now a part of the RFP by way of attachment with this addendum.

Signify receipt of this addendum by initialing "*Addendum #1*\_\_\_\_\_" on the signature page of your proposal.

Sincerely,

Doug Chester  
Buyer Senior  
Phone: (540-568-4272)

MSC 5720  
752 Ott Street, Room 1042  
Wine Price Building  
Harrisonburg, VA 22807  
Office of 540.568.3145 Phone  
PROCUREMENT SERVICES 540.568.7936 Fax

**JMU DAS/BDA Specifications and Scope of Work:**

- This Public Safety DAS Specification shall apply to all JMU DAS/BDA Systems installed on JMU owned or operated facilities.
- Any variances, discrepancies, or additional requirements from this standardized specification for JMU DAS/BDA Systems will be addressed in the corresponding sections of a separate but specific site related **Scope Of Work** which will be issued prior to the time of procurement for any DAS/BDA design for new building, building refresh or system upgrade.

**JMU DAS/BDA Ownership:**

- Public Safety DAS/BDA Ownership and Administration in JMU Owned Buildings will be by the JMU IT Telecom Department; MSC 5732 – JMAC1, 1021 S Main St, Harrisonburg, VA 22807; Phone 540-568-6471.

**JMU Public Safety DAS/BDA Systems Must Support Enhanced Communications for:**

- 450-470 MHz LMR for JMU Legacy UHF System
- 806-869 MHz NPSPAC channels for Local HRECC P25 Public Safety Trunked 800 Mhz System usage.
- 700 MHz Band 14 FirstNet LTE in anticipation of migration to the FirstNet Public Safety Network in Virginia is not a requirement for Band 14 coverage in the DAS today.
- It is anticipated that all the services will be taken over the air and the proposed DAS network should include rooftop donor antennas for each service and each signal source. It is not a requirement to provide a donor antenna for FirstNet at this time, although connectivity and an appropriately sized roof penetration should be provided for future installation of additional donor antennas and cabling to support 700 Mhz FirstNet.
- The proposed system should also be able to support connectivity for a local base station for FirstNet.

**Location of Current Radio System Sources for the 450 MHz and 800 MHz bands:**

- **UHF JMU Frequencies to be repeated:**
  - UHF Frequencies DownLinks (DL) are listed in MHz
  - All UpLinks (UL) are 5 MHz higher than the DL frequencies
  - **UHF Donor Site 1:**
    - **JMUPD** (DL) 453.9000 (UL) 458.9000
    - **ADMIN** (DL) 453.6250 (UL) 458.6250
    - Repeater Site: Showker Hall, 421 Bluestone Dr, Harrisonburg, VA 22807
    - GIS: LAT: 38°26'00" N LONG: 78°52'21.6" W
  - **UHF Donor Site 2:**
    - **FM** (DL) 453.4250 (UL) 458.4250
    - Repeater Site: Wilson Hall, 951 Madison Dr, Harrisonburg, VA 22807
    - GIS: LAT: 38-26-17.1 N LONG: 078-52-23.3 W
  - **UHF Donor Site 3:**
    - **B&G** (DL) 453.2250 (UL) 458.2250
    - **UREC** (DL) 453.8125 (UL) 458.8125
    - Repeater Site: ISAT/CS Building A1, 701 Carrier Dr, Harrisonburg, VA 22807
    - GIS: LAT: 38°26'03" N LONG: 78°51'44.9" W
  - You may combine the signals from multiple UHF donor antennas with a combiner between the surge arrestors and the UHF repeater Donor port. The use of an Omni donor antenna may be a better way of aggregating multiple UHF serving sites into the system.

- **800 MHz HRECC trunked frequencies to be repeated.**
  - 800 Frequency DownLinks (DL) are listed in MHz.
  - All UpLinks (UL) are 45 MHz lower than the DownLink (DL) frequencies.
  - 800 Mhz Donor is part of the HRECC P25 TRUNKED RADIO SYSTEM:
  - HRECC Trunked Radio System Frequencies:
    - (DL) 851.4625 (UL) 806.4625
    - (DL) 851.5625 (UL) 806.5625
    - (DL) 852.1125 (UL) 807.1125
    - (DL) 852.3375 (UL) 807.3375
    - (DL) 852.6000 (UL) 807.6000
    - (DL) 852.6875 (UL) 807.6875
    - (DL) 852.8625 (UL) 807.8625
    - (DL) 853.1250 (UL) 808.1250
    - (DL) 853.1875 (UL) 808.1875
    - (DL) 853.3750 (UL) 808.3750
    - (DL) 853.9250 (UL) 808.9250
  - Potential Donor Sites – AHJ has the final approval on the specific donor site to use.
    - Tower Site: Tower Street, 653 Tower St, Harrisonburg, VA 22802
    - GIS: LAT: 38°27'07.1" N LONG: 78°51'06.9" W
    - Tower Site: Stone Spring, 1565 Peach Grove Ave, Harrisonburg, VA 22801
    - GIS: LAT: 38°25'04.3" N LONG: 78°52'31.8" W
    - Tower Site: Massanutten Peak, 856 Rainier Rd, Massanutten, VA 22840
    - GIS: LAT: 38°23'34.2" N LONG: 78°46'11.5" W
    - Tower Site: Kaylor Hill, 1319 W Mosby Rd, Harrisonburg, VA 22801
    - GIS: LAT: 38°24'47.7" N LONG: 78°54'52.3" W
    - Tower Site: HRECC, 101 N Main St, Harrisonburg, VA 22802
    - GIS: LAT: 38°27'02.3" N LONG: 78°52'07.1" W

**Designated Critical Area Coverage Requirements:**

- Critical Areas specifically designated by JMU and AHJ include [REF: NFPA 1221, 9.6.7.4]:
  - ALL Elevators, Elevator Lobbies & Elevator Control Rooms
  - ALL Mechanical & Equipment Rooms
  - ALL Exit Stairwells
  - ALL Exit Passageways
  - ALL Areas of Refuge and/or Areas of Rescue Assistance
  - ALL Fire Control Rooms
  - ALL Command & Control Centers
  - ALL Commercial Kitchen and Food Preparation Areas
  - ALL HAZMAT Usage Areas (labs) and Storage Areas
  - ALL Sprinkler Sectional Valve Locations
  - ALL Standpipe Cabinets
  - Any other areas that may be designated by JMU and/or AHJ as Critical Areas for specific structures.

**Delivered Audio Quality (DAQ) Requirements:**

- JMU requires that BDA/DAS systems installed in JMU Facilities provide an overall targeted **[95/95 @ 4.0 DAQ = (*Speech easily understandable. Little noise or distortion. 95% of the time across 95% of the general coverage area.*)]** over the entire service area. In the presence of exigent circumstances that significantly hinder the ability to obtain a 4.0 DAQ, JMU may allow a minimal acceptance level of **[95/95 @ 3.4 DAQ = (*Speech understandable without repetition. Some noise or distortion present. 95% of the time across 95% of the general coverage area.*)]** for approval by JMU and the AHJ for both UHF and 800 Mhz. [REF: NFPA 1221, 9.6.7.5]
- Critical Areas in the buildings require **[99/99 @ DAQ 3.4 (*Speech understandable without repetition. Some noise or distortion present. 99% of the time across 99% of the critical coverage area.*)]** coverage or better by JMU and as approved by the AHJ for both UHF and 800 Mhz. [REF: NFPA 1221, 9.6.7.4]

**Radio Signal Strength Coverage Requirements (RSSI in -dBm):**

- In an effort to meet the JMU Targeted Standard of [95/95 @ 4.0 DAQ], Design Propagation Prediction Modeling for 800 Mhz relative to Received Signal Strength Indicators (RSSI) of -95 dBm or better for the designated coverage areas.
- The entire coverage area shall meet the -95 dBm Minimum Propagation Signal Strength Requirements set forth in NFPA 1, 0.3.3 & 11.10; NFPA 72 and NFPA 1221.

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- JMU and AHJ will test for 4.0 DAQ and 800 MHz Signal Strength using test transmissions and signal strength indicators on first responder public safety radios and other signal strength analyzers during walk through testing of completed projects to determine Delivered Audio Quality and Propagated Signal Strength for the overall coverage area and specifically in Designated Critical Areas and will note compliance on Final Approval & Acceptance Documentation.

### **System Design and Approval:**

- Design, engineering and installation of the entire DAS by any contractor will require continued close communications and coordination efforts the JMU Project Manager (JMU PM), JMU IT Telecommunications Department (JMU ITT), JMU Public Safety (JMUPD), Local Fire Marshall's Office (AHJ) and with the VA State Fire Marshall (VSFM).
- An additional assessment of the coverage area shall be coordinated by the Contractor/Designers with the JMU PM and include JMU ITT, JMUPD, AHJ and the VSFM, to be conducted generally when the building is 85% complete to take into consideration construction design, environmental conditions and materials used that may be found to impede the distribution of radio frequency signal in the structure when it is 100% complete and that the system design accurately addresses system area coverage requirements. This will allow for conduits and additional power installation needs to be addressed while pull paths are still accessible and give JMU the opportunity to assess whether the system is over or under designed so they may approve any necessary change orders.
- Requirements set forth by first-responder code, ordinance, or the AHJ shall supersede the requirements described herein and shall be met in their entirety. It is the Contractor's responsibility to ensure that the system complies with all JMU, local and state codes, ordinances and/or requirements established by the AHJ (whichever is more stringent).
- The Contractors/Designers shall perform thorough reviews of the construction drawings, and perform their site survey with the JMU representative prior to submitting the preliminary design document to include a color coded Propagation Prediction Map that demonstrates proposed design meets specifications.

### **Electrical and Mechanical:**

- Active equipment should be modern equipment only, and to the greatest extent, shall use modular design to facilitate potential upgrades and expansions.
- All operating parameters shall be stored in electrically alterable non-volatile memory technology and shall be field programmable.

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- All equipment assemblies and sub-assemblies shall be shielded to the greatest extent possible to minimize susceptibility to electromagnetic interference from, or to other co-located and/or adjacent equipment in accordance with FCC approved standards.

### **Programming Software:**

- Programming, alignment and service software shall be supplied. All programming software shall be the latest version and be licensed to JMU.
- System design, hardware and software shall be serviceable for not less than 5 years from date of acceptance.
- Required programming, alignment and service cable, as well as extender cards shall be supplied by contractor at time of installation.

### **Equipment Locations and Enclosures:**

- Head end equipment should be located in the MDF or other room identified by JMU Telecom for this purpose where space is available to:
  - Support a 2' x 3' Wall Mounted Device weighing 100 lbs with adequate clearance, power and ventilation.
  - Accommodate a Free Standing Rack/Cabinet/Enclosure weighing up to 500 lbs and occupying no more than 3'L x 3'W x 6'H of floor space with adequate clearance, power, and ventilation.
- Should remote hubs or amplifiers be required, wall space or rack space will be identified by JMU Telecom for the Contractor/Designer to install this equipment in IDFs, etc.
- All BDA/DAS RF Equipment Enclosures should be (at minimum) NEMA-4 TYPE or NEMA4X TYPE enclosures and/or RATING of IP65 or HIGHER for interior 19" equipment rack mounted hardware, and consistent with other code requirements.
- Stand Alone UPS Battery Enclosures should be NEMA-3R Complaint or higher
- Active equipment shall be supported safely to prevent falling or damage in normal use and maintenance.

### **Head End Design:**

- System shall provide for independent donor downlink level control for each frequency for conventional channel, and band isolation controls for trunked channels, to allow for signal

level modifications should the external radio source be relocated or reconfigured in the future.

