

**Federal
Engineering®**

Federal Engineering, Inc.

10600 Arrowhead Drive
Fairfax, VA 22030
703-359-8200

BASIC SERVICE AGREEMENT

AGREEMENT made this 19 day of March 2019 by and between Federal Engineering, Inc., a Maryland corporation, having offices at 10600 Arrowhead Drive, Suite 160, Fairfax, Virginia 22030, (hereinafter called "**FE**") and the County of Rowan, NC having offices at 130 W Innes St, Salisbury, NC 28144 (hereinafter called the "**Client**").

The period of performance of this Agreement, for the purpose of issuing task orders hereunder, is from March 2019 to March 2022. This agreement may be extended by mutual agreement by both parties, in writing.

Subject to the provisions herein, **FE** shall in accordance with task orders issued hereunder, perform tasks in the general area of telecommunications, information technology, and management consulting services.

1. **STATEMENT OF WORK:** **FE** will complete the initial work as described in its proposal for *Radio Communications Consulting* dated November 14, 2018 in response to the Client's *Request for Proposal for Radio Communications Consulting*, which is attached and made part of this agreement.

The **Client** may, from time to time, issue additional written Task Orders under this agreement which will specify: (a) the statement of work to be performed; (b) security requirements, if any; (c) ceiling price or amount of the order including all charges and travel authorizations, if any; and (d) any other applicable instructions. Said Task Orders will incorporate this agreement by reference. Where a conflict exists between the terms of any Task Order and the terms of this Agreement the terms of this Agreement shall control.

2. **CLIENT OBLIGATIONS:** Nothing herein shall be construed as an obligation of the **Client** to issue any additional tasks hereunder and the limit of the **Client's** duties shall extend only to the initial work and such additional task orders as it may issue. Additional task Orders, when issued, are subject to review and acceptance by **FE**, which shall accept by signing in the space so provided and returning a copy of the Task Order.

3. **COMPENSATION:** **FE** will be compensated in accordance with the terms and conditions as described in its proposal *Radio Communications Consulting* dated November 14, 2018 in response to the *Client's Request for Proposal for Radio Communications Consulting*.

For any additional fixed price Task Orders, **FE** will submit invoices in accordance with the agreed upon milestone schedule showing the tasks that have been completed. For any additional time and materials Task Orders, **FE** will submit invoices in accordance with the rates and terms indicated in Schedules A of its proposal. Unless stated otherwise in any Task Order, payment of all invoices shall be due within thirty (30) days of the invoice date. Late balances are subject to a finance charge of 1.5 percent per month or fraction thereof. Any and all taxes, except income taxes, imposed or

assessed by reason of this Agreement or its performance, including but not limited to sales or use taxes, will be in addition to the invoiced amounts and shall be paid by the Client.

4. **INDEPENDENT CONTRACTOR:** *FE* shall be deemed at all times to be an independent Contractor. Neither *FE* nor its personnel shall at any time, or for any purpose be considered employees or agents of the **Client**. **Client** is hereby contracting with *FE* for the services described in the Task Order and *FE* is not required to perform the services during a fixed hourly or daily time and if the services are performed at the **Client's** premises, then *FE's* time spent at the premises is to be at the discretion of *FE*; subject to the **Client's** normal business hours and security requirements. *FE* hereby confirms to the **Client** that the **Client** will not be required to furnish or provide any training to *FE* to enable *FE* to perform the services required hereunder. The services shall be performed by *FE* and the **Client** shall not be required to hire, supervise or pay any assistants to help *FE* perform the services under this Agreement. The management of the work, including but not limited to the order or sequence in which it is performed, shall be under the control of *FE* subject to compliance with the task order. Except to the extent that *FE's* work must be performed on or with **Client's** computer or **Client's** software, all materials used in providing the services shall be provided by *FE*. *FE* shall provide any insurance coverage that is required in the normal course of business as well as any specialized insurance that is specifically called for in this agreement. The **Client** understands and agrees that as an independent contractor, *FE* does not have any authority to sign contracts, notes, or obligations to make purchases, or to acquire or dispose of any property for or on the behalf of the **Client**.

5. **WARRANTY:** *FE* hereby warrants to the **Client** that the firm is not under any obligation, contract, or agreement, nor has the firm previously executed any documents whatsoever, with any person, firm, association, or corporation that would, in any manner, prevent *FE* from giving, and the **Client** from receiving, the full benefit of the firm's consulting services. *FE* makes no other warranties, whether written, oral or implied, including without limitation warranty of fitness for purpose or merchantability. In no event shall *FE* be liable for special or consequential damages, either in contract or tort, whether or not the possibility of such damages has been disclosed to *FE* in advance or could have been reasonably foreseen by *FE*, and in the event this limitation of damages is held unenforceable, then the parties agree that by reason of the difficulty in foreseeing possible damages, all liability to **Client** shall be limited to One Hundred dollars (\$100.00) as liquidated damages and not as a penalty.

6. **PROPRIETARY INFORMATION:** *FE* hereby agrees that at all times both during the term of this Agreement and three (3) years after termination thereof, *FE* will hold inviolate and keep secret all knowledge, information, data, trade secrets, inventions, and customer lists that have been clearly marked "PROPRIETARY" by the **Client**. *FE* under the terms of this agreement will not disclose such information to any competitor, or other individual, corporation, or firm except when authorized to do so by the **Client**, in writing. Nothing herein shall be construed as to preclude *FE* in engaging in any occupation or endeavor which will not directly or indirectly involve the proprietary information of the **Client**.

FE's obligations with respect to handling and using proprietary information as set forth in this agreement are not applicable to: (1) Information that at the time of disclosure under this agreement is either known to *FE* or disclosed in existing literature

or patents or is in any other way in the public domain; (2) Information that after disclosure under this agreement becomes known to **FE** by independent discovery or by casual observation or analysis of information provided by a third party; (3) Information that after disclosure under this agreement becomes known to **FE** from a source other than the **Client** without breach of any obligation by the disclosing party; (4) Information that is or has been furnished by the disclosing party to the Government with "unlimited" rights, and (5) Information available in the public domain

7. **RELEASE OF INFORMATION:** **FE** shall not make any public release of information in any medium concerning this agreement without prior review and approval by the **Client**. Requests for review of any materials proposed for public release in any medium shall be submitted in writing to an authorized representative of the **Client** for approval, which shall not be unduly withheld.

8. **TERMINATION FOR CONVENIENCE:** This Agreement may be terminated by either party at any time, for any reason, by giving written notice of such termination to the other party. Should the **Client** terminate this agreement while work is in progress, **FE**, upon receipt of the notice shall stop all work as quickly as practical. The **Client** shall be responsible for all labor and expenses incurred by **FE** up until work actually terminates.

9. **ASSIGNMENT:** Neither party shall assign or transfer this Agreement without written consent of the other party.

10. **GOVERNING LAW:** This agreement shall be interpreted and the rights of the parties shall be determined under the laws of the State of North Carolina. The **Client** hereby agrees to pay all legal, court, and collection fees incurred by **FE** to collect any overdue invoices rendered to the **Client**. **FE** agrees that the venue for any and all disputes shall be in the courts of Rowan County, North Carolina.

11. **COMPLIANCE WITH APPLICABLE LAWS:** **FE** agrees to comply with all applicable laws, statutes, and orders of the United States Government and any State or political subdivisions thereof now in effect or hereafter enacted, and the same shall be deemed to be incorporated by reference. **FE** shall be held harmless by the **Client** for violation of any governmental procurement regulation to which it may be subject but to which specific written reference is not made in this agreement.

12. **SET OFF:** The **Client** agrees that **FE** shall have the right to set off, against any amounts which may become due and payable to the **Client**, any amount which the **Client** may owe to **FE**, whether arising under this Agreement or otherwise.

13. **NON-SOLICITATION:** **Client** hereby agrees that for the term of this Agreement, and for a period of one (1) year thereafter, that the **Client** shall not directly or indirectly, orally, in writing, or by other method of communication, solicit any employee, agent, or consultant of **FE**, nor encourage any employee, agent, or consultant to terminate his or her employment or relationship with **FE**. **Client** further agrees that for the term of this Agreement, and for a period of one (1) year thereafter, should the **Client** hire any employee, agent, or consultant of **FE**, that **FE** is entitled to a finder's fee equal to seventy percent (70%) of the employee, agent, or consultant's first year total compensation package.

14. **WAIVER:** The failure of **FE** to insist on strict performance of any of the terms and conditions hereof shall not constitute a waiver of any other provisions.
15. **FORCE MAJEURE:** Neither party shall be responsible for failure to fulfill its obligations due to causes beyond its reasonable control, including without limitation, acts or omissions of government or military authority, acts of God, materials shortages, transportation delays, fires, floods, labor disturbances, riots, wars, terrorist acts or any other causes, directly or indirectly beyond the reasonable control of the non-performing party, so long as such party is using its best efforts to remedy such failure or delays.
16. **ATTORNEYS FEES:** If either **Party** should breach any term, condition or obligation created by this Agreement, then the other **Party** shall be entitled to be reimbursed for all of its reasonable attorneys' fees, court costs, litigation fees, transcript costs, deposition costs, and other related litigation and non-litigation costs incurred by the other **Party**.
18. **CONSTRUCTION:** Paragraph numbers and headings are for convenience only and shall not affect the interpretation of this agreement. If any term or condition of this Agreement is in conflict with local, state, or federal law and becomes null and void, the remainder of the Agreement shall survive and remain in effect. If the scope of any of the provisions of the Agreement is too broad in any respect whatsoever to permit enforcement to its full extent, then such provisions shall be enforced to the maximum extent permitted by law, and the parties hereto consent and agree that such scope may be judicially modified accordingly and that the whole of such provisions of this agreement shall not thereby fail, but that the scope of such provisions shall be curtailed only to the extent necessary to conform to law. This Agreement shall be construed as having been negotiated between the parties and not drafted by a particular party.
19. **ENTIRE AGREEMENT:** This Agreement supersedes all previous agreements both oral and in writing and contains all the terms and conditions of this transaction. All modifications to this agreement must be reduced to writing as amendments and duly executed by both parties hereto.
20. **EFFECTIVE DATE:** This Agreement shall become effective when executed by both parties and shall be binding upon the parties hereto, their successors and permitted assigns.

