

# **RFP# 5217 – Countywide Radio Communications Interoperability and Systems Engineering Services – TECHNICAL PROPOSAL**

**Presented to:**

**Orange County, North Carolina**

**Submitted: March 1, 2016**



**A BLACK & VEATCH COMPANY**

## **RCC Consultants**

Black & Veatch Corporation, a Delaware Corporation  
6800 W. 115<sup>th</sup> St., Suite 2292  
Overland Park, KS 66211

**Proposal Contact: Mark Athearn**

General Manager

Telephone: 919-463-3033

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**ORIGINAL**

## COVER LETTER

March 1, 2016

Attn: Mr. David Cannell, Purchasing Agent  
200 S. Cameron Street  
PO Box 8181  
Hillsborough, North Carolina 27278  
Email: [dcannell@orangecountync.org](mailto:dcannell@orangecountync.org)  
Phone: 919-245-2651

### **RE: RFP# 5217 – Countywide Radio Communications Interoperability and Systems Engineering Services – TECHNICAL PROPOSAL**

Dear Mr. Cannell;

RCC Consultants, a Black & Veatch Company (RCC), is pleased to submit the enclosed proposal for public safety radio communications consulting services to Orange County (the County). We believe this proposal offers an exceptional range of experience and the depth of resources necessary to meet the needs of the County. RCC is willing and able to provide all the services needed to recommend an upgrade or a replacement of the County's public safety radio system. Our proposed Scope of Work (SOW) includes a needs assessment, a review of system alternatives, a recommended system solution and procurement support.

As the attached document demonstrates, RCC Consultants specializes in the planning, design, procurement, implementation, and optimization of governmental and public safety communications and information systems and is perfectly suited to assist the County in this important project. Each member of the RCC team is a seasoned veteran of the communications industry, bringing to the County years of experience in developing strategies for improving the efficiency and effectiveness of public safety communications and information systems.

RCC offers significant benefits to the County, including:

- **Public Safety Voice and Data Communications System Expertise** – RCC is regarded as one of the best public safety communications system consulting and engineering firms in the United States. Our project teams have supported the planning, design, procurement and implementation of more than 200 advanced interoperable trunked radio systems. RCC assisted the City of Independence, Missouri in implementing the Nation's first 700 MHz P25 radio system. We are currently assisting dozens of public safety clients across the country with their emergency communications needs, including the analysis of current system and implementation of new systems, similar to the needs outlined in the County's RFP.
- **Project Management Oriented Company** – RCC takes project management seriously and has implemented a companywide training program based on the Project Management



Institute (PMI) project management guidelines. This standardized approach ensures that each project is professionally managed, which helps ensure that the project meets its objectives and stays on schedule and within budget. As you will see, many members of our project team are PMI-certified Project Management Professionals.

- **Independence** – RCC is not affiliated with, nor do we have any financial interest in, any communications equipment manufacturer, distributor, or supplier. We do not receive or accept remuneration of any type from any manufacturer, distributor, or supplier for recommending any of their products. Our unbiased independent position provides our clients a capable partner in meeting their project requirements without the potential for conflicts of interest.
- **Proven Project Methodology** – RCC has provided a detailed Scope of Work to meet the requirements outlined in the County’s RFP, which is based on our proven project methodology that has been refined over thousands of projects over our 30+ year history. Our project has been customized to meet the specific needs of the County and addresses all of the requirements in the County’s RFP.

Black & Veatch, with its industry leading turnkey design/build capabilities, coupled with RCC’s strong expertise in the public safety industry, has more capability than any other consulting firm in the industry. This vertically integrated approach benefits our clients with end-to-end delivery solutions that reduce deployment costs while improving schedule durations. It is also important to note that Black & Veatch has achieved the number one ranking worldwide in telecommunications for U.S.-based engineering companies for six consecutive years.

RCC, a Black & Veatch Company, looks forward to the opportunity to support Orange County in its quest for a new and / or improved Public Safety communication system. If there are questions regarding this submission or if you would like to schedule an in-person meeting, please do not hesitate to contact me at (919) 463-3033 (office), (434) 258-7196 (mobile) or by e-mail at [athearnm@bv.com](mailto:athearnm@bv.com). We look forward to meeting with you and discussing your project in more detail and demonstrating how we are the best firm to meet your needs for this project.

Sincerely,



Mark Athearn  
Regional Director  
Mid-Atlantic & Midwest Regions



Chris Krafft  
Vice President  
Telecommunications Business

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## INTRODUCTION (SECTION 4)

Throughout thousands of professional engagements, RCC has developed a proven project approach and has refined it as additional experience has been gained. This approach consists of three phases; a needs assessment phase, a procurement support phase and an implementation support phase. This typical three phased approach is shown in Figure 1 below.

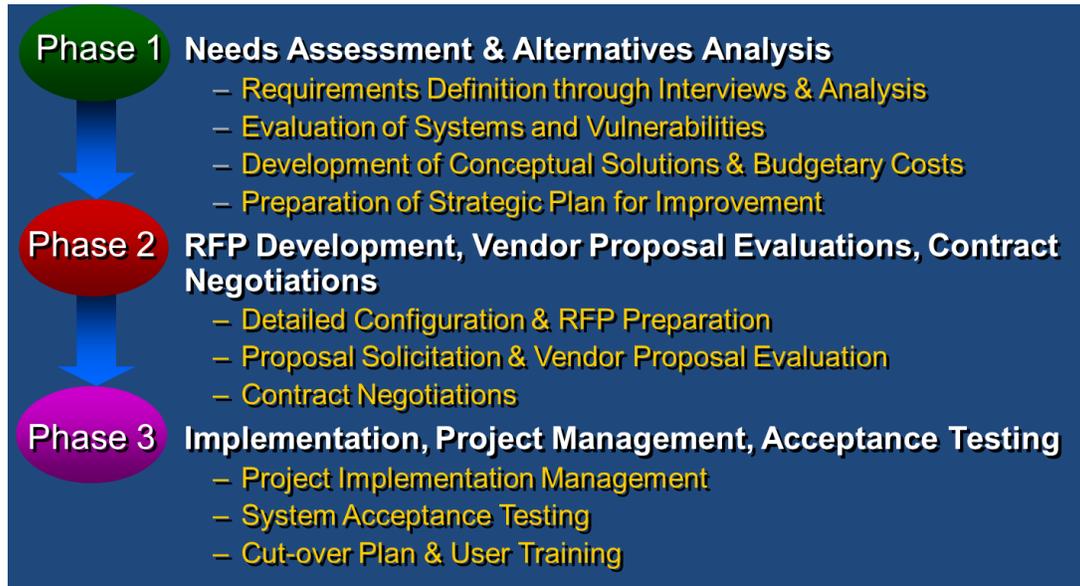


Figure 1. RCC's Typical Scope of Work by Project Phase

RCC has proposed a Phase 1 and Phase 2 scope of work that has been customized and designed to address the requirements outlined in the County's RFP. This scope reflects our understanding of the project, but can also be customized further to meet any additional requirements of the County as necessary. RCC looks forward to discussing the details of the project and our approach with the County. RCC will perform its work under the direction of the County's project manager.

During Phase 1 of the project, RCC will compile all of the necessary information to evaluate the current system status as it relates to upgrading or migrating to a new and improved mission critical communication system, such as APCO P25. RCC will perform an assessment that focuses on assessing and identifying the most practical and cost effective upgrade path to a new communication system.

RCC will begin by performing a needs assessment that focuses on identifying and assessing the current state of the County's communications infrastructure. This needs assessment will address functionality, capability and the needs of all current infrastructure users. This effort will involve field visits and site surveys of the PSAP communication centers, the radio communication sites, other fixed components, as well as mobile and remote components. Included in this initial assessment will be the identification of the operational needs of the stakeholders and users of the public safety radio communication system, including the interoperability needs. A needs

assessment report will be developed in collaboration with the County to document the results and will be used to develop a set of system design alternatives. These alternatives will undergo further consideration via a feasibility analysis and a preferred alternative will be recommended. RCC will present these options to the County's review committee and will assist and guide them in choosing a recommended alternative. This recommended and County approved solution which will then undergo further analysis and study in order to develop an acquisition and implementation plan, which will include a comprehensive cost analysis, a systems transition plan and a user migration plan.

RCC will summarize this information in a draft report which will be delivered to the County for review and comment. RCC will collaborate with the County's key stakeholders and will incorporate their input and feedback into the draft report. Once finalized, the Needs Assessment and System Enhancement Recommendation Report will be delivered to the County. This deliverable will conclude the Phase 1 activities.

During Phase 2, RCC will finalize the recommended system alternative, assist in the development of the Request for Proposal (RFP) document, and support the contractor selection and procurement processes. In this phase, RCC will provide the following services in order to meet the County's requirements:

1. Project management services;
2. Develop a high level functional system design;
3. Create a functional specification document;
4. Provide FCC regulatory services;
5. Collaborate with the County to create the RFP documents;
6. Respond to bidders' inquiries;
7. Prepare evaluation criteria, including total cost of ownership;
8. Assist with bid submittal reviews;
9. Attend and participate in vendor interviews and oral presentations;
10. Prepare and present final evaluation and recommendation; and
11. Assist the County in contract negotiations.

Once again, RCC will collaborate with the County's key stakeholders throughout Phase 2. Our frequent and regular project review meetings with the County representatives will be used to report status, plan actions, assign work responsibilities and make decisions.

For more detailed information related to our project approach and proposed SOW, please refer to the 'Response to Technical Requirements' section.

For more detailed information related to introductory information about our company, please refer to Appendix A – Overview of the Firm and Qualifications.

## RESPONSE TO GENERAL REQUIREMENTS (SECTION 4)

### Organizational Qualifications (4B)

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#### **Black & Veatch Corporation**

6800 W. 115<sup>th</sup> St., Suite 2292

Telephone: (913) 458-2000

Overland Park, KS 66211

Fax: (913) 458-2934

Website: [bv.com](http://bv.com)

RCC Consultants (RCC) is a Black & Veatch company. RCC Consultants, Inc. was acquired by Black & Veatch in August of 2015.

#### **Proposal Contact: Mark Athearn**

Regional Director

Telephone: 919-463-3033

Email: [athearnm@bv.com](mailto:athearnm@bv.com)

For a more in depth review of RCC's organizational qualifications and experience, the reader is directed to Appendix A.

### Staff Qualifications and Facilities (4C)

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RCC has carefully chosen an expert project team to offer the best service to the County's project. Our multi-disciplinary team enables us to meet the project's specific needs with the extraordinary and varied experience of our professionals and their proven ability to deliver quality public safety telecommunications consulting services on time and within budget. RCC has significant staff resources specializing in the skill sets needed to complete the scope of services described in the RFP. Our staff brings a rich variety of experience and qualifications to the County's project.

Telecommunications consulting is RCC's specialty. The size and diverse capabilities of our team enables us to tailor a project team specifically suited to the unique needs of the project. Such flexibility in our team is particularly beneficial to the County's project. We are capable of providing knowledgeable and experienced subject matter experts and engineers to support the services described in the County's RFP, and our team is fully capable of meeting any unexpected challenges that may arise.

RCC's typical approach to projects is to assign an executive sponsor that provides the client with direct availability to senior management, so that the client has an avenue to address high-level matter affecting the project. For this project, Mr. Chris Krafft, Public Safety Director will serve as the executive sponsor for the County.

Mr. Mark Athearn is the Regional Director of the Mid-Atlantic Region. Mr. Athearn oversees RCC's operations within the region and provides business, technical expertise, program

management, risk management, and quality assurance to clients involved in communication system implementations. Mr. Athearn has 30+ years of progressive experience in complex technology insertion programs, including 20+ years focusing on Public Safety LMR systems, wireless voice and data networks and broadband/LTE. Mr. Athearn is a veteran of the United States Navy. He joined RCC in 2013.

Mr. Wayne Stack, PMP, will serve as the Project Manager and will act as the daily contact to the County. Mr. Stack will manage all aspects of the project for RCC and will direct the RCC project resources to accomplish the identified tasks. Mr. Stack will schedule and utilize the expertise identified in the project team as necessary to perform a particular task at hand, and may also take advantage of the broader RCC support staff as necessary to address unique or unforeseen items that may arise during execution of the project. Mr. Stack's responsibilities include project management, planning, design and implementation of communications systems; development of budgets and specifications; bid evaluation and contract negotiation; vendor oversight; schedule development and adherence; acceptance testing; site acquisition; training; and contract change management. Mr. Stack joined RCC in 1993 and has more than 34 years of experience in wireless communications systems.

Mr. Gary Whitley will serve as the Lead Consultant and will provide the technical leadership and coordination of all technical aspects of the project. Mr. Whitley has significant experience as a lead project consultant, most recently with Augusta County and St. Mary's County. Mr. Whitley has held Secret and Top Secret Security clearances. He joined RCC in 2005 and has more than 24 years of experience in communications systems.

Additional key members and subject matter experts (SME) of the proposed RCC project team may include:

**Don Bowman: Communications Center and Dispatch Operations SME**

Mr. Don Bowman has more than 30 years of experience in the in the operational use and applications of technology to public safety and public service agencies. His experiences include project management, system procurement, specifications, proposal and bid evaluation, contract implementation, and acceptance testing. This includes needs assessments, planning, construction management, operational analysis, site and systems evaluations, systems maintenance, systems operational policies and procedures, and training. With his extensive background in public safety, Mr. Bowman offers expertise in all aspects of public safety including Fire, EMS, and Law Enforcement Operations, Emergency Management, Disaster Planning, EOC Operations and practical training exercises.

**John Pearson: FAA/FCC Regulatory and Licensing SME**

Mr. John Pearson is responsible for licensing issues under Part 90 of the FCC's Rules for Public Safety entities. He has extensive knowledge of the Commission's Universal Licensing System, and is responsible for regulatory issues with the Federal Aviation Administration. Additionally, he is responsible for the preparation, filing and licensing of Part 101 point-to-point microwave applications and for the preparation of co-channel interface studies. Other responsibilities include FCC research for technical support of all communications clients, preparation and filing of FAA determinations, and the preparation of maps for filings. Mr. Pearson will review the existing

County licenses, identify any revisions necessary to implement the recommended improvements; determine the availability of additional frequencies if necessary and license applications if needed.

**John Hitch: Site Inspections and Evaluations**

Mr. Hitch will lead the team that evaluates the existing and any candidate communications sites and determines what effort and additional evaluation is required to ensure that the sites will meet the communications needs of the County. Mr. Hitch provides zoning, site planning, site acquisition and real estate support for regional and national wireless network deployment and microwave relocation projects. His primary responsibilities are managing processes and activities to minimize or avoid deployment delays associated with site use permitting and zoning. He works with clients to plan site selection and filing activities, and provides effective prior coordination, as well as verbal and written presentations to governmental representatives. Mr. Hitch joined RCC in 1996.

**Tom McDonald: Microwave/Backbone Design**

Mr. Tom McDonald supports clients with microwave transport and land mobile radio systems and communications site infrastructure planning and development, including microwave and land mobile radio systems and site engineering, project and construction management, quality assurance/quality control, and microwave and land radio mobile system performance testing. His expertise includes microwave system transmission engineering, requirements development for Microwave Interconnection Network and Site Development RFPs, evaluations of vendor responses to Microwave and Site Development RFPs, RF propagation studies, project and construction management, and QA/QC. Mr. McDonald joined RCC in 1995 and has more than 25 years of industry experience.

**Brent O’Daniel, PE, PMP: Quality Engineer**

Mr. Brent O’Daniel is a Professional Engineer (PE) licensed in the State of North Carolina and is a certified Project Management Professional (PMP). Mr. O’Daniel has over 21 years of experience in the program management, analysis, planning, design, construction, and startup of complex systems. Mr. O’Daniel’s responsibilities have included project management, engineering quality oversight, estimation, budget, schedule, system analysis, planning, design, installation, configuration, programming, inspection, startup, and training. Mr. O’Daniel will provide engineering quality oversight on this project. Mr. O’Daniel has been employed by Black & Veatch since 2006.

An organization chart of RCC’s proposed organization is shown below and resumes of the RCC team members are also provided.

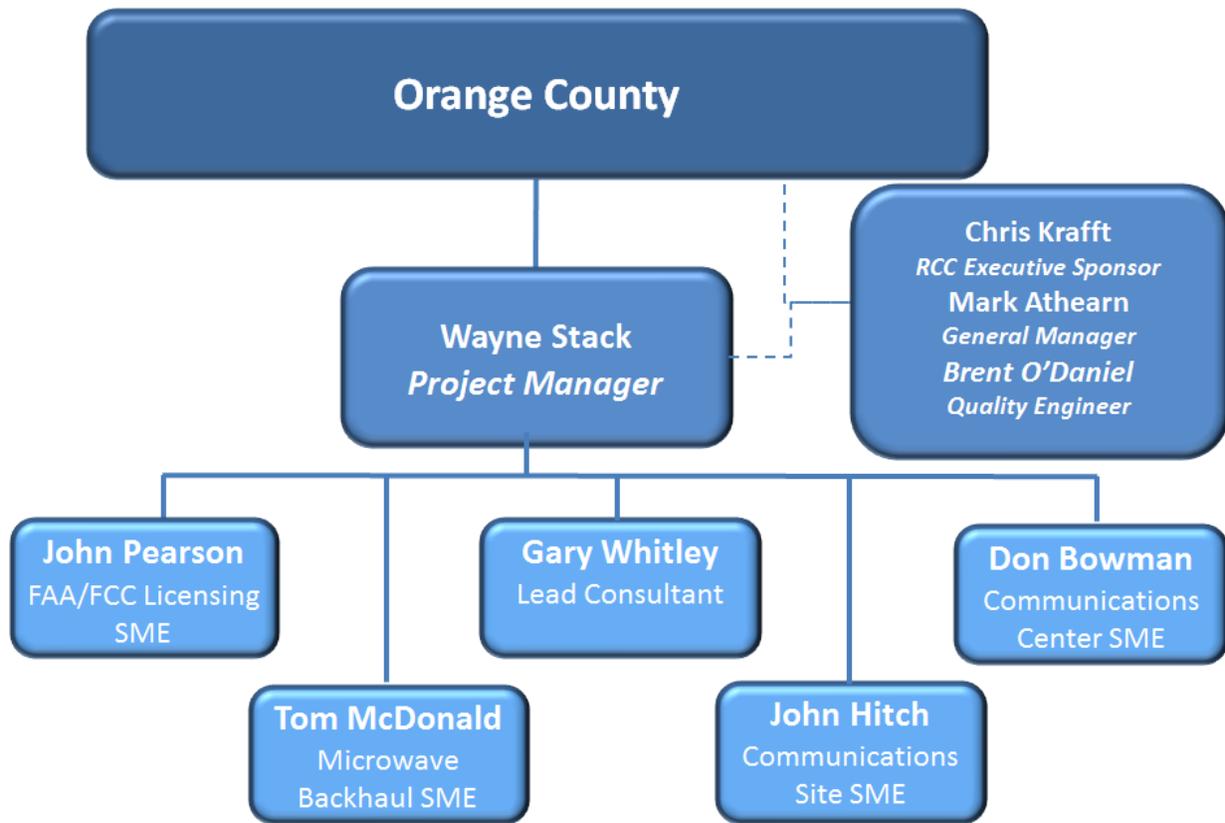


Figure 2. Project Team Organizational Chart

It is important to note that the primary team members, Mr. Stack and Mr. Whitley, are physically located in Virginia and are a relatively short distance from Orange County. Mr. Athearn, Mr. Bowman and Mr. Hitch also reside in Virginia. Mr. O’Daniel resides in North Carolina.