- Uplink and downlink paths shall be equipped with automatic level or gain control to provide more consistent signal performance and protect from amplifier overload and intermodulation products.
- Critical network equipment shall provide SNMP alarm message capability compatible with existing JMU SNMP monitoring capabilities to indicate a condition or conditions that would disrupt or degrade DAS performance.
- All passive components must be sold and supported by a US headquartered manufacturer or supplier. The term 'supplier' does not include a Distributor; but the products can be procured through a distributor.
- The Contractor/Designer is responsible for proving routes for coaxial cabling.
- Equipment shall be FCC Type Certified for all proposed operating bands.
- All RF equipment provided shall be installed to comply with operational requirements of FCC authorizations and the manufacturer's FCC Type Certification.
- JMU Prefers Passive Distributed Antenna System Designs in our structures if they can sufficiently meet coverage signal strength and audio quality requirements. However, alternative approaches are welcome should the designer believe that these alternatives offer acceptable performance with cost saving or other technical advantages.

**Cabling Selection, Design Layout and Supply:**

- Cabling used in the DAS, including coaxial, solid copper and fiber-optic, shall be selected by the Contractor/Designer, so long as it is compliant with NFPA 72 and approved by JMU.
- Installation of indoor and outdoor antennas, bi-directional amplifiers, fiber RF distribution hardware, RF and optical cabling, filters, backup power, and all cabling and wiring required to interface, monitor and power supplied devices, etc., shall be the responsibility of the Contractor.
- The Contractor shall be responsible for installation of roof-mounted donor antennas fixed or on sleds, antenna connecting jumpers, grounding and termination, roof penetrations and sealing of said penetrations.

**Interior Antennas:**

- Internal DAS antennas should be chosen and installed with a balance towards minimizing aesthetic impact on the building and achieving dominant signal level inside the building. Ceiling, Wall Stand-off or Pole Mounts may need to be provided or painted by the installer to blend aesthetically with the surrounding color palette as approved by the University
- Samples of the indoor antennas and mounting options chosen for the DAS must be presented to JMU IT Telecom personnel managing the project prior to approval being given for the project design.
- All installations must be approved by JMU Engineering and be approved by the University for aesthetic and safety considerations before work begins.
- Selection of the specific antenna models for use inside the building structure shall be the responsibility of the Contractor/Designer.
- Antennas, cabling and mounting hardware in proposed areas should not be readily accessible by the public or non-maintenance personnel. In some cases, to be determined by JMU, additional tamper proof measures may be required.
- Unless otherwise specified, All DAS Antennas, splitters and cabling shall support multiple band width spectrums to include JMU UHF 450 MHz and Regional 800 MHz frequencies regardless of whether or not BDA's for both UHF 450 MHz and/or 800 MHz are initially installed.

**Interior Cabling and Fittings:**

- Cable routing will be coordinated with JMU Telecom and JMU FM Engineers to identify and utilize proposed and/or existing pathways within a structure that take into consideration the specific needs of this project and the potential needs for future projects when considering pathway, junctions, size and access portals to conduits. [REF: NFPA 70, 312.5(A-C)] [REF: NFPA 1221, 5.5]
- All Cabling will need to be neat, hidden out of sight in open ceiling systems, structural framing, poles, conduits, wire molding or raceways such that it is reasonably protected, aesthetically acceptable or blends with surroundings and not easily accessible to the general public as approved by the University.
- All Vertical Riser Cabling inside the structure SHALL BE INSIDE of NFPA approved conduits and/or tubing as approved by AHJ.
- Horizontal cabling on separate floors IS NOT REQUIRED TO BE INSIDE of conduit and/or tubing, but must have a UL Certification of **CMP** or NEC Certification of **MPP** (cable

meeting **CSA FT6** Flame Test or ANSI/NFPA 262 / UL 910 standards) for exposed cabling with fire retardant sheathing as approved by AHJ.

- All exposed Horizontal cabling in plenum areas must be (UL) **CMP** and/or (NEC) **MPP** Certified as approved by the AHJ or it will be required to be in NFPA approved conduit or tubing.
- All Horizontal cabling support systems need to be installed according to manufacturing specifications.
- Install electrical style junction boxes at each floor for Vertical Riser to Horizontal Cabling connections. These boxes must be labeled “DAS # FLOOR RISER CONNECTION”
- All Exposed Horizontal Cabling must terminate inside NFPA approved enclosures or electrical style junction boxes at junctures with riser cabling as approved by AHJ.
- All Vertical Riser Wiring Inside of Buildings, Conductors and Fiber-optic cables shall be installed in accordance with NFPA 70 in any one of the following wiring methods [REF: NFPA 1221, 5.5.2]:
  - Electrical Metallic Tubing
  - Intermediate Metal Conduit
  - Rigid Metal Conduit
  - Surface Metal Raceways
  - Rigid Polyvinyl Chloride Conduit only if specifically, pre-approved by AHJ [REF: NFPA 1221, 5.5.2.1]
- Splitters and couplers shall be independently and separately supported from the coax. In no case may the weight of the splitter or coupler be suspended only from the coax in any orientation. Wire or other supports for splitters and couplers shall attach to structure or other building components per governing code.
- Coax cables must be installed and supported in a fashion that meets local codes, or this project’s specifications for low voltage cabling.
- Coax cannot be installed as “laid on” or “lay-in” above tile ceilings. It must be suspended above the lay-in tile ceiling per local code requirements, and in accordance with requirements for other interior low voltage communications cabling. Support with J-Hooks above lay-in ceilings not to exceed 5’ on center [REF: TIA 569] is acceptable.
- Contractor/Designer shall provide appropriately sized conduit everywhere else as approved by JMU ITT and Engineering where penetrating partitions (floors or walls) that is adequate to prevent cable damage and capable of meeting potential future needs.

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- The bend radii for ALL COAXIAL CABLE installs SHALL be within manufacturers specifications.
- Use of powered mechanical pullers on ANY coax cable is prohibited.
- Indoor Coaxial Cable from the Repeater Output for the indoor DAS must be at least:
  - (UL) **CMP** or (NEC) **MPP** rated outer jacket (Meeting CSA FT6 Flame Test Requirements).
  - Appropriately sized cabling, non-radiating, 50 ohms impedance.
  - Other corrugated coax cable substitutes for this coax are allowed under the following conditions. Must meet a return loss specification of > 30 dB at 400-900 MHz when used with the manufacturer's connectors specified for the cable.
- Coax connectors:
  - Connectors must be fully threaded onto the mating connector and torqued to manufacturer's specifications.
  - Cable end preparation must be done with manufacturer's precision, preset cable end preparation tools. Manual flaring tools must also be used for flare type connectors if offered for sale by the manufacturer; installing connectors without manual flaring of the outer conductor is not acceptable.
  - Cable integrity testing shall be completed by the installer by means of a Sweep Test with Spectrum Analyzer or other acceptable procedure at the time of install and meet minimum industry standards. Results of integrity test shall be included with "As-Built" documentation submitted by vendor/installer to JMU ITT upon project completion.
- Coax surge arrestors:
  - 50 ohm type using gas tube surge arrestors.
  - Maximum gas tube break over voltage shall be 90V.
  - Connectors used in the system must meet the performance standards equivalent to or greater than an N-Type Connector.
  - Must include grounding stud or lug connection on surge arrestor body which may be removable.

- Stainless steel or nickel plated brass body.
- Indoor splitters and couplers:
  - 50 ohm impedance.
  - Industry standard coupling values of 6, 10, 15 and 20 dB for couplers must be used.
  - Use of either Wilkinson type splitters or 'tappers' is allowed.
  - Connectors used in the system must meet the performance standards equivalent to or greater than an N-Type connector.
  - Machined metal outer housing painted, anodized or passivated for corrosion resistance.
  - Frequency range must be specified for the 450-900 MHz frequency range or greater.

**Exterior Antennas:**

- External donor antennas should be installed in compliance with industry standards and methodology.
- The Contractor/Designer will work with JMU to identify all donor antenna locations. All installations must be approved by JMU Engineering and be approved by the University for aesthetic and safety considerations before work begins.
- Selection of the specific antenna models for use outside the building structure shall be the responsibility of the Contractor/Designer.
- Antennas shall be high quality, ruggedized models designed for long-term, outdoor use with high-reliability performance and reduced generation of passive intermodulation (PIM)
- Couplers, duplexers, filters, combiners and related hardware utilized outside the building should be designed for long-term, outdoor use with high reliability and minimal PIM.
- Each exterior transmission line shield shall be equipped with a ground kit and connected to an external ground bus bar provide by the Contractor. JMU, for existing buildings, and the General Contractor, for new construction, will provide the ground conductor and the Contractor shall attach securely to this ground bus bar.

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- External DAS or BDA antennas shall be protected from lightning and static discharges with an appropriate Transient Voltage Surge Suppression (TVSS) device.
- All exterior mounting hardware shall be of steel and hot-dipped galvanized. Grounding hardware shall be stainless steel with copper conductors as appropriate.
- Samples of the exterior antennas and mounting options chosen for the DAS must be presented to JMU IT Telecom personnel managing the project prior to approval being given for the project design.
- Antennas, cabling and mounting hardware proposed for areas accessible by the public shall be tamper-proof and protected from easy manipulation and/or damage.
- UHF band donor antennas:
  - Minimum 50 ohm, Omni, Yagi or log-periodic type.
  - Minimum gain of 6 dBd over 450-470 MHz.
- Outdoor donor antenna: 800 MHz Trunked public safety donor:
  - Minimum 50ohm, Yagi or log-periodic type.
  - Applicable gain for 806 to 862 MHz and intended purpose of the system.
  - Heavy aluminum or stainless construction; Directional elements shall be mounted to the boom through holes through the center line of the boom and welded in place or pinned in place with stainless steel fasteners.

### **Exterior Cabling and Fittings:**

- Cable routing will be coordinated with JMU Telecom and JMU FM Engineers to identify and utilize proposed and/or existing pathways within a structure that take into consideration the specific needs of this project and the potential needs for future projects when considering pathway, junctions, size and access portals to conduits. [REF: NFPA 70, 312.5(A-C)] and [REF: NFPA 1221, 5 (Applicable Sections)]
- All Cabling will need to be neat, hidden out of sight in open ceiling systems, structural framing, poles, conduits, wire molding or raceways such that it is reasonably protected, aesthetically acceptable or blends with surroundings and not easily accessible to the general public as approved by the University.

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- All Wiring on the Exterior of the Structure, Conductors and Fiber-optic cables shall be installed in accordance with NFPA 70 in any one of the following wiring methods [REF: NFPA 1221, 5.5.2]:
  - Electrical Metallic Tubing
  - Intermediate Metal Conduit
  - Rigid Metal Conduit
  - Surface Metal Raceways
  - Rigid Polyvinyl Chloride Conduit only if specifically, pre-approved by AHJ [REF: NFPA 1221, 5.5.2.1]
- Coax cable from donor antennas to repeater should be:
  - Black UV rated outer jacket.
  - (UL) **CMP** or (NEC) **MPP** rated outer jacket (Meeting CSA FT6 Flame Test Requirements).
  - 1/2" or .400" nominal industry size or appropriately sized cabling.
  - Use a single corrugated outer conductor, or a combination braid + conductive tape outer conductor.
  - Have a specified loss per 100' not exceeding 2.9 dB at 450 MHz.
- Coaxial Jumpers:
  - Coax type: Preferred RG142 or other double shielded coax type that is size equivalent to RG-58. Contractor/Designer may suggest alternates if engineering design identifies better potential solution.
  - See section on indoor antennas for jumpers from DAS to indoor antennas.
- Coax connectors:
  - 50 ohm impedance, .400" or 7/8" nominal industry size or appropriately sized cabling to match the coax size on which the connector is mounted.
  - Connectors used in the system must meet the performance standards equivalent to or greater than an N-Type connector.