FEDERAL ENGINEERING, INC.

County of Rowan, North Carolina

By: Ronald F. Bosco
Signature

By: Aaron Church
Signature

Ronald F. Bosco

Print Name

AARON Church

Print Name

President and CEO

Title

COUNTY MANAGER

Title

March 13, 2019

Date

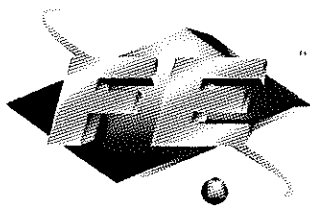
MARCH, 19, 2019

Date

THIS INSTRUMENT HAS BEEN PREAUDITED IN THE
MANNER REQUIRED BY THE LOCAL GOVERNMENT
BUDGET AND FISCAL CONTROL ACT.

Leslie E. Hershick
FINANCE DIRECTOR

ATTACHMENT A
Federal Engineering Proposal and
Best and Final Offer for
Radio Communications Consulting



"Unleashing the Power of Technology"

**Federal
Engineering®**

Federal Engineering, Inc.

10600 Arrowhead Drive

Fairfax, VA 22030

703-359-8200

March 13, 2019

Mr. Aaron Church – County Manager
Rowan County, NC
130 West Innes Street
Salisbury, North Carolina 28144

Reference: Federal Engineering, Inc. proposal to Rowan County, North Carolina dated
November 14, 2018

Dear Mr. Church:

Federal Engineering, Inc. (**FE**) is pleased to submit this Best and Final Offer. The above
referenced proposal is modified as follows:

Page 1 – Cost Proposal Firm Fixed Price

Paragraph 1, first sentence is modified to read as follows:

The total firm fixed price, including labor, travel, and other direct costs, for the
Rowan County Radio Communications Consulting project is ~~\$149,341~~ \$144,341.

Page 1 – Cost Proposal Price Breakdown per Phase

Exhibit 1 - Cost Breakdown by Task is modified as follows:

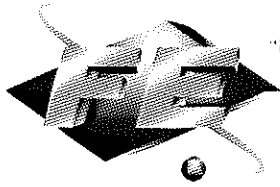
Tasks	Description	Cost
Phase I	Needs Assessment and Recommendations	\$78,272
Phase II	RFP Procurement System Upgrade	\$46,143
Phase III	Project Management and Implementation Support Services	\$24,926 \$19,926
	Total	\$149,341 \$144,341

The remainder of the proposal remains unchanged in full effect.

Sincerely,

Ronald F. Bosco

Ronald F. Bosco
President and CEO
rbosco@fedeng.com



"Unleashing the Power of Technology"

**Federal
Engineering®**

Federal Engineering, Inc.

10600 Arrowhead Drive
Fairfax, VA 22030
703-359-8200

November 14, 2018

Rowan County Finance Department
Attention: David Sifford, Purchasing Agent
130 West Innes Street
Salisbury, NC 28144

Dear Mr. Sifford:

Federal Engineering, Inc. (FE) is pleased to submit this proposal to Rowan County, North Carolina to serve as radio communications consultant on behalf of the County. The attached proposal details the tasks required for the successful completion of the project as defined in your RFP for Consulting Services for Public Safety Radio Communications and clarified in Addendum 1 dated November 2, 2018.

As required by the RFP, the adjacent text box contains our corporate name address, telephone number and contact information for our President/CEO, Ronald F. Bosco, who will be your contact should you need additional information regarding our proposal.

FE certifies our vendor independence. Unlike some consulting firms, we are not affiliated with any suppliers of public safety communications equipment or software, nor do we provide any services to them. We are not now, nor have we ever been, in the business of selling or leasing telecommunications equipment or services.

We are willing and able to provide the services necessary to successfully support the County in all elements of the anticipated systems upgrade. We have been in the business of public safety telecommunications consulting for over 35 years, and the qualifications of our team far exceed the minimum qualifications to successfully complete this project.

FE specializes in the planning, assessment, needs analysis, conceptual design, specification, and RFP development to upgrade standards-based P25 digital systems in all frequency bands. We are experts in the design and implementation of ancillary systems such as computer aided dispatch (CAD), records management systems (RMS), paging and alerting. We have extensive experience in providing services related to vendor evaluation, contract negotiations, system implementation, and testing oversight.

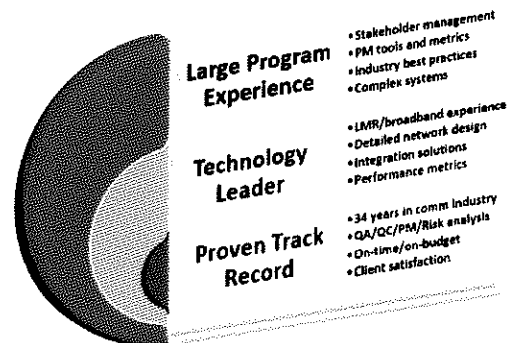
FE will engage County stakeholders and first responders and facilitate consensus through a collaborative process. Every project is unique. We develop customized tools, solutions, and deliverables based on your needs, while drawing upon our experience encompassing thousands of radio system upgrades, including

FULL NAME & ADDRESS OF FIRM

**Federal Engineering, Inc.
10600 Arrowhead Drive
Fairfax, VA 22030**

PROPOSAL CONTACT

**Ronald F. Bosco, President/CEO
Address/Phone: same as above
rbosco@fedeng.com**



numerous P25 projects. We have assembled the best in-house team of consultants for your project, who have direct, hands-on experience planning, designing, and implementing multiple recent public safety radio projects in North Carolina.

FE's proposal is complete and compliant with the requirements in the RFP and describes, in detail, how we will accomplish the required tasks. *FE* possesses the permits, licenses, and professional credentials required to perform consulting services as specified in the RFP.

Our senior management team is actively involved in all projects, providing both technical and operational guidance and executive management of the team and our high-quality deliverables. As the founder of *FE*, I will be your contact regarding this proposal and will participate in the negotiation of contractual issues. By my signature below, I hereby authorize submission of this proposal and bind Federal Engineering, Inc. to the terms and conditions of this proposal for a period of 90 days, beginning on the due date for proposals.

My team and I look forward to working with Rowan County on this project.

Sincerely,

A handwritten signature in black ink that reads "Ronald F. Bosco". The signature is written in a cursive, flowing style.

Ronald F. Bosco
President and Chief Executive Officer
Federal Engineering, Inc.



Rowan County, North Carolina

Radio Communications Consulting

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1 OVERVIEW OF THE FIRM

1.1 FE Corporate Profile

Our company began 35 years ago and has a rich history of providing system analysis and design for public safety communications technology; this is our only business. Our founder, Ronald F. Bosco, a former first responder and degreed engineer, continues to lead the firm and has kept his vision steady to improve the functionality and cost-effectiveness of public safety communications. This consistency in ownership translates into consistency in performance as evidenced by the fact that our earliest government clients remain clients today, over a quarter of a century later.



FE's philosophy to "exceed client expectations to retain that client for life" has resulted in client retention and repeat business since the firm's inception.

Federal Engineering provides consulting services for the full life cycle of public safety radio system and 9-1-1 system projects, as highlighted below.

<i>Federal Engineering Consulting Services</i>	
• LMR technologies and systems	• Strategic planning
• Total communications network design	• Needs assessment and analysis
• Trunked, simulcast, and conventional LMR	• Coverage and capacity analyses
• Spectrum planning and licensing	• Broadband/LTE
• P25 technology	• Interoperability analyses
• PSAP design, site planning and selection	• RFP development and specifications
• PSAP regionalization / efficiency studies	• Procurement support
• Next Generation 9-1-1 and E9-1-1	• Program management
• Governance and policy analysis	• Implementation management
• Data management services	• Independent validation/verification
• Cyber security	• Transition planning
• CAD/RMS	• FCC license applications



Exhibit 1 shows our corporate organization.

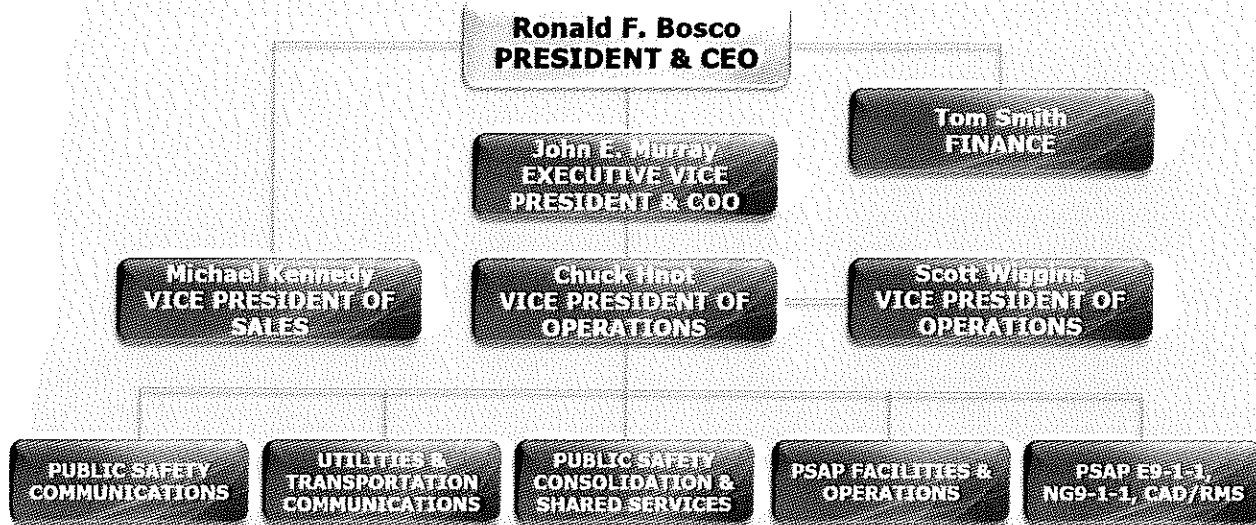


Exhibit 1—Federal Engineering's Corporate Structure

FE's corporate capabilities align with public safety voice and data radio system planning, design, and deployment.