RCC carefully selects our teams, taking into consideration the needs of the project and the workload of our experts. On projects of this size and significance, we typically take a two-tier approach to team member assignments. The first tier would consist of the Project Manager and Lead Consultant. For this core team the project becomes the priority. The additional team members, typically specific subject matter experts, are brought in and out of the project on as needed basis. RCC has approximately 60 fulltime consultants in direct support of our Public Safety business. Many of our consultants are Subject Matter Experts (SMEs) who specialize in Public Safety related radio communication systems and issues. Should the need arise for additional professional services, such as those related to site development and site construction, Black & Veatch can supply these services with in-house professionals.

### Schedule of Standard Labor Rates

The requested hourly labor rates are included in the Cost Proposal, under separate cover.

## Staff Resumes

# Mark Athearn

## General Manager, Mid Atlantic & Midwest

### Technical Expertise

*Land Mobile Radio  
Broadband/LTE  
System Design and  
Optimization  
Wireless Voice and Data  
Networks  
Wide Area System Design  
Engineering  
Capture Management  
Program Management  
Process Development  
Procurement Support  
Financial Modeling  
Budget Planning*

### Education

*MS, Virginia Polytechnic  
Institute and State  
University, Systems  
Engineering  
BS, Southern Polytechnic  
State University, Electrical  
Engineering Technology*

### Awards, Affiliations and Certifications

*Harris Excellence Award  
Tyco Electronics Honor  
Award for Outstanding  
Performance  
M/A-COM Honor Award for  
Outstanding Performance  
Ericsson GE Certificate of  
Excellence  
U.S Navy Meritorious  
Advancement for  
Exemplary Leadership*

Mr. Athearn manages RCC's operations in the Mid-Atlantic and Midwest regions and provides business and technical expertise to clients in LMR system design, wireless voice and data networks, broadband/LTE, program management and sales support. He has 30+ years of progressive experience in communications systems, including 20+ years focusing on Public Safety. Mr. Athearn is a veteran of the United States Navy. He joined RCC in 2013.

### Selected Professional Experience

- **Harris Corporation (Director, Business Development)** – Global responsibility for sales and business development of key business strategic growth initiatives, including P25 migrations and LTE Business start-up activities. Duties included market analysis, business plan definition, capture management, program implementation and execution. Provided leadership and direction to a multifaceted, cross-functional team to transition customers to new telecommunication technologies.
- **Harris Corporation (General Manager, Harris Canada Systems)** – Country manager for Harris's Canadian Operations Division (HCSI). Successfully led HCSI to its best 4 years. Grew annual sales from \$30M to \$75M. Co-led HCSI to a \$300M+ contract award for a provincial-wide P25 telecommunications system.
- **Tyco Electronics M/A-COM Inc.** – P25 Global Business Manager responsible for start-up operations and management of the P25 LMR systems business. Grew the business to \$100M+ in the first three years. Duties included business/process development, P&L, sales support, proposal development, program management, system engineering, contract execution and customer satisfaction. Also served as the Technical Lead and Capture Manager for the \$5B Integrated Wireless Network (IWN) for the U.S. DoJ / DHS.
- **Ericsson/GE** – As Systems Engineering Manager, was responsible for LMR systems sales support, proposal development, contract execution, system implementation, customer satisfaction and employee retention. Served in this capacity for the US and International regions of Asia-Pacific and Latin America.
- **Babcock and Wilcox, NNFD** – As Systems Integration Engineer, was responsible for system design and system integration activities of large scale robotic systems, computer integrated manufacturing, test and inspection systems. Held U.S. DoE Top Secret security clearances.
- **United States Navy** - Aviation Electronics Technician

## Wayne F. Stack, PMP

### Director of Program Management

#### Technical Expertise

VHF, UHF, 800 Conventional  
and Trunked Systems  
Digital and Analog Systems  
Mobile Digital Systems  
E9-1-1 Implementation

#### Education

MBA, Duke University, Fuqua  
School of Business  
BS, California State  
University, School of  
Engineering, Industrial  
Technology (Electronics)

#### Awards, Affiliations and Certifications

Project Management  
Professional (PMP)  
Project Management  
Institute - Member  
FCC General Radio Telephone  
Operator License  
FCC Amateur Radio License  
Association of Public-Safety  
Communications Officials –  
International (APCO)

Mr. Stack is responsible for management and business development in RCC's Mid-Atlantic Region. His responsibilities include project management, planning, design and implementation of communications systems; development of budgets and specifications; bid evaluation and contract negotiation; vendor oversight; schedule development and adherence; acceptance testing; site acquisition; training; and contract change management. Mr. Stack joined RCC in 1993 and has more than 34 year of experience in wireless communications systems.

#### Selected Professional Experience

- **State of Maryland** – Project Manager for a statewide interoperability radio system project. Included functional requirements development, user agency interviews, technical work session facilitation, channel plan development, detailed system design, implementation planning and proof of concept design and implementation.
- **Stafford County, VA** – Project Manager and lead engineer for the conceptual design, procurement, selection and implementation of a new 13-site countywide 700 MHz digital-simulcast-trunked land mobile radio system.
- **Albemarle County, VA** – Project Manager and lead engineer for implementation of a new countywide 800 MHz digital-simulcast-trunked land mobile radio system.
- **Chesterfield County, VA** – Total project management, including functional design, planning, and implementation of a regionally designed 10-site, 20-channel Public Safety digital-simulcast-trunked radio system, an E9-1-1 system and the associated emergency command and dispatch center.
- **City of Cleveland, OH** – Project and technical management of 8-site digital-simulcast-trunked radio system serving 20 city agencies and 4,700 radio users. Supervision of, and technical liaison with, City's prime contractor and system vendor, fleet mapping, site inspection, technical documentation review, ATP evaluation and supervision, equipment inspection, implementation management and cut-over.

#### Additional Experience

- **Fluor Daniel, Inc. /Telecommunications Services** - Communications Engineer, Project Manager, and Voice/Data Segment Manager/Lead Engineer.
- **County of Orange, California** – Communications Engineer
- **Unites States Army Reserve** - Communications Section Chief

## Gary M. Whitley

### Senior Consultant

#### Technical Expertise

*Technical Systems Project Management*

*Quantar Base Station Configuration and*

*Installation Management*

*Telephone Circuit Analysis*

*Console Installation*

#### Education

*Electronics Technician 'A' School, Automated Aids to*

*Navigation, Instructor Training, AN/WSC-3 (V)*

*UHF Transceiver, AN/SPS-*

*64(V) Radar Systems, Model 40 Teletype,*

*An/URC-9 UHF Transceiver,*

*AN/FPN-44A LORAN*

*Transmitter, LORAN C*

*Timing Systems, AN/URT-*

*41(V) HF Transmitter*

*Total Quality Leadership*

*Fundamentals*

*Team Skills and Concepts,*

*Facilitator Course*

*Methods for Managing*

*Quality*

#### Awards, Affiliations and Certifications

*Numerous awards including*

*six Good Conduct and two*

*Coast Guard Achievement*

*Medals*

Mr. Whitley coordinates and tracks all aspects of diverse communications projects. His expertise includes the use of spectrum analyzers, communications service monitors, oscilloscopes, data transmission test sets, signal generators, multimeters and test equipment used in making measurements, adjustments, calibrations, and repairs to communications equipment. He has held Secret and Top Secret Security clearances. Mr. Whitley joined RCC in 2005 and has more than 20 years of experience in maintenance, installation, troubleshooting and repair of electronic communications systems.

#### Selected Professional Experience

- **L & E Associates, Inc.** – Project Manager. Managed all aspects of day-to-day maintenance activities providing corrective and preventive maintenance support of USCG National Distress System (NDS) communications and Vessel Traffic Service (VTS) systems consisting of 350 sites. Managed relocation of 10 NDS Communications sites. Developed and implemented solutions to integrate new sites with existing console systems. Developed cost proposals, Installation Design Plans (IDP), Basic Electronics System Engineering Plans (BESEP) and System Operational Verification Test (SOVT). Coordinated work and cutover schedules with Coast Guard customers, subcontractors, site managers, and Telco implementation managers.
- **ARMA, Inc.** – Project Manager/Engineering Technician. Developed, planned and implemented support activities for the U.S. Coast Guard; assisted program manager in developing cost estimates, planning work, tracking progress and coordinating USCG National Distress System (NDS) electronics efforts. Developed Installation Design Plans (IDP), Basic Electronics System Engineering Plans (BESEP) and System Operational Verification Test (SOVT) procedures for a wide variety of work including the console installation for USCG Group New Orleans' new building as well as numerous new NDS High Level Site (HLS) installations on towers and in buildings. Managed tower inspections at sites throughout the eastern half of the U.S.
- **Retired, United States Coast Guard, 20 years**, E-8 Senior Chief Electronics Technician. Positions included:
  - **Electronics Division Supervisor**, U.S. Coast Guard Communications Area, Master Station Atlantic (CAMSLANT), Chesapeake, VA.
  - **Transmitter Site Supervisor**, U.S. Coast Guard Communications Area, Master Station Atlantic (CAMSLANT), Chesapeake, VA.
  - **Senior Technical Officer**, U.S. Coast Guard LORAN Station, Attu, AK.

## Don Bowman Project Manager

### Technical Expertise

*Project Management*  
*Communications System*  
*Replacement and*  
*Upgrades*  
*Communications Systems*  
*Interoperability and*  
*Operations*  
*Communications Center*  
*Management and*  
*Operations*  
*Records Management*  
*Systems*  
*Mobile Data Systems*  
*Fire, EMS, and Law*  
*Enforcement Operations*

### Education

*John Tyler Community*  
*College*  
*J. Sargeant Reynolds*  
*Community College*  
*National Fire Academy*

### Awards, Affiliations and Certifications

*Virginia Chapter of*  
*Associated Public Safety*  
*Communications Officers,*  
*former member*  
*Region 42 APCO Committee,*  
*former VA Fire*  
*Representative*

#### *Certifications:*

*Incident Command*  
*National Incident*  
*Management System*  
*Homeland Security Exercise*  
*and Evaluation and*  
*Improvement Planning*

For over 35 years, Mr. Bowman has had experience in the operational use and applications of technology to public safety and public service agencies. His experiences include project management, needs assessments, operational analysis, site and systems evaluations, systems maintenance, systems operational policies and procedures, and training. His extensive background in public safety includes Fire & EMS dispatcher, Director of Fire & EMS Communications, Director of Public Safety Communications to include Police, Fire, EMS, and the Sheriff's Department. He has served at the rank of Battalion Chief in Fire & EMS and has experience in Law Enforcement Operations, Emergency Management and disaster planning, EOC Operations and training exercises.

### Selected Professional Experience:

**Chesterfield County, VA** - Provided project management that included development of system and tower requirements, contract negotiations, and build-out of an 800 MHz digital trunked communications system along with developing regional interoperability. It included construction of a new communications center, development and implementation of a new 911 system and call distributor, new console equipment, digital logging recorder system, fire and EMS station alerting system, new CAD System, fire and EMS records management system, mobile data system, and automatic vehicle location system.

**Wake County, NC Communications System Needs Analysis** –Developed options for upgrading to P25 technology including partnering options and budgetary costs projections. This project included site surveys, stakeholder interviews, radios system capabilities and shortfalls, and a detailed system maintenance analysis.

**Wake County, NC Rebanding** – Project Manager for radio system rebanding requirements.

**State of North Carolina Department of Crime Control and Public Safety** – Project Manager for rebanding the "Viper" Statewide Radio System.

**Winston Salem / Forsyth County, NC Rebanding** – Project Manager for radio system rebanding requirements.

**Louisa County, VA** – Conducted a radio system needs assessment and recommendations for system replacement and interoperability.

**St. Louis Area Regional Response System** – Project Manager to provide the region with a Regional Interoperable Communications Plan to include the City of St. Louis, three counties in Missouri, and three counties in Illinois. This project included completing Tactical Interoperable Communications Plans for each of the three counties in Illinois.

## John E. Pearson

### Senior Consultant

#### Technical Expertise

*Regulatory Affairs  
FCC/FAA Applications*

#### Education

*Central Methodist College,  
Fayette, Missouri  
Northern Virginia Community  
College, Annandale,  
Virginia*

Mr. Pearson is responsible for licensing issues under Part 90 of the FCC's Rules for Public Safety entities. He has extensive knowledge of the Commission's Universal Licensing System, and is responsible for regulatory issues with the Federal Aviation Administration. Additionally, he is responsible for the preparation, filing and licensing of Part 101 point-to-point microwave applications and for the preparation of co-channel interface studies. Other responsibilities include FCC research for technical support of all communications clients, preparation and filing of FAA determinations, and the preparation of maps for filings.

#### Selected Professional Experience

- **Commonwealth of Pennsylvania** – Provides licensing services for hundreds of Part 90 licenses and for a state wide Point-to-Point microwave system, the largest in the world. Prepared applications for tower approvals for the entire system, including successful negotiations for towers that were necessary for the expansion of the system. Assisted in the Sprint-Nextel rebanding process.
- **T-Mobile USA** – Responsible for the evaluation of more than 300 sites in the greater Philadelphia area for possible FAA issues. Participated in zoning hearings as an expert in FAA issues.
- **RAM Mobile Data** – Prepared thousands of applications for a nationwide system operating in the 935-940 MHz band. Also prepared Assignment of License applications for the acquisition of spectrum.

#### Additional Experience

- **RAM/BSE Paging Company, L.P.** – Assistant Secretary. Responsible for all aspects of licensing before the FCC for all RAM Broadcasting Corporation's paging subsidiaries and affiliates. Thorough knowledge of Part 22 of the Commission's Rules. Familiar with Parts 17, 80, 90 and 101 of the Rules. Negotiated and maintained site leases for installation and support of paging transmitters and antennas. Maintained numerous databases, prepared Federal Aviation Administration filings for antenna structure clearances, and had day-to-day contact with FAA officials.
- **Goldberg, Godles, Wiener & Wright** – Legal Assistant. Responsible for preparation and prosecution of FCC applications for cellular, paging, SMRS, point-to-point microwave and VSAT earth station facilities. Participated in mass media and cellular comparative hearings. Performed research regarding various aspects of FCC regulation, including paging, radio and television, private land mobile, satellite earth stations and experimental radio services.

## John Hitch

### Consultant, Site Acquisition/Zoning

#### Technical Expertise

*Site Planning*

*Site Acquisition*

*Zoning*

#### Education

*Licensed Real Estate Broker  
in State of Virginia;*

*Certified Commercial  
Investment Member,  
(CCIM) Classes: CCIM 100  
Class, Washington, DC*

*Broker Classes: Property  
Management/ Leasing,  
Appraisal I, Appraisal II,  
Business Law, Investments,  
Brokerage I, Brokerage II;  
Tidewater Community  
College*

*Certified Property Manager  
(CPM), Institute of Real  
Estate Management*

*Real Estate License, Old  
Dominion University*

*BS, Elon College, Business,  
Minor in Mathematics*

#### Awards, Affiliations and Certifications

*Tidewater Association of  
Realtors*

*Commercial Multiple Listing  
Service of Hampton Roads  
Norfolk Ambassador Club*

Mr. Hitch provides zoning, site planning, site acquisition and real estate support for regional and national wireless network deployment and microwave relocation projects. His primary responsibilities are managing processes and activities to minimize or avoid deployment delays associated with site use permitting and zoning. He works with clients to plan site selection and filing activities, and provides effective prior coordination, as well as verbal and written presentations to governmental representatives. Mr. Hitch joined RCC in 1996.

#### Selected Professional Experience

- **VoiceStream Wireless** – Site acquisition, zoning and permits.
- **Commonwealth of Pennsylvania** – Survey and lease sites to be used in the new statewide radio system.

#### Additional Experience

- **TEA Group Incorporated** – As Site Specialist/ Project Manager, worked on Dial Call's Wireless (ESMR) Project in Alabama, South Carolina and North Carolina. Negotiated ground leases, rooftop leases and co-location leases on communication towers. Purchased existing towers and parcels of land for Dial Call. Also worked on P.C.S. PrimeCo L.P. project in Norfolk, VA.
- **Decker/Kyrus Commercial Real Estate**- Sold, developed and resold the Cavalier Business Center, a 98-acre Private Industrial Park in Chesapeake, VA.
- **Kyrus Commercial Real Estate**- Oversaw all aspects of management and leasing of retail, office and industrial properties. Developed and implemented successful marketing strategies for non-performing assets. Property management, tenant buildout, and tenant relocation for four shopping centers and three office buildings.
- **Marland Rock Industries**- Superintendent of barge loading facility. Managed 15 workers in a mining operation. Conducted exploration drilling. Executed lease acquisitions. Sold mineral rights in Maryland and Virginia.
- **J.E.II. Land Holding Corporation** – Vice President of Development. Sold 4,456 acres of land in Chesapeake, VA. Leased to and managed four heavy industrial waterfront sites: DuBrook Concrete Inc.; Sadler Materials; English Construction Company; and Southern Materials, Inc. Converted vacant land into income-producing property.

# Thomas A. McDonald, Jr., PMP

## Associate Director

### Technical Expertise

*Microwave Systems  
Communication Site  
Infrastructure  
Project Management*

### Education

*Brevard Community College  
and Community College of  
the Air Force, Pre-  
Engineering  
Harris RF Digital Microwave  
Field Course  
National Radio Institute,  
Communications  
Electronics  
Narda Non-Ionizing Radiation  
Safety Course  
Harris Advanced Digital  
Microwave Radio  
Transmission Seminar*

### Awards, Affiliations and Certifications

*Project Management  
Professional (PMP)*

Mr. McDonald supports clients with field surveys for site acquisitions; 900 MHz Specialized Mobile Radio (SMR) mobile data system planning and site development, including construction management, inspections, and transmission system performance testing; analysis of radio frequency interference (RFI) and radio system coverage/performance issues; and microwave system relocation, including field surveys, system engineering, construction, installation, implementation management, proof of performance testing and inventory control.

His expertise includes microwave path studies, field surveys, requirements development for Microwave Interconnection Network and Site Development RFPs, evaluations of vendor responses to Microwave and Site Development RFPs, and RF propagation studies. Mr. McDonald joined RCC in 1995 and has more than 20 years of industry experience.

### Selected Professional Experience

- **South East Pennsylvania Regional Counter Terrorism Task Force** – Mr. McDonald is responsible for the project management, design, engineering, implementation and quality assurance testing of a multi-county and multi-agency Emergency Operations Center Internetworking system. The project will provide voice interoperability between 12 counties in four states and up to 10 additional agencies.
- **Commonwealth of Pennsylvania** – Mr. McDonald played a key role in the development of the microwave systems for the \$222M statewide multi-agency mobile radio project. The project provides voice and data communications coverage over the 45,000 square miles of the state for more than 20 public safety, administration, utility and commission user agencies.