- Connector mounting:
  - For corrugated outer conductor coax, use threaded front and back, shell type connectors designed for automatic flare-and-clamp field assembly design.
  - High Quality Matching Connectors that match the coax type required. Crimp style connectors are not acceptable.
- Passivated stainless steel or silver-plated outer shell.
- Gold plated captivated center conductor.
- Manufacturer shall match to coax on which the connector is mounted. Coax type and connector type shall be specified by that manufacturer as made for each other.
- Connector type is to be N type unless noted otherwise for the indoor antennas.

**System Power, UPS Backup and Automatic Emergency Generator**

- All electrical outlets supplying power to radio communications equipment that are connected to Emergency Generator circuits shall be RED in color and labeled to identify the respective breaker box and circuit number that controls that outlet.
- All BDA/DAS Systems shall be installed on circuits supported by Automatic Building Emergency Generator Power to maintain Controller/Repeater during domestic power outages when available.
- If multiple Generators are present BDA/DAS Systems shall be connected with Emergency Generators designated and labelled specifically for Telecom, Emergency Notification, and Communications Services.
- Where an Automatic Emergency Generator Power Transfer Switch is present a UPS system shall be installed that provides **at least 3 hours** of uninterrupted electrical power to all communications devices until the automatic transfer switch fully engages to provide stabilized Emergency Generator electrical supply or until the power can be manually transferred in the event of an automatic transfer switch failure as approved by AHJ. [REF: NFPA 1221, 4.7.8]
- Dedicated Stand-alone UPS options shall be used if Automatic Building Emergency Generator Power circuits are not available. These UPS Systems shall also include battery backup for all electronic devices capable of supporting normal communications usage for a period of **24 hours** in accordance with NFPA standards
- Power loss, power restoration, surges, sags and/or brownouts shall not alter the unit's operating parameters. The unit shall remain fully operational when supplied power is

within the specification of its design. The unit shall automatically recover within a maximum of **90 seconds** after experiencing any of the aforementioned occurrences.  
[REF: NFPA 110 Generators & Emergency Standby Power]

- Stand Alone UPS Battery Enclosures should be NEMA-3R Complaint or higher.

### **Grounding, Lightning & Power Surge Protection**

- Equipment shall be properly grounded.
- Care shall be taken to minimize the length of the connection to the internal ground bus and sharp bends in the ground lead shall be avoided.
- All Interior electronic equipment racks and chassis shall be connected to the internal building grounding bus using copper wire.
- All ground wire shall be #6 Gauge Wire or heavier with non-ferrous compressive connectors or crimp on lugs on each end.
- Ground connections to structure must be clean, bare metal, and to surfaces that are treated with a conductive paste prior to attachment of the ground lug.
- Circuit Protection shall be in accordance with NFPA 70 and NFPA 1221, 5.6 (Applicable Sections).
- Surge suppression devices should be provided for all active components.
  - This includes but is not limited to the Main repeater ground and any added donor coax surge suppressor at the main repeater.
  - Donor coax surge suppressor ground in each donor coax line must be installed and grounded within 10' of the building entry of the coax.
- Exterior Ground connections may be compressive grounds, or CadWeld grounds. Appropriate precautions for the use of the CadWeld process must be taken to prevent burning or excessive smoke.
- The following Exterior grounding must be performed:
  - Donor antenna mast ground; Earth ground is preferred but this mast ground path can be to structure if earth ground isn't readily available. (Requires approval from JMU ITT)
  - Connections:

- Any compressive or other mechanical exterior ground connection must be treated with a ground paste prior to ground installation, and then covered with a protective layer of Butyl followed by a covering layer of vinyl electrical tape. Caulk protection is not acceptable.
- The ground connection to the mast may alternatively be a CadWeld ground to the mast and a #2 Gauge solid ground wire or a pipe grounding ring connection and #6 Gauge stranded wire.
- Compressive grounding to an aluminum ground ring cable must be done with metallurgically appropriate connections and surface treatments that prevent direct contact of the aluminum cable and the copper ground wire, to prevent long term corrosion.
- Exterior coax connection water proofing: Any exterior coax connections must be water proofed with 3 layers. Layer 1 is to be vinyl electrical tape, layer 2 is to be butyl, and the top layer is to be vinyl electrical tape. All layers shall be applied with even, overlapping wraps of the specified materials. The weather proofing layers must extend over the coax jacket, and onto the surface to which the mating connector is affixed.

**System Monitoring:**

- Alarm reporting for the DAS and power supply circuit shall be supervised and/or monitored 24/7/365.
- Both the DAS and the Power Supply Systems should be interfaced with the specified fire panel in the building to provide standardized alarms for faults within the DAS or the battery backup or be connected to JMUPD Communications Center where they can be monitored on a separate stand-alone alarm tied to the Universities Central Alarm Monitoring Panel or at minimum via SNMP to JMU Centralized IT Management System.
- Alarm capability should support all components within the DAS system. Design and performance shall comply with NFPA 72, 24.5.2.6 (System Monitoring). Signaling cables shall be supplied, installed and tested by the Contractor.
- BDA/DAS alarms shall include at minimum [REF: NFPA 1221, 9.6.13.1 and NFPA 72, 10]:
  - Donor Antenna Malfunction.
  - Head-end Degradation or Failure.
  - Telco Dialer Circuit Continuity or Failure (For independent direct connect alarms to JMUPD Communications Central Centralized Alarm Monitoring Station that are not

connected to an in-building Fire Alarm System that reports to JMUPD and FM Life Safety).

- Power supply alarms shall include [REF: NFPA 1221, 4.7.8.7 and NFPA 1221, 9.6.12.3 and NFPA 1221, 9.6.13.1]:
  - Source Power Failure (i.e.-Normal Domestic AC Power), Over Voltage, Under Voltage
  - High and Low Battery Voltage
  - UPS in By-pass Mode
  - And failure of the battery charger power and/or low-battery capacity (if required).
- If DAS monitoring is tied directly to JMUPD Communications Center Centralized Alarm Monitoring Station, then the telco alarm dialer circuit should be monitored and check in periodically on Alarm Panel and indicate an error or trouble alarm if it misses scheduled check-in alarms at least once daily with twice daily preferred consistent with other JMU fire alarm dialer circuit check-ins.
- If DAS monitoring is connected to JMUPD Communications Central Alarm Monitoring Station or other remote monitoring station via a VoIP primary circuit then additional telco circuits and connections may be required (i.e. POTS or CELL circuits) to ensure communications connectivity during potential IP network disruptions or outage and require approval by JMU ITT and AHJ.
- As a JMU POLICY for all JMU Entities, Maintenance Personnel and/or Related Contractors specifically working on JMU BDA/DAS systems. In the event of a malfunction or system maintenance issue that is known to affect the operational capability of an on-line system being reported to them or detected remotely, responding personnel will notify Operational Staff at the following locations immediately of any degraded functionality for first responders and again when full coverage is restored.
  - **JMUPD Communications Center (540-568-6911)**
  - **Harrisonburg/Rockingham Emergency Communications Center (540-434-4436)**
  - **JMU Work Control (540-568-6101)**

**Interference:**

- System shall be designed as to not interfere with its own equipment or other systems.

- Interference in this case is defined as a degradation of effective receive performance 1 dB or greater. Interference includes Passive Intermodulation (PIM), which must be kept 10dB below the noise floor of all co-located receivers. Special attention shall be given to locations having co-located control or base stations.

**Testing and Acceptance:**

- There are four types of Testing specified:
  - **System Design Testing** – Performed by the Contractor/Designer and submitted to the JMU PM and JMU ITT to demonstrate projected coverage for approval prior to project initiation or as change orders during completion of project.
  - **Commissioning Testing** - Conducted by the Contractor/Designer with results submitted to JMU PM and JMU ITT for validation through inspections and verification performed by JMU FM and JMU ITT in cooperation with JMU PD and AHJ.
    - Hardware Installations will be subject to inspection by JMU PM, JMU ITT and JMU FM Engineering for compliance with this specification.
    - The Contractor/Designer will be required to provide current documentation of the results of their **BER** testing of the as-built system at the time of the system commissioning to JMU ITT for system as-built archives.
    - Test all coax runs after connectors have been installed for return loss to the following specification:
      - -25 dB return loss or lower across the frequency band of 450 to 862 MHz, with a precision 50 ohm load terminating the coax under test at the far end of each coax tested
      - Tabulate test results and plots for submission for approval.
      - Tune repeater for gain and channel and filter bandwidth settings. For 800 MHz frequencies, narrowband, minimal delay filter mode is to be employed; filter bandwidth is to be 50 kHz, 31 second delay. Narrow bandwidths shall be used for UHF as well. Determine and install any uplink overload attenuators beyond any shown on the drawings to avoid uplink front end overload (-30 dBm peak uplink signals into repeater). Document all settings for submittal as part of the maintenance baseline document. Note that particular care needs to be taken to not radiate excess uplink noise back to the 800 MHz BTS site. Uplink noise figure of the BTS from this repeater shall be increased by 0dB as required by the AHJ. The use of the uplink muting feature in the repeater may be required.

- Measure and record isolation between indoor antennas and outdoor antenna for both UHF and 800 MHz bands. The system deployment must meet the isolation requirements as defined by NFPA 1221 (2016) and IFC 810. These publications require the isolation to be 20dB + total system gain as a minimum. For example, if a final system gain setting is 80dB, the measured isolation from the donor antenna to the inbuilding services antennas must be 20dB + 80dB = **100dB total**. Recorded measurements and testing methodology shall be provided as part of the system testing and As-Built documentation.
- Record input spectrum from donor antenna on spectrum analyzer showing at least one channel in the active state in both UHF and 800 MHz systems, to show input downlink power levels. Use the spectrum analyzer on Max Hold for at least 30 minutes to detect any other strong potential interfering signals coming in from the donor antennas. (Cellular signals in the 862-894 MHz range are of particular concern and must be documented.) Document for submittal as part of the maintenance baseline document.
- Record repeater downlink output spectrum on spectrum analyzer showing at least one Harrisonburg-Rockingham County system channel in the active state, to show output downlink power levels. Document for submittal as part of the maintenance baseline document.
- Call quality tests must be met with the final system gain settings.
  - If settings are changed after the call quality tests by more than 3 dB (to meet 800 MHz base site noise figure requirement as an example), then the call quality ATP must be repeated.
- Downlink Coverage Levels - The facility shall be tested for coverage levels and to insure proper system settings and connections as follows:
  - A test antenna and spectrum analyzer shall be used to measure control channel power radiated from each of the system's indoor antennas for the 800 MHz system. The test antenna brand/model must be documented, and may be a test antenna with known gain, or the same antenna as specified for indoor omnidirectional antennas in this specification and is to be connected to the spectrum analyzer input via short jumper with loss of < 0.5 dB at 850 MHz.
  - For indoor system antennas within 10' of the floor level, the test antenna shall be placed in as clear an area as possible at distance of 10' +/- 1' from the system antenna under test, and as close to the same horizontal plane as

the antenna under test, and no more than 3' below the antenna under test. The level of the control channel on the spectrum analyzer shall be recorded.