Our team has extensive experience in the State of North Carolina and the southeast United States on projects with requirements similar to the County's. A sampling of our work in the region includes the following clients:

Buncombe County, NC	State of South Carolina	Town of Jupiter, FL
Lenoir-Jones Counties, NC	Gwinnett County, GA	City of Lakeland, FL
New Hanover County, NC	Henry County, GA	Lee County, FL
State of North Carolina NG911 Planning	Camden County, GA	Manatee County, FL
Orange County, NC	Alachua County, FL	City of Miami, FL
Pitt County, NC	Collier County, FL	Okeechobee County, FL
Charleston County, SC	City of Gainesville, FL	Palm Beach County, FL
Lancaster County, SC	Gainesville (FL) Regional Utilities	

Federal Engineering meets the requirements of the RFP, as documented throughout each section of our proposal.

FE's corporate headquarters in northern Virginia is strategically located in the *communications capital of the United States*, minutes from the nation's capital. This facility supports our technical and professional personnel with a wealth of library materials, automated design tools, and dedicated staff. Our close proximity to the Federal Communications Commission (FCC), Federal Emergency Management Agency (FEMA), Department of Homeland Security (DHS), and other key federal government agencies has proven invaluable to our clients.



In addition to our headquarters in Virginia, we also have regional offices in Florida, Arizona, Minnesota, Pennsylvania, and New York. **FE** has a distributed workforce with consultants located in over 15 states, providing efficient response to our clients. To best support Rowan County, we have assigned staff based in the southeastern United States to your project: Florida-based project director and lead technical consultant, project manager in Tennessee, and RF coverage expert in Virginia.

1.2 Delivering the Lowest Cost Solution

Typical public safety mobile radio projects have three phases: analysis and recommendations, procurement, and implementation. The first phase is the lowest cost involving thousands of dollars in consulting fees while the last phase is by far the highest involving millions of dollars in equipment costs. The County can realize significant savings during the implementation phase by engaging the right consulting firm at the start.

Federal Engineering is that consulting firm. We have saved our clients millions of dollars while delivering solutions that meet or exceed their needs. Because we have been involved in billions of dollars in systems procurements, we have developed unmatched skills, methodologies, and databases that consistently yield satisfactory results.

FE starts with a proven RFP that encourages competition and motivates equipment vendors to "sharpen their pencils". Our subject matter experts review the vendors' proposed designs to determine if they will meet your stated requirements without the need for post-cutover enhancements. Our **FECostPro™** tool provides a database of historical equipment pricing so we can determine if the vendor is bidding an appropriate amount for a specific piece of equipment. We provide experienced negotiators that know where to look in the vendor proposals for hidden services and equipment costs that can be eliminated. We will work with the County to finalize a contract that contains the specifications developed by **FE** during the RFP process that tightly defines system performance thereby minimizing the vendor's ability to "up scope" the project. The result of **FE's** process typically is significant savings to our clients.

The balance of this page intentionally left blank.



2 QUALIFICATIONS AND REFERENCES

Federal Engineering is the nation's leading specialist in industry and government land mobile radio voice and broadband consulting. Our consultants have assisted and guided hundreds of clients across the nation with identifying needs, making recommendations, developing specifications and RFPs, and implementing systems to improve communications; the combined costs of which reach into the billions of dollars.

2.1 Experience Managing All Project Phases

Many of our clients have been migrating from legacy systems from various vendors to standards-based P25 Phase 1 and Phase 2 systems. The table below highlights our extensive conventional system and P25 expertise. It shows recent experience working on projects that involved: 1) comprehensive public safety radio communications assessments, 2) conceptual design of P25 700/800 MHz trunked radio systems, and 3) management of all project phases, from RFP to final system acceptance of a P25 trunked radio system for public safety.

Federal Engineering Project Management Experience									
Client Name	Public Safety Radio Communications Assessment	Needs Assessment/ Requirements	Strategic Upgrade Plans	Conceptual Design	Conceptual Design of P25 Design 700/800 MHz trunked systems	RFP / Specification	Procurement	Implementation and Final Acceptance	P25 Implementation
Arkansas									
City of Hot Springs	✓		✓			✓	✓	✓	
Arizona									
Arizona Public Service Company	✓	✓			✓	✓	✓		✓
State of Arizona	✓	✓			✓	✓	✓		✓
Town of Florence	✓	✓			✓				✓
City of Mesa	✓	✓		✓		✓	✓		
City of Mesa Utilities	✓	✓				✓	✓	✓	
Pinal County	✓	✓			✓				✓
Salt River Pima Maricopa Indian Community	✓	✓		✓					
California									
Bay Area Regional Interoperable Communications System	✓	✓		✓	✓	✓			
Contra Costa County	✓	✓							
Los Angeles Department of Water and Power	✓	✓	✓			✓			
Los Angeles Regional Interoperable Communications System						✓	✓	✓	
Marin County	✓	✓	✓			✓	✓	✓	
City of San Diego	✓	✓	✓						
San Diego and Imperial Counties	✓	✓			✓	✓	✓		✓
City and County of San Francisco	✓	✓			✓	✓	✓		✓



Federal Engineering Project Management Experience									
Client Name	Public Safety Radio Communications Assessment	Needs Assessment/ Requirements	Strategic Upgrade Plans	Conceptual Design	Conceptual Design of P25 Design 700/800 MHz trunked systems	RFP / Specification	Procurement	Implementation and Final Acceptance	P25 Implementation
Canada									
Calgary Transit	✓	✓		✓		✓	✓		
Edmonton, Alberta Fire Rescue	✓	✓	✓						
Edmonton, Alberta Police	✓	✓	✓						
E-Comm, Vancouver, British Columbia				✓			✓		
Colorado									
Routt County				✓					
State of Colorado DTR	✓	✓	✓						
State of Colorado Microwave	✓	✓				✓			
Florida									
Collier County	✓	✓				✓	✓	✓	
Gainesville Regional Utilities	✓	✓			✓	✓	✓		
City of Lakeland	✓	✓			✓	✓	✓		✓
Nassau County							✓	✓	
Georgia									
Camden County	✓	✓				✓	✓	✓	
Henry County	✓	✓		✓		✓	✓	✓	
LaGrange County	✓	✓							
Iowa									
City of Davenport	✓	✓					✓		
Iowa State Police	✓	✓			✓	✓	✓		✓
State of Iowa Department of Corrections	✓	✓		✓		✓			
Mills County	✓	✓							
Kentucky									
Boone County	✓	✓			✓				✓
Bowling Green Municipal Utilities	✓	✓			✓	✓	✓		✓
Bowling Green-Warren County	✓	✓			✓	✓	✓		✓
City and County of Henderson	✓	✓				✓	✓	✓	
Maryland									
State of Maryland								✓	
Minnesota									
Mayo Clinic				✓			✓	✓	
State of Minnesota	✓	✓	✓		✓				
Montana									
State of Montana			✓		✓				
Montana 15-90 Interoperable Communications Consortium	✓	✓							



Rowan County, North Carolina

Radio Communications Consulting

Federal Engineering Project Management Experience

Client Name	Public Safety Radio Communications Assessment	Needs Assessment/ Requirements	Strategic Upgrade Plans	Conceptual Design	Conceptual Design of P25 Design 700/800 MHz trunked systems	RFP / Specification	Procurement	Implementation and Final Acceptance	P25 Implementation
Montana Big Sky Consortium	✓	✓							
Nebraska									
State of Nebraska	✓	✓				✓			
Metropolitan Utilities District of Omaha, Nebraska	✓	✓	✓						
Nevada									
State of Nevada	✓	✓		✓		✓	✓	✓	
New Hampshire									
Twin State Mutual Aid Fire Association, New Hampshire	✓	✓		✓					
New Mexico									
State of New Mexico	✓	✓	✓						
City of Albuquerque	✓					✓	✓		
New York									
State of New York								✓	
Cortland County	✓	✓			✓	✓	✓		✓
Essex County	✓	✓				✓		✓	
Lewis County	✓	✓		✓					
New York City Transit / Metropolitan Transportation Authority					✓	✓	✓		
North Carolina									
Buncombe County	✓	✓			✓	✓	✓		✓
New Hanover County	✓	✓			✓	✓	✓		✓
Orange County	✓	✓	✓	✓					
Pitt County					✓	✓			
Yadkin County	✓	✓				✓	✓	✓	
North Dakota									
State of North Dakota	✓	✓	✓	✓		✓	✓		
Oregon									
State of Oregon	✓	✓			✓	✓	✓		✓
City of Portland	✓	✓		✓		✓	✓	✓	
Portland General Electric	✓	✓		✓		✓			
Tennessee									
Town of Collierville	✓	✓	✓			✓	✓	✓	
Cumberland County							✓	✓	
City of Nashville	✓	✓							
Texas									
City of El Paso	✓	✓			✓	✓	✓		✓
El Paso County	✓	✓			✓	✓			



Federal Engineering Project Management Experience									
Client Name	Public Safety Radio Communications Assessment	Needs Assessment/ Requirements	Strategic Upgrade Plans	Conceptual Design	Conceptual Design of P25 Design 700/800 MHz trunked systems	RFP / Specification	Procurement	Implementation and Final Acceptance	P25 Implementation
Virginia									
Caroline County	✓	✓			✓	✓			
City of Chesapeake	✓	✓		✓		✓	✓	✓	
Fauquier, Culpeper, and Rappahannock Counties	✓	✓		✓			✓	✓	
City of Hampton	✓	✓	✓		✓				✓
Hanover County	✓	✓		✓		✓		✓	
King and Queen County	✓	✓			✓	✓	✓		✓
Middlesex County	✓	✓					✓	✓	
New Kent County	✓	✓				✓	✓	✓	
City of Newport News	✓	✓			✓	✓	✓		✓
Hampton Roads Region, Virginia / Overlay Regional InterOperability Network (ORION)	✓	✓			✓	✓	✓		✓
Pittsylvania County	✓	✓			✓	✓	✓		✓
City of Portsmouth	✓	✓			✓	✓	✓		✓
Rockbridge County	✓	✓			✓	✓	✓		✓
Sussex County	✓	✓					✓	✓	
City of Virginia Beach	✓	✓	✓						
Washington									
Bonneville Power Administration	✓					✓	✓		
Pierce County	✓		✓						
City of Redmond	✓					✓	✓		
City of Seattle	✓							✓	
State of Washington	✓		✓						
Wisconsin									
Dane County	✓				✓	✓	✓		✓
Manitowoc County	✓				✓	✓			✓
State of Wisconsin	✓		✓	✓					
Wyoming									
State of Wyoming	✓								
Campbell County	✓								
City of Gillette	✓								