### Additional Experience

- **Cellular One/Genesee Telephone Company** –Responsible for site location, acquisition and construction management.
- **Emerson Rittenhouse** –Responsible for testing, troubleshooting, and repairing intercom systems to component level.
- **Rockwell International/Collins Avionics** – As Senior Technician, responsible for troubleshooting and repairing avionics equipment, including EFIS, AHRS and VHF systems to component level.
- **United States Air Force** – As Staff Sergeant and AC&W Radar Repairman, responsible for installation, preventive maintenance, alignments, troubleshooting and repair of Early Warning Radar, SIF and IFF equipment, videomappers and power generation equipment.

## **Experience (4D)**

Experience and qualifications are consistent evaluation criteria used to help select consultants for public safety radio systems. However, evaluating and measuring the relevance of respondents' claims of experience and qualifications can be a daunting task.

We believe that experience and qualifications are the most important and valuable traits that a consultant brings to its clients. We recognize our experience enables us to develop and refine solutions, helping our clients achieve their objectives. We have learned this while performing more than 4,000 communications and information systems projects for governments, public safety agencies, and other essential service organizations over more than 30 years of operation.

### ***Public Safety Radio - Including P25 Experience***

Perhaps no other consulting firm has a better understanding of the public safety communications and governmental communications systems than RCC. RCC has or is currently assisting more than 300 public safety agencies with the planning, design, procurement and implementation of advanced public safety communications networks. Of these, RCC has worked with more than 200 agencies in the design and/or implementation of advanced trunked interoperable radio systems.

RCC has provided or is providing consulting services for more than 50 independent P25 communication system projects throughout the country. RCC leads all other consulting firms in P25 system development knowledge and experience. An overview of RCC's P25 system development experience begins with RCC's direct participation in the P25 Radio System Standards development process that helped pave the way for today's P25 Phase 2 TDMA based radio systems.

We have assisted clients such as Fairfax County, VA plan and implement two large 800 MHz trunked radio systems, one serving public safety and the second serving other county agencies. RCC assisted the County in the planning, implementation, management and operation of the systems. Our work in Fairfax also supported the public safety communications interoperability planning for the National Capital Region (Metropolitan Washington DC Area).

Our P25 experience includes assisting the City of Houston, TX to implement a 48 site, \$130 million 700 MHz P25 Phase 2 trunked radio system to support public safety and other City users. We are currently assisting the East-West Gateway Council of Governments in the St. Louis area in the planning, procurement and implementation of a regional P25 700/800 MHz system that will network the Illinois counties of Madison, Monroe and St. Clair; the Missouri counties of Franklin, Jefferson, St. Charles and St. Louis County; and the City of St. Louis.

Our P25 experience includes systems operating in VHF and UHF in addition to 700/800 MHz systems. We have also had direct experience with Motorola, Harris and Airbus (formerly Cassidian) P25 equipment providers. Figure 3 shows the distribution of our P25 project experience.

Additionally, as indicated in RCC has extensive nationwide P25 experience, including the Mid-Atlantic States.



Figure 3. RCC's P25 Experience

For additional information related to experience, qualifications and capabilities, the reader is directed to Appendix A.

### Statement of Objectivity (4E)

RCC is not affiliated with, nor do we have any financial interest in, any communications equipment manufacturer, distributor, or supplier. We do not receive or accept remuneration of any type from any manufacturer, distributor, or supplier for recommending any of their products. Our unbiased independent position provides our clients a capable partner in meeting their project requirements without the potential for conflicts of interest.

### Project Schedule and Work Plan (4F)

RCC has developed a comprehensive schedule for Phases One and Two of Orange County's radio system upgrade project. An abbreviated version of the schedule appears in Figure 4 below.

Task Name	Dur.	Start	Finish
<b>ORANGE COUNTY RADIO SYSTEM UPGRADE PROJECT</b>	<b>284 d</b>	<b>Mon 4/18/16</b>	<b>Thu 5/18/17</b>
<b>PHASE 1 – COMPREHENSIVE NEEDS ANALYSIS AND RECOMMENDED SOLUTION</b>	<b>87.5 d</b>	<b>Mon 4/18/16</b>	<b>Wed 8/17/16</b>
+ <b>TASK ONE – PROJECT PLAN AND KICK-OFF</b>	<b>5.5 d</b>	<b>Mon 4/18/16</b>	<b>Mon 4/25/16</b>
+ <b>TASK TWO – CURRENT INFRASTRUCTURE AND NEEDS ASSESSMENT</b>	<b>53.5 d</b>	<b>Mon 4/25/16</b>	<b>Thu 7/7/16</b>
+ <b>TASK THREE – RECOMMENDATIONS FOR AN ENHANCED SYSTEM DESIGN</b>	<b>28.5 d</b>	<b>Fri 7/8/16</b>	<b>Wed 8/17/16</b>
<b>PHASE 2 – RFP PROCUREMENT SUPPORT SERVICES</b>	<b>191.5 d</b>	<b>Wed 8/24/16</b>	<b>Thu 5/18/17</b>
+ <b>Initiation Activities</b>	<b>3 d</b>	<b>Wed 8/24/16</b>	<b>Mon 8/29/16</b>
+ <b>TASK FOUR – DEVELOP RFP DOCUMENT</b>	<b>51 d</b>	<b>Mon 8/29/16</b>	<b>Tue 11/8/16</b>
+ <b>TASK FIVE – DEVELOPMENT OF EVALUATION CRITERIA</b>	<b>49 d</b>	<b>Tue 11/8/16</b>	<b>Mon 1/16/17</b>
+ <b>TASK SIX – SUPPORT OF PRE-BID MEETING, SITE VISITS, AND QUESTIONS</b>	<b>25 d</b>	<b>Mon 12/12/16</b>	<b>Mon 1/16/17</b>
+ <b>TASK SEVEN – PROPOSAL EVALUATION AND SUPPORT</b>	<b>29.5 d</b>	<b>Mon 1/16/17</b>	<b>Fri 2/24/17</b>
+ <b>TASK EIGHT – VENDOR INTERVIEWS AND ORAL PRESENTATIONS</b>	<b>34 d</b>	<b>Mon 2/27/17</b>	<b>Thu 4/13/17</b>
+ <b>TASK NINE – REVIEW CONTRACT DELIVERABLES</b>	<b>10 d</b>	<b>Fri 4/14/17</b>	<b>Thu 4/27/17</b>
+ <b>TASK TEN – ASSIST WITH NEGOTIATIONS</b>	<b>15 d</b>	<b>Fri 4/28/17</b>	<b>Thu 5/18/17</b>

Figure 4. Abbreviated Project Schedule

The detailed version of this schedule can be found in Appendix B of this proposal.

The project work plan begins on Page 23 of this proposal.

## References (4G)

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The References are located in Attachment C.

## RESPONSE TO TECHNICAL REQUIREMENTS (SECTION 5)

### Project Approach

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#### **Phase 1 – Comprehensive Needs Analysis and Recommended Solution (5B, C, D)**

During this portion of the project, RCC will compile all of the necessary information to evaluate the current system status as it relates to upgrading or migrating to a new and improved mission critical communication system, such as APCO P25. RCC will perform an assessment that focuses on assessing and identifying the most practical and cost effective upgrade path to a new and /or improved communication system.

RCC will begin by performing a needs assessment that focuses on identifying and assessing the current state of the County's communications infrastructure. This needs assessment will address functionality, capability and the needs of all current infrastructure users. This effort will involve field visits and site surveys of the PSAP communication centers, the radio communication sites, other fixed components, as well as mobile and remote components. Included in this initial assessment will be the identification of the operational needs of the stakeholders and users of the public safety radio communication system, including the interoperability needs. A needs assessment report will be developed in collaboration with the County to document the results and will be used to develop a set of system design alternatives. These alternatives will undergo further consideration via a feasibility analysis and a preferred alternative will be recommended. RCC will present these options to the County's review committee and will assist and guide them in choosing a recommended alternative. This recommended and County approved solution which will then undergo further analysis and study in order to develop an acquisition and implementation plan, which will include a comprehensive cost analysis, a systems transition plan and a user migration plan.

This Phase 1 information will be presented to the County in the form of a Needs Assessment and System Enhancement Recommendation Report.

#### ***Task One – Project Plan and Kick-Off***

To initiate the project, RCC will develop and submit to the County a project management plan that includes identification of key project milestones, a project meeting plan, a recommended timeline, a schedule of deliverables, identification of consulting team members, organization structure, scope of services, and quality management approach. Following submission of this plan, RCC will schedule and conduct a kick-off meeting to review the project team members, the scope of work and the deliverables to the County.

***Deliverable(s):*** Project Management Plan, Kick-Off Meeting and Presentation

#### ***Task Two –Current Infrastructure and Needs Assessment***

During this portion of the project, RCC will compile data for the current infrastructure and develop a functional needs analysis that will identify the requirements for the desired system improvements. RCC will compile all of the necessary information to evaluate the current system

status. This effort will include identification of critical points of failure, any system components nearing end of life, priority of replacement, and mitigation strategies for component and service obsolescence. Additionally, RCC will gather data from key stakeholders (to be identified by the County) with respect to the systems performance and requirements including interoperability needs. To gather this data, RCC will utilize surveys, telephone interviews, and direct meetings. RCC will compile, evaluate, and incorporate its findings into a needs assessment report which will be submitted to the County as the deliverable item for this task.

The items that RCC will address include, but are not limited to the following:

- Review, summarize and validate previous documents and studies;
  - Validation will be based upon professional opinion of the reviewed material;
- Current system functional specifications, usage, coverage areas, etc.;
- Additional desired functional and operational requirements if any (system and subscriber terminals);
- Location, condition and capacity of the existing radio facilities;
- Critical points of failure;
- Expected future life of components;
- All interfaces and interactions with other systems;
- Interoperability needs (local and regional) and current equipment and provisions;
- Areas of re-use or other areas of savings in shared resources (i.e., facilities, frequencies, regional partnering, etc.);
- FCC regulatory services including spectrum searches for channel availability for all required bands;
- Voice channel loading/capacity;
- Required radio propagation coverage areas, including any special in-building or underground requirements;
- Potential new site locations if required to meet coverage requirements;
- Network management capabilities and potential enhancements (reports and tools);
- Existing communications center and console configurations and requirements;
- Existing microwave system paths, including loading, capacity and available bandwidth;
- Existing paging and fire-alerting systems/equipment;
- Requirements for system reliability and fail-safe modes;
- Current and proposed radio system maintenance and support requirements and arrangements.

RCC will visit the existing and backup dispatch communications centers and existing remote radio sites to ascertain the age, condition, and improvement requirements of these facilities, including:

- Location of existing equipment buildings, antenna support structures, and towers;
- Identification of equipment space availability; and
- Condition and service history of existing equipment and facilities.

Additionally, during this process, RCC will use its internally developed RF propagation and system-planning tool ComSiteDesign™ to estimate existing coverage based on current system site locations and parameters.

***Deliverable(s):*** Needs Assessment, included in the Needs Assessment and System Enhancement Recommendation Report.

### ***Task Three – Recommendations for an Enhanced System Design***

RCC will use the information gathered during Task Two, the Current Infrastructure and Needs Assessment, to develop a set of possible system designs. RCC will work in a collaborative manner with the County’s project staff to review the design alternatives and select a single concept design which reflects the best interests of the County. Included in the design alternatives to be considered will be a stand-alone system dedicated to the County’s users and a shared regional system that shares resources with neighboring jurisdictions, such as the VIPER system. Planning tools, including budget forecasts and estimated project schedules, will be used to assist in this selection process.

The selected design will be used for the development of the needed modifications and/or upgrades to the current system and will identify potential impacts to current operations. The concept design will address impacts to existing subscriber radios, special requirements for migration/cut-over, facilities space requirements and the planning budget and schedule. The design will provide any additional recommendations for upgrades to ensure that the tower sites meet the definition of “Public Safety Grade” as defined by NPSTC and APCO. Solutions for local, regional, state and Federal interoperability solutions will also be provided.

During this process, RCC will use ComSiteDesign™ to evaluate predicted coverage at various operational levels (mobile, portable, in-building) and provide comparison coverage maps to the County.

For each potential alternative/solution identified, RCC will evaluate the pros and cons, advantages, disadvantages, issues and considerations, related to capacity, functionality, operational usage and complexity. The areas to be explored include, but are not limited to:

- The areas impacted;
- The site requirements;
- The recommended frequency band and capacity requirements;
- Technology (analog, digital, P25 Phase 1 and Phase 2);
- Encryption options and capabilities;
- Operating protocol (conventional, trunking, combination);
- Single or shared infrastructure;

- Procurement scope;
- The interoperability requirements (in County and adjoining County entities);
- Coverage propagation studies;
- The migration requirements;
- Budgetary cost estimates for the implementation;
- Estimated implementation schedule;

The alternatives will be presented to the County’s Review Committee for review and selection of a single recommended solution. This recommended solution will be further developed to include an acquisition and implementation plan, which will include a comprehensive cost analysis, and the requirements for a systems transition plan and a user migration plan. The actual transition plan and migration plan is vendor specific and will be defined by the contracted equipment vendor.

The Phase 1 Scope of Work as defined by Tasks 1 through 3 meets the RFP requirements 5.C, items 1 through 6. These RFP requirements are listed and *italicized* below for the reader’s convenience:

1. *Meet with management personnel and end users of the current infrastructure to develop a comprehensive needs analysis addressing functionality, capability and needs of all current infrastructure users. A draft needs analysis shall be presented to the end-users for validation in at least two group meetings, and then to the committee for final approval.*
2. *Gather, analyze, and document operational, functional, and specific technical information of existing fixed sites and associated equipment for various emergency service departments that serve Orange County residents (may be an Orange County based agency or a Department in a County adjacent to Orange County that serves/protects geography within Orange County), or Orange County emergency service departments that serve residents outside Orange County in order to understand the present status of our communications capabilities.*
3. *Review interoperability needs with all agencies serving citizens and/or territory within the county and those law and fire/EMS agencies bordering Orange County, including gateway or P25 ISSI needs for users not served by the proposed infrastructure (i.e.: ambulances from outside Orange County needing inter-communications with Orange County based hospitals) as may be identified.*
4. *Conduct and analyze coverage studies of proposed infrastructure based on multiple tower sites in order to provide countywide coverage including the potential of new communications sites, additional “satellite” receiver sites, and/or paging sites.*
5. *Develop a comprehensive migration plan for all current infrastructure users.*
6. *Recommend and submit a planned acquisition and implementation process based on the option approved by the review committee.*

RCC will summarize this information in a draft report which will be delivered to the County for review and comment. RCC will be available to discuss the draft report and will be prepared to incorporate input and feedback received from the County.

The report will include the following deliverables:

- An Executive Summary;
- A summary of the needs assessment, which includes the following:
  - Assessment of the existing communications capabilities;
  - Review, summarization and validation of previous documents and studies; (Note: Validation will be based upon professional opinion of the reviewed material. If the study must be performed anew in order to validate, a mutually agreeable scope and price for this effort will be agreed upon by both parties.)
  - Analysis of interoperability gaps;
- Coverage maps depicting the current public safety infrastructure user performance for mobile and portable radios, and paging receivers, to verify gaps noted from the interviews;
- Propagation studies showing expected coverage of the recommended system;
- A comprehensive transition plan for all current infrastructure users to the new / proposed infrastructure.

RCC will meet with the County project team and executives as appropriate to review the draft report, its findings and recommendations, seek feedback and discuss the next steps for the project. Once the feedback has been received and incorporated, RCC will develop the final report and submit to the County.

***Deliverable(s):*** *A Needs Assessment and System Enhancement Recommendation Report. RCC will collaborate with key County stakeholders before finalizing this report.*

## **Phase 2 – RFP Procurement Support Services (5B, C, D)**

During Phase 2, RCC will finalize the recommended conceptual design, assist in the development of the Invitation to Bid (ITB) or Request for Proposal (RFP) document, and support the contractor selection and procurement processes. In this phase, RCC will provide the following services in order to meet the County's requirements:

12. Project management services;
13. Develop a high level functional system design;
14. Create a functional specification document;
15. FCC regulatory services including spectrum searches for channel availability;
16. Collaborate with the County to create the RFP or ITB documents;
17. Respond to bidders' inquiries;

18. Prepare evaluation criteria, including total cost of ownership;
19. Assist with bid submittal reviews;
20. Attend and participate in vendor interviews and oral presentations;
21. Prepare and present final evaluation and recommendation; and
22. Assist the County in contract negotiations.

This scope includes the following tasks.

#### ***Task Four – Develop RFP Document***

RCC will complete the high level functional approach for the recommended solution. RCC will work with the County's Review Committee to finalize the overall system approach. The finalized concept design will be developed to ensure that all requirements of all stakeholders have been addressed. This functional and performance based design will include requirements for predicted radio system coverage, microwave system design and reliability analyses, paging and fire alerting and budgetary system costs for the proposed system. A proposed implementation plan will also be included with options for expedited or phased implementations.

The finalized design will also recommend the planned frequency band for the improved system and recommended frequencies to be used by the County.

The finalized design will be used as the basis for a Request for Proposals (RFP) specification and will address the following major components:

- Functional Requirements;
- Coverage Requirements;
- Capacity Requirements;
- Interoperability Requirements;
- Radio Site Base/Repeater Station Equipment;
- Frequency Plan and Restrictions Required for Frequency Coordination;
- Site Connectivity (Microwave and/or Fiber);
- Legacy Equipment Interface;
- New Radio Site Candidate Structures and Facilities;
- Antenna Structures;
- Antenna Systems;
- Equipment Shelters;
- Site Development Requirements for County owned or Leased Sites;
- Lightning and Surge Protection Systems;
- Emergency Power Systems;

- Facility HVAC;
- Network Monitoring and Alarm System;
- Installation Requirements and Schedule;
- Acceptance Test Tools and Procedures (Including Traceability Matrix);
- Training Program;
- Warranty and Future Maintenance Plans;
- System Cutover/Startup Plans.

After development of the draft RFP specification, RCC will deliver the draft and discuss with the County any comments and needed updates. RCC will then update the RFP specification based on the comments received and provide the final RFP specification to the County as a deliverable item. RCC assumes that the County's procurement department will prepare the final commercial documents for distribution to potential equipment providers.

***Deliverable(s):*** Technical specification document

#### **Task Five – Development of Evaluation Criteria**

Prior to release of the RFP, RCC, together with the County, will develop weighted evaluation criteria to be used for evaluation of the RFP responses. The evaluation criteria will ensure all costs are identified and adjustment factors are applied to allow a proper comparison of the vendors' proposals. The evaluation criteria may include the following items:

- Vendor qualification;
- Quality of proposal and presentation;
- RF coverage performance criteria;
- System performance and flexibility;
- Potential single points of failure;
- System redundancy;
- System acceptance testing methodology;
- Migration and cutover methodology
- System training;
- Availability of local support and parts;
- Life cycle system costs (implementation, maintenance and support costs).