- For indoor system antennas that are more than 10' above the floor, make the measurement at a location where the test antenna is within the specified vertical beam width of the antenna under test. Record both the spectrum analyzer reading and the horizontal distance between the test antenna and the system antenna under test. Note the test location in sufficient detail so that the test can be repeated as part of maintenance measurements.
  - Care must be taken in spectrum analyzer bandwidth, detection, and sweep speed settings, as well as test antenna polarization, to ensure that the digital control channel levels are accurately displayed. 'Max hold' shall be used for recording the levels in systems that do not employ a control channel.
  - These spectrum analyzer results must be compared with the computed EIRP from the systems antennas plus computed distance loss. Any deviation more than +/- 10 dB requires investigation as to the cause, and rectification of any problems found. Any antenna requiring fixes to meet this requirement must be re-tested after any repairs.
  - These spectrum analyzer test results, along with the computed EIRP's from each antenna, are to be submitted as part of the final documentation. They can be in tabular or building plan view format. Note any non-standard test locations in sufficient detail so that the test can be repeated as part of maintenance measurements.
- Interferer and Repeater Filtering Tests:
- Provide spectrum analyzer readings for the main repeater output in the downlink direction, showing any strong in-band signals that are not part of the JMU UHF system or the Harrisonburg-Rockingham County Regional 800 MHz trunked system. For the UHF band, use of Max Hold for at least 30 minutes during the hours of 8 AM to 5 PM local time is required for this test. For the 800 MHz band, show the frequency range of 851-894 MHz for at least 30 minutes in the same time period. A coupler on the repeater output may be used to prevent spectrum analyzer damage; the value of any such coupler used must be documented.
  - Use of the repeaters internal spectrum analyzer function is not acceptable for these tests. However, such plots can be included as supplementary information.

- Uplink Noise Figure Checks for 800 MHz Base Station sites.
  - Confirmation from the AHJ must be received that no excess increase in uplink noise figure at the base station sites is being received after this DAS is put into operation. Increase is to be 0dB as required by the AHJ. ATP call quality tests must be met with the final uplink gain settings.
- **Acceptance Testing** – Performed by JMU ITT, JMUPD, and the AHJ to be approved by JMU ITT, AHJ & VSFM with documentation provided by Contractor/Designer and JMU PM.
  - Contractor shall coordinate testing with the Project Manager, JMU IT Telecom, JMU Police & Safety, and Local Public Safety Providers (AHJ) including HRECC to ensure acceptable coverage and delivered audio quality to UHF & 800 Mhz System Users that operate within the coverage area.
  - JMU ITT will utilize their PCTel SeeGull IBFlex RF Scanner when available to test and document DAS coverage and signal strength in facility and/or manual perform Call Quality Tests as necessary to verify coverage area and actual signal strength meets established levels and Delivered Audio Quality specifications for acceptance by JMU and AHJ.
  - Call Quality Tests are to be conducted as follows:
    - Call Quality tests are to be conducted in all areas of the facility.
      - Most areas are to be tested as grid areas.
      - Critical individual spaces smaller than the grid size but larger than closets, are to be tested individually.
      - Testing may be done by individual room if their size and usage dictates and/or if building design makes it necessary to document specific room coverage.
      - Side halls (<20' long) may be tested as part of the grid.
    - Grid tested areas: Test point number and location.
      - Divide the grid tested areas into grid spaces sized 20' x 20' for confined individual office or academic spaces or 50' x 50' for general use open air arenas and parking structures or other pre-approved grid size) Each grid space is to be tested in its approximate center, and the test call within a grid space must exceed AQ 3.4 for the grid space to pass.

- Call quality of minimum DAQ 3.4 is to be recorded in each test grid area for both 800 Mhz and UHF on a DAQ Scale Score rating (i.e. – 3.4 or 4.0).
- Propagated 800 Mhz Signal Strength at each test site should also be recorded in -dBm as indicated on Radios used for testing or Spectrum Analyzer.
- Hallway testing: Test point numbers and locations.
  - Each major connecting hallway is to be tested every 30' along its length. Test in the center of the hall, and each test call at a hall test point must exceed DAQ 3.4 for the location to pass.
- If a call fails in a grid space or individual area, then that grid space or individual area is to be re-tested in the center of smaller areas of approximately 10'x 10' each. The whole grid space or area is to be recorded as failed if this test fails in 2 or more of the 4 quadrants.
- The system passes if the average of 95% or more of the test locations pass at a DAQ 4.0. If the system does not meet the targeted 95% requirement for DAQ 4.0. JMU ITT will have the option of accepting the system if it meets minimum of at least a DAQ 3.4 as required by AHJ, but must sign a letter of variance explaining why DAQ 4.0 was not achieved or JMU ITT may require the contractor to make necessary improvements to the system to achieve the overall DAQ 4.0 as specified in JMU's initial requirements.
- Any calls that do not go through due to a system busy condition are not counted as pass or fail.
- Call quality tests are to be conducted with multiple radios (4) provided by the AHJ that are in known good operating condition, and that meet specified power output, frequency accuracy, and receive sensitivity, and shall include at least one portable radio operated on-site in the test grid on 800 Mhz JMU ADM, a second portable radio on-site in close proximity to the test grid on JMU UHF ADMIN frequency, a third portable or mobile radio operated off-site operating on 800 Mhz JMU ADM and a radio console or remote control station operated from a communications center on the 800 Mhz JMU ADM talk group and on UHF JMU ADMIN.
  - This methodology will allow the multiple evaluators to test and record DAQ across both bandwidths simultaneously through the established gateway that links the two together.

- Baseline testing should be done on each individual talkgroup/frequency, 800 Mhz (JMU ADM) and JMU UHF (ADMIN-R) to ensure that gatewayed DAQ is representative of the DAQ on each talkgroup/frequency if tested individually.
- Contractor/Designer shall work through the JMU PM to provide electronic and hard copies of the Building Plan with Grid Overlay Test Recording Sheets to JMU ITT, JMUPD, AHJ, and VSFM at least 48 hours before the scheduled ATP.
- Building Plan with Grid Overlay Test Recording Sheets shall preferably be formatted and printed on 8.5" x 11" paper sheets as a representation of the corresponding floor plan to include assigned room numbers on the floorplan layer with font and lines printed in medium **(50%) GREY**.
- Multiple sheets per structure level/section are acceptable if the structures size requires blow-up views to be able to clearly record ATP results.
- Grid blocks (representing grid tested spaces sized 20' x 20' for confined individual office or academic spaces or 50' x 50' for general use open air arenas and parking structures or other pre-approved grid size) on the Test Scoring Sheets should be no smaller than ½" x ½" square and consist of outlines and font printed in **RED for grid blocks that encompass any Designated Critical Coverage Areas** and **BLUE for all other grid blocks that encompass General Coverage Areas**.
- Grid blocks shall be numbered sequentially starting in the upper left corner of the sheet and increasing from Left to Right across the rows, and from Top to Bottom as rows continue down the grid overlay on the page.
- Each DAS GRID TEST LOG SHEET will need a Header to include: Building Name; Floor Represented; Grid Numbers Included on this Particular Page; Blank for Evaluators Name; Blank for Evaluators Location & Method (i.e. - On-site 800 Mhz, On-Site UHF, Remote 800 Mhz, Remote UHF, JMUPD Console 800, JMU Stadium Console UHF, etc.) Blank for Date Test Performed.
- Each Evaluator will use the following format to transmit audio starting with the On-Site 800 Evaluator:
  1. **"ON-SITE 800 TRANSMITTING, TEST, TEST, X FLOOR, GRID #"**
  2. **"ON-SITE UHF TRANSMITTING, TEST, TEST, X FLOOR, GRID #"**
  3. **"REMOTE 800 TRANSMITTING, TEST, TEST, X FLOOR, GRID #"**

4. **"REMOTE UHF TRANSMITTING, TEST, TEST, X FLOOR, GRID #"**
  5. **"CONSOLE 800 TRANSMITTING, TEST, TEST, X FLOOR, GRID #"**
  6. **"CONSOLE UHF TRANSMITTING, TEST, TEST, X FLOOR, GRID #"**
- Each evaluator will record their overall perceived DAQ quality test results in the specified grid block on their copy of the DAS GRID TEST LOG SHEET which corresponds to the grids on the Building Plan with Grid Overlay in the following format DAQ: 3.4 or 4.0 ; RSSI -dBm Mhz Signal Strength 82 or 95, 121, etc.).
  - Any unusual call quality issues other than the prescribed DAQ / RSSI shall be thoroughly documented and reported to JMU PM, JMU ITT and the AHJ with a complete description of the symptoms, test conditions and include any recommended remedial actions that could or should be taken to resolve the issue.
  - JMU ITT and the AHJ may allow alternative testing using RSSI and DAQ results from test TX/RX individually on designated 800 Mhz Talkgroups and UHF 450 frequencies or through established system gateways that will link specific frequencies and talkgroups and recorded in JMU ITT's PCTel SeaGull IBflex RF DAS Testing Unit.
- **Annual Maintenance/Warranty Testing** – Performed by the Maintenance Contractor under supervision of JMU ITT.
    - Review any reports of degraded service since last test.
    - Inspect All infrastructure hardware for signs of damage or malfunctions.
    - Inspect All external antennas, cabling and grounds for signs of weathering, deterioration, or damage.
    - Test all UPS batteries to ensure that they hold for prescribed durations, replace as necessary.
    - Conduct RSSI – Radio Signal Strength Indicator Testing either with a portable radio or spectrum analyzer in all areas listed as Critical Coverage Areas documenting current RSSI levels and all test locations.
    - Do spot testing throughout at least 25% of the remainder of the General Coverage Areas of the structure documenting current RSSI levels and all test locations.

## ***JMU PUBLIC SAFETY DAS - SPECIFICATIONS (Published Revision 2020-07-01)***

- Conduct Full Grid RSSI level testing on any areas of the structure that may have been modified or had significant changes in usage or equipment present since last Maintenance/Warranty Test was conducted.
- Compare the results of current testing with RSSI documentation from original acceptance testing and last maintenance/warranty testing and/or any JMU ITT PCTel SeaGull IBflex RF DAS Testing Documentation to identify any discrepancies or variations in coverage.
- Use results of testing to identify any areas that need hardware tuning, repair, or upgrades to meet required standards of coverage.
- Document any tuning, repairs, modifications or replacements to the system conducted as a result of this test.
- Submit all documentation to JMU ITT for DAS System Archive file.

### **Documentation:**

- Contractor/Designer shall provide copies of ALL design related supporting documents and images related to DAS/BDA which will be maintained by JMU IT Telecom with their RF Documentation Files.
- Provide a detailed materials list and inventory of all installed equipment to include: Manufacturer; Model; Serial Number; Installation Date; Physical Address of all equipment to include Room Number or Descriptive Location on within the Interior or on the Exterior of Structure; Specify RX & TX Frequencies tuned to boost. Materials list should also include: JMU Building Name; 911 Street Address, Installing Vendor/Representative Name, Address and Contact Info; Maintenance/Warranty Vendor Name, Address and Contact info.
- Provide labelled digital images of all: Radio Repeaters; Signal Boosters; Different Antennae Types Deployed Internally and Externally; Equipment Cabinets; Roof Penetrations; Equipment Supporting Battery or UPS Hardware and Equipment Ground Connections.
- Provide comprehensive As-Built Diagrams in MS Visio or other approved format. Should also be included in IBCW/IBX floorplan files provided to JMU ITT when Commissioning and Acceptance Testing is performed.
- Provide electronic and hard copies of the Building Plans to included DAS Hardware Designations and Locations WITH and WITHOUT acceptable Grid Overlay in both IBCW/IBX and PDF File formats Testing and Recording to JMU ITT as specified in the

## ***JMU PUBLIC SAFETY DAS - SPECIFICATIONS (Published Revision 2020-07-01)***

Commissioning & Acceptance Testing Procedures Section of this policy at least 48 working hours prior to any type of Inspection or Testing.