2.2 Knowledge of Public Safety Radio Systems

FE consultants have worked on practically every type of system and in hundreds of project and operational situations. As a result, we are familiar with and understand the complexity



that will be involved with upgrading the County's system to the desired service and performance levels. A sampling of our knowledge includes the following:

Land Mobile Radio Systems

- Trunked
- Simulcast
- Multicast
- Analog
- Digital

Frequency Bands

- Low band
- T-band
- VHF
- UHF
- 700/800 MHz
- 900 MHz
- 2.4, 4.9, 5.8 GHz
- Other licensed and unlicensed bands

Land Mobile Radio Technologies

- APCO TIA P25
- MPT1327
- TETRA
- DMR
- SCADA

Manufacturers' Systems and Equipment

- Harris (M/A-COM)
- Motorola
- Tait
- Airbus DS (Cassidian)
- EF Johnson
- Raytheon
- DataRadio
- Others

Broadband/Advanced Wireless Technologies

- LTE
- WiMAX
- WiFi
- Integrated voice and data

Backhaul Systems

- Microwave
- T-carrier
- Optical fiber

Leveraging Our Industry Reputation and Emerging Technologies

FE is a corporate affiliate of leading industry groups, and our consultants are heavily involved in the organizations below. This investment of time and energy by our staff in participating in current LMR trends enables us to stay abreast of and anticipate upcoming developments in radio system technologies and allows us to provide a voice for first responders in standards development.

- Association of Public-Safety Communications Officials (APCO)
- National Emergency Number Association (NENA)
- National Association of State Telecommunications Directors (NASTD)
- Project 25 Technology Interest Group (PTIG)
- P25 Phase 2 Industry Roundtables and Best Practices Workshops
- Radio Club of America (RCA)
- National Fire Protection Association (NFPA)
- Alliance for Telecommunication Industry Solutions-Emergency Service Interconnection Forum (ATIS-ESIF)
- Telecommunications Industry Association (TIA)
- Internet Engineering Task Force (IETF).
- National Public Safety Telecommunications Council (NPSTC)
- Federal Partnership for Interoperable Communications (FPIC)
- Institute of Electrical and Electronic Engineers (IEEE)

Our team is recognized by their peers; our consultants chair national technical committees and have had papers published by many professional organizations. Our consultants serve on the APCO Commercial Advisory Council and MissionCritical Communications magazine's editorial advisory board, and **FE's** chief consultant currently serves on the NG9-1-1 Institute Board of Directors.

We regularly present at APCO and NENA national and regional conferences, as well as the International Wireless Communications Expo (IWCE). **FE's** interactive coverage methodology



tool, **FECoverage™**, has set the industry standard and we have been invited by IWCE to deliver real-time workshops highlighting its effectiveness for the past four years.

Over the past two years our experts have participated in over 37 sessions at IWCE and APCO on P25, LMR and LTE, and other relevant topics.

2.3 Recent Relevant Experience in North Carolina



For **Buncombe County, North Carolina**, **FE** conducted a needs analysis, collecting, compiling, and analyzing key information obtained from county public safety wireless systems users. We also conducted an assessment of the county's existing infrastructure to determine if sites were suitable for continued use or if modifications were required for an upgraded system.

Estimated costs associated with improving the sites to meet the county's needs were provided. **FE** performed system propagation analysis to analyze outdoor and in-building coverage and modeled coverage in the VHF, UHF and 700 MHz frequency bands. We also developed a conceptual design for the system infrastructure, backhaul, and capacity meeting the county's requirements and developed the county's RFP for a digital trunked 800 MHz radio communications system.

Yadkin County, North Carolina selected **FE** to assist with the procurement process of acquiring a new public safety radio system to comply with FCC narrowbanding requirements. **FE** reviewed unsolicited system proposals the county had already received and recommended that the county issue an RFP. **FE** conducted an abbreviated needs assessment with baseline coverage study and developed an RFP. **FE** assisted the county with contract negotiations and implementation support, including tower structural analyses to verify the vendor's final design viability. This project was completed in 2016.



New Hanover County, North Carolina selected **FE** to conduct needs assessments and coverage analyses, and develop recommendations for a new, countywide public safety mobile radio network. **FE** generated an RFP based on the design and provided procurement assistance, proposal evaluations, and contract negotiation support. **FE** conducted program management and implementation support for the county's new 800 MHz, digital public safety

mobile radio network **FE** also provided program management and technical assistance for the county's 800 MHz rebanding. This project was completed in 2015.

Orange County, North Carolina selected **FE** to recommend a solution to resolve the county's public safety radio system coverage and capacity deficiencies. **FE** conducted a thorough user needs assessment with county fire, law enforcement, and EMS agencies to fill information gaps and gather requirements for the upgraded system. Our team explored the current portable, mobile, and in-building coverage and capacity issues in depth with county agency representatives during the needs assessment. **FE** then developed a set of high-level requirements for enhancements to the VIPER network to be used to provide an upgrade to a viable digital system for county agencies. **FE** performed coverage and capacity analyses to recommend a radio site constellation and set of

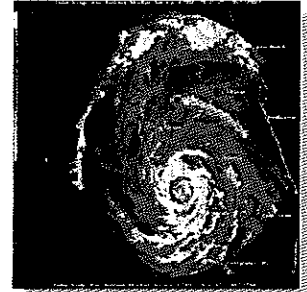


channels, determine required modifications to existing towers, specify equipment needs to upgrade to P25, consider the inclusion of a backup conventional subsystem that includes a station and unit paging system, and outline the tower type and construction for any new sites. This project was completed in 2013.

Understanding Public Safety Communications in Hurricane Environments

Although not as vulnerable as the State's coastal areas, Rowan County's location is still vulnerable to natural disasters such as hurricanes, high winds, and flooding.

Through experience gained on our multiple projects in North Carolina and other coastal states, we understand that radio communications systems must be built to higher standards of redundancy and survivability to withstand the potential for severe weather events, must be capable of operating for extended periods on backup or emergency powers systems, and must support mutual aid communications with other first responders coming to render aid for communities impacted by these severe weather events.



We will address the following issues in our radio system planning and design for the County to minimize system outages and facilitate both quick disaster response and efficient disaster recovery:

- Structures must be able to withstand hurricane force winds, high waters, and tidal surges to provide communications during disasters and so they do not become part of the problem during disaster recovery
- Radio sites must have adequate backup power (larger fuel tanks, portable generators, and other means) to provide power during long outages
- Evacuation routes must have very good coverage
- All first responders and secondary responders (utilities, public works, and others) must have interoperable communications to coordinate road blockage, fallen trees, notification, and clearing
- If school buses are utilized to evacuate shelters, they will need access to the communications system
- A radio cache should be available to accommodate outside assistance
- A "site on wheels" may be considered to provide coverage where a communication site is lost
- Dispatch systems should be designed to allow for dispatching from a backup location or locations. This entails linking additional emergency use consoles to the radio system via wireless, Ethernet, T1, and/or other means.



2.4 Client Satisfaction with *FE* as an Independent Trusted Advisor

FE's certified independence guarantees that Rowan County will receive totally objective analyses. Unlike some consulting firms, *FE* has no business relationship with any suppliers of public safety communications equipment or software, nor do we provide any services to them. We are not engaged in, nor are we associated with, the business of selling, servicing, or renting radio communications, telephony, CAD, or any other systems.

We are your trusted advisor, helping you attain your goals and objectives in a cost-effective manner. A sampling of recent system procurements shown below are evidence that *FE's* involvement has resulted in a wide range of major system vendor selections.

<i>Client</i>	<i>Radio System Vendor</i>
State of Oregon	Harris
King and Queen County, Virginia	Tait
City of Virginia Beach, Virginia	Motorola
ORION, Hampton Roads Region, Virginia	Motorola
Buncombe County, North Carolina	Airbus DS (Cassidian)
Manitowoc County, Wisconsin	Motorola
Dane County, Wisconsin	Harris
Pittsylvania County Virginia	Harris

Our specialists have considerable experience supporting public safety radio systems negotiations with a proven track record of saving millions of dollars for our clients. Because our team deals with vendors on a regular basis, we have insights into their negotiation methods and practices that will prove invaluable to the County.

2.5 P25 Experience

Rowan County seeks a consultant experienced with P25 radio system upgrades. In addition to the P25 experience described in previous sections, *FE* is proud to share our leadership as consultants to the first three P25 Phase 2 system procurements/ implementations in the United States:

- Buncombe County, North Carolina—*FE* assisted with the procurement and supervised the deployment of the first Airbus DS (formerly Cassidian Communications) P25 Phase 2 implementation in the U.S.
- Bowling Green Municipal Utilities, Kentucky—*FE assisted with the procurement and supervised the first P25 Phase 2 system implementation in the U.S.*, a Motorola Astro 25 system.
- State of Oregon—*FE* assisted with the procurement of the first Harris Corporation P25 Phase 2 implementation in the U.S.

Our firm remains on the forefront of technology today.



2.6 References

The projects listed in our references on the following pages demonstrate our excellent recent experience in performing projects with similar project goals for city and county systems of comparable size and subscriber base.

FE is one of the few public safety consulting firms who has not changed hands or ownership over the past three decades. Every project described in our references has been completed successfully under FE technical management and by FE staff with the company today.

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NEW HANOVER COUNTY, NORTH CAROLINA Public Safety Communications Consulting



Project Dates

2005 – 2015

Relevant Technologies

- P25
- Digital LMR
- 800 MHz
- Trunked

Project Contact

Stephen Still
Director of Emergency Management
230 Market Place Drive Suite 115
Wilmington, NC 28403
910-798-6910
sstill@nhcgov.com

Project Snapshot

- Collect information on and assess radio infrastructure, licenses, applications, operations, channel usage, and sites
- Assess all existing sites and several potential sites
- Develop system specifications and features RFP
- Assess vendor technical proposals and recommend compliant vendor to county
- Provide program management and IV&V services
- Rebanding program management
- Low voltage systems design and implementation oversight for Admin Bldg

Project Description

New Hanover County, North Carolina, retained **FE** to provide needs assessment, design, RFP generation, system procurement, and implementation services for their 800 MHz public safety system. Subsequently, the county required the design of low voltage signaling infrastructure for IT, telecom, and security systems to support the daily operations of the County Administration Building. **FE** assessed the needs of the county's mobile and portable radio users by collecting information about the existing radio infrastructure, licenses, applications, operations, channel usage, and sites via interviews and questionnaires.