***Deliverable(s):*** Proposal evaluation criteria

#### **Task Six – Support of Pre-Bid Meeting, Site Visits, and Questions**

As part of the system procurement process, RCC will assist the County and provide technical support throughout the procurement process.

Following release of the RFP, RCC will attend the pre-proposal conference and provide an overview of the project and specification. Following the pre-proposal conference, RCC will accompany and assist the County during visits to the RF site locations with the vendors. RCC will act as technical advisor to the County and assist with preparation of technical addenda and responses to vendor questions.

***Deliverable(s):*** Pre-proposal conference presentation and technical addenda

### **Task Seven – Proposal Evaluation and Support**

Throughout the procurement process, RCC will provide services to augment the County's planning and execution of the radio system purchase. RCC's extensive experience in reviewing vendor proposals, identifying critical issues, concerns, and discrepancies; inquiring about alternative solutions based upon a particular vendor's equipment platform; and judging the validity of the proposed costs, will be very helpful through this critical process.

RCC, in conjunction with the County personnel, shall review and evaluate up to three (3) proposals for compliance with the technical requirements portion of the RFP. RCC will provide technical advice in the proposal evaluation and vendor selection process. RCC will also assist the County with drafting questions to vendors. RCC will evaluate vendor technical responses to previously issued questions and prepare technical responses.

***Deliverable(s):*** Proposal evaluations, questions and summary

### **Task Eight – Vendor Interviews and Oral Presentations**

As part of the evaluation process, RCC will support vendor interviews and anticipates that the County will schedule oral presentations with up to three (3) respondents to give them an opportunity to present their proposal and their approach to the project. RCC proposes to support these presentations acting as the County's technical representative and advisor to the user representatives designated and assigned by the County to attend and participate.

***Deliverable(s):*** Attendance at oral presentations and vendor interviews/questions support

### **Task Nine – Review Contract Deliverables**

RCC will assist the County with review and revision of the recommended vendor's proposed Statement of Work (SOW), Acceptance Test Procedure (ATP) and system contract to help protect the County and minimize project risk during implementation.

It is common for the proposing vendor to include a SOW for their proposed project as part of its proposal. RCC will review this to ensure it is accurate and that it includes all necessary items for a turn-key project to update the County's system. This document will likely go through multiple revisions during the negotiations process.

RCC will include the acceptance testing requirements for the system in the RFP that RCC develops. The vendor's compliance to these testing requirements will be a requirement of the proposal. The responding vendors are likely to propose changes within the ATP document submitted with their proposal. One of the tasks of the negotiations process will be to work out a

mutually-acceptable ATP that effectively confirms the system performance and protects the County.

RCC will also review the system purchase contract proposed by the vendor(s) from a technical perspective and make recommendations to the County regarding typical processes, appropriate sequencing, and appropriate exhibits to detail important operational and procedural aspects of the project. RCC assumes that the County will also have a legal and/or procurement team reviewing the system purchase contract.

***Deliverable(s):*** *Recommended revisions to the Proposed ATP, vendor SOW and comments or typical verbiage regarding the system purchase contract*

### **Task Ten – Assist with Negotiations**

RCC will participate in the negotiations meetings with the preferred vendor to assist the County in finalizing contract documents. As described above, RCC's primary focus will be on the SOW and ATP, although RCC will provide assistance to the County in review of the system purchase contract and other documents as well. RCC has extensive experience with communications system contracts, and can provide to the County examples of contracts which have successfully protected RCC clients.

***Deliverable(s):*** *Comments and revisions to ATP, vendor SOW and system purchase contract.*

The Phase 2 Scope of Work as defined by Tasks 4 through 10 meets the RFP requirements 5.C, items 7 through 10. These RFP requirements are listed and *italicized* below for the reader's convenience:

7. *Development of a vendor-neutral Request for Proposal (RFP) suitable to be released to the vendor community for the purposes of procuring the approved alternative.*
8. *Facilitation of the RFP process, including staff support to the County in conducting a comprehensive evaluation of RFP responses received.*
9. *Create and submit computer aided design (CAD) drawings as required.*
10. *Obtain and submit budgetary costs for alternatives presented, and assist the review committee to prioritize acquisitions and implementation.*

### **Phase 3 (Optional) – Project Management and Implementation Support Services**

RCC understands that the inclusion a detailed Phase 3 Statement of Work (SOW) was not a requirement of the RFP. However, RCC chose to include the following example of a typical Phase 3 SOW as a means of further qualifying our capabilities and expertise within this area of work. Pricing for a Phase 3 SOW will be provided upon request.

RCC will serve as the County's representative by providing customer project management support and technical oversight during the contract execution phase. RCC will provide independent verification and validation to ensure that the contractual requirements are fulfilled by the vendor.

The project implementation tasks described below meet and/or exceed the County's project implementation requirements called out in the RFP. RCC's vast experience with project implementations has led to the methodology and tasks called out below.

### ***Task Eleven – Implementation Oversight, Monitoring and Support***

With Project Implementation, RCC provides oversight and project management services on behalf of the client to ensure that work is being performed by the contractor appropriately and consistent with the executed contract. The exact scope of this effort cannot be known until after the contractor's formal scope of work and schedule are negotiated, agreed upon and executed in the system procurement contract. For this reason, RCC has provided a list of the potential services that it is capable of providing. The detailed scope of this Phase will be agreed upon by RCC and the County prior to the start of the implementation phase.

### ***Implementation – General project support***

Throughout the project, RCC will act as the County's representative, to ensure accurate and timely implementation of the project. RCC will utilize a three-fold project management approach to monitor vendor activity and to help maintain the project schedule. First, RCC will periodically review the schedule with the vendor's Project Manager to ensure that all parties agree on the dates for the next several milestones. RCC will participate in regular project meetings to review progress, receive reports on project events, and discuss any problems that have arisen or are expected. Finally, RCC's project team can check to ensure that each scheduled task has been carried out and properly completed. In this way, any slippage or schedule problems will be identified so that the project team, vendor, and if necessary, the County's representative can deal with them at once. Examples of some of the activities that RCC will participate in include:

- Review vendor implementation plan & cutover plan;
- Participation in the critical design review (CDR);
- Participation in project schedule development;
- Assistance with finalization of the system frequencies and licensing;
- Equipment inventory and inspection;
- Oversight of factory staging;
- Installation supervision and inspection & optimization supervision;
- Coordination between the vendor and the County;
- Technical documentation review;
- Invoice audit and approval;
- Change order management;
- Project meetings participation;
- Construction supervision;
- Periodic project schedule updating;

- Risk management;
- Punch list development and monitoring.

***Implementation – Assistance with finalization of sites and frequencies***

If necessary, RCC will provide assistance with securing the site locations and frequencies that are required by the accepted design. RCC can provide the services necessary to review and analyze the following:

- Selected sites can accommodate the equipment required;
- Site interconnection can be achieved by reliable and practical means;
- An acceptable lease can be obtained for the property and/or structure;
- The necessary zoning and permitting approvals can be obtained;
- Perform searches for additional frequencies required by the system;
- Expand the use of frequencies to wide area use as necessary;
- Perform contour analysis, short spacing and/or interference analysis; and
- Prepare license applications and assistance with the licensing and coordination process.

Upon request by the County to provide the aforementioned services, RCC will develop a specific scope of work and provide a quotation for these additional services.

***Implementation – Construction management assistance***

During the construction phase of the project, RCC will act as the County's representative to ensure that the system vendor stays in compliance with the executed contract and in compliance with industry standards and best practices. Additionally, RCC will participate in, and represent the County's interest during inspection of each of the facilities as necessary to ensure that they meet the requirements in the following areas:

- Building layout and area specifications;
- Heating, ventilation and air conditioning (HVAC);
- Lighting;
- Cable trays;
- Fire protection and safety;
- Weatherproof antenna ports;
- Alarms/Security;
- Electrical and grounding; and
- Site clean-up and landscaping.

***Additional Services: Radio Site Construction Management***

RCC can provide construction management services for any new radio sites which might be required as well as modifications for any existing sites. Construction management services can include site development, tower erection, communication shelter construction, and grounding system installation.

### ***Implementation – Oversee and evaluate acceptance testing***

One of the most critical elements of the system implementation is the acceptance testing. This is the time when the system vendor is required to prove that the system, as installed, meets or exceeds all the requirements that were agreed to contractually. The acceptance tests will utilize the acceptance test procedure previously agreed upon during the contract negotiations process and will address the following areas:

- Radio features;
- Console/Dispatch features;
- Microwave/Interconnect performance and features;
- Failure Scenarios;
- Coverage performance;
- Reliability performance.

RCC will participate in and oversee this process, analyze the results, and provide recommendations as appropriate to the County and specific action items to the system vendor if necessary.

### ***Implementation – Recommend and assist with training programs***

RCC will work with the County and the infrastructure provider to identify and schedule appropriate training programs to prepare the County and all of the stakeholders for proper system administration and operation prior to system cutover. Specifically for the infrastructure, RCC will expect the system vendor to address dispatcher training, system management training, and maintenance training. RCC will also aid in reviewing course syllabi, identifying personnel profiles and typical County participants for the various training sessions proposed and reviewing overall training plans for approach, staffing considerations, recommended class sizes and customer support requirements, in accordance with the vendor contract requirements. RCC normally does not include or plan to assist with or attend the various training classes, but can do so upon request of the County.

### ***Implementation – Develop Cutover plan and assist with transition***

RCC will work with the County and the system vendor to develop an effective cut-over procedure that will minimize agency disruption and provide a smooth transition from the current radio system to the new system. RCC will identify all participating stakeholders and assist with the talkgroup planning and radio template development prior to cut-over. RCC, together with the County and the system vendor, will identify a timeline that will identify each participating agency, along with a specific timeframe for their transition. This transition schedule will take into account any interoperability requirements among the stakeholder entities, and develop a

strategy to maximize the continuity of operations through the transition. In order to maintain the highest levels of operational integrity and quality assurance during the transition phase, RCC will ensure the inclusion of a fallback plan within the overall risk mitigation plan. This fallback plan will establish a retreat path and recommended criteria for enacting it, in the event that it becomes necessary.

***Deliverable(s):*** Requirements tracking matrix, periodic reports on testing and implementation results and areas of non-compliance.

### ***Task Twelve – Project Final Review***

Following the testing, and in order to complete the project, RCC will maintain a list of functional, testing and installation related deficiencies and make suggestions to the County and the contractor on resolution methods for all deficiencies. RCC will ensure that the new radio system has been tested properly per the acceptance test plans and performs according to the specifications. This will include validation of the vendor's installation, system acceptance testing procedures, the results, and training of operational and support personnel.

RCC will review final system documentation as submitted by the contractor. RCC will evaluate the documentation for comprehensiveness and accuracy.

Following the review of the above material and results, RCC will publish a document providing its assessment to the County, including a detailed analysis of any non-compliance or test failure, and recommendations for resolution toward acceptance of the system and the radio system project.

***Deliverable(s):*** Project punchlist, responsibility matrix and project close-out document

## **COST PROPOSAL (SECTION 6)**

The Cost Proposal is included in a separate document.

## REQUIRED FORMS (SECTION 8)

### Attachment A – Signature Affidavit

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Countywide Radio Communications Interoperability and Systems Engineering Services

#### Attachment A

#### SIGNATURE AFFIDAVIT

In signing this proposal, we also certify that we have not, either directly or indirectly, entered into any agreement or participated in any collusion or otherwise taken any action in restraint of free competition; that no attempt has been made to induce any other person or firm to submit or not to submit a proposal; that this proposal has been independently arrived at without collusion with any other proposer competitor or potential competitor; that this proposal has not been knowingly disclosed prior to the opening of proposals to any other proposer or competitor; that the above statement is accurate under penalty of perjury.

The undersigned, submitting this proposal, hereby agrees with all the terms, conditions and specifications required by the County in this Request for Proposal, and declares that the attached proposal and pricing are in conformity therewith.

<u>Chris Krafft</u> Name (Type or Print)	<u>Vice President, Public Safety</u> Title
<u></u> Signature	<u>Black &amp; Veatch</u> Firm
<u>02/19/2016</u>	

6800 W. 115<sup>th</sup> St., Suite 2292, Overland Park, KS 66211

Address: (Street, City , State, Zip Code)

<u>913-458-2148</u> Telephone	<u></u> Fax	<u>KrafftCA@bv.com</u> E-Mail
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2/18/2016  
Date

RFP# 5217

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## Attachment B - Vendor Data Sheet

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Countywide Radio Communications Interoperability and Systems Engineering Services

### Attachment B

#### VENDOR DATA SHEET

- Proposing Company Name** Black & Veatch  
Telephone 913-458-2148 Toll Free Telephone \_\_\_\_\_ Fax \_\_\_\_\_  
Address: 6800 W. 115<sup>th</sup> St., Suite 2292  
City: Overland Park State: Kansas Zip + Four: 66211-240
- Contact Person in the event there are questions about your proposal**  
Name: Mark Athearn Title: Regional Director  
Telephone: 919-463-3033 Toll Free Telephone: \_\_\_\_\_  
Address: 106 London Downs Drive  
City: Forest State: Virginia Zip + Four: 24551-3020
- Mailing address where County purchase orders/contracts are to be mailed and person the Department can contact concerning orders and billing.**  
Name: Chris Krafft Title: Vice President  
Telephone: 913-458-2148 Toll Free Telephone: \_\_\_\_\_  
Address: 6800 W. 115<sup>th</sup> St., Suite 2292  
City: Overland Park State: Kansas Zip + Four: 66211-240

## Attachment C – References

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### Countywide Radio Communications Interoperability and Systems Engineering Services

#### Attachment C

#### REFERENCES

Provide company name, address, contact person, telephone number, and appropriate information on the product(s) and/or service(s) used for three (3) or more installations/services with requirements similar to those included in this solicitation document. If vendor is proposing any arrangement involving a third party, the named references should also be involved in a similar arrangement.

Company Name: Fluvanna County, Virginia  
Company Address: 132 Main Street; P.O. Box 540; Palmyra, VA 22963  
Telephone/email: celliott@fluvannacounty.org  
Contact Person: Ms. Cheryl Elliott, Emergency Services Coordinator  
Services provided by proposer/vendor: **Needs Assessment, Procurement, and Implementation for New VHF P25 Phase 2 Radio System and 4- Site Simulcast Paging System.**

*Description:* Currently providing Fluvanna County with technical and project management assistance during the implementation phase of the County's new 4-channel, 7-site, VHF digital simulcast trunked P25 Phase 2 public safety radio system. A 4-site simulcast paging system will also be implemented.

*Services:* Produced a needs assessment for the County, prepared a Request for Proposal based on the findings with detailed specifications, solicited proposals from qualified vendors, assisted the County in equipment and vendor evaluations, and provided assistance in contract negotiations. Since August 2014, has provided project management and technical oversight for the procurement and implementation phases of the system. The implementation phase is ongoing and the County expects to cut-over to the new radio system in late, 2016.

Company Name: City of Fredericksburg, Virginia  
Company Address: Fredericksburg Fire Department; 601 Caroline Street, Suite 700; Fredericksburg, VA 22401  
Telephone/email: 540-372-1061 / eallen@fd.fredericksburgva.gov  
Contact Person: Chief Edwin L. Allen, Jr.

Services provided by proposer/vendor: **Needs Assessment and Recommendation.**

*Description:* Assessed and evaluated the City's current VHF conventional radio system and developed a list of the City's functional requirements. Systems in adjacent counties were evaluated for their potential to host Fredericksburg and an assessment of the feasibility for Fredericksburg to upgrade or replace its existing system took place. A comprehensive report was provided to the City, the final recommendation being for the City to join the Stafford County, Virginia, 700 MHz, 10-channel, 13-site P25 Phase 1 system.

*Services:* Evaluated the existing Fredericksburg system, in addition to, two counties adjacent to Fredericksburg – one system is a mature system and the other is undergoing implementation at this time. Produced a comprehensive needs assessment report for the City and conducted a presentation to the Fredericksburg City Council to explain the results of the report and answered questions posed by the Council. Assisted the City during its

discussions with Stafford County which led to an agreement between the City of Fredericksburg and Stafford County.

Company Name: St. Mary's County, Maryland  
Company Address: 23090 Leonardtown Hall Drive; P.O. Box 653; Leonardtown, MD 20650  
Telephone/email: 301-475-4200 ext. 2111

Contact Person: Mr. Bob Kelly, Director – Emergency Services & Technology  
Services provided by proposer/vendor: **Needs Assessment, Procurement, and Implementation for New 800 MHz P25 Radio System.**

*Description:* Currently providing St. Mary's County with technical and project management assistance during the implementation phase of the County's new 10-channel, 13-site, 800 MHz digital simulcast trunked public safety radio system.

*Services:* Produced an in-depth needs assessment for the County, prepared a Request for Proposal based on the findings with detailed specifications, solicited proposals from qualified vendors, assisted the County in equipment and vendor evaluations, and provided assistance in contract negotiations. Since 2014, has provided project management and technical oversight for the implementation phase of the system which is ongoing. The county expects to cut-over to the new radio system in late, 2016.

Company Name: Stafford County, Virginia  
Company Address: 1225 Courthouse Road; Stafford, VA 22555  
Telephone/email: 540-658-4712

Contact Person: Ms. Carol Adams, Communications Director  
Services provided by proposer/vendor: **Needs Assessment, Procurement, Implementation and Project Management for New 700 MHz Radio System in Stafford County.**

*Description:* Provided Stafford County with technical and project management assistance during the implementation phase of a new P25 10-channel, 13-site, 700 MHz digital simulcast trunked public safety radio system.

*Services:* Produced an in-depth needs assessment for the County, prepared a Request for Proposal based on the findings with detailed specifications, solicited proposals from qualified vendors, assisted the County in equipment and vendor evaluations, and provided assistance in contract negotiations. In 2007: Provided the County with project and technical management assistance during the procurement phase of the project. From 2008-2011: Provided project management and technical oversight for the implementation phase of the system. The County cut-over to the new radio system and the project concluded in 2011.

Company Name: Nelson County, Virginia  
Company Address: P.O. Box 336; Lovingston, Virginia 22949  
Telephone/email: 434-263-7122; SRorrer@nelsoncounty.org

Contact Person: Susan Rorrer, Information Systems Director  
Services provided by proposer/vendor: **P25 VHF Land Mobile Radio System Implementation.**

*Description:* Upgrade to a new P25 VHF Land Mobile Radio System that would meet the County's long term public safety/service radio communications requirements. The county

is home to nearly 15,000 people across 474 square miles, and is part of the Charlottesville, Virginia, metropolitan statistical area.

*Services:* Reviewed vendor proposals and provided feedback to the County, reviewed the contract with the successful vendor, and conducted a Critical Design Review (CDR).

Currently providing oversight of the successful contractor's system implementation, coverage acceptance testing, system acceptance testing, and final system acceptance. These services are provided under a cooperative procurement contract created by Fairfax County, Virginia.

## **Attachment D – Cost Summary**

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The Cost Summary Sheet is included in a separate document.