- Provide supporting Spectrum Analyzer Graph and Report Print Outs from all tests and final inspections performed in electronic PDF format to demonstrate design progression and final as-delivered levels. Signal Strength Propagation coverage maps (i.e. - Heat Maps) shall be kept on file with JMU ITT RF Documentation from original acceptance of the installed system. These may be used for future comparison in the event of signal degradation, system failure, or future system refresh to compare differences or similarities.
- Provide all design propagation maps in electronic PDF format during design and testing phases of the project and shall be kept on file with JMU ITT RF Documentation. These may be pulled out and compared to current RSSI signal strength conditions to see if something has degraded or changed to compare difference or similarities.
- Final acceptance will be granted once the all public safety authorities (JMU & Local AHJ) approve the performance of the DAS for public safety first responders and daily users and JMU accepts the DAS for use with their radio system, all punch list items have been completed and all documentation has been submitted and approved by JMU IT Telecom.

### **Warranty:**

- All equipment furnished, including hardware and software components, shall be fully warranted to be free from defects in material and workmanship for a period of one (1) year from the date of final acceptance.
- Contractor shall be responsible for all warranty activities related to product registration.
- At the end of the warranty period, Contractor shall hand over all warranty related records to JMU
- Costs associated with base warranty and options shall be itemized and included in the pricing section of any design proposals for DAS installations at JMU.

**Preventative Maintenance:**

- All preventive maintenance necessary for the system and its components shall be performed during the warranty period and during year two through five. This maintenance shall be limited to the hardware, software and firmware furnished by the Contractor.
- Manufacturer-recommended software and firmware updates associated with security, operation or maintenance shall be provided during this period and shall include local and/or remote installation.
- JMU expects such maintenance to be performed at regularly scheduled intervals in accordance with the recommendations of the manufacturer at a minimum. Contractor shall perform the agreed-upon preventive maintenance twice annually during the original warranty period, during the entire life of any active extended maintenance contract with that contractor, or as often as recommended by the manufacturer in accordance with [REF: NFPA 1221, 11.3.9], whichever is more stringent.
- Any potential costs associated with this type of support or service that will be the responsibility of JMU shall be clearly and individually identified in the pricing section of any proposals to provide DAS related Hardware or Services.
- JMU may issue separate Preventative Maintenance & Service Contracts beyond those services covered by initial installation warranty period.

**Nuisance Malfunctions and Failures:**

- Nuisance malfunctions and/or failures are recurring operational or functional problems that prevent systems and/or equipment from providing the degree of reliability and services specified at the time of procurement or usefulness necessary for JMU operations, or cause JMU to assign significant resources to resolve on three or more occasions, on similar models of equipment. Such problems can be caused by software, firmware or hardware that is faulty or improperly designed, engineered, manufactured, installed or configured. It does not include degraded operation, which could be resolved through additional optimization within the term of the initial contract.

**NFPA Reference List by Subject Matter used to develop policy:**

- NFPA 1, 11.10 or 0.3 (DAS Standards)
- NFPA 72, 24.9 (Two-Way Radio Communications Enhancement Systems)
- NFPA 70, 312.5 (Cabinets, Cutout Boxes and Meter Socket Enclosures)
- NFPA 1221, 9.6.2 (Pathway, Risers, Couplings, Survivability)
- NFPA 1221, 9.6.11.2 (Enclosure Standards)
- NFPA 1221 (Standards for Installation, Maintenance and Use of Emergency Services Communications Systems)
- NFPA 1221, 5 (Communications and Signal Wiring)
- NFPA 1221, 9.6.7 (Radio Coverage Areas and Signal Strength DAQ / -dBm)
- NFPA 1221, 9.6.12, NFPA 1, 0.3.6 (Power and Secondary Power Supply standards)
- NFPA 1221 (Status monitoring with regard to the 450 MHz and 800 MHz systems and Power Systems)

**Abbreviations and Acronyms:**

- **AHJ** - Authority Having Jurisdiction over the Public Safety Radio System
- **ATP** - Acceptance Test Plan
- **BER** - Bit Error Rate
- **BDA** - Bi-Directional Amplifier
- **BOM** - Bill-of-Material
- **BTS** - Base Transceiver Station
- **DAS** - Distributed Antenna System
- **DAQ** - Delivered Auto Quality
- **DL** - Radio Frequency Down Link
- **dBm** - The power ratio in decibels (dB) of the measure power per one milliwatt (mW).
- **FCC** - Federal Communications Commission
- **HRECC** - Harrisonburg/Rockingham Emergency Communications Center
- **JMU FM** - JMU Facilities Management Department
- **JMU ITT** - JMU IT Telecom Department
- **JMU PM** - JMU Project Manager
- **JMUPD** - James Madison University Department of Police & Public Safety
- **LMR** - Land Mobile Radio
- **MTBF** - Mean Time Between Failure
- **NFPA** - National Fire Protection Association
- **PSN** - Public Safety Network
- **REF** - Reference
- **RSSI** - Received Signal Strength Indicator
- **SNIR** - Signal-to-Noise Interference Ratio
- **SOW** - Scope of Work
- **UL** - Radio Frequency Up Link

- **VoIP** - Voice Over Internet Protocol
- **VSFM** - Virginia State Fire Marshall

**Definitions:**

- **Acceptance** - Expressed approval by the Owner or AHJ.
- **Active** - Components that require AC or DC power for operation.
- **Component** - A main system element of the DAS.
- **DAQ 3.4** - Speech understandable; repetition only rarely required. This term will be applied to both digital and analog voice transmissions.
- **DAQ 4.0** - Speech easily understandable; Little noise or distortion. This term will be applied to both digital and analog voice transmissions.
- **Passive** - Components that do not require AC/DC power for operation.
- **Supplier** - A seller of manufactured products who controls the specifications of a product and warrants the product directly, regardless whether the seller actually manufactures the product directly. A distributor is not a Supplier but an approved Supplier's products may be procured through a distributor.



July 21, 2020

**ADDENDUM NO.: Two**

**TO ALL OFFERORS:**

**REFERENCE:** Request for Proposal No: **RFP# FDC-1078**  
Dated: June 29, 2020  
Commodity: Public Safety Distributed Antenna System  
RFP Closing On: **July 29, 2020 @ 2:00pm**

Please note the clarifications and/or changes made on this proposal program:

1. Question: RFP Section IV.A.9 states "JMU can provide secured space for advanced shipping and staging of project material. The Offeror is responsible maintaining inventory of project material through to completion of the project and for transporting material from JMU storage facility to the job site." What security would be provided for the indicated staging and storage space?

Answer: Controlled spaces under lock and key and in some cases card access. Surveillance systems may be present in some areas. All spaces are covered with fire protection.

2. Question: RFP Section IV.B states "At some point during the life of the contract, JMU will purchase one or more PS DAS solutions.". Is there a projected timeline when specific PS DAS solutions are expected to be purchased?

Answer: There is not a specific timeline for purchasing DAS solutions. Unless circumstances otherwise dictate, DAS solutions are purchased during new building construction and renovations. Areas for potential future buildings and renovations can be found in the Campus Master Plan. The master plan notes areas of opportunity for the university only and in no way establishes a guarantee for future events or purchase opportunities.

<https://www.jmu.edu/jmuplans/supporting-plans/jmu-master-plan-update-2017.pdf>

**Note:** This will be a cooperative contract. Other state entities will have the ability to use it as a means to procure PS DAS Services.

3. Question: RFP Section IV.B.1 states "Offerors(s) will be asked to turnkey design, install, and commission PS DAS in accordance with JMU's standardized PS DAS design specifications. See Attachment E." Attachment E appears to include only the floor plans that the representative PS DAS system is to be designed upon. This Attachment does not appear to include JMU's standardized PS DAS Design specifications. Can a copy of JMU's standardized PS DAS Design Specifications be provided?

MSC 5720  
752 Ott Street, Room 1042  
Wine Price Building  
Harrisonburg, VA 22807  
Office of 540.568.3145 Phone  
PROCUREMENT SERVICES 540.568.7936 Fax

Answer: Current PDF version: “JMU ITT – JMU PUBLIC SAFETY DAS – SPECIFICATION – Published Revision 2020-07-01” is attached as per Addendum 1.

4. Question: RFP Section IV.B.4.a states “JMU may be required to use a specific commissioning document(s) as dictated by the Commonwealth of Virginia or JMU’s Capital Planning and Construction program manager.”. Can a sample of such a document, or a summary of the anticipated requirements be provided to give an understanding of the scope of work that would be required under the anticipated commissioning process?

Answer: JMU ITT has adopted the attached NFPA 72- Fire Alarm and Emergency Communications System Record of Completion Form as our commissioning document. The vendor will only be responsible for the sections pertaining specifically to PS DAS.

5. Question: Which version of NFPA 72/1221 shall the designs be based upon?

Answer: The JMU PS DAS Design specification encompasses elements of both versions.

The JMU ITT – JMU PUBLIC SAFETY DAS – SPECIFICATION – Published Revision 2020-07-01 indicates (per individual section – i.e. [REF: NFPA 1221, 9.6.13.1 and NFPA 72, 10]) where we derived the specific requirement from and includes the following comprehensive reference on Page 28.

NFPA Reference List by Subject Matter used to develop policy:

- NFPA 1, 11.10 or 0.3 (DAS Standards)
- NFPA 72, 24.9 (Two-Way Radio Communications Enhancement Systems)
- NFPA 70, 312.5 (Cabinets, Cutout Boxes and Meter Socket Enclosures)
- NFPA 1221, 9.6.2 (Pathway, Risers, Couplings, Survivability)
- NFPA 1221, 9.6.11.2 (Enclosure Standards)
- NFPA 1221 (Standards for Installation, Maintenance and Use of Emergency Services Communications Systems)
- NFPA 1221, 5 (Communications and Signal Wiring)
- NFPA 1221, 9.6.7 (Radio Coverage Areas and Signal Strength DAQ / -dBm)
- NFPA 1221, 9.6.12, NFPA 1, 0.3.6 (Power and Secondary Power Supply standards)
- NFPA 1221 (Status monitoring)

See attached NFPA 72 document in the attachments section of the VBO posting.

6. Question: Question - Which AHJs are involved with the process?

Answer: The City of Harrisonburg Fire Department (HFD) Harrisonburg Rockingham County Emergency Communications Center Virginia State Fire Marshal also signs off on the NFPA 72 – Fire Alarm and Emergency Communications System Record of Completion in the process of getting the occupancy permit, however they generally accept the approval of the local AHJ (HFD) that the system adequately meets local first responder needs. We also make sure that systems meet JMUPD approval as far as functionality and alarm signal monitoring processes. Those are not usually signed off directly by JMUPD, but rather by JMU ITT when we accept the system to make sure that specs affecting the DAS are consistent JMUPD systems and needs.