The **FE** team assessed existing sites and several potential sites for an additional tower to improve coverage, then developed system specifications and features for both the LMR system and the microwave network and incorporated them into an RFP. **FE** developed an evaluation matrix for ranking the vendors' technical proposals, conducted the vendor pre-bid conference, reviewed vendor questions, and prepared the responses and RFP addenda. **FE** evaluated new vendor technical proposals, processed the vendors' cost proposals, combined the technical and cost proposals to rank the vendor proposals, and recommended a compliant vendor to the county.

During the implementation phase, **FE** coordinated the *Installation and Implementation Oversight Plan* with the installation and equipment vendors' plans. This detailed oversight plan guided **FE** to oversee and evaluate the implementation of each site (for both radio stem and microwave installation) and the dispatch center. The 800 MHz P25 countywide system is currently operational and meets New Hanover County's requirements for a reliable first responder network.

FE also provided program management and technical assistance for the county's 800 MHz rebanding as well as design and implementation oversight for low voltage systems in the County Administration Building.



YADKIN COUNTY, NORTH CAROLINA

Procurement and Implementation Support and Tower Inspections



Project Dates

2013 – 2016

Relevant Technologies

- Analog
- VHF
- Conventional
- Simulcast
- Microwave

Project Contact

Lisa Hughes
Deputy County Manager
217 East Willow St.
Yadkinville, NC 27055
336-679-4200
lhughes@yadkincountync.gov

Project Snapshot

- Reviewed unsolicited system proposals received by the County
- Provided recommendation that the County issue an RFP
- Conducted abbreviated needs assessment with baseline coverage study
- Developed RFP
- Assisted County with contract negotiations and implementation support
- Tower structural analyses and request for quotes for tower modifications

Project Description

Yadkin County, North Carolina, was operating a three-site Tait Quasi-Sync wideband VHF public safety mobile radio system supporting 12 combination (paid/ volunteer) fire and/or rescue agencies, countywide emergency medical services, the county sheriff (court, detention, patrol, civil and investigations divisions), county public safety answering point, and other agencies. The system supported the police departments and other departments within the municipalities of Boonville, East Bend, Jonesville, and Yadkinville. **FE** was selected to provide procurement support for upgrades or modifications to the system that will satisfy the narrowbanding requirement.

FE assessed the current proposal and made recommendations, reviewed the work products of the previous consultant including the initial assessment and recommendations, and presented the findings and recommendations to the County Administrator and County Board.

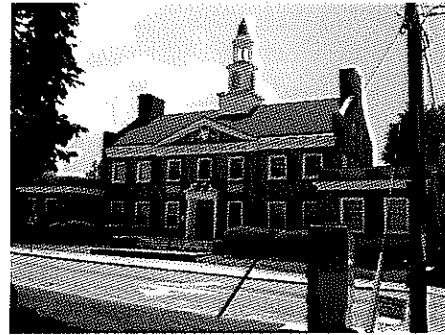
FE conducted a coverage assessment and produced a set of maps for both mobile and portable subscriber units depicting major geographical landmarks and the area topography, including scale, color schemes, highway/road data, jurisdictional boundaries, and desired performance characteristics. **FE** developed technical specifications to serve as the basis for an RFP, updated the technical specifications based on County review and comments, reviewed the vendor proposal selected by the County, assisted the County with contract negotiations, and provided support for technical issues.

FE provided implementation services which included the modifying of existing antenna support structures to support new LMR and microwave equipment.



ORANGE COUNTY, NORTH CAROLINA

Radio System Upgrade Plan and Coverage Analysis



Project Dates

2012 – 2018

Relevant Technologies

- Analog to digital
- 800 MHz
- Trunked
- Multicast
- Paging and logging recorder
- Microwave

Project Contact

Jim Groves
Emergency Service Director
200 S. Cameron St.
P.O. Box 8181
Hillsborough, NC 27278
919-245-6140
jgroves@orangecountync.gov

Project Snapshot

- Assessed options for improving radio coverage
- Conducted a user needs assessment
- Conducted system requirements assessment
- Conducted a coverage workshop
- Developed alternatives report
- Performed coverage and capacity analyses

Project Description

Orange County has diverse challenges for public safety communications, including coverage and varied operational environments. The County selected **FE** to recommend a solution to resolve the county's public safety radio system coverage and capacity deficiencies.

FE conducted a thorough user needs assessment with county fire, law enforcement, and EMS agencies to fill information gaps and gather requirements for the upgraded system. Our team explored the current portable, mobile, and in-building coverage and capacity issues in depth with county agency representatives during the needs assessment.

Using this information, **FE** developed a set of high-level requirements for enhancements to the VIPER network that can be used to provide an upgrade to a viable digital system for county agencies. Based on the county-approved requirements.

FE performed coverage and capacity analyses to recommend a radio site constellation and set of channels, determine required modifications to existing towers, specify equipment needs to upgrade to P25, consider the inclusion of a backup conventional subsystem that includes a station and unit paging system, and outline the tower type and construction for any new sites.

FE's evaluation of user needs, combined with baseline assumptions, VIPER and technology trends, allowed for the identification of specific system requirements that will be used in the development of RF coverage improvements for the 800 MHz VIPER system, as well as for the station alerting and paging systems in use.



CITY AND COUNTY OF HENDERSON, KENTUCKY Radio Communications Consulting



Project Dates

2014 – 2018

Relevant Technologies

- 700 MHz
- Analog and digital
- VHF/UHF
- Conventional and trunked
- Logging recorder
- Fire alerting

Project Contact

William “Buzzy” Newman
Assistant City Manager
222 First Street
Henderson, KY 42420
270-831-1200
bnewman@cityofhendersonky.org

Project Snapshot

- Conduct needs assessment
- Prepare alternatives analysis
- Develop RFP and procurement-related documents
- Assist with vendor proposal review and contract negotiations
- Provide implementation support

Project Description

FE provided professional guidance in support of acquiring a modern, efficient, and cost-effective communications system for the first responders. **FE** is providing services to the City and County of Henderson in three phases: Phase 1–Needs Assessment and Alternatives Analysis, Phase 2–Procurement Support, and Phase 3–Implementation Support.

FE inspected radio communication sites to determine the current state of the equipment and installations, and conducted onsite interviews to identify user communication needs.

The City and County of Henderson agencies use multiple systems to dispatch their first responders. **FE** identified the needs of the five primary system categories, which included City Police and City Fire, County Sheriff, and multiple volunteer fire departments. Part of the on-site interview process was potential interest in sharing a new countywide system.

From the information obtained during the on-site interviews and site visits, **FE** developed and evaluated three alternatives for improving the City and County systems: upgrade the current system, simulcast conventional, and simulcast trunking

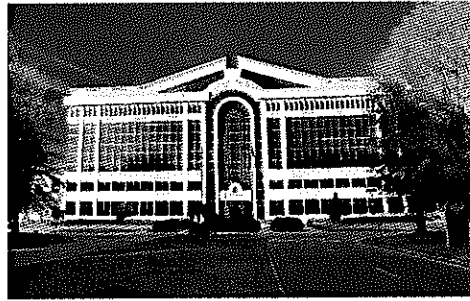
FE determined user needs through onsite interviews, developed system alternatives, and prepared a competitive RFP for procurement of the replacement system. Multiple proposals were received, and **FE** conducted technical compliance reviews, and requested clarifications from bidders where appropriate. **FE** also assisted in vendor negotiations and vendor contract finalization.

FE is currently providing technical assistance to the City and County during implementation of the replacement system.



CITY OF CHESAPEAKE, VIRGINIA

Communications Needs Assessment, Conceptual Design, and Procurement and Implementation Support



Project Dates

2012 – 2022

Relevant Technologies

- 700 / 800 MHz
- P25
- Trunked
- Microwave backhaul

Project Contact

Bernie Reaser
Radio Systems Administrator
300 Shea Drive
Chesapeake, VA 23322
757-382-6692
breaser@cityofchesapeake.net

Project Snapshot

- Review documentation and existing system
- FCC license review
- Stakeholder interviews
- Site surveys
- Develop conceptual design
- Develop cost estimate
- Generate functional specifications
- Provide implementation support

Project Description

The City of Chesapeake, Virginia, selected **FE** to provide consulting services regarding the upgrade of the city's current radio communications system to an interoperable P25 system leveraging existing 800 MHz and 700 MHz frequencies, sites, and infrastructure. Regional interoperability is an important element.

FE determined the city's needs through existing documentation and FCC license review, on-site face-to-face interviews with agencies and stakeholders, and detailed site surveys. **FE** developed a conceptual system design including budgetary costs based upon the needs assessment. **FE** created a requirements tracking matrix documenting the collected needs and used this matrix throughout the entire project to ensure subsequent tasks align with Chesapeake's documented needs. **FE** also assisted the city in reviewing vendor proposals, attending vendor presentations, and attending city evaluation team meetings.

FE is contracted to support implementation, construction, optimization and system acceptance supervision services and technical support during the installation, construction, testing and cutover phases of Chesapeake's communications system. **FE's** role includes independent vendor testing supervision to verify that the system is working as required during staging, functional testing, coverage (indoor and outdoor) testing, acceptance testing and system cutover.



BUNCOMBE COUNTY, NORTH CAROLINA

System Assessment and Upgrade Planning and RFP Development



Project Dates

2010 – 2016

Relevant Technologies

- Digital
- P25
- VHF/UHF
- 700 MHz
- Microwave

Project Contact

Bryan Dillingham
Network and Communications Manager
59 Woodfin Place
Asheville, NC 28801V
828-250-6807
bryan.dillingham@buncombecounty.org

Project Snapshot

- Perform system propagation analysis
- Prepare propagation maps
- Conduct needs analysis
- Conduct infrastructure assessment
- Provide estimated costs for site improvements
- Develop and submit Needs Assessment and System Recommendation Report
- Develop and submit Conceptual Design Report
- Present recommended solution to the county
- Provide on-call technical consulting services regarding PSMR technology, microwave systems, consoles, and dispatch center systems
- Develop RFP

Project Description

Buncombe County, North Carolina engaged Federal Engineering to evaluate the existing system, plan for an upgrade, design a compliant system, and recommend a solution.