## APPENDIX A - OVERVIEW OF FIRM AND QUALIFICATIONS

### RCC Consultants is a Black & Veatch Company

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RCC Consultants is now a Black & Veatch Company! Black & Veatch is a leading engineering, consulting, and construction firm headquartered in Overland Park, Kansas. On the ranking of the Engineering News and Record's 500 top design firms, Black & Veatch is number 15. Among the ENR 500, Black & Veatch is *number one* in Telecommunications. In 2015 Black & Veatch celebrates its 100<sup>th</sup> anniversary and the firm employs more than 10,000 persons. RCC now couples with Black & Veatch's industry leading turnkey design/build capabilities. The combination of these two great companies will allow Black & Veatch to offer its public safety clients, and other clients involved in mission critical communications, a more complete portfolio of services. Our more capable and more vertically integrated company will benefit clients with end-to-end delivery solutions that reduce deployment costs while improving schedule durations.

Black & Veatch is uniquely qualified to support not only needs and requirements as defined in the County's RFQ document, but also any expanded scope that might arise as the project progresses. Our typical scope of work normally includes three distinct phases: (1) a needs assessment phase, (2) a procurement phase, and (3) an implementation phase. RCC's in-house expertise is very supportive and complementary to the County's requirements. Our expertise includes, but is not limited to the following:

- Upgrading or replacing legacy LMR systems to APCO P25;
- System and network design services, including RF coverage / capacity analysis;
- Infrastructure, mobile and portable radio assessments, evaluations and recommendations;
- FCC / FAA regulatory and licensing expertise;
- Site evaluations, analysis and modifications;
- Site acquisition and site development, and;
- Analyses, evaluations, recommendations, cost and time estimates and certification reports.

Not only will the County have direct access to the vast knowledge and expertise of our many Land Mobile Radio (LMR) Telecommunications Subject Matter Experts (SME), but the County will also have access to the vast resources and capabilities that exist within Black & Veatch.

As your partner, Black & Veatch will share with you our best practices gained from deploying large, thousand-site, multi-region projects for our wireless carrier clients. We've taken our large-scale program and project management processes, and applied them to our public safety business, so all of our clients experience the same expertise that leading carriers count on us to deliver for their advanced 3G and 4G wireless networks, such as:

- Expert program management processes managed by experienced, certified project managers for on time, on budget, and high-quality site execution.
- Vertically integrated service offering to provide in-house consultants, project managers, engineers, site acquisition, and construction resources for the entire life cycle of a project, offering better control over project variables.
- Valued architecture and engineering best practices that drive efficiency and consistency across the entire network. We have registered professional engineers in all 50 states.
- ISO 9001:2008 certification, ensuring quality is engineered into every detail of the design-build process and deployment is executed in an accelerated manner, while meeting quality and cost standards.
- Financial Stability from an outstanding history and established credibility in the Telecommunications industry. Our long history and stability will provide assurance that you have partnered with a strong and viable company that will effectively complete any project.
- Continual commitment to safety, producing a safe work environment on every job site for every worker. Black & Veatch’s safety performance consistently receives highest honors from OSHA and is considered by many to be a benchmark in the industry. The Black & Veatch Safety Program is applied to all of our projects in order to provide the highest level of safety throughout construction.

## Overview of RCC Consultants

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RCC Consultants (“RCC”) is a global telecommunications consulting, engineering and integration firm. A leader in the industry since 1983, RCC specializes in the design and implementation of radio communications systems, microwave and fiber optic systems, broadband, intelligent transportation systems and public safety emergency telephone systems, as well as the design of communications centers, tower sites and monitoring facilities.

### ***The RCC Difference***

RCC has a unique and deep understanding of all facets involved in the design, development and operation of telecommunications systems. This comprehensive expertise built over decades of success enables us to offer fully informed and more effective solutions to our clients. We differentiate ourselves through four aspects of our business:

#### **Experience**

For more than 30 years, RCC has been at the forefront of wireless communications and information systems technology. We pioneered the development of comprehensive multiple layer, radio frequency engineering software tools, used by organizations around the world.

#### **Team**

Our full-time staff of more than 60 consultants, engineers and support staff are some of the most respected and sought-after specialists in their fields. Experienced in the design and operation of all major manufacturers’ platforms, our team will have a local presence and will utilize the resources of the company to perform the project tasks.

## Approach

We believe in forming strong partnerships with our clients, and our record of repeat business is testimony to our focus on complete client satisfaction. We approach every project with time-proven engineering and project management strategies that help our clients implement the right long-term solutions for their needs.

## Independence

We provide unbiased recommendations to our clients, ensuring they receive thoughtful, independent solutions. We will never accept any form of payment from manufacturers, distributors or suppliers for recommending their products.

## Our People

RCC has gained the reputation of being a respected leader in all of the markets we serve because of the depth and breadth of our knowledge and experience. We have a diverse team of more than 60 professionals with a rich variety of experience and qualifications – all who are carefully matched to projects based on our clients’ specific objectives.

We are especially proud of the tenure of our team – more than 90% of our staff has been with RCC for five or more years. This longevity ensures we retain a deep wealth of knowledge, as well as consistent staffing, on our projects.

**90%**

More than 90% of  
RCC’s staff has been  
with the company  
for five or more  
years.

## Our Participation in Industry, Standards and Regulatory Groups



RCC’s consultants and engineers are frequent contributors to nationally recognized industry and standards-setting organizations, such as the Telecommunications Industry Association (TIA), Institute of Electrical and Electronic Engineers (IEEE), Integrated Justice Information Systems (IJIS) and American National Standards Institute (ANSI).



An original signatory to the Terrestrial Trunked Radio Memorandum of Understanding (TETRA MoU) in 1994, RCC staff has served in leadership roles within the organization since its inception. We chair or serve on technical committees of the IEEE and our experts have helped forge standards that have been adopted by the IEEE. Taking an active leadership role in the industries we serve helps us to provide our clients with clear insight into new and emerging technologies.



## Our Vision, Mission and Values

**Vision** RCC’s vision is to be the most respected and technically competent provider of client-centered consulting, engineering, integration and outsourcing services in the fields of voice and data communications.

**Mission** RCC’s mission is to provide solutions that allow our clients to meet their objectives through the application of communications and information technologies.

**Values** We believe we can best fulfill our vision and accomplish our mission by living these nine values every day:

- *Client Centered* – We are committed to achieving the best outcomes by gaining a thorough understanding of client operations, by providing responsive service and through effective communications between RCC and our clients.
- *Doing It Right the First Time* – We will deliver superior products and services in everything we do for our clients.
- *Honesty and Fairness* – We will act openly, ethically, equitably and consistently in all we do.
- *Unbiased and Objective* – We will provide our services without potential or perceived conflicts of interest and maintain a completely independent position in every engagement.
- *Teamwork* – We will come together as a diverse workforce to achieve our vision and to help our clients find the solutions that meet their needs.
- *Excellence* – We will perform our jobs effectively and by being informed and excited about our clients and our services.
- *Lifelong Learning* – We will consistently seek knowledge and use that knowledge to benefit our clients.
- *Profitability* – We are committed to earning financial returns that will enable sustainable growth and enhance stakeholder value.
- *Quality of Life* – We are committed to improving the lives of our families and the well-being of our community.

## Our Company History

RCC has a rich history as a communications pioneer. RCC was originally incorporated as RAM Communications Consultants, Inc. in 1983. During 1986 and 1987, RAM Communications Consultants developed the concept of a shared access wireless data network. This concept evolved into RAM Mobile Data, one of the first national wireless data networks in the United States. RAM Communications Consultants handled all of the procurement, technical negotiations, design, implementation, conformance testing and optimization of this national network of more than 2,000 sites.

In 1991, BellSouth Enterprises acquired an interest in RAM through the formation of RAM/BSE Communications, L.P. In 1996, RAM/BSE spun-off what became RCC Consultants, Inc. as a separate entity. TeleCom Towers, Inc. (TTI), a venture capital firm, acquired RCC. In 1999, RCC was purchased by private equity investors, the principals of TTI, and RCC management

and employees through RCC Holdings, Inc. In August of 2015, RCC Consultants was acquired by the Black & Veatch Corporation.

<b>RCC Consultants</b>	Telephone: (913) 458-2000
<b>A Black &amp; Veatch Corporation</b>	Fax: (913) 458-2934
6800 W. 115 <sup>th</sup> St., Suite 2292	Website: bv.com
Overland Park, KS 66211	

### ***Local Offices***

RCC maintains a strong virtual workforce, providing flexibility to serve our clients and their local needs. We have employees conveniently located near our clients in major metropolitan areas, including Boston, Chicago, Dallas, Los Angeles, Miami, Phoenix and Washington, D.C.

### ***Integrity***

RCC is dedicated to performance with integrity in every interaction. This commitment is the cornerstone of our past, present and future success. Our Corporate Compliance Program was established to convey our long-standing commitment to compliance with the law and our high standards of ethical business and personal conduct.

Employees participate in the Program three ways: first, by exercising good judgment and personal integrity; second, by reading, understanding and complying with our Code of Conduct and Corporate Integrity policies and procedures; and third, by reporting any potential violations of laws or policies.

### ***Business and Personal Ethics***

RCC employees are expected to observe high standards of business and personal ethics. This requires the practice of honesty and integrity in every aspect of our dealings with our clients, partner companies, vendors, the public, our employees and governmental and regulatory authorities.

### ***Absence of Conflict of Interest***

RCC is not affiliated with, nor do we have any financial interest in, any communications equipment manufacturer, distributor or supplier. RCC does not receive or accept remuneration of any type from any manufacturer, distributor or supplier for recommending any of their products. Employees – and the company – must be free from any actual or potential conflict of interest in interactions with our clients, the public, our partners and our vendors.

### ***Compliance with Laws and Regulations***

RCC and our employees comply with all applicable laws and regulations. We take this responsibility seriously and expect that our actions will reflect our commitment to honest, ethical and professional interactions with our stakeholders.

There are no pending Securities Exchange Commission investigations involving RCC and there are no open or pending litigation initiated by RCC in a customer matter.

### ***Political Contributions***

Federal and state laws place complex restrictions on the making of corporate political contributions. Because RCC complies strictly with all applicable laws and regulations relating to corporate political contributions, no employee may involve RCC in any way in political campaigns. No political contributions for any candidate shall be made for or on behalf of RCC by any employee unless it has been approved by Company management under established corporate procedures. RCC resources may not be used to support any candidates or political committees.

### ***Equal Employment Opportunity/Affirmative Action Statement***

RCC is an equal opportunity employer and does not discriminate on the basis of race, color, gender, religion, age, sexual orientation, national or ethnic origin, disability, marital status, veteran status or any other occupationally irrelevant criteria. We promote affirmative action for minorities, women, disabled persons and veterans in all our employment practices.

## **Black & Veatch Experience Overview**

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Since the dawn of cellular, Black & Veatch has deployed wireless networks for the wireless, utility and government industries. Over the years, we've developed a proven suite of site development services. Tested with success on several national deployments, these services are designed to be scalable - performed at a local, regional or national scale. They're designed to be flexible - delivered ala carte or turnkey with as many resources needed to complete the project. Above all, they're designed to be executed seamlessly with high quality, on-time and on budget.

As your partner, Black & Veatch will share with you our best practices gained from deploying large, thousand-site, multi-region projects for our wireless carrier clients. We've taken our large-scale program and project management processes, and applied it to all our wireless projects, so all of our clients experience the same expertise and services that leading carriers count on us to deliver for their advanced 3G and 4G wireless networks, such as:

- Program Management
- Planning & Consulting
- Site Acquisition
- Engineering
- Procurement
- Site Construction Management and Construction

Black & Veatch has provided site development services for over 100,000 wireless sites. Our project experience includes all types of communications supporting facilities ranging from the simplest pad-based equipment cabinets to thousands of transmit sites spread across the U.S. with mid-sized equipment shelters, all the way up to and including complex manned network central

facilities, data centers, POP/switching facilities and control center facilities for utilities and public safety dispatch with enhanced 9-1-1 services.

- Network Consolidation and Expansion
- Greenfield Network Deployment
- Collocations
- Site and Lease Audits
- Site Hardening / Backup Power Services
- Equipment Upgrades
- Backhaul Networks (Fiber, Copper/T1, Microwave)
- Spectrum Rebanding
- Regulatory and Security Compliance Issues
- Workforce Management
- Service Restoration and Reliability
- Alternate energy and off grid solutions

## RCC Experience Overview

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For more than 1,500 clients around the world, RCC has provided solutions through wireless and wired voice/data communications and information technologies. Our consultants and engineers are experts in strategic planning and direction, business analysis, system design, procurement, implementation, systems integration, monitoring and maintenance.

### Our Technical Expertise

#### Radio Communications Systems

- All frequency bands HF, VHF, UHF, 700 MHz, 800 MHz, 900 MHz and microwave
- Digital and Analog Systems
- Conventional and Trunked Systems
- Simulcast Systems
- Cellular and Other Roaming Technologies
- Coverage Prediction Modeling
- Interference Control and Analysis
- Coverage Measurement and Verification

#### Microwave and Fiber Optic Transmission Systems

- Point to Point and Point to Multipoint
- Digital – Ethernet Microwave Radio Design
- Analog/Digital Interface and Conversion
- Alarm and Monitoring Systems
- Microwave Propagation Modeling
- System Optimization
- Power Supplies

#### Telephony Services

- Voice over IP (VoIP) Network Specification/ Deployment
- ACD Administration
- Performance and Capacity Management
- Call Accounting Services

#### Information Technology And Data Systems

- Computer Aided Dispatch (CAD)
- Records Management Systems (RMS)
- Mobile Computing (MDC)
- Automatic Vehicle Location (AVL)
- Geographic Information Systems (GIS)
- Field Based Reporting (FBR)
- Wireless Data Systems – Public and Private

#### Data Networks

- Local and Wide Area Networks
- Broadband Wireless (WiMax, WiFi, LTE)
- Voice, Data, Video Structured Cabling Systems

### Communications/Dispatch Center Planning, Facilities Design and Cost Estimating

- Consolidation/Co-location Studies
- Floor Plan Layout
- Space Planning
- Ergonomic Recommendations
- Environmental Controls
- Dispatch Console Furniture Design
- Console System Radio and Data Interfaces
- Dispatch Center Staffing and Management Operations Studies

### Public Safety Emergency Telephone Systems

- E9-1-1 Emergency Telephone Number Systems
- Wireless 9-1-1 Deployment
- Wireless Location Accuracy Testing
- Automatic Call Distributor Systems

### Intelligent Transportation Systems

- Traffic Management Systems
- Highway Advisory Radio Systems
- Mass Transit Communications Systems

- Supervisory Control and Data Acquisition

### Fiber Optic Networks

- Campus Networks
- Metropolitan Networks

### Communications Site Planning

- Tower Specifications
- Site Development, Planning, Zoning, Acquisition
- Lightning Protection, Grounding, Bonding
- Equipment Shelter and Room Design
- Security and Alarm Systems
- Backup Power and Fuel Systems
- Automatic Fire Suppression Systems
- Surveillance Cameras

### Network Services

- Business Case and Strategic Planning
- Network Planning, Engineering and Construction
- Network Optimization and Management

### Market Research

- Technology
- Market Segment Research

## Our Client Industries

RCC works with clients around the world in a wide range of industries, including:

- Public Safety Agencies
- National/State/Local Governments
- Transit Authorities and Agencies
- Utilities – Electric, Gas, Water
- Airports and Ports
- Transportation Agencies
- Colleges, Universities and Public School Systems
- Manufacturers
- Retailers
- Oil/Gas Production and Transportation
- Wireless Network Operators
- Real Estate Owners and Managers
- Healthcare Facilities
- Educational Councils
- Special Authorities

## Our Products

To help our clients design, operate, monitor and maintain their wireless networks, RCC has developed a suite of comprehensive radio frequency software tools called ComSite<sup>®</sup>. The suite consists of five products that can be used in combination or independently:

### **COMSITE**DESIGN

#### Wireless Network Planning & Design

This high-speed software tool set supports wireless system analysis and planning, design and optimization of wireless networks in one scalable

PC platform small enough for field technicians to use.

**COMSITE<sup>PRO</sup>**

**Wireless Site Engineering**

This powerful site interference analysis tool is the only tool on the market specifically designed to help identify, analyze, locate and resolve radio frequency interference (RFI).

**COMSITE<sup>MANAGER</sup>**

**Wireless Site Management**

This site management application will save you hours of work, whether you are responsible for a single wireless communications site or a nationwide communications network containing thousands of sites.

**COMSITE<sup>MPE</sup>**

**Wireless Site Compliance**

This powerful tool evaluates non-ionizing radio frequency (RF) emissions and predicts the Maximum Permissible Exposure (MPE) potential to humans at or near wireless communications sites.

**COMSITE<sup>E9-1-1</sup>**

**Wireless Location Accuracy**

This easy-to-use tool helps you determine the location data accuracy of wireless E9-1-1 calls delivered to your Public Safety Answering Point (PSAP), based on standard and repeatable statistical methods.

For more information on the ComSite suite of products, visit the RCC website at [www.rcc.com](http://www.rcc.com).

**Our Approach**

At the foundation of our relationship with every client is a strategic, disciplined approach to providing long-term solutions. During the past 30 years, we have developed comprehensive engineering and project management practices to create our time-tested approach that ensures success for our clients.

According to Standish Group's *Chaos 2007 REX: A Standish Research Exchange*, a staggering 39% of projects with budgets exceeding \$10 million failed. Failure is defined as either total abandonment or failure to meet one or more of the key project objectives within the budget and time allocated. Proper project management and planning are vital to ensuring a project's success.

RCC has managed more than 4,000 communications and information systems projects for organizations big and small. To ensure the success of each project, we utilize a companywide project approach based on the Project Management Institute (PMI)'s global best practices.

### “If You Fail to Plan, You Plan to Fail”

RCC’s five-step approach to any project starts with project initiation and planning. Through our decades of experience, we have found that proper planning can reduce risk, ensure alignment of objectives, capitalize on efficiencies and ultimately lead to project success.

Once planning is complete, the project moves into the execution phase. This is often where the bulk of the work plan is executed, and depending on the project, tasks can range from developing specifications to designing radio systems to installing tower sites.

A key step in our project management approach is monitoring and control. This is an iterative process, and only after successful acceptance testing can a project be considered closed out.

Throughout an RCC project’s lifecycle, there is extensive communication among the project team and with our client. By communicating regularly, all stakeholders are kept informed, promoting collaboration and reducing re-work.

### A Companywide, Shared Model

All of our project managers, and many of our engineers, have participated in more than 50 hours of project management training. The training teaches the best practices from PMI, as well as the specific, practical application of those practices for telecommunications engineering projects.

Through our application of a consistent project management methodology, which we employ for all engagements, we ensure consistent and efficient delivery for our clients.

### Quality Assurance Commitment

RCC is built on a solid foundation of quality products and services that meet our client needs and add value to every project. We are committed to maintaining strict quality requirements based on International Organization for Standardization (ISO) and Total Quality Management standards. Our project managers, consultants and engineers are all trained in adherence to these standards, and for larger projects, we assign an Executive Sponsor who is accountable for the quality assurance and success of a project.