7. Question: Do the AHJs have specific guidelines for two-way radio enhancement systems besides the NFPA?
- Answer: We worked very closely with the City of Harrisonburg Fire Department in developing our specification as they did not have one. If they have since developed their own, we are not aware of it. They continue to have personnel present during commissioning and testing of campus systems built to our standards with little if any input.
8. Question: Are elevators considered critical areas and radio coverage is required inside the shaft? If yes, is it allowed to place an antenna inside the hoistway or does the coverage have to come from outside antennas?
- Answer: Elevators are considered critical areas. Coverage must come from outside.
9. Question: What are the Number of Channels for each AHJ?
- Answer: This information is covered on pages two and three of the JMU Public Safety DAS Specification.
10. Question: What is the methodology that will be used for the DAQ testing?
- Answer: JMU realizes that DAQ is subjective in nature. Our intent is to balance actual RSSI values and group consensus of system testers. This includes on-site AHJ function testing performed during walkthrough and review of system design and commissioning testing documentation.
11. Question: Are stairwell penetrations are allowed? If yes, are penetrations allowed in and out on every floor or the shall the riser only serve the coverage inside the stairwells?
- Answer: Stairwell penetrations are not allowed.
12. Question: Can stairwells be used as a donor antenna riser?
- Answer: Stairwells cannot be used for donor antenna riser.
13. Question: Are there any critical areas required in deviance to code? If yes, can a list of these areas be provided?
- Answer: Critical areas are defined on page 4 of the JMU Public Safety DAS Specification and duplicated here.
- Critical Areas specifically designated by JMU and AHJ include [REF: NFPA 1221, 9.6.7.4]:
- o ALL Elevators, Elevator Lobbies & Elevator Control Rooms
  - o ALL Mechanical & Equipment Rooms
  - o ALL Exit Stairwells
  - o ALL Exit Passageways
  - o ALL Areas of Refuge and/or Areas of Rescue Assistance
  - o ALL Fire Control Rooms
  - o ALL Command & Control Centers
  - o ALL Commercial Kitchen and Food Preparation Areas
  - o ALL HAZMAT Usage Areas (labs) and Storage Areas
  - o ALL Sprinkler Sectional Valve Locations
  - o ALL Standpipe Cabinets
  - o Any other areas that may be designated by JMU and/or AHJ as Critical Areas for specific structures (determined prior to bid solicitation).
14. Question: Is the required cabling fire survivability in deviance to code? If yes, can the required cabling fire survivability be provided?
- Answer: No. See pages 8 thru 10 of the JMU Public Safety DAS Specification.

15. Question: Do any alarms need to be monitored in deviance to code? If yes, can a list of the alarms requirements outside of the code be required.
- Answer: Refer to pages 16 & 17 of the JMU Public Safety DAS Specification.
16. Question: What is the signal strength on the roof for every system?
- Answer: Unknown. Shall be determined on-site at the time of system design and install by vendor. Proximate testing of ambient signal strength on adjacent structures in the geographic area may be evaluated to assist in the design phases until such time as any new structures are completed enough to permit actual donor antenna signal strength levels present.
17. Question: What is the donor azimuth required for every system?
- Answer: Unknown. Donor azimuth will depend on the geographic location of each new facility in relation to our UHF donor sites and the best available 800 donor site as indicated. Donor site locations can be found on pages 2 and 3 of the JMU Public Safety DAS Specification.
18. Question: What is the number of devices associated with the existing public safety in-building systems that need to be included in the pricing for ongoing monitoring of the network?
- Answer: System monitoring is performed by JMU and or the AHJ. We are not asking the vendor to monitor the system(s). We require the system(s) to provide alarms for monitoring purposes. Respondents are encouraged submit Monitoring and any other services they are qualified to provide to the university in response to, Section D Other Services, on Page 15 of the RFP.
19. Question: When pricing the monitoring of the system, can we assume that an ethernet network connection will be provided at the location of each device being monitored?
- Answer: System monitoring is performed by JMU and or the AHJ. We are not asking the vendor to monitor the system(s). We require the system(s) to provide alarms for monitoring purposes. Respondents are encouraged submit Monitoring and any other services they are qualified to provide to the university in response to, Section D Other Services, on Page 15 of the RFP.
20. Question: Please describe the maintenance and repair history of the existing systems, particularly any recent history of service - affecting outages.
- Answer: Systems remain as installed with no maintenance issues noted. There have been no outages. Our current plan is to have the winning vendor evaluate system performance.
21. Question: Bit Error Rate testing is mentioned as a deliverable, but pass / fail criteria and methodology (grid, walk test etc) are not listed. Can you provide more detail on how / whether BER testing will be a part of the acceptance process?
- Answer: This requirement has been dropped as part of commissioning/acceptance testing. BER testing will typically only be performed in extreme circumstances that would require the HRECC to activate BER for trouble shooting purposes.
22. Question: Please describe the environments that existing active equipment is located in? Conditioned TR's? Penthouse mechanical spaces? Etc.
- Answer: Depending on the scale and scope of the system, they are housed in a variety of spaces, typically conditioned TR's or purpose-built rooms.

23. Question: The RFP includes this sentence: "Allocation of points for evaluation criteria will be published to the eVA solicitation posting prior to the closing date and time." When will this information be posted to the solicitation?
- Answer: We don't have a specific time requirement. The points allocation will be posted prior to the closing of the RFP.
24. Question: Are as-Built documentation available for the existing systems?
- Answer: We are still collecting data as part of our internal transition of ownership for these systems. As-builts are available for some of the systems and accuracy has not been validated.
25. Question: Is JMU seeking a fixed annual price for ongoing Maintenance on existing systems or just Will Call service on a time and material basis?
- Answer: Will Call would be preferred but we would entertain either and or both.
26. Question: If maintenance on existing systems, is it assumed that JMU will pay for a full health inspection on each of the existing systems at the outset of the contract (for example Engineering resource time to work through each system to determine health of what we'd be supporting)?
- Answer: Yes, our current plan is to have the winning vendor evaluate system performance.
27. Question: What digital radio protocols are you using?
- Answer: The HRECC 800 Mhz trunked system is a Harris P25 Digital System
- Of JMU's (5) Kenwood NEXEDGE UHF Repeaters, 4 (JMUPD, ADMIN, B&G, and FM) are currently set in dual mode (both Analog and Digital). The UREC Repeater is also a Kenwood NEXEDGE but is only Analog as it does not have Digital Capabilities.
28. Question: Are these Motorola radio systems?
- Answer: University Systems are Kenwood NEXEDGE UHF NXR Repeater & TKR Voters HRECC 800 mhz systems are Harris Trunked P25.
29. Question: Pricing for any training associated with proposed solutions. Who would we be training, and what's the scope of this training?
- Answer: Our intent is to have JMU ITT personnel be able to act as "smart hands" to perform preliminary trouble shooting and or assist vendor remote personnel in system restoration in emergency situations where the vendor may not be able to be present. JMU ITT personnel would like to be trained in the fundamentals and industry best practices for system installation and maintenance.
30. Question: In 2 places, this RFP refers to IBWC/IBX files. It appears that this is to use for data collection with the JMU PCTel device. Who will format the files to this format? This is not a common file format.
- Answer: If the vendor uses iBwave products to design their systems then they should be able to export directly in this file format for compatibility with JMU Testing Equipment. If they do not use iBwave, then they may be able, depending on their design and testing product, to export from their design product in these formats. We are asking respondents to confirm their capability to export in these formats and to list the formats types they can export.

31. Question: Related to the above, section IV.B.4.c at the top of page 7, the term 'BER testing' is included for documentation of system commissioning. Is this an error? If not an error, please explain what BER testing is required.

Answer: See answer to previous BER related Question 21.

32. Question: Will any PCTel testing be done by JMU only? Or is this a requirement on the bidder to have and use the PCTel equipment for testing?

Answer: JMU uses PCTel test equipment. We are **NOT** requiring the vendor to use PCTel. See answer to IBWC/IBX files question.

Signify receipt of this addendum by initialing “*Addendum #2\_\_\_\_\_*” on the signature page of your proposal.

Sincerely,

Doug Chester  
Buyer Senior  
Phone: (540-568-4272)

## FIRE ALARM AND EMERGENCY COMMUNICATION SYSTEM RECORD OF COMPLETION

*To be completed by the system installation contractor at the time of system acceptance and approval.  
It shall be permitted to modify this form as needed to provide a more complete and/or clear record.*

*Insert N/A in all unused lines.*

*Attach additional sheets, data, or calculations as necessary to provide a complete record.*

### 1. PROPERTY INFORMATION

Name of property: \_\_\_\_\_

Address: \_\_\_\_\_

Description of property: \_\_\_\_\_

Occupancy type: \_\_\_\_\_

Name of property representative: \_\_\_\_\_

Address: \_\_\_\_\_

Phone: \_\_\_\_\_ Fax: \_\_\_\_\_ E-mail: \_\_\_\_\_

Authority having jurisdiction over this property: \_\_\_\_\_

Phone: \_\_\_\_\_ Fax: \_\_\_\_\_ E-mail: \_\_\_\_\_

### 2. INSTALLATION, SERVICE, AND TESTING CONTRACTOR INFORMATION

Installation contractor for this equipment: \_\_\_\_\_

Address: \_\_\_\_\_

License or certification number: \_\_\_\_\_

Phone: \_\_\_\_\_ Fax: \_\_\_\_\_ E-mail: \_\_\_\_\_

Service organization for this equipment: \_\_\_\_\_

Address: \_\_\_\_\_

License or certification number: \_\_\_\_\_

Phone: \_\_\_\_\_ Fax: \_\_\_\_\_ E-mail: \_\_\_\_\_

A contract for test and inspection in accordance with NFPA standards is in effect as of: \_\_\_\_\_

Contracted testing company: \_\_\_\_\_

Address: \_\_\_\_\_

Phone: \_\_\_\_\_ Fax: \_\_\_\_\_ E-mail: \_\_\_\_\_

Contract expires: \_\_\_\_\_ Contract number: \_\_\_\_\_ Frequency of routine inspections: \_\_\_\_\_

### 3. DESCRIPTION OF SYSTEM OR SERVICE

☐ Fire alarm system (nonvoice)

☐ Fire alarm with in-building fire emergency voice alarm communication system (EVACS)

☐ Mass notification system (MNS)

☐ Combination system, with the following components:

☐ Fire alarm

☐ EVACS

☐ MNS

☐ Two-way, in-building, emergency communication system

☐ Other (specify): \_\_\_\_\_

NFPA 72, Fig. 10.18.2.1.1 (p. 1 of 12)

### 3. DESCRIPTION OF SYSTEM OR SERVICE (continued)

NFPA 72 edition: \_\_\_\_\_ Additional description of system(s): \_\_\_\_\_

#### 3.1 Control Unit

Manufacturer: \_\_\_\_\_ Model number: \_\_\_\_\_

#### 3.2 Mass Notification System

☐ This system does not incorporate an MNS

##### 3.2.1 System Type:

☐ In-building MNS—combination

☐ In-building MNS—stand-alone

☐ Wide-area MNS

☐ Distributed recipient MNS

☐ Other (specify): \_\_\_\_\_

##### 3.2.2 System Features:

☐ Combination fire alarm/MNS

☐ MNS autonomous control unit

☐ Wide-area MNS to regional national alerting interface

☐ Local operating console (LOC)

☐ Direct recipient MNS (DRMNS)

☐ Wide-area MNS to DRMNS interface

☐ Wide-area MNS to high-power speaker array (HPSA) interface

☐ In-building MNS to wide-area MNS interface

☐ Other (specify): \_\_\_\_\_

#### 3.3 System Documentation

☐ An owner's manual, a copy of the manufacturer's instructions, a written sequence of operation, and a copy of the numbered record drawings are stored on site. Location: \_\_\_\_\_

#### 3.4 System Software

☐ This system does not have alterable site-specific software.

Operating system (executive) software revision level: \_\_\_\_\_

Site-specific software revision date: \_\_\_\_\_

Revision completed by: \_\_\_\_\_

☐ A copy of the site-specific software is stored on site. Location: \_\_\_\_\_

#### 3.5 Off-Premises Signal Transmission

☐ This system does not have off-premises transmission.