FE conducted a needs analysis, collecting, compiling, and analyzing key information obtained from county public safety wireless systems users. We also conducted an assessment of the county's existing infrastructure, surveying the five simulcast transmit sites and the one receive-only site used for radio coverage to determine if they were suitable for continued use or if modifications were required for an upgraded system. Estimated costs associated with improving the sites to meet the county's needs were provided.

FE performed system propagation analysis to analyze outdoor and in-building coverage and modeled coverage in the VHF, UHF and 700 MHz frequency bands. We also developed a conceptual design for the system infrastructure, backhaul, and capacity meeting the county's requirements and developed the county's *RFP for Detention Facility of the Buncombe County Sheriff Office Digital Trunked 800 MHz Radio Communications System*.

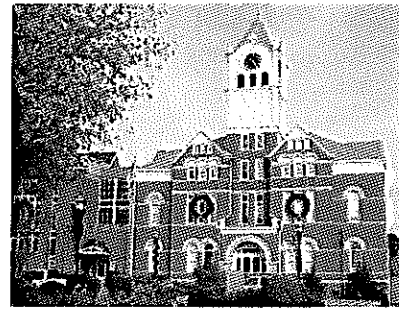
FE recommended cost-effective, shared, reliable mobile wireless infrastructure enhancements which met the county's requirements. The county retained **FE** to provide on-call technical consulting services regarding public safety mobile radio technology, microwave systems, consoles, and dispatch center systems.



HENRY COUNTY, GEORGIA Radio Systems Consulting

Project Dates

2014 – 2018



Relevant Technologies

- 800 MHz
- P25 digital
- Simulcast
- VHF / UHF
- RF coverage

Project Contact

Don Ash
E911/EMA Director
Henry County Emergency Center
526 Industrial Blvd
McDonough, GA 30253
770-288-7870
dash@co.henry.ga.us

Project Snapshot

- Evaluation of existing facilities
- Determine radio coverage
- Determine interoperability requirements
- Conceptual design
- Develop short- and long-term communications plan
- Develop RFP specifications
- Assist with creation of RFP evaluation criteria
- Review vendor proposals
- Conduct vendor negotiations
- Provide implementation support
- Provide technical support

Project Description

Henry County had an 800 MHz simulcast radio system. Their desire was to transition into a P25 800 MHz public safety radio system with improved coverage. The overall program is structured into three phases: Phase I—System Assessment and Conceptual Design; Phase II—Procurement Support; Phase III—Implementation Support.

FE performed an evaluation of existing facilities, determined radio coverage before and after FCC mandated narrowbanding, determined future interoperability requirements, and identified and explored funding opportunities for future expansion. **FE** developed three separate conceptual designs containing mitigation strategies and budgetary estimates. **FE** assisted the county in preparing RFP documents and aided with developing evaluation criteria and provided support during the evaluation and negotiation periods.

FE is contracted to provide implementation support during the final phase of the project by supervising the construction of the infrastructure, the receiving of all specified equipment, the quality and adherence to the stipulated standards for all work performed and the approval of all pay requests and change orders.



3 PROJECT APPROACH AND UNDERSTANDING

3.1 Understanding of Work to be Performed

FE fully understands the work necessary to assist the County in achieving its objectives for improved coverage, interoperability, features and functionality, voice communications with other public safety and non-public safety agencies, and enhanced fire paging/alerting.

Rowan County shares operation of a Motorola P25 800 MHz trunked digital radio system with the City of Salisbury that serves police, fire, EMS, and related users throughout the County. The County is facing several issues directly impacting its radio communications systems and recognizes the need to develop a plan for system ownership, continuity, operations, and replacement for future stability. Specific items facing the County include the following:

- Phase-out of support and parts availability for elements of the existing equipment
- User requests for features such as GPS location, RING continuity capability and similar enhancements that the current system does not support
- Identify and address user interest in increased data capabilities and applications including the review of FirstNet impact and interoperability

The County's objective is to work with an independent communications consultant to assess the existing public safety radio system and related subsystems, specifically fire/EMS VHF simulcast paging/alerting and 800 MHz trunked paging. Working with the County, **FE** will develop recommendations for upgrading or replacing these systems and components and a proposed structure for enhanced operations. The County has identified three phases for the project:

- Phase 1—Needs Assessment and Recommendations
- Phase 2—RFP Procurement and System Upgrades, including developing and conducting a Subscriber Radio Testing and Verification Program
- Phase 3—Project Management and Implementation Support Services

Because we are one of the largest independent public safety consulting firms, we leverage this experience to save our clients costs—on the order of millions of dollars—for public safety information technology systems.

Our Proven Project Management Approach Works to Meet Your Needs

FE recognizes that projects such as this one requires effective project management. We have worked on many large scale, multi-year projects and have developed effective methodologies to manage these types of consulting projects.



Our team's adherence to the Project Management Institute Project Management Body of Knowledge agile methodologies facilitates timely completion of deliverables. **FE** has developed a methodical and defined approach to projects that align with the Project Management Institute's (PMI) approach to project management.

We tailor our project approach to fit the needs of our clients and design a custom solution that solves your unique challenges. The key component to managing any project is our unique ability to apply this methodology and its components to manage the success of the project. Our project management methodology, applied with our public safety and technology experience, produces success on hundreds of projects each year, many of them similar to the County's engagement.

FE will apply continuous project management to support the County's entire project lifecycle, completing each phase to complete satisfaction before opening the gate to the next phase. **FE's** adherence to PMI methodologies facilitates timely deliverables that are within budget and compliant with requirements; a majority of our project managers are certified Project Management Professionals (PMP).

"FE consultants continue to be very helpful throughout this phase of the project. Your project manager has developed an excellent relationship with our County Manager and the Directors on the Governance Committee."

~Jay Vargo, IT/Radio Communications Director, Pinal County, Arizona

FE develops customized solutions and process tools, unique to each client. Many public safety consultants use standard templates for conducting site surveys, user interviews, developing RFP specifications, and preparing report deliverables. We apply our extensive body of knowledge to each project, as we customize each survey tool and deliverable to your unique situation. Clients have said, on many occasions, that the quality of our deliverables is superior to other firms' reports due to our focus on custom solutions and thorough quality control.

Our past and current clients have expressed satisfaction and given prompt approval of our RFPs. We have received feedback from system vendors that our RFPs are fair and allow them to prepare comprehensive, clear responses. No system award based on an RFP written by **FE** has ever been successfully protested.

Our proposal and detailed scope of work in this section outlines the key issues that our team will help you address as we work together to analyze, recommend technical and operational solutions, then oversee the procurement of infrastructure components and subscriber equipment and installation.

Our QA Process Provides Clients with the Highest-Quality Deliverables

FE recognizes that no project is complete without a rigorous quality assurance (QA) program. Our program supports the successful execution of the project by applying specific and rigorous QA measures to system analysis and design, vendor processes, independent quality verification testing, documentation, and reports.



Through our industry contacts, client feedback, and use of subject matter experts (SME), we have developed a comprehensive deliverable review program, managed by our Quality Assurance Review Board, shown in Exhibit 2. The County will benefit from **FE's** quality assurance (QA) processes and program throughout the project.

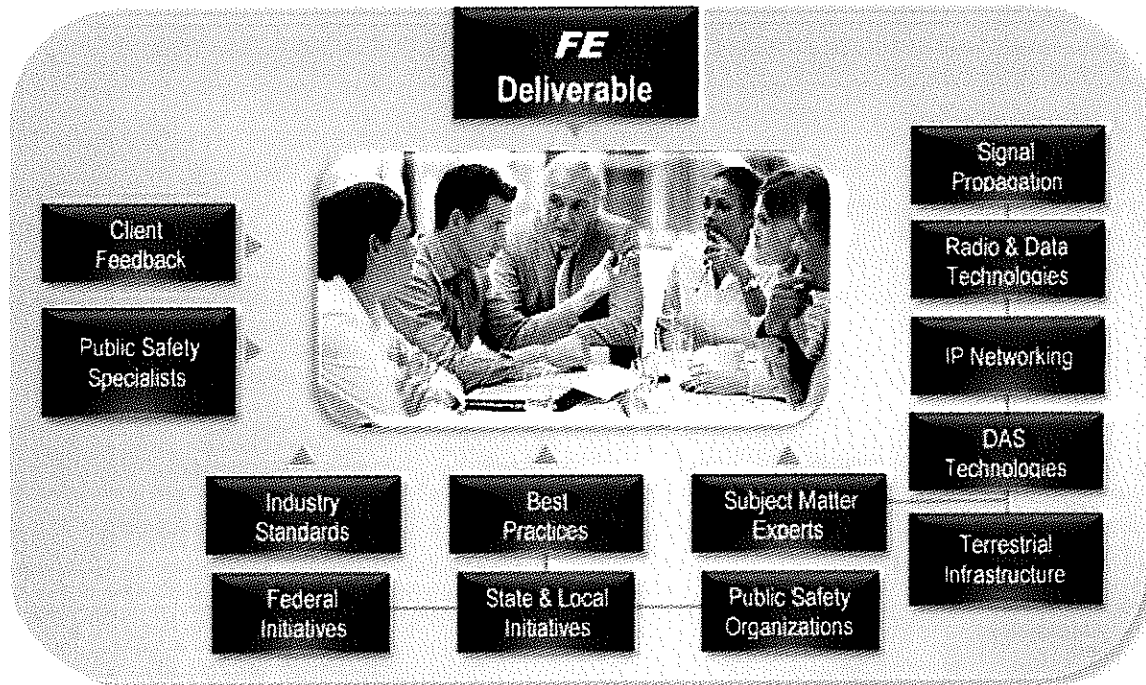


Exhibit 2—Quality Assurance Review Board

FE's quality assurance review process takes advantage of best practices, SMEs, and client feedback to assure the highest quality in our project deliverables.