To ensure every project meets our high quality standards, we have developed an internal quality management process based on recognized quality management objectives:

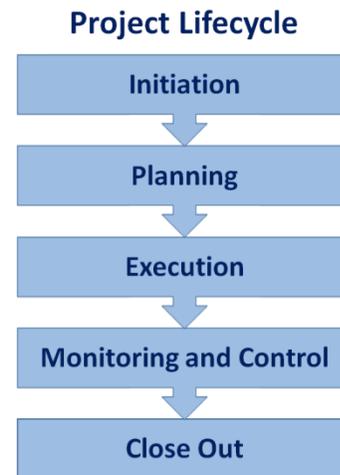


Figure 5. RCC's Project Management Approach

RCC utilizes a companywide, shared model, based on PMI’s global best practices, to ensure the success of each and every project.

### RCC's Quality Management Model

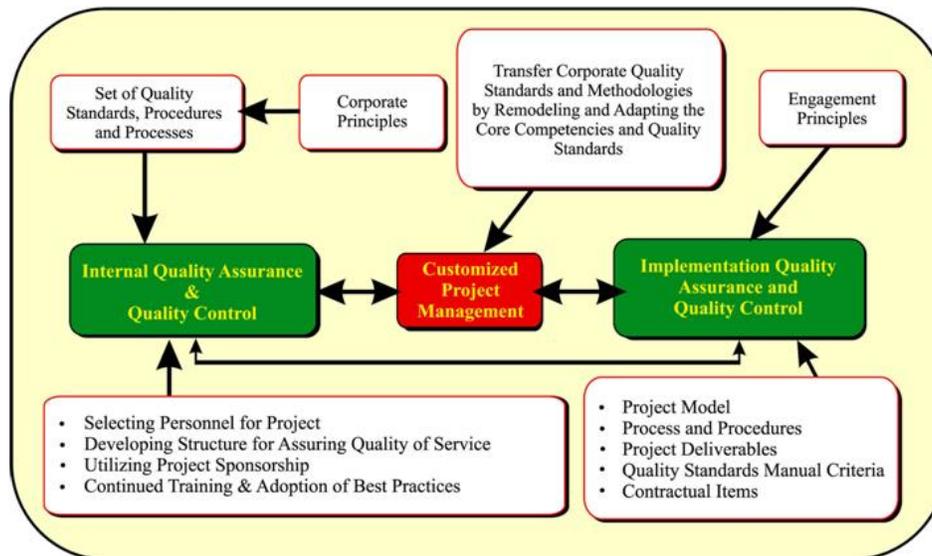


Figure 6. RCC's Quality Management Model

**RCC's Quality Management Model supports the unique requirements of each project. Quality management ensures client satisfaction and has equal priority with deliverable execution, schedule management and cost control.**

RCC's model includes six quality management concepts that support the unique requirements of each project:

- Quality Policy
- Quality Objectives
- Quality Assurance
- Quality Control
- Quality Audit
- Quality Program Plan

We begin each project by taking the time to fully understand the needs of our clients. We then tailor our quality management oversight to meet those needs. Our project manager has the ultimate responsibility for quality management during the project.

Quality management has equal priority with deliverable execution, schedule management and cost control. Quality management within RCC is an ever-improving system for integrating the processes and procedures necessary to provide cost-effective services that are fully acceptable to our clients.

### RCC's Public Safety and Government Practice

RCC has specialized in communications consulting for public safety and government clients since 1983. A trusted industry advisor, we help domestic and international governments, law enforcement, Fire departments, EMS, dispatch centers and other public safety agencies get the most out of their mission-critical communications systems.

We know that public safety agencies and governments have unique needs. We also know the complexities they face with their communications systems, not only in technology, but also in business planning. That's why we devote an entire practice to supporting the needs of public sector agencies – RCC's Public Safety and Government practice.

### ***Specialized Services for the Public Sector***

RCC's Public Safety and Government practice helps our clients determine their needs and develop a solution, whether they are upgrading, improving or building new systems. With the right strategic planning, our clients' information and communications systems can deliver the increased efficiency and productivity they need, within their budget. We assist our clients with:

- **Developing strategic plans**, including definition of goals and objectives, and conducting needs assessments, technology evaluations, risk analyses and staffing reviews.
- **Designing systems and facilities using new and emerging technologies** for data, voice and video networks, emergency communications and operations centers.
- **Investigating and developing funding methodologies and financial analyses** to help justify recommended solutions.
- **Identifying and obtaining grants** in support of technology initiatives.
- **Assisting with the regulatory approvals** needed for licensure of wireless systems, antenna sites and other facilities.
- **Conducting radio frequency research** and enabling acquisition.
- **Preparing detailed specifications and procurement documents** for new or upgraded technology.
- **Assisting in negotiating contracts and service level agreements** with vendors.
- **Implementation support and installation oversight** to ensure work is completed according to the specifications, on time and within the established budget.

### ***Technology Expertise for the Public Sector***

Our consultants and engineers are experts in planning, designing, procuring and implementing communication systems. To provide the best support to our public sector clients, we have focused our Public Safety and Government practice on providing customized services in six areas: Wireless Communications, Information Systems, Mobile Data, Communications Centers, Emergency Number Systems, and Business Planning and Management.

## **Wireless Communications**

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Governments and public safety agencies are facing rapidly changing economic conditions and high consumer expectations for easy access and quick response. Wireless communications and interoperability among agencies and jurisdictions are critical to meeting those needs. RCC has helped hundreds of client improve their interoperability and get the most out of their wireless communications systems. We assist public safety agencies and governments with:

- Interoperability Assessment, Planning, Design and Implementation
- RF System Design and Performance Engineering
- Coverage Analysis and Enhancement
- Spectrum Planning and Licensing (VHF,UHF, 700 MHz, 800 MHz, 4.9 GHz)
- Conventional and Trunked Radio
- Public Safety Broadband
- Microwave Networks
- Paging Systems
- 800 MHz Rebanding
- Interference Resolution
- Wireless Data/Voice/Video Networks
- Wireless LANs (802.11x)
- System Integration, Maintenance and Optimization
- Cellular, PCS & LMDS System Design

To enhance radio systems for public safety agencies and governments, we provide the following specialized services:

### ***Microwave Radio Engineering***

Our experts conduct microwave path engineering and system design, including point-to-point propagation, multipath fading, diffraction and reflections along path, antenna system configuration and optimization, Fresnel and earth curvature clearance, line of site verifications, and system testing, optimization and implementation.

### ***Radio Traffic Monitoring***

The radio frequency spectrum is a limited natural resource that requires proper engineering to maximize capacity and minimize interference. Before designing or enhancing a client's system, RCC monitors radio traffic to assess channel loading to ensure we understand our client's current operating environment so we recommend the most efficient and effective solution. Using a radio receiver capable of scanning up to 20 radio channels a second, we assess the amount of radio traffic generated throughout the day. The analysis becomes a core input into the system design, and provides verifiable evidence of the need for frequencies during the licensing process.

### ***Radio Propagation and Coverage Analysis***

## **Scope**

RCC designed the microwave backhaul network supporting Pennsylvania's statewide land mobile radio network. It is believed to be the largest private microwave radio network in the U.S.

RCC’s propagation and coverage analysis helps determine the optimum site layout and distribution, as well as radio system coverage and expected system reliability. Our consultants have developed and tested an industry-leading toolset, ComSiteDesign, to aid in radio propagation and coverage analysis. The portable toolset delivers comprehensive multi-site coverage analysis, interference analysis, multiple point-to-point and point-to-multipoint analyses.

### **Radio Frequency Interference Analysis**

To assist with base station site engineering and frequency compatibility, RCC created another powerful software tool, ComSitePro. This tool includes a database of more than 3,000 antennas, filters, transmitters and receivers to allow engineers to determine the minimum required isolation and protection from unwanted signal.

### **Spectrum and Regulatory Services**

Proper planning for frequencies, including how many are needed, how they will be used and how to acquire them, is essential when a radio communications system. RCC’s regulatory experts assist public safety clients with frequency planning, searches and licensing applications for VHF, UHF, 700 MHz, 800 MHz and 4.9 GHz frequencies.

Our experts provide support and advice to help our clients identify, manage and control any existing or future regulatory risks. All of our work is performed in accordance with the Federal Communications Commission (FCC) or European Telecommunications Standards Institute (ETSI).

**\$1MM**

RCC’s regulatory specialists saved more than \$1 million in licensing fees for four New Jersey towns building a shared emergency communications system.

### **Antenna Site Planning and Engineering**

RCC provides a full range of antenna site design and construction management services to support radio communications systems, including:

#### **Site Plans and Specifications**

- Planning board/permit approval process
- Tower specifications
- Antenna specifications
- Equipment shelter specifications

#### **Power and Monitoring Systems**

- Emergency generator and fuel supply systems
- Uninterruptible power supply systems
- Rectifier and battery DC power system
- Grounding and surge suppression
- Security access control, CCTV systems
- Fire detection and suppression systems

#### **Procurement Assistance**

- Construction cost estimates
- Final bid documents, including sealed construction drawings
- Option analysis (value engineering)
- Bid review, negotiation and construction contracts

#### **Project Management**

- Project scheduling
- Subcontractor coordination
- Review of equipment shop drawings
- Change order and cost management
- Start-up and system commissioning

- Tower light monitoring systems
- As-built drawings and documentation

## Information Systems

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Urgent demands from customers, combined with internal goals and objectives, require that public safety agencies and governments not only make smarter network and systems deployment decisions, but also make them faster. RCC can help agencies enhance and improve their voice and data infrastructure, and update and optimize mission-critical systems. RCC provides expert consulting services in:

- VoIP Systems and Networks
- TCP/IP network design
- LAN/WAN
- Records Management Systems (RMS)
- Utility Management systems
- Criminal Justice and Jail Management Systems
- Geographic Information Systems (GIS)
- Voice and Data Recording Systems
- Fleet Management
- Document Management/Imaging
- Computer Aided Dispatch (CAD)
- Mobile Data Computing
- Automated Field Reporting
- Automatic Vehicle Location
- Enterprise Resource Planning
- Field Force Management and Reporting

## Mobile Data

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RCC has been at the forefront of the mobile computing industry since the early 1980s. Our engineers designed, built and optimized the first nationwide public mobile data network in the United States, which now includes more than 2,000 base station sites.

We have continued to build on that expertise, assisting hundreds of public safety agencies plan, design, procure and implement mobile computing systems on both public and private platforms. Our engineers are experienced in the latest technologies and policies, and are frequently invited to

**2,000**

RCC pioneered the first nationwide public mobile data network in the United States, which now has more than 2,000 base stations.

participate on panels and regulatory committees regarding mobile data standards.

Our expertise to help our clients with their critical mobile communications includes:

- Commercial Networks
- 2G, 2.5G, 2.75G and 3G Technologies (TDMA, CDMA, GSM, GPRS, EDGE, WCDMA, CDPD, iDEN, UMTS)
- Wireless Application Protocol (WAP)
- Wireless LANs (802.11x)
- Multimedia Messaging Service (MMS)
- SMS Text Messaging
- IP Media Subsystem (IMS)
- Push-to-Talk over Cellular (PoC)
- VoIP and Location Based Services
- Base-stations and Backhaul Networks
- Broadcasting and Multicasting to Handheld Devices
- Audio Visual Coding Technologies (Sound/Video/Multimedia Data Compression)
- Field Force Management and Reporting
- Tactical Map Display Systems
- Message Switching
- User Equipment Selection and Configuration
- Interference Resolution
- Automatic Vehicle Location

## **Emergency Number Systems**

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More than 25 countries around the world operate universal emergency number systems, providing citizens with rapid access to emergency services. Since Britain introduced the first system, “999,” in 1937, there have been many sophisticated advances, including automated caller number identification and caller location information.

RCC helps public safety agencies and governments take advantage of these opportunities, and plan for future advances. Our team of Emergency Number Professionals and experienced engineers has consulted on systems for a wide range of clients – from the country’s largest cities, including New York and Los Angeles, to smaller, rural counties.

We have extensive experience with major manufacturers of customer premise equipment, automatic call distributors, statewide switch networks and related technologies. Our engineers offer the expertise to:

- Identify emergency services boundaries and configuration
- Identify telephone service requirements and features
- Plan the proper telephone line capacity and number of lines
- Specify and procure call answering and transfer equipment
- Plan personnel, equipment and operational needs
- Verify wireless emergency number location information

Our broad array of consulting and engineering services can be customized to fit individual needs, and includes specific expertise in the following areas:

#### **Traffic Engineering**

- Busy Hour Call Volume Per Shift
- Call-Taker Obligated Time
- Emergency Call Process Analysis

#### **Performance Requirement Definition**

- Call-Taker Grade of Service
- Telephone Grade of Service
- Staffing Levels

#### **Communications Network Features**

- Answering Point Location
- Dispatch Center Locations
- Central Office Service Areas
- Types of Telephone Lines
- Terminal Equipment
- Optional Service Features

#### **Personnel Planning**

- Call Takers
- Dispatchers
- Supervisory
- Support

#### **Operational Methods**

- Direct Dispatch, Transfer, Relay
- Single State or Multi Stage Emergency Call Handling Equipment
- Incoming Emergency Lines
- Outgoing Private Lines
- Non-Published Number Lines
- Administrative Lines
- Terminal Equipment

#### **Other Equipment Requirements**

- Logging Devices
- Instant Playback Devices
- Intercom Systems
- Automated Call Distributors
- Automated Attendant Systems
- Emergency & Standby Power Systems
- Lightening Protection Systems
- CCTV and Surveillance Systems
- Access Control

### **Wireless 9-1-1 Location Testing and Verification**

RCC is the exclusive partner with the National Emergency Number Association (NENA) to provide testing and certification recommendation of wireless 9-1-1 location technology installations. This service provides assurance to the public safety answering point and to wireless

carriers that the location of an emergency caller is properly routed and received. The benefits to wireless 9-1-1 location testing include:

- Greater public confidence in 9-1-1 systems
- Improved service to public
- Independent review and verification

### ***Testing to the FCC's OET-71 Standards***

Using a comprehensive software suite developed by RCC, ComSite 9·1·1e, our teams conduct field verification of wireless 9-1-1 position and call routing in accordance with the Federal Communications Commission's OET-71 Standards.

Our teams randomly establish the position of each test location and collect coordinate samples at a rate of one every three seconds. To ensure the highest level of accuracy in each test, ComSite 9·1·1e determines the optimal number of samples at each test location based on a statistical confidence level of 95%. The ground truth samples are compared against the location determination method used by the wireless carrier.

The tests are correlated with data received at the PSAP, providing true end-to-end testing of the system. Results of tests are subjected to statistical analysis to determine a "pass" or "fail" condition. This essential verification service can be provided on a turnkey basis, or RCC can train testers from a PSAP, 9-1-1 Board or district to use the equipment and to submit data for independent review by RCC engineers. The test seeks to verify if the wireless carrier under test is providing Phase II class of service and whether the location coordinates delivered to the PSAP meet the expected accuracy and confidence for a given location determining technology.

### ***Ensure Accuracy with an Independent Review***

An independent review of wireless location accuracy is the only way to ensure that wireless callers are receiving the same high quality of service that wired users receive. Field experience has indicated that regardless of the good intentions of the wireless industry, failures do occur in installations that on the surface appear to be functioning properly. Location accuracy testing provided by RCC gives the PSAP and other public safety managers the essential, objective analysis they need to be confident in their service delivery quality.

## **Business Planning and Management**

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Now, more than ever, Public Safety and Government agencies are expected do more with less. To ensure you get the most out of the money you spend, it is critical to work with a strategic partner who can provide planning, assistance, oversight and management to ensure you get the most from your investment.

RCC offers a wide array of business planning and management consulting services that can be tailored to meet a client's unique needs:

- Strategic Planning

- Business and Business Case Planning/Analysis
- Public / Private Partnership Planning
- Grant Writing
- Disaster Management Planning
- Project Financing
- Business Process Reengineering
- Needs Analysis
- System Design
- Evaluation and Vendor Negotiation
- Implementation Assistance
- Operations and Maintenance Management
- Cutover Support

## Antenna Sites

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RCC and our team members can provide turn- key antenna site deployments and build-to-suit projects. Our antenna site services include:

- RF planning
- Site acquisition
- Site planning and zoning support
- Design
- FAA and FCC filings
- Construction management
- Acceptance testing and inspection
- Lease and site valuation
- Business plans
- Ongoing management, operations and maintenance support.



*Shown above right is a collocation antenna site maintained by RCC Facilities Group.*

## Distributed Antenna Systems (DAS)

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As wireless services replace traditional wired telecommunications technologies, demand for reliable in-building coverage in both commercial and residential structures increases. Provision of in-building coverage from outside of the structures is often impractical due to the construction or content of the buildings, or, in the case of residential structures, due to antenna siting restrictions in the area.



structures.

RCC provides full DAS design and construction services. RCC experience includes provision of these services in high-rise structures, convention centers, tunnels, transportation facilities, and large residential

*Shown at left is the Jacobs Javits Convention Center – New York City –DAS Design by RCC.*

## Site Acquisition Services

For private or public sector clients, RCC will locate antenna sites that meet the coverage and capacity requirements of the wireless system. Site acquisition includes identification of existing structures such as towers, buildings, or water tanks, or “greenfield” sites where raw land is available for construction of a new facility.



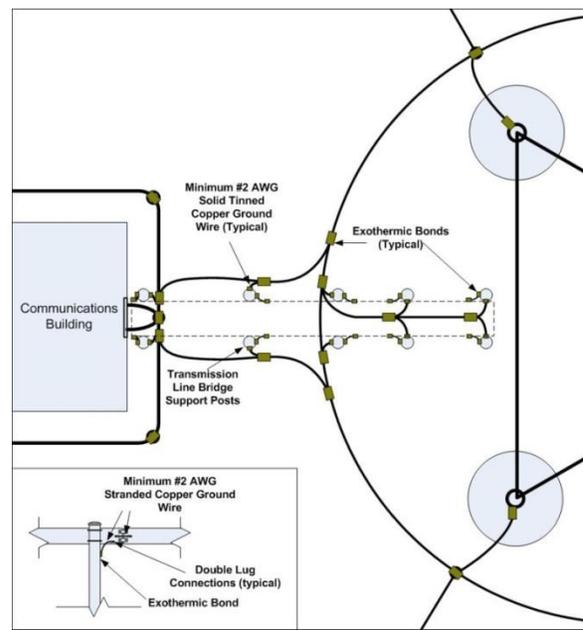
RCC provides research into site availability for lease or purchase from a list of candidate sites located within a geographic search ring centered on the area in which coverage is needed.

RCC researches planning and zoning for the area and will recommend sites with the highest probability of success of approval.

RCC contacts site owners or managers and determines their interest in leasing space or selling property or structures. Business terms and conditions are discussed with the owner or manager and are used in a comparison of other site alternatives. Candidate sites are ranked in conjunction with the client team and lease negotiation with the representative of the highest rank site commences.

RCC provides planning and zoning support in conjunction with its site acquisition activity, working with client legal counsel or outside

RCC contacts site owners or managers and



attorneys to move applications through the planning process.