Name of organization receiving alarm signals with phone numbers:

Alarm:

Phone: \_\_\_\_\_

Supervisory:

Phone: \_\_\_\_\_

Trouble:

Phone: \_\_\_\_\_

Entity to which alarms are retransmitted: \_\_\_\_\_

Phone: \_\_\_\_\_

Method of retransmission: \_\_\_\_\_

If Chapter 26, specify the means of transmission from the protected premises to the supervising station: \_\_\_\_\_

If Chapter 27, specify the type of auxiliary alarm system: ☐ Local energy ☐ Shunt ☐ Wired ☐ Wireless

## 4. CIRCUITS AND PATHWAYS

### 4.1 Signaling Line Pathways

#### 4.1.1 Pathways Class Designations and Survivability

Pathways class: \_\_\_\_\_ Survivability level: \_\_\_\_\_ Quantity: \_\_\_\_\_  
(See NFPA 72, Sections 12.3 and 12.4)

#### 4.1.2 Pathways Utilizing Two or More Media

Quantity: \_\_\_\_\_ Description: \_\_\_\_\_

#### 4.1.3 Device Power Pathways

- ☐ No separate power pathways from the signaling line pathway
- ☐ Power pathways are separate but of the same pathway classification as the signaling line pathway
- ☐ Power pathways are separate and different classification from the signaling line pathway

#### 4.1.4 Isolation Modules

Quantity: \_\_\_\_\_

### 4.2 Alarm Initiating Device Pathways

#### 4.2.1 Pathways Class Designations and Survivability

Pathways class: \_\_\_\_\_ Survivability level: \_\_\_\_\_ Quantity: \_\_\_\_\_  
(See NFPA 72, Sections 12.3 and 12.4)

#### 4.2.2 Pathways Utilizing Two or More Media

Quantity: \_\_\_\_\_ Description: \_\_\_\_\_

#### 4.2.3 Device Power Pathways

- ☐ No separate power pathways from the initiating device pathway
- ☐ Power pathways are separate but of the same pathway classification as the initiating device pathway
- ☐ Power pathways are separate and different classification from the initiating device pathway

### 4.3 Non-Voice Audible System Pathways

#### 4.3.1 Pathways Class Designations and Survivability

Pathways class: \_\_\_\_\_ Survivability level: \_\_\_\_\_ Quantity: \_\_\_\_\_  
(See NFPA 72, Sections 12.3 and 12.4)

#### 4.3.2 Pathways Utilizing Two or More Media

Quantity: \_\_\_\_\_ Description: \_\_\_\_\_

#### 4.3.3 Appliance Power Pathways

- ☐ No separate power pathways from the notification appliance pathway
- ☐ Power pathways are separate but of the same pathway classification as the notification appliance pathway
- ☐ Power pathways are separate and different classification from the notification appliance pathway

## 5. ALARM INITIATING DEVICES

### 5.1 Manual Initiating Devices

#### 5.1.1 Manual Fire Alarm Boxes

☐ This system does not have manual fire alarm boxes.

Type and number of devices: Addressable: \_\_\_\_\_ Conventional: \_\_\_\_\_ Coded: \_\_\_\_\_ Transmitter: \_\_\_\_\_

Other (specify): \_\_\_\_\_

#### 5.1.2 Other Alarm Boxes

☐ This system does not have other alarm boxes.

Description: \_\_\_\_\_

Type and number of devices: Addressable: \_\_\_\_\_ Conventional: \_\_\_\_\_ Coded: \_\_\_\_\_ Transmitter: \_\_\_\_\_

Other (specify): \_\_\_\_\_

### 5.2 Automatic Initiating Devices

#### 5.2.1 Smoke Detectors

☐ This system does not have smoke detectors.

Type and number of devices: Addressable: \_\_\_\_\_ Conventional: \_\_\_\_\_

Other (specify): \_\_\_\_\_

Type of coverage: ☐ Complete area ☐ Partial area ☐ Nonrequired partial area

Other (specify): \_\_\_\_\_

Type of smoke detector sensing technology: ☐ Ionization ☐ Photoelectric ☐ Multicriteria ☐ Aspirating ☐ Beam

Other (specify): \_\_\_\_\_

#### 5.2.2 Duct Smoke Detectors

☐ This system does not have alarm-causing duct smoke detectors.

Type and number of devices: Addressable: \_\_\_\_\_ Conventional: \_\_\_\_\_

Other (specify): \_\_\_\_\_

Type of coverage: \_\_\_\_\_

Type of smoke detector sensing technology: ☐ Ionization ☐ Photoelectric ☐ Aspirating ☐ Beam

#### 5.2.3 Radiant Energy (Flame) Detectors

☐ This system does not have radiant energy detectors.

Type and number of devices: Addressable: \_\_\_\_\_ Conventional: \_\_\_\_\_

Other (specify): \_\_\_\_\_

Type of coverage: \_\_\_\_\_

#### 5.2.4 Gas Detectors

☐ This system does not have gas detectors.

Type of detector(s): \_\_\_\_\_

Number of devices: Addressable: \_\_\_\_\_ Conventional: \_\_\_\_\_

Type of coverage: \_\_\_\_\_

#### 5.2.5 Heat Detectors

☐ This system does not have heat detectors.

Type and number of devices: Addressable: \_\_\_\_\_ Conventional: \_\_\_\_\_

Type of coverage: ☐ Complete area ☐ Partial area ☐ Nonrequired partial area ☐ Linear ☐ Spot

Type of heat detector sensing technology: ☐ Fixed temperature ☐ Rate-of-rise ☐ Rate compensated

## 5. ALARM INITIATING DEVICES (continued)

### 5.2.6 Addressable Monitoring Modules

☐ This system does not have monitoring modules.

Number of devices: \_\_\_\_\_

### 5.2.7 Waterflow Alarm Devices

☐ This system does not have waterflow alarm devices.

Type and number of devices: Addressable: \_\_\_\_\_ Conventional: \_\_\_\_\_ Coded: \_\_\_\_\_ Transmitter: \_\_\_\_\_

### 5.2.8 Alarm Verification

☐ This system does not incorporate alarm verification.

Number of devices subject to alarm verification: \_\_\_\_\_ Alarm verification set for \_\_\_\_\_ seconds

### 5.2.9 Presignal

☐ This system does not incorporate pre-signal.

Number of devices subject to presignal: \_\_\_\_\_

Describe presignal functions: \_\_\_\_\_

### 5.2.10 Positive Alarm Sequence (PAS)

☐ This system does not incorporate PAS.

Describe PAS: \_\_\_\_\_

### 5.2.11 Other Initiating Devices

☐ This system does not have other initiating devices.

Describe: \_\_\_\_\_

## 6. SUPERVISORY SIGNAL-INITIATING DEVICES

### 6.1 Sprinkler System Supervisory Devices

☐ This system does not have sprinkler supervisory devices.

Type and number of devices: Addressable: \_\_\_\_\_ Conventional: \_\_\_\_\_ Coded: \_\_\_\_\_ Transmitter: \_\_\_\_\_

Other (specify): \_\_\_\_\_

### 6.2 Fire Pump Description and Supervisory Devices

☐ This system does not have a fire pump.

Type fire pump: ☐ Electric pump ☐ Engine

Type and number of devices: Addressable: \_\_\_\_\_ Conventional: \_\_\_\_\_ Coded: \_\_\_\_\_ Transmitter: \_\_\_\_\_

Other (specify): \_\_\_\_\_

#### 6.2.1 Fire Pump Functions Supervised

☐ Power ☐ Running ☐ Phase reversal ☐ Selector switch not in auto ☐ Engine or control panel trouble ☐ Low fuel

Other (specify): \_\_\_\_\_

### 6.3 Duct Smoke Detectors (DSDs)

☐ This system does not have DSDs causing supervisory signals.

Type and number of devices: Addressable: \_\_\_\_\_ Conventional: \_\_\_\_\_

Other (specify): \_\_\_\_\_

Type of coverage: \_\_\_\_\_

Type of smoke detector sensing technology: ☐ Ionization ☐ Photoelectric ☐ Aspirating ☐ Beam

### 6.4 Other Supervisory Devices

☐ This system does not have other supervisory devices.

Describe: \_\_\_\_\_

## 7. MONITORED SYSTEMS

### 7.1 Engine-Driven Generator

☐ This system does not have a generator.

#### 7.1.1 Generator Functions Supervised

☐ Engine or control panel trouble    ☐ Generator running    ☐ Selector switch not in auto    ☐ Low fuel

☐ Other (specify): \_\_\_\_\_

### 7.2 Special Hazard Suppression Systems

☐ This system does not monitor special hazard systems.

Description of special hazard system(s): \_\_\_\_\_

### 7.3 Other Monitoring Systems

☐ This system does not monitor other systems.

Description of special hazard system(s): \_\_\_\_\_

## 8. ANNUNCIATORS

☐ This system does not have annunciators.

### 8.1 Location and Description of Annunciators

Location 1: \_\_\_\_\_

Location 2: \_\_\_\_\_

Location 3: \_\_\_\_\_

## 9. ALARM NOTIFICATION APPLIANCES

### 9.1 In-Building Fire Emergency Voice Alarm Communication System

☐ This system does not have an EVACS.

Number of single voice alarm channels: \_\_\_\_\_

Number of multiple voice alarm channels: \_\_\_\_\_

Number of speakers: \_\_\_\_\_

Number of speaker circuits: \_\_\_\_\_

Location of amplification and sound-processing equipment: \_\_\_\_\_

Location of paging microphone stations: \_\_\_\_\_

Location 1: \_\_\_\_\_

Location 2: \_\_\_\_\_

Location 3: \_\_\_\_\_

### 9.2 Nonvoice Notification Appliances

☐ This system does not have nonvoice notification appliances.

Horns: \_\_\_\_\_

With visible: \_\_\_\_\_

Bells: \_\_\_\_\_

With visible: \_\_\_\_\_

Chimes: \_\_\_\_\_

With visible: \_\_\_\_\_

Visible only: \_\_\_\_\_

Other (describe): \_\_\_\_\_

### 9.3 Notification Appliance Power Extender Panels

☐ This system does not have power extender panels.

Quantity: \_\_\_\_\_

Locations: \_\_\_\_\_

**10. MASS NOTIFICATION CONTROLS, APPLIANCES, AND CIRCUITS** ☐ This system does not have an MNS.

**10.1 MNS Local Operating Consoles**

Location 1: \_\_\_\_\_

Location 2: \_\_\_\_\_

Location 3: \_\_\_\_\_

**10.2 High-Power Speaker Arrays**

Number of HPSA speaker initiation zones: \_\_\_\_\_

Location 1: \_\_\_\_\_

Location 2: \_\_\_\_\_

Location 3: \_\_\_\_\_

**10.3 Mass Notification Devices**

Combination fire alarm/MNS visible appliances: \_\_\_\_\_ MNS-only visible appliances: \_\_\_\_\_

Textual signs: \_\_\_\_\_ Other (describe): \_\_\_\_\_

Supervision class: \_\_\_\_\_

**10.3.1 Special Hazard Notification**

☐ This system does not have special suppression predischARGE notification.

☐ MNS systems DO NOT override notification appliances required to provide special suppression predischARGE notification.

**11. TWO-WAY EMERGENCY COMMUNICATION SYSTEMS**

**11.1 Telephone System**

☐ This system does not have a two-way telephone system.

Number of telephone jacks installed: \_\_\_\_\_ Number of warden stations installed: \_\_\_\_\_

Number of telephone handsets stored on site: \_\_\_\_\_

Type of telephone system installed: ☐ Electrically powered ☐ Sound powered

**11.2 Two-Way Radio Communications Enhancement System**

☐ This system does not have a two-way radio communications enhancement system.