The **FE** Quality Assurance Review Board manages our peer review process to assure that our internal procedures and delivered documentation and reports are of the highest quality. Peer reviewers are individuals with skill sets directly applicable to the program. They are typically not involved in the day-to-day aspects of the program but, rather, serve in a “red team” capacity ***challenging the program team and assuring that all decisions have been well thought-out.*** Periodic technical reviews are conducted throughout the duration of the program and draft reports evaluated before delivery.

The County will be an active participant in our quality assurance process by providing feedback on drafts so we can include necessary revisions in the final deliverables. This methodology provides the County with the best value for your consulting services investment.



3.2 Phase I—Needs Assessment and Recommendations

Project Initiation

FE will begin by coordinating project planning with the County's project manager. We will schedule and lead a project initiation meeting with designated County officials on a mutually agreed-upon date following contract signing. This initial meeting will establish a common understanding of the project goals, objectives, and vision, items best understood through a close working relationship between our respective management teams and staffs. During this half-day meeting, we will engage in a high-level review of the primary user agencies' communications needs.

We will use this meeting as the first opportunity to establish the foundation for our ongoing relationship. The adjacent text box summarizes key topics discussed during the project initiation meeting.

Documentation Review—Before meeting with the County, we will request and review County-supplied system documentation, including previous studies, as-built documents, Federal Communication Commission (FCC) licenses, radio shop records, site information, equipment and subscriber inventories, existing user or governance agreements, and other documents to begin assessing the system and its operations across agencies. We will also request documentation from the City of Salisbury because the systems are shared, as well as from the City of Kannapolis, where the backup dispatch center is located. Performing a detailed review of the current documentation provides us with a common starting point and a foundation for a complete understanding of the status of the County's system.

Site Visits

Immediately following the project initiation meeting we will conduct site surveys of the County's four RF sites with both 800 MHz and VHF equipment, the master site and prime site, primary dispatch center, and backup dispatch center in Kannapolis. We will evaluate interfaces to ancillary systems such as Computer Aided Dispatch, logging recorders, the VHF simulcast paging/alerting channels mainly used for fire/EMS, and the 800 MHz trunked paging system. We will assess sites and equipment for redundancy and resiliency, especially during natural disasters.

Leveraging our experience surveying thousands of radio sites across the country, our project team will review the status of each of the radio sites in the County. To provide a cost-effective plan for the County, **FE** will review data previously collected to develop an assessment of the conditions and equipment at each site prior to the site visits.

During the RF site visits, **FE** will confirm site coordinates including latitude, longitude, and elevation, and will collect information about the sites, typically including the following:

Project Initiation Meeting Agenda

- Introductions
- Clarify roles
- Review project objectives and expectations
- Review key issues
- Review key milestones and schedule
- Review and clarify deliverables
- Finalize user interview schedule
- Review status reporting methodologies
- Determine progress review meeting schedule
- Resolve immediate issues
- Build relationships



- Access road conditions
- General site conditions
- HVAC (i.e., environmental)
- Antennas and mounts
- Physical availability of surrounding land
- Perimeter security
- Equipment shelter
- Nearby obstructions that may impact paths or coverage
- Transmission line support structures
- Waveguide and dry air systems
- AC and/or DC power
- Emergency power
- Electronics, both radio and microwave
- Service history
- Grounding/variances from standards

We will rely on documentation and inventory records provided by the County, information from the County's radio system service provider, and data from our site surveys to develop an analysis of the conditions and evaluate and quantify the radio communications equipment at each of the County's radio sites. We will identify the components of the existing system and identify if any could be retained in a new system. The results of our analysis will be included in the next task's report, *Needs Assessment and Requirements Report*.

Needs Assessment and Requirements Definition (User Interviews)

Determine User Requirements—The requirements assessment task is one of the most important efforts because it establishes the foundation for systems' analyses. This task has the following four objectives:

- Identify and document current and future user needs
- Solicit users' perceptions of current system performance including gaps that do not meet their needs
- Educate users as to what is practical and affordable
- Begin to build consensus and eventual "ownership" in the recommendations.

The focus of this task is the collection, compilation and analysis of key information obtained from a broad spectrum of County management and user agencies. Our interview approach will include face-to-face meetings, focus group meetings and, as required, telephone interviews. Interviews are envisioned to last approximately one to two hours each. Detailed notes will be captured by our interviewers.

FE will work with the County project manager to plan a combination of individual interviews and focus groups over two days on-site. Our project manager will develop a customized questionnaire that will form the basis for the interviews and submit it to the County project manager for review. The interview approach will generally follow the questionnaire but will also allow for additional areas of the interviewee's choice to be discussed. Functional, performance, and operational needs will be addressed.

The County does not need a study to put on the shelf. Clearly this program must "hit the mark" and deliver practical solutions. Diverse groups within the County have different needs. The critical success factors paramount to one user group are likely to be very different than those of other groups. Because this study incorporates the needs of an extremely broad



spectrum of users, the challenges grow exponentially. The true “art” in this process is to develop a requirements document that will be embraced by all users.

Early involvement helps to encourage a broader understanding and participation by all stakeholders with the assurance that their issues are being addressed and incorporated into the overall design. Based upon hundreds of consortia, local, county, and state government projects, our technical experts have extensive experience in creating and facilitating this sense of unity and participation. Our team appreciates and understands the need for representative user participation to build consensus in the early stages and to gain buy-in by the broadest group of participants. Once achieved, this participation must be constantly reinforced through a program of proactive, robust communications and the opportunity for ongoing dialog among the stakeholders. Our plan will facilitate both critical factors.

This methodology reflects our strong belief that the County infrastructure should be user driven, as opposed to technologically or politically driven, to best serve user needs. To achieve this goal, **FE** will carefully analyze the requirements of the relevant departments and stakeholders to establish a baseline of operational user needs, including maintenance/radio shop support, system ownership and governance, increased data capabilities and applications, subscriber radio features, accessories, and paging operations in the P25 environment. Common needs will be identified as will those unique to specific organizations. Where needs diverge or conflict, we will use our expertise and experience to recommend an approach to resolving the differences.

FE will prepare a draft *Rowan County Needs Assessment and Requirements Report* based upon our site visits and interviews, outlining the results of our user interviews and agreed-upon requirements. We will present the results of our Needs Assessment to the County in an on-site session. After the meeting, we will revise the report based on County comments and recommendations and issue the final *Rowan County Needs Assessment and Requirements Report*.

“We needed additional expertise and selected Federal Engineering because of their unique technical and operations backgrounds.

FE personnel have served as first responders and understand, from a user perspective, how these systems must function.

~Terry Owen, Project Manager, Edmonton, Alberta

Analysis and Recommendations

Coverage and Redundancy/Resiliency Analysis

Portable and mobile coverage is the single most important characteristic of a mobile radio network. An advanced digital network is of little value if the users cannot access it due to unreliable coverage. Recognizing this years ago, Federal Engineering made major investments and developed **FEPerformancePro™**, a powerful toolset used to accurately model radio network performance.



FEPerformancePro™ is based upon the ICS Telecom software engine used by the Department of Defense (DoD), FCC, NTIA, and APCO for radio network analysis. Its accuracy has been confirmed by the Federal Government and validated for clients by drive testing by **FE** and numerous network implementations.

FEPerformancePro™ includes the following network analysis tools:

- **FECoverage™** - complete coverage analysis tool
- **FEMapper™** - high-resolution mapping tool
- **FENetwork™** - network capacity analysis tool
- **FEMitigate™** - system-wide interference analysis tool (optional)
- **FETeamCoverage™** - interactive user coverage workshop

Our coverage expert will work with the County project manager to determine how coverage plots should be depicted, including color schemes, topology, roads, patrol zones, and other characteristics unique to the County. He will then load the existing transmitter locations and other relevant information into the **FECoverage™** model and generate a coverage map of the current County radio system using **FEMapper™**. He will then add a potential new site at Young's Mountain in Cleveland to evaluate its impact on improving coverage. He will evaluate the existing network sites and infrastructure and develop recommendations to improve redundancy and resiliency.

As shown in Exhibit 3, he will develop maps for mobile and portable coverage areas, noting both talk-out and talk-in, with indoor and outdoor coverage areas defined. Maps, coverage and redundancy analysis, and recommendations will be included in the final Phase I report.

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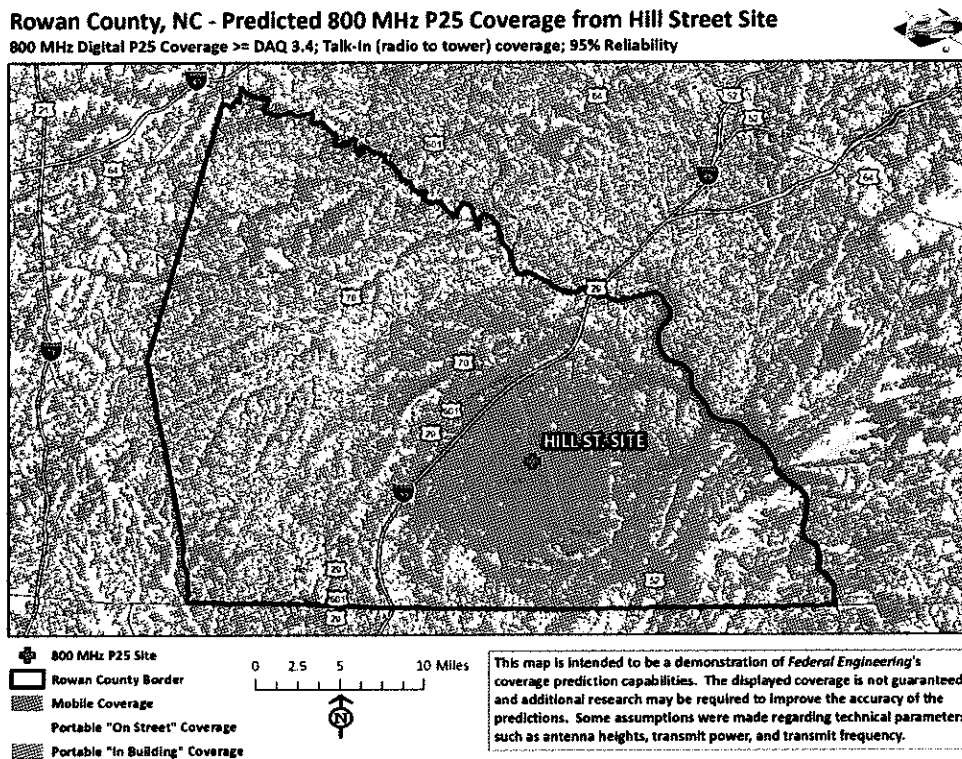


Exhibit 3—Sample Coverage Map of Rowan County

Fire Alerting System Assessment

Our team has ongoing experience working with fire-rescue clients as their core radio systems transition to P25 digital systems. We understand the requirements of NFPA 1221 and potential options for paging and station alerting. *FE* has extensive experience evaluating key strengths and weaknesses of fire alerting options. We will review the County's current fire alerting system and make recommendations for modification, replacement or improvement. We will discuss with the County the various fire paging/alerting options that may be pertinent to the County.