RCC provides services such as photo-simulation, balloon tests, community outreach, and concealment plans. Other experts such as environmental engineers are retained as needed to meet local requirements.

## Specification and Design

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RCC prepares site development specifications and designs for competitive procurement of towers, shelters, site construction, grounding, lightning protection, security, and standby power systems.

RCC has complete hundreds of site designs in varying conditions throughout the United States and in international markets.

## Procurement Assistance

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Services provided in support of procurements include:

- Requests for Bids or Proposals
- Pre-proposal process management
- Proposal review
- Bid tabulation and analysis
- Negotiation support
- Technical exhibit preparation for contracts



Vendor recommendations and competitive analysis of proposals are value-added services to the purchaser of antenna sites or components.



## Construction Management

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On-site construction management by RCC staff ensures compliance with plans, specifications, permits, licenses, environmental and safety regulations. Empowered construction managers

stop work when contractors fail to comply with the terms and conditions under which site work is to be performed.

Quality assurance and inspections provide confidence to the owners that the antenna site has been installed properly. Progress payment management is an important function performed by RCC to ensure that deficiencies are corrected before contractors are paid.

*Shown above is an RCC project for the construction management of a monopole foundation.*



## Testing and Acceptance

Verification of performance of antenna site subsystems, such as grounding, installation, electrical distribution, standby power systems, security devices, tower lighting, HVAC systems, and other components is a valuable service that provides protection to the site owner.

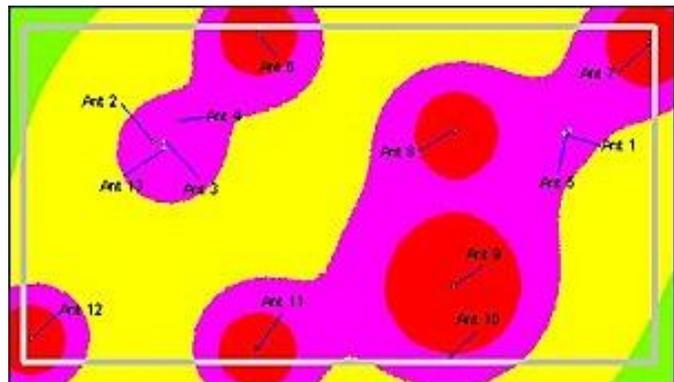
## Radio Frequency Interference Analysis and Control

Collocation of radio frequency transmitters and receivers without harmful interference is a challenge as antenna space is heavily used on existing towers and structures. RCC performs interference analyses to identify and cure sources of interference that result from intermodulation and receiver desensitization.

RCC has developed and uses a software tool, ComSitePro, which calculates the thousands of intermodulation products that can occur on a heavily loaded site. RCC engineers use this data, along with equipment performance parameters and inventory of existing installations to both provide solutions to interference problems as well as to prevent problems from occurring.

## Radio Frequency Emissions Safety

RCC engineers perform calculations and field measurements to verify that existing or planned installation of radio frequency transmitters do not exceed Federal standards for maximum permissible emissions for exposure of the human body



to non-ionizing radiation radio frequency emissions.

RCC has developed and uses a RF exposure software tool, ComSiteMPE, to predict the Maximum Permissible Exposure of RF emissions at antenna sites. The analysis determines if the communications site complies with Federal Communication Commission (FCC) regulations or other standards regarding safe human exposure to radio frequency emissions.

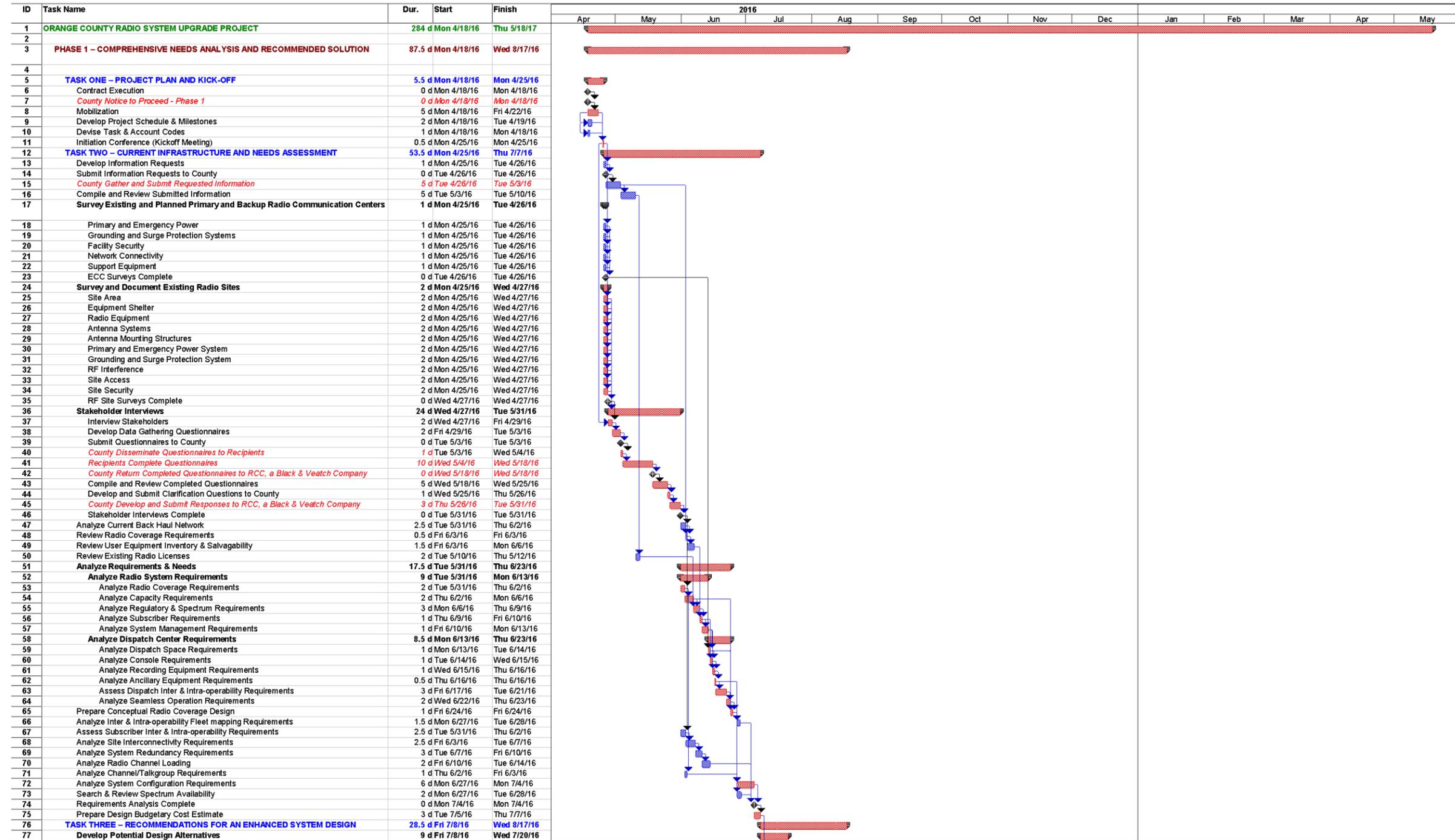
In conjunction with field measurements, RCC produces reports that are used in the certification of the safety of a proposed installation to satisfy authorities with relevant jurisdiction. Above is an image from the tool showing the Maximum Permissible Exposure prediction for personnel safety of a rooftop antenna site.

ComSiteMPE is used to analyze:

- On tower, Off tower and Rooftop MPE analysis configurations
- Exposure standards for the USA ( FCC OET 65 or ANSI/IEEE C95.1), UK, Australia, (ARPANSA) and other international Standards (ICRIRP)
- Near Field or Far Field predication models
- Occupational/Controlled and General/Uncontrolled RF environment exposure evaluations
- Evaluation along a single radial or 360 degree exposure analysis about a communications site
- View results on screen or create custom reports in Microsoft Word
- Presentation quality reporting suitable for distribution

## APPENDIX B - DETAILED PROJECT SCHEDULE

The following pages contain a detailed version of the project schedule.







## APPENDIX C – SIGNED ADDENDA



Orange County  
Financial Services Department  
**ADDENDUM #1**  
**February 8, 2016**

RFQ 5217
Countywide Radio Communications Interoperability And Systems Engineering Services

To all Vendors:

Modifications to bid documents for the above-named Request for Proposal are made as follows and shall be included in the proposed amount.

Questions received with County's responses are on page 2 of this document

All other terms and conditions shall remain the same

By: David E. Cannell, Purchasing Agent; [dcannell@co.orange.nc.us](mailto:dcannell@co.orange.nc.us) / (919) 245-2651

**Acknowledgement of receipt of this addendum shall be included with your submittal**

Company Name: \_\_\_\_\_ Black & Veatch \_\_\_\_\_

By: \_\_\_\_\_  \_\_\_\_\_

Date Received: \_\_\_\_\_ 02/24/2016 \_\_\_\_\_

P.O. Box 8181 200 South Cameron Street Hillsborough, North Carolina 27278  
Telephones: Area Code 919-245-2651 Fax: 919-636-4913

1. Is the County expecting to replace the EMS/Fire Station Alerting System or only to provide audio and interface to this system?  
**The only system in place are consolettes at each station. The county is currently looking at station alerting systems independent of this study – we would not be opposed to the consultant assessing this.**
2. Will the previous radio system studies be made available to the successful proposer for this work and if yes, do these studies contain detailed information describing the present system?  
**Yes, Orange County will provide previous study from CTA consultants in 2004. The studies do contain detailed information regarding VIPER and Legacy VHF/UHF – however, the study was done in 2004.**
3. Does the County operate its own 911 dispatch center and if yes, how many radio console positions exist today?  
**Yes with 11 positions.**
4. Is the project as described funded? What is the expected date for completion of the assessment and RFP development?  
**The work defined by the rfp is budgeted in this fiscal year’s budget. As stated in the RFP we want respondents to propose a timeline based on the County’s budget (CIP) process. A description of that timeline can be found here [http://www.orangecountync.gov/departments/orange\\_county\\_budget\\_documents.php#](http://www.orangecountync.gov/departments/orange_county_budget_documents.php#)**
5. Currently, how many County public safety radios operate on the VIPER system?  
**Currently 1300 Radio IDs**
6. We acknowledge your request of 2 copies of all cost information to be provided in a separate sealed envelope. Does the County desire to have any cost information, as described in Section 4.C & 4.D of the RFP, included in the technical proposal? **Yes**
7. Section 4.C Staff Qualifications and 4.D Experience requests the same information. May we use the Experience section to share with you our Firms’ industry and project experience? **Yes**
8. In the RFP, Section 3.0; Subsection 3.C. states the terms of the contract are negotiable with the selected vendor. However on Attachment A: Signature of Affidavit it states that by submitting a proposal response the submitter agrees to the Terms & Conditions, and Specifications. Is it possible to acquire a copy of the Terms & Conditions for review prior to response? Or would the County make an addendum to the RFP to revise the language in Attachment A to reflect the Terms & Conditions as negotiable?  
**Yes, terms and conditions are negotiable. Attached is a copy of the County’s template contract.**

NORTH CAROLINA

**CONSULTING SERVICES AGREEMENT -RFQ-**

ORANGE COUNTY

This Agreement, made and entered into this \_\_\_\_\_ day of \_\_\_\_\_, 20\_\_\_\_, (“Effective Date”) by and between Orange County, North Carolina a body politic and corporate of the State of North Carolina (hereinafter, the "County") and \_\_\_\_\_, (hereinafter, the "Consultant").

**WITNESSETH:**

That the County and Consultant, for the consideration herein named, do hereby agree as follows:

**ARTICLE 1            SCOPE OF WORK**

1.1        Scope of Work

1.1.1     This Services Agreement (“Agreement”) is for professional consulting services to be rendered by Consultant to County with respect to (insert type of project)

1.1.2     By executing this Agreement, the Consultant represents and agrees that Consultant is qualified to perform and fully capable of performing and providing the services required or necessary under this Agreement in a fully competent, professional and timely manner.

1.1.3     Time is of the essence with respect to this Agreement.

1.1.4     The services to be performed under this Agreement consist of Basic Services, as described and designated in Article 3 hereof. Compensation to the Consultant for Basic Services under this Agreement shall be as set forth herein.

**ARTICLE 2            RESPONSIBILITIES OF THE CONSULTANT**

2.1        Services to be Provided. The Consultant shall provide the County with all services required in Article 3 to satisfactorily complete the Project within the time limitations set forth herein and in accordance with the highest professional standards.

2.2.       Standard of Care

2.2.1     The Consultant shall exercise reasonable care and diligence in performing services under this Agreement in accordance with the highest generally accepted standards of this type of Consultant practice throughout the United States and in accordance with applicable federal, state and local laws and regulations applicable to the performance of these services. Consultant is solely responsible for the professional quality, accuracy and timely completion and submission

of all reports, drawings, specifications, plans, documents and services (hereinafter “Deliverables”) related to the Basic Services.

2.2.2 The Consultant shall be responsible for all errors or omissions in the deliverables prepared by the Consultant.

2.2.3 The Consultant shall correct at no additional cost to the County any and all errors, omissions, discrepancies, ambiguities, mistakes or conflicts in any Deliverables prepared by the Consultant.

2.2.4 The Consultant shall assure that all Deliverables prepared by it hereunder are in accordance with applicable laws, statutes, and that any necessary or appropriate applications for approvals are submitted to federal, state and local governments or agencies in a timely manner so as not to delay the Project.

2.2.5 The Consultant shall not, except as otherwise provided for in this Agreement, subcontract the performance of any work under this Agreement without prior written permission of the County. No permission for subcontracting shall create, between the County and the subcontractor, any contract or any other relationship.

2.2.6 Any and all employees of the Consultant engaged by the Consultant in the performance of any work or services required of the Consultant under this Agreement, shall be considered employees or agents of the Consultant only and not of the County, and any and all claims that may or might arise under any workers compensation or other law or contract on behalf of said employees while so engaged shall be the sole obligation and responsibility of the Consultant.

2.2.7 Consultant agrees that Consultant and its subcontractors, if any, shall be required to comply with all federal, state and local anti-discrimination laws, regulations and policies that relate to the performance of Consultant’s services under this Agreement.

2.2.8 If activities related to the performance of this agreement require specific licenses, certifications, or related credentials Consultant represents that it and/or its employees, agents and subcontractors engaged in such activities possess such licenses, certifications, or credentials and that such licenses certifications, or credentials are current, active, and not in a state of suspension or revocation.

### **ARTICLE 3 BASIC SERVICES**

#### **3.1 Basic Services**

3.1.1 The Consultant shall perform as Basic Services the work and services described herein and as specified in the County’s Request for Qualifications RFQ Number for (the “RFQ”) issued , 20 , which is fully incorporated and integrated herein by reference together with Attachments (designate all attachments).

3.1.2 The Basic Services will be performed by the Consultant in accordance with the following schedule: (Insert task list and milestone dates)

<u>Task</u>	<u>Milestone Date</u>
1.	
2.	
3.	
4.	
5.	
6.	
7.	
8.	
9.	
10.	

3.1.3 Should County reasonably determine that Consultant has not met the Milestone Dates established in Section 3.1.2 of this Article, County shall notify Consultant of the failure to meet the Milestone Date. The County, at its discretion may provide the Consultant seven (7) days to cure the breach. County may withhold the accompanying payment without penalty until such time as Consultant cures the Breach. In the alternative, upon Consultant’s failure to meet any Milestone Date the County may modify the Milestone Date schedule. Should Consultant or its representatives fail to cure the breach within seven (7) days, or fail to reasonably agree to such modified schedule County may immediately terminate this Agreement in writing without penalty or incurring further obligation to Consultant. This section shall not be interpreted to limit the definition of breach to the failure to meet Milestone Dates.

**ARTICLE 4 DURATION OF SERVICES**

4.1 Scheduling of Services

4.1.1 The Consultant shall schedule and perform his activities in a timely manner so as to meet the Milestone Dates listed in Article 3.

4.1.2 Should the County determine that the Consultant is behind schedule, it may require the Consultant to expedite and accelerate his efforts, including providing additional resources and working overtime, as necessary, to perform his services in accordance with the approved project schedule at no additional cost to the County.

4.1.3 The Commencement Date for the Consultant's Basic Services shall be \_\_\_\_\_.

**ARTICLE 5 COMPENSATION**

5.1 Compensation for Basic Services

5.1.1 Compensation for Basic Services shall include all compensation due the Consultant from the County for all services under this Agreement except for any authorized Reimbursable Expenses which are defined herein. The maximum amount payable for Basic Services is \_\_\_\_\_ Dollars (\$ \_\_\_\_\_). Payment for Basic Services shall become due and payable in direct proportion to satisfactory services performed and work accomplished. Payments will be made as percentages of the whole as Project milestones as set out in Section 3.1.2 are achieved. *(For example, if there are 10 Project Tasks with Milestone Dates then Consultant may invoice for the first 10% of the whole upon County’s acknowledgement of the satisfactory completion of*

*Task one. Upon the County's acknowledgement that the second Task has been satisfactorily completed Consultant may invoice for the next 10% of the whole.)*

## **ARTICLE 6     **RESPONSIBILITIES OF THE COUNTY****

### **6.1     Cooperation and Coordination**

6.1.1     The County has designated \_\_\_\_\_ to act as the County's representative with respect to the Project and shall have the authority to render decisions within guidelines established by the County Manager and the County Board of Commissioners and shall be available during working hours as often as may be reasonably required to render decisions and to furnish information.

6.1.2     The County shall be solely responsible for determining whether Consultant as satisfactorily completed Tasks associated with Milestone Dates. Upon County's written determination to Consultant that a Task has been satisfactorily completed by its accompanying Milestone Date Consultant may submit an invoice for payment. It is agreed that County shall not unreasonably withhold its determination of satisfactory completion of any Task. In the event the amount of an invoice is disputed County may withhold payment until the dispute is resolved by the parties. County may also withhold payment on an invoice until the satisfactory completion of a Task by Consultant.

## **ARTICLE 7     **INSURANCE AND INDEMNITY****

### **7.1     General Requirements**

7.1.1     Consultant shall obtain, at its sole expense, Commercial General Liability Insurance, Automobile Insurance, Workers' Compensation Insurance, Professional Liability Insurance, and any additional insurance as may be required by Owner's Risk Manager as such insurance requirements are described in the Orange County Risk Transfer Policy and Orange County Minimum Insurance Coverage Requirements (each document is incorporated herein by reference \_\_\_\_\_ and \_\_\_\_\_ may \_\_\_\_\_ be \_\_\_\_\_ viewed \_\_\_\_\_ at [http://www.orangecountync.gov/departments/purchasing\\_division/contracts.php](http://www.orangecountync.gov/departments/purchasing_division/contracts.php)). If Owner's Risk Manager determines additional insurance coverage is required such additional insurance shall be designated here \_\_\_\_\_ (if no additional insurance required mark N/A as being not applicable). Consultant shall not commence work until such insurance is in effect and certification thereof has been received by the Owner's Risk Manager.