Percentage of area covered by two-way radio service: Critical areas: \_\_\_\_\_ % General building areas: \_\_\_\_\_ %

Amplification component locations: \_\_\_\_\_

Inbound signal strength: \_\_\_\_\_ dBm Outbound signal strength: \_\_\_\_\_ dBm

Donor antenna isolation is: \_\_\_\_\_ dB above the signal booster gain

Radio frequencies covered: \_\_\_\_\_

Radio system monitor panel location: \_\_\_\_\_

## 11. TWO-WAY EMERGENCY COMMUNICATION SYSTEMS *(continued)*

### 11.3 Area of Refuge (Area of Rescue Assistance) Emergency Communications Systems

☐ This system does not have an area of refuge (area of rescue assistance) emergency communications system.

Number of stations: \_\_\_\_\_ Location of central control point: \_\_\_\_\_

Days and hours when central control point is attended: \_\_\_\_\_

Location of alternate control point: \_\_\_\_\_

Days and hours when alternate control point is attended: \_\_\_\_\_

### 11.4 Elevator Emergency Communications Systems

☐ This system does not have an elevator emergency communications system.

Number of elevators with stations: \_\_\_\_\_ Location of central control point: \_\_\_\_\_

Days and hours when central control point is attended: \_\_\_\_\_

Location of alternate control point: \_\_\_\_\_

Days and hours when alternate control point is attended: \_\_\_\_\_

### 11.5 Other Two-Way Communication Systems

Describe: \_\_\_\_\_

## 12. CONTROL FUNCTIONS

This system activates the following control functions:

☐ Hold-open door releasing devices ☐ Smoke management ☐ HVAC shutdown ☐ F/S dampers

☐ Door unlocking ☐ Elevator recall ☐ Fuel source shutdown ☐ Extinguishing agent release

☐ Elevator shunt trip ☐ Mass notification system override of fire alarm notification appliances

Other (specify): \_\_\_\_\_

### 12.1 Addressable Control Modules

☐ This system does not have control modules.

Number of devices: \_\_\_\_\_

Other (specify): \_\_\_\_\_

## 13. SYSTEM POWER

### 13.1 Control Unit

#### 13.1.1 Primary Power

Input voltage of control panel: \_\_\_\_\_ Control panel amps: \_\_\_\_\_

Overcurrent protection: Type: \_\_\_\_\_ Amps: \_\_\_\_\_

Location (of primary supply panel board): \_\_\_\_\_

Disconnecting means location: \_\_\_\_\_

#### 13.1.2 Engine-Driven Generator

☐ This system does not have a generator.

Location of generator: \_\_\_\_\_

Location of fuel storage: \_\_\_\_\_ Type of fuel: \_\_\_\_\_

### 13. SYSTEM POWER (*continued*)

#### 13.1.3 Uninterruptible Power System

☐ This system does not have a UPS.

Equipment powered by a UPS system: \_\_\_\_\_

Location of UPS system: \_\_\_\_\_

Calculated capacity of UPS batteries to drive the system components connected to it:

In standby mode (hours): \_\_\_\_\_

In alarm mode (minutes): \_\_\_\_\_

#### 13.1.4 Batteries

Location: \_\_\_\_\_

Type: \_\_\_\_\_

Nominal voltage: \_\_\_\_\_

Amp/hour rating: \_\_\_\_\_

Calculated capacity of batteries to drive the system:

In standby mode (hours): \_\_\_\_\_

In alarm mode (minutes): \_\_\_\_\_

☐ Batteries are marked with date of manufacture

☐ Battery calculations are attached

#### 13.2 In-Building Fire Emergency Voice Alarm Communication System or Mass Notification System

☐ This system does not have an EVACS or MNS system.

##### 13.2.1 Primary Power

Input voltage of EVACS or MNS panel: \_\_\_\_\_

EVACS or MNS panel amps: \_\_\_\_\_

Overcurrent protection: Type: \_\_\_\_\_

Amps: \_\_\_\_\_

Location (of primary supply panel board): \_\_\_\_\_

Disconnecting means location: \_\_\_\_\_

##### 13.2.2 Engine-Driven Generator

☐ This system does not have a generator.

Location of generator: \_\_\_\_\_

Location of fuel storage: \_\_\_\_\_

Type of fuel: \_\_\_\_\_

##### 13.2.3 Uninterruptible Power System

☐ This system does not have a UPS.

Equipment powered by a UPS system: \_\_\_\_\_

Location of UPS system: \_\_\_\_\_

Calculated capacity of UPS batteries to drive the system components connected to it:

In standby mode (hours): \_\_\_\_\_

In alarm mode (minutes): \_\_\_\_\_

##### 13.2.4 Batteries

Location: \_\_\_\_\_

Type: \_\_\_\_\_

Nominal voltage: \_\_\_\_\_

Amp/hour rating: \_\_\_\_\_

Calculated capacity of batteries to drive the system:

In standby mode (hours): \_\_\_\_\_

In alarm mode (minutes): \_\_\_\_\_

☐ Batteries are marked with date of manufacture

☐ Battery calculations are attached

### 13. SYSTEM POWER (*continued*)

#### 13.3 Notification Appliance Power Extender Panels

☐ This system does not have power extender panels.

##### 13.3.1 Primary Power

Input voltage of power extender panel(s): \_\_\_\_\_ Power extender panel amps: \_\_\_\_\_

Overcurrent protection: Type: \_\_\_\_\_ Amps: \_\_\_\_\_

Location (of primary supply panel board): \_\_\_\_\_

Disconnecting means location: \_\_\_\_\_

##### 13.3.2 Engine-Driven Generator

☐ This system does not have a generator.

Location of generator: \_\_\_\_\_

Location of fuel storage: \_\_\_\_\_ Type of fuel: \_\_\_\_\_

##### 13.3.3 Uninterruptible Power System

☐ This system does not have a UPS.

Equipment powered by a UPS system: \_\_\_\_\_

Location of UPS system: \_\_\_\_\_

Calculated capacity of UPS batteries to drive the system components connected to it:

In standby mode (hours): \_\_\_\_\_ In alarm mode (minutes): \_\_\_\_\_

##### 13.3.4 Batteries

Location: \_\_\_\_\_ Type: \_\_\_\_\_ Nominal voltage: \_\_\_\_\_ Amp/hour rating: \_\_\_\_\_

Calculated capacity of batteries to drive the system:

In standby mode (hours): \_\_\_\_\_ In alarm mode (minutes): \_\_\_\_\_

☐ Batteries are marked with date of manufacture ☐ Battery calculations are attached

### 14. RECORD OF SYSTEM INSTALLATION

*Fill out after all installation is complete and wiring has been checked for opens, shorts, ground faults, and improper branching, but before conducting operational acceptance tests.*

This is a: ☐ New system ☐ Modification to an existing system Permit number: \_\_\_\_\_

The system has been installed in accordance with the following requirements: (Note any or all that apply.)

☐ NFPA 72, Edition: \_\_\_\_\_

☐ NFPA 70, National Electrical Code, Article 760, Edition: \_\_\_\_\_

☐ Manufacturer's published instructions

Other (specify): \_\_\_\_\_

System deviations from referenced NFPA standards: \_\_\_\_\_

Signed: \_\_\_\_\_ Printed name: \_\_\_\_\_ Date: \_\_\_\_\_

Organization: \_\_\_\_\_ Title: \_\_\_\_\_ Phone: \_\_\_\_\_

## 15. RECORD OF SYSTEM OPERATIONAL ACCEPTANCE TEST

☐ New system

*All operational features and functions of this system were tested by, or in the presence of, the signer shown below, on the date shown below, and were found to be operating properly in accordance with the requirements for the following:*

☐ Modifications to an existing system

*All newly modified operational features and functions of the system were tested by, or in the presence of, the signer shown below, on the date shown below, and were found to be operating properly in accordance with the requirements of the following:*

☐ NFPA 72, Edition: \_\_\_\_\_

☐ NFPA 70, National Electrical Code, Article 760, Edition: \_\_\_\_\_

☐ Manufacturer's published instructions

Other (specify): \_\_\_\_\_

☐ Individual device testing documentation [Inspection and Testing Form (Figure 14.6.2.4) is attached]

Signed: \_\_\_\_\_ Printed name: \_\_\_\_\_ Date: \_\_\_\_\_

Organization: \_\_\_\_\_ Title: \_\_\_\_\_ Phone: \_\_\_\_\_

## 16. CERTIFICATIONS AND APPROVALS

### 16.1 System Installation Contractor:

This system, as specified herein, has been installed and tested according to all NFPA standards cited herein.

Signed: \_\_\_\_\_ Printed name: \_\_\_\_\_ Date: \_\_\_\_\_

Organization: \_\_\_\_\_ Title: \_\_\_\_\_ Phone: \_\_\_\_\_

### 16.2 System Service Contractor:

The undersigned has a service contract for this system in effect as of the date shown below.

Signed: \_\_\_\_\_ Printed name: \_\_\_\_\_ Date: \_\_\_\_\_

Organization: \_\_\_\_\_ Title: \_\_\_\_\_ Phone: \_\_\_\_\_

### 16.3 Supervising Station:

This system, as specified herein, will be monitored according to all NFPA standards cited herein.

Signed: \_\_\_\_\_ Printed name: \_\_\_\_\_ Date: \_\_\_\_\_

Organization: \_\_\_\_\_ Title: \_\_\_\_\_ Phone: \_\_\_\_\_

## 16. CERTIFICATIONS AND APPROVALS *(continued)*

### 16.4 Property or Owner Representative:

I accept this system as having been installed and tested to its specifications and all NFPA standards cited herein.

Signed: \_\_\_\_\_ Printed name: \_\_\_\_\_ Date: \_\_\_\_\_  
Organization: \_\_\_\_\_ Title: \_\_\_\_\_ Phone: \_\_\_\_\_

### 16.5 Authority Having Jurisdiction:

I have witnessed a satisfactory acceptance test of this system and find it to be installed and operating properly in accordance with its approved plans and specifications, with its approved sequence of operations, and with all NFPA standards cited herein.

Signed: \_\_\_\_\_ Printed name: \_\_\_\_\_ Date: \_\_\_\_\_  
Organization: \_\_\_\_\_ Title: \_\_\_\_\_ Phone: \_\_\_\_\_



July 24, 2020

**ADDENDUM NO.: Three**

**TO ALL OFFERORS:**

**REFERENCE:** Request for Proposal No: **RFP# FDC-1078**  
Dated: June 29, 2020  
Commodity: Public Safety Distributed Antenna System  
RFP Closing On: ~~July 29, 2020 @ 2:00pm~~  
**August 5, 2020 @ 2:00 pm**

Please note the clarifications and/or changes made on this proposal program:

The closing date/time has been extended until August 5, 2020, at 2:00 pm EST.

1. Question: Does the JMU UHF system require 24-hour battery backup, or is that for the AHJ portion only?

Answer: As well as supporting everyday use, JMU's UHF systems serve as JMU Life Safety Operations backup for the 700/800 MHZ system. Unless specifically excluded in the specification, all requirements in the JMU PS DAS Specification apply to both UHF and 700/800 MHZ Systems. See page 14 for BBU requirements. Also duplicated here.

- Where an Automatic Emergency Generator Power Transfer Switch is present a UPS system shall be installed that provides at least 3 hours of uninterrupted electrical power to all communications devices until the automatic transfer switch fully engages to provide stabilized Emergency Generator electrical supply or until the power can be manually transferred in the event of an automatic transfer switch failure as approved by AHJ. [REF: NFPA 1221, 4.7.8]
- Dedicated Stand-alone UPS options shall be used if Automatic Building Emergency Generator Power circuits are not available. These UPS Systems shall also include battery backup for all electronic devices capable of supporting normal communications usage for a period of 24 hours in accordance with NFPA standards

Signify receipt of this addendum by initialing "*Addendum #3*\_\_\_\_\_" on the signature page of your proposal.

Sincerely,

Doug Chester  
Buyer Senior  
Phone: (540-568-4272)

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