### **7.2     Indemnity**

7.2.1     The Consultant agrees to indemnify and hold harmless the County from all loss, liability, claims or expense, including attorney's fees, arising out of or related to the Project and arising from bodily injury including death or property damage to any person or persons caused in whole or in part by the negligence or misconduct of the Consultant except to the extent same are caused by the negligence or willful misconduct of the County. It is the intent of this provision to require the Consultant to indemnify the County to the fullest extent permitted under North Carolina law.

## **ARTICLE 8     **AMENDMENTS TO THE AGREEMENT****

8.1 Changes in Basic Services

8.1.1 Changes in the Basic Services and entitlement to additional compensation or a change in duration of this Agreement shall be made by a written Amendment to this Agreement executed by the County and the Consultant. The Consultant shall proceed to perform the Services required by the Amendment only after receiving a fully executed Amendment from the County.

**ARTICLE 9 TERMINATION**

9.1 Termination for Convenience of the County

9.1.1 This Agreement may be terminated without cause by the County and for its convenience upon seven (7) days prior written notice to the Consultant.

9.2 Other Termination

9.2.1 The Consultant may terminate this Agreement based upon the County's material breach of this Agreement; provided, the County has not taken all reasonable actions to remedy the breach. The Consultant shall give the County seven (7) days' prior written notice of its intent to terminate this Agreement for cause.

9.3 Compensation After Termination

9.3.1 In the event of termination, the Consultant shall be paid that portion of the fees and expenses that it has earned to the date of termination, less any costs or expenses incurred or anticipated to be incurred by the County due to errors or omissions of the Consultant.

9.3.2 Should this Agreement be terminated, the Consultant shall deliver to the County within seven (7) days, at no additional cost, all Deliverables including any electronic data or files relating to the Project.

9.4 Waiver

9.4.1 The payment of any sums by the County under this Agreement or the failure of the County to require compliance by the Consultant with any provisions of this Agreement or the waiver by the County of any breach of this Agreement shall not constitute a waiver of any claim for damages by the County for any breach of this Agreement or a waiver of any other required compliance with this Agreement.

9.5 Suspension

9.5.1 County may suspend suspend the work at any time for County's convenience and without penalty to County upon three (3) days' notice to Consultant. Upon any suspension by County, Consultant shall discontinue the work and shall not resume the work until notified to proceed by County.

**ARTICLE 10 ADDITIONAL PROVISIONS**

## 10.1 Relationship of Parties

10.1.1 Consultant is an independent contractor of the County. Neither Consultant nor any employee of the Consultant shall be deemed an officer, employee or agent of the County. Consultant's personnel shall not be employees of, or have any contractual relationship with the County.

## 10.2 Limitation and Assignment

10.2.1 The County and the Consultant each bind themselves, their successors, assigns and legal representatives to the terms of this Agreement. Neither the County nor the Consultant shall assign or transfer its interest in this Agreement without the written consent of the other.

## 10.3 Governing Law

10.3.1 This Agreement and the duties, responsibilities, obligations and rights of respective parties hereunder shall be governed by the laws of the State of North Carolina. Consultant shall at all times remain in compliance with all applicable local, state, and federal laws, rules, and regulations including but not limited to all anti-discrimination laws. By executing this Agreement Provider affirms that Provider and any subcontractors of Provider are and shall remain in compliance with Article 2 of Chapter 64 of the North Carolina General Statutes. Where applicable, failure to maintain compliance with the requirements of Article 2 of Chapter 64 of the General Statutes constitutes Consultant's breach of this Agreement. By executing this Agreement Consultant affirms Consultant is in compliance with Article 2 of Chapter 64 of the North Carolina General Statutes.

## 10.4 Dispute Resolution

10.4.1 Any and all suits or actions to enforce, interpret or seek damages with respect to any provision of, or the performance or non-performance of, this Agreement shall be brought in the General Court of Justice of North Carolina sitting in Orange County, North Carolina and it is agreed by the parties that no other court shall have jurisdiction or venue with respect to such suits or actions. The Parties may agree to nonbinding mediation of any dispute prior to the bringing of such suit or action.

## 10.5 Extent of Agreement

10.5.1 This Agreement, together with the RFQ and attachments distributed by the County and the Consultant's submitted response to the RFQ, all of which constitute the Contract Documents, represents the entire and integrated agreement between the County and the Consultant and supersedes all prior negotiations, representations or agreements, either written or oral. In the event of a conflict among the terms of the Contract Documents, the priority of documents shall be this Agreement, the County's RFQ, attachments to the County's RFQ, and the Consultant's response to the RFQ. This Agreement may be amended only by written instrument signed by both parties. Modifications may be evidenced by facsimile signatures.

## 10.6 Severability

10.6.1 If any provision of this Agreement is held as a matter of law to be unenforceable, the remainder of this Agreement shall be valid and binding upon the Parties.

10.7 Ownership of Deliverables

10.7.1 All Deliverables, together with all supporting materials, source documentation, data collected, field notes, and working drafts, developed in the performance of this Agreement shall become the property of the County and may be used on any other project without additional compensation to the Consultant. The use of the Deliverables by the County or by any person or entity for any purpose other than the Project as set forth in this Agreement shall be at the full risk of the County.

10.8 Non-Appropriation

10.8.1 Consultant acknowledges that County is a governmental entity, and the validity of this Agreement is based upon the availability of public funding under the authority of its statutory mandate.

In the event that public funds are unavailable and not appropriated for the performance of County's obligations under this Agreement, then this Agreement shall automatically expire without penalty to County immediately upon written notice to Consultant of the unavailability and non-appropriation of public funds. It is expressly agreed that County shall not activate this non-appropriation provision for its convenience or to circumvent the requirements of this Agreement, but only as an emergency fiscal measure during a substantial fiscal crisis.

In the event of a change in the County's statutory authority, mandate and/or mandated functions, by state and/or federal legislative or regulatory action, which adversely affects County's authority to continue its obligations under this Agreement, then this Agreement shall automatically terminate without penalty to County upon written notice to Consultant of such limitation or change in County's legal authority.

10.9 Notices and Signatures

10.9.1 This Agreement together with any amendments or modifications may be executed electronically. All electronic signatures affixed hereto evidence the intent of the Parties to comply with Article 11A and Article 40 of North Carolina General Statute Chapter 66.

10.9.2 Any notice required by this Agreement shall be in writing and delivered by certified or registered mail, return receipt requested to the following:

Orange County  
Attention:  
P.O. Box 8181  
Hillsborough, NC 27278

Consultant's Name & Address

[SIGNATURE PAGE TO FOLLOW]

**IN WITNESS WHEREOF**, the Parties, by and through their authorized agents, have hereunder set their hands and seal, all as of the day and year first above written.

**ORANGE COUNTY:**

**PROVIDER:**

By: \_\_\_\_\_

By: \_\_\_\_\_

Orange County

*Printed Name and Title*



Orange County  
Financial Services Department  
**ADDENDUM #2**  
**February 12, 2016**

RFQ 5217
Countywide Radio Communications Interoperability And Systems Engineering Services

To all Vendors:

Modifications to bid documents for the above-named Request for Proposal are made as follows and shall be included in the proposed amount.

The due date has been extended to March 1, 2016 at 5:00 pm. We anticipate issuing at least one additional addendum to address questions received

All other terms and conditions shall remain the same

By: David E. Cannell, Purchasing Agent; [dcannell@co.orange.nc.us](mailto:dcannell@co.orange.nc.us) / (919) 245-2651

**Acknowledgement of receipt of this addendum shall be included with your submittal**

Company Name: Black & Veatch

By: 

Date Received: 02/24/2016

P.O. Box 8181 200 South Cameron Street Hillsborough, North Carolina 27278  
Telephones: Area Code 919-245-2651 Fax: 919-636-4913



Orange County  
Financial Services Department  
**ADDENDUM #3**  
**February 23, 2016**

RFQ 5217
Countywide Radio Communications Interoperability And Systems Engineering Services

To all Vendors:

Modifications to bid documents for the above-named Request for Proposal are made as follows and shall be included in the proposed amount.

Questions received with County's responses are on pages 2-4 of this document

All other terms and conditions shall remain the same

By: David E. Cannell, Purchasing Agent; [dcannell@co.orange.nc.us](mailto:dcannell@co.orange.nc.us) / (919) 245-2651

**Acknowledgement of receipt of this addendum shall be included with your submittal**

Company Name: Black & Veatch

By: 

Date Received: 02/24/2016

P.O. Box 8181 200 South Cameron Street Hillsborough, North Carolina 27278  
Telephones: Area Code 919-245-2651 Fax: 919-636-4913

## 1.0 General Information

### 1. B Scope of the Project

#### B.1.3 Background

**RFP Statement:** The Orange County Emergency Communications Center currently dispatches law enforcement, fire, EMS and all County and local municipality users.

**Question:** Will you provide a list of all county and local municipality users dispatched by the Emergency Communications Center?

**Current VIPER System users:**

Law Enforcement – Orange County Sheriffs Dept, Chapel Hill Police, Carrboro Police, Hillsborough Police

EMS – Orange County EMS, South Orange Rescue Squad

Fire Departments – Municipal – Chapel Hill Fire, Carrboro Fire, Hillsborough Fire

Volunteer/Mixed – Efland Fire, Eno Fire, New Hope Fire, Orange Grove Fire, Cedar Grove Fire, Caldwell Fire, White Cross Fire, Mebane Fire, North Chatham Fire

**Additions with this system:**

Orange County Animal Control, Orange County Solid Waste, Orange County Transit, Orange County Asset Management

all Town of Chapel Hill, Town of Carrboro, Town of Hillsborough departments and OWASA (a private water system within the county.)

**Question:** Are there other dispatch centers including back-up dispatch centers to be included in the Scope of Work for this project? If there are other dispatch centers, will they be included in this project and will the County considering a detailed dispatch center consolidation assessment plan as part of this project?

UNC Public Safety dispatch is within our jurisdiction that handles law enforcement, security, parking for UNC Chapel Hill. We are currently working out back up plan with Alamance County.

**RFP Statement:** In addition to the VIPER and County VHF Paging systems, there are numerous other radio systems in operation within the County that are in various stages of decay. Solid Waste, Orange County Transportation and local governments to include Towns of Carrboro, Chapel Hill, and Hillsborough operating their own, distinct radio systems for various systems such as Public Work, Transit, Schools, etc. The Orange Water and Sewer Authority (OWASA) also operates a distinct radio system.

**Question:** Are there any other radio or other systems not included in this list that will be included in the project to include SCADA, mobile data, automatic vehicle location, records management, CAD, etc. that exists today that will be required in the systems assessment and recommendations for upgrade or inclusion in assessment report? All mobile data at this time is handled by consumer LTE. The county has started a broadband initiative, so LTE integration may be welcomed.

**Question:** How many agencies or entities will the consultant be interviewing during the needs assessment phase? There is a radio system workgroup that would be the majority of the interviews, but interviews with all partner agencies may be warranted.

**RFP Statement:** While the County has conducted numerous studies of radio communications, none of these studies has been definitive. None of these studies have provided enough information to provide a clear direction for the policy makers and decision makers in the County to identify a solution to the problem.

**Question:** Will all of studies be provided to the firm chosen for this project and will these studies be in electronic or paper format for internal distribution to the project team? Is there an Orange County Tactical Interoperable Communications Plan and/or a Regional Tactical Interoperable Communications Plan available for review by the firm chosen?

## 5.0 Scope of Work

### 5. A Introduction and Definitions

#### Bullet 2:

**RFP Statement:** 2. Communications infrastructure backbone (microwave, fiber, or other)

**Question:** Does the County own any infrastructure backbone (microwave, fiber, or other) or are all systems operating on the VIPER microwave infrastructure? The County does own legacy vhf/uhf system, but as part of this needs assessment that needs to be built out. Most of current infrastructure does belong to VIPER.

**Bullet 3:**

**RFP Statement:** 3. New and/or upgrades to existing towers, supporting buildings, and backup power.

**Question:** It is understood that the Authority (OWASA) also operates a distinct radio system. Does this system operate on VIPER towers, on Authority owned towers, County owned towers, or do they have equipment co-located on towers owned and operated by other entities?

**Question:** Are there any Authority SCADA requirements that need to be addressed during this effort? **This would be based on the needs of services, such as OWASA, in using radio to control valve openings, etc. and would need to be incorporated in the interview process.**

**Question:** How many towers are included in this project that are not owned and maintained by the County other than the VIPER towers? **The 5 current VIPER towers are not owned by the County, plus based on needs assessment there is funding per year for up to three more towers based on previous coverage maps.**

**Bullet 5:**

**RFP Statement:** Voice paging infrastructure

**Question:** Does the current voice paging system have antenna sites independent of the VIPER towers and if so are they located on towers owned by the County? **No, they are on the same towers.**

**Question:** How many sites are used to transmit the voice paging system? **2 which are not providing proper coverage.** |

**Bullet 6:**

**RFP Statement:** Fire and EMS station alerting infrastructure

**Question:** Do all entities and Fire/EMS departments utilize the same station alerting infrastructure and if not, how many are included in this project? **The only current station alerting in place station radios with tones. We would like to look at what "basic" infrastructure would be needed to get all EMS/Fire departments on the same station alerting infrastructure.**

**Question:** Is the Fire and EMS alerting infrastructure defined at the station location as the receiver only or will the County require the report to include the building functions (bells, lights, door operations, gas shut-offs, etc.) as part of the infrastructure? **The County, Fire depts., and EMS are currently looking at Station Alerting solutions, but can be included.**

**5.0 Scope of Work**

**5. B Study Expectations**

**Question:** **In several instances, the RFP mentions agencies and user entities whose input will be required during the needs assessment phase. To assist our understanding of the level of effort, can a quantity of agencies /entities, or a list, be supplied? See Above.**

**Section 3.a**

**RFP Statement:** Frequency range (low band, high band, UHF, 700, 800) and analysis of spectrum availability within each frequency range.

**Question:** Are frequency searches expected or required for the analysis of spectrum availability within each of the listed frequency bands? **Yes – but more interested in your providing what frequencies are available for licensing within the recommended frequency range.**

**Section 3.h.ii**

**RFP Statement:** Interoperability with adjoining County Emergency Service entities (for adjoining County units responding into Orange County, and for Orange County units responding into adjacent Counties).

**Question:** Which adjoining counties are included in the requirement of interoperability? **Durham, Alamance, Person, Chatham, Caswell, and State VIPER system**

**5.0 Scope of Work**

**5. C Work to be Performed**

**Bullet 9**

**RFP Statement:** Create and submit computer aided design (CAD) drawings as required.

**Question:** If computer aided drawing are necessary, may drawings be supplied via the Visio software drawing application? **Yes and should be exported as a PDF document.**

**5.0 Scope of Work**

**5. D Deliverables**

**Bullet 6:** A vendor-neutral RFP, including recommended tower requirements suitable to be released to the vendor community for the purposes of procuring the approved alternative.

**Question:** Does the County desire tower structural analysis reports, tower modification drawings, and greenfield tower requirements to be included in this effort? **Yes to all except need clarification of greenfield tower sites.**

1. **Question 4, Addendum 1** asks the County to identify their expected dates for the completion of the assessment and RFP. The answer to question 4 in Addendum 1 states:

*"The work defined by the RFP is budgeted in this fiscal year's budget. As stated in the RFP we want respondents to propose a timeline based on the County's budget (CIP) process."*

The link provided in the addendum states *"the first year of the CIP's budget is adopted in June, in conjunction with the operating budget"*

a. Does Orange County require that the consultant complete all needs assessment, alternatives analysis and budgetary estimation tasks for inclusion in the CIP process in May-June 2016? **No, however the cip is for long range budgeting, so any information within those time constraints would be helpful**

2. **RFP B.1.3—Background** states the following:

*"In addition to the VIPER and County VHF Paging systems, there are numerous other radio systems in operation within the County that are in various stages of decay. Solid Waste and Orange County Transportation and local governments, including the Towns of Carrboro, Chapel Hill, and Hillsborough operate their own, distinct radio systems for various services such as Public Works, Transit, Schools, etc. The Orange Water and Sewer Authority (OWASA) also operate a distinct radio system."*

a. Will the County provide a list of the agencies that will need to be interviewed as part of the Needs Analysis phase of the project? **See above**

b. Will the County identify which if any of the other "numerous radio systems" will also need to be assessed as part of this project? **See above, question asked prior.**



Orange County  
Financial Services Department  
**ADDENDUM #4**  
**February 24, 2016**

RFQ 5217
Countywide Radio Communications Interoperability And Systems Engineering Services

To all Vendors:

Modifications to bid documents for the above-named Request for Proposal are made as follows and shall be included in the proposed amount.

Questions received with County's responses are on page 2 of this document

All other terms and conditions shall remain the same

By: David E. Cannell, Purchasing Agent; [dcannell@co.orange.nc.us](mailto:dcannell@co.orange.nc.us) / (919) 245-2651

**Acknowledgement of receipt of this addendum shall be included with your submittal**

Company Name: \_\_\_\_\_

By: \_\_\_\_\_  


Date Received: \_\_\_\_\_  
02/24/2016

P.O. Box 8181 200 South Cameron Street Hillsborough, North Carolina 27278  
Telephones: Area Code 919-245-2651 Fax: 919-636-4913

"Bullet 6: A vendor-neutral RFP, including recommended tower requirements suitable to be released to the vendor community for the purposes of procuring the approved alternative.

Question: Does the County desire tower structural analysis reports, tower modification drawings, and greenfield tower requirements to be included in this effort? Yes to all except need clarification of greenfield tower sites."

To be clear the County will expect the selected Consultant to complete structural analysis of existing towers that may be used in the proposed design? Any new tower construction would not require a structural analysis as it would be built know the loads and future load requirements. **Structural analysis of existing tower data is available through the Federal Engineering Study from 2013; however, that study is based on the existing VIPER and Legacy systems. Additional tower sites were recommended, again, based on the existing radio system.**

"RFP Statement: Interoperability with adjoining County Emergency Service entities (for adjoining County units responding into Orange County, and for Orange County units responding into adjacent Counties).

Question: Which adjoining counties are included in the requirement of interoperability? Durham, Alamance, Person, Chatham, Caswell, and State VIPER system."

Is it anticipated that the selected Consultant will conduct interviews with each of the listed agencies? **There is a radio committee with members representing each discipline (including county and municipalities). We would be more than willing to set up interviews with any agency you request.**

Or will the selected Consultant be able to gather the required information from Orange County personnel with respect to the requirements of interoperability with these agencies? **See above.**

Section 6 Cost Proposal requires that pricing be submitted in a separate sealed envelope. Section 2.E. Proposal Organization and Format calls for the Cost Summary page to be included in the technical response. Should we include it there or just in the separate sealed Cost Proposal? Please clarify where we should include our cost proposal. **Per the RRP**

**Two (2) copies of the cost proposal should be submitted in a separate envelope with the written proposal. The proposal will be scored using a standard quantitative calculation where the most cost criteria points will be awarded to the proposal with the lowest cost.**

**We want any cost information to be included in a separate envelope, and included with the submittal that is turned in. We want to distribute technical responses for evaluation with cost information**