FE is very familiar with P25-based fire alerting systems, including those newer offerings arriving on the market in just the past few years. We will discuss the advantages and disadvantages of these, as well as more established technologies, with the County. We will work to identify a dual path to station alerting to meet NFPA regulations.

County fire services, and other fire departments across the country, are concerned about the safety of digital communications in the firefighting environment. *FE is fully aware of, and has expertise in, the issues facing fire departments as they look at upgrading their paging systems from conventional VHF to 800 MHz P25 radio systems.* Our team has worked closely with numerous fire departments to develop system fire alerting systems. In addition, many of our staff are former first responders with direct experience in firefighting environments and therefore understand the challenges facing firefighters.



Individual firefighter paging can be done via several alternatives, including new P25 pagers, dedicated voice monitor pagers, two-tone voice paging via radios, or digital alphanumeric messaging. Many firefighters rely on a voice monitor pager as the primary means of being alerted when their services are needed. A P25 800 MHz radio system solution presents some challenges for voice paging devices. We will identify available options to be used for firefighter paging and fire station alerting, evaluate their pros and cons including cost, functionality, supportability, and reliability, and recommend a solution that best meets the needs of firefighters.

We will document the results of the fire alerting system analysis, including a basic overview of the high-level design, high-level description of advantages and disadvantages, and recommendations. This analysis will be included in the final Phase I report.

FirstNet and Other Data Capabilities

FE clients are justifiably concerned about the impact that emerging technologies will have on their investments in new radio systems. Addressing these challenges takes much more than just an understanding of technology. It is critical to maintain a connection with the direction of public safety systems development, from technical, operational, and a standards perspective. This understanding of both technology and the surrounding environment requires efforts beyond a deep resume of project work.

FE will work with the County to evaluate requirements for enhanced data capabilities and develop recommended solutions, including analysis of FirstNet. Since 2012, **FE** has been a key member of the project and construction management consulting team, led by Jacobs, for the Los Angeles Regional Interoperable Communications System (LA-RICS), the first large-scale LTE based public safety mobile data system. LA-RICS is a modern, wireless voice and data communications system designed to support 34,000 first responders in 86 participating agencies. Its board members recently approved an agreement to transfer the LA-RICS public-safety LTE assets to AT&T, to be integrated into the FirstNet system. The **FE** team is providing planning, design, procurement, and implementation oversight for LA-RICS regional LMR voice and LTE data networks.

The following was published in IWCE's *URGENT Communications* on July 2, 2018, in an article announcing the transfer of public-safety LTE cell sites built by LA-RICS to AT&T, FirstNet's contractor to build and maintain the nationwide public-safety broadband network (PNSB):

"The LA-RICS system was the largest of the early-builder public-safety LTE networks that FirstNet allowed to be built and played a key role in helping the FirstNet board develop its strategy to build the PNSB, according to Chris Sambar, AT&T's senior vice president for FirstNet. 'The LA-RICS team helped lead the way forward for the nationwide public safety broadband network, and we're pleased to integrate these assets into FirstNet,' Sambar said in a prepared statement."

FE has been involved with the activities that have evolved into FirstNet. This includes participation in the Nationwide Public Safety Broadband Network (NPSB) stakeholders meeting orchestrated by NIST and the standards activities managed by TIA and APCO, and the state-level preparation work sponsored under the DHS OEC Interoperable Communications



Technical Assistance Program (ICTAP). Through this program, our coverage experts have conducted extensive statewide LTE coverage analysis and developed coverage maps using existing assets.

FE consultants are heavily involved in the many organizations that develop and set the standards and technology decisions that public safety relies upon. We have dedicated resources devoted to membership and participation in organizations, such as APCO and NENA committees and standards development groups, PTIG, TIA wideband and land mobile radio standards activities, and the FPIC. Our team is recognized by their peers; our consultants chair national technical committees and have had papers published by many professional organizations.

The next generation of public safety communications systems must leverage the most appropriate technologies, including FirstNet, to meet first responders' requirements. We bring this expertise to bear for our clients seeking to build or update voice and data networks in this rapidly changing environment. Our analysis will address the role of FirstNet in County plans.

Governance and Ownership Analysis

FE will use the results of the user interviews and focus groups to ascertain a variety of information related to the County's system and specific agencies' users, equipment, charter, responsibilities, organization and governance. We will evaluate the ownership of the current system and recommend a governance structure to enhance operations.

We will provide recommendations for a phased replacement of subscriber radios that will be out of manufacturer support in the next five years. Additionally, we will review the current radio shop for its capabilities in "up-fitting" public safety radios to those with newer features and functionality, installation, maintenance, and support, including alerting devices for public safety vehicles. We will also assist the County in merger and negotiations of its existing maintenance contracts.

Cost Estimates and System Funding Analysis

Using our in-house **FE**CostPro™ tool, **FE** will estimate the cost of required changes and/or upgrades to the radio system, fire paging/alerting subsystems, subscriber radios and accessories based on our experience with the design of systems comparable to the County's, and publicly available industry information. This high-level, quantitative analysis relies on our team's knowledge base, which spans numerous similar county projects.

Even if one could develop a 100 percent accurate projection of what vendors would bid, the dynamics of the public safety mobile radio market are such that the actual bid prices can vary significantly. Factors such as where the vendor is in their fiscal cycle, their profit picture year-to-date, how they are doing against the competition, factory parts and labor costs, energy costs, and where they are along the learning curve for a particular product line have a major impact upon proposal pricing. It is not uncommon to see the price variance between two vendors vary more than 20 percent for the same system. In fact, we have seen the prices quoted from the same vendor vary by more than 10% for the exact same system between the



initial quote and the best and final offer. *FE's* itemized cost estimates will, therefore, be conservative in nature to ensure the vendor proposal pricing does not exceed the estimates.

FE will assist the County in identifying ways to fund the required system upgrades, including grants, user fees, and leasing assets such as a new tower at the Young's Mountain site. We will analyze the existing radio fee structure and estimate potential revenues from alternative sources.

Analysis and Recommendations Report

FE will prepare a draft *Rowan County Phase I Analysis and Recommendations Report* based upon the tasks described in previous sections. We will present the results of our analysis to the County in an on-site session. After the meeting, we will revise the report based on County comments and recommendations and issue the final *Rowan County Phase I Analysis and Recommendations Report*.

3.3 Phase II—RFP Procurement System Upgrades

Upon County authorization to proceed to Phase II, *FE* will provide specification development services, defining the required system upgrades or functional requirements of the system and of the subscriber radios, and will incorporate these specifications into respective RFP documents.

Infrastructure Specifications, RFP and Procurement Support

FE will develop a set of infrastructure technical specifications based on the County-approved requirements, which may include new system equipment, paging/alerting system equipment, and Young Mountain tower site. The nature of the specifications may vary greatly depending on the solution selected by the County. Specifications will describe the radio system(s)' functional and performance requirements in sufficient detail for vendors to submit consistent proposals, will be verifiable through future acceptance testing, and will stress the use of existing investments wherever possible.

The detailed design of the system will be left to the radio system vendor to allow for innovative approaches and to cause the vendor to remain responsible for system performance in accordance with the specifications. These specifications will be the foundation for vendor proposal evaluation and as acceptance criteria.

FE's functional/performance specifications approach has been proven over billions of dollars in procurements. It avoids the pitfalls of an approach in which the consultant develops detailed design specifications. This obsolete approach inherently shifts the burden of risk from the vendor to the County since the vendor is no longer required to meet the County's functional and performance needs but rather just delivers a design. Even the Federal Government, which has used detailed design specifications for decades, is moving away from them and embracing the same approach proposed by *FE*.

Our specifications are properly crafted to tightly define performance and at the same time encourage competition and innovation. *FE* typically includes the following in our specifications:



- System functional, protocol, and operational requirements
- Regulatory and standards compliance
- Leverage existing resources
- Infrastructure equipment
- Dispatch equipment
- Suggested site locations and development
- Site subsystems (e.g. power and HVAC)
- Site/shelter modifications
- System reliability and redundancy
- Required coverage and capacity
- Spectrum usage and restrictions
- Local, regional, state, and federal interoperability
- System functional, protocol, and operational requirements
- Required legacy and new interfaces
- Expandability to accommodate future growth
- Backhaul connectivity
- Network management
- Network and physical security
- Migration and cutover/transition requirements for continuity of operations
- System delivery and installation
- Regulatory and standards compliance
- Overall project schedule and implementation plan
- Factory, interoperability, coverage, site, system, and acceptance test guidelines and criteria
- Network management
- Cost proposal for initial equipment, implementation, and ten-year maintenance and support

FE will support the County in its development of a *Rowan County Radio Infrastructure RFP* incorporating the technical specifications, boilerplate terms and conditions provided by the County, and other local purchasing requirements. We will submit the draft RFP to the County for review and comment, update based on the County's review, and submit a final RFP for Rowan County Radio Infrastructure.

Procurement Support for Radio Infrastructure

FE will assist the County with the following system vendor procurement activities:

- Responding to written vendor questions and preparing addenda, as needed.
- Establishing the evaluation criteria and a vendor evaluation scoresheet.
- Reviewing vendor proposals, participating in evaluation meetings and vendor interviews, and assisting with proposal scoring and vendor selection.

FE will conduct an independent, unbiased review of each radio system vendor's proposal (up to three), researching the proposals for technical compliance to the RFP technical specifications. We will perform an item-by-item comparison of each technical specification and non-technical requirement documenting compliance or non-compliance to each, with concise assessments of non-compliance and relative strengths and weaknesses of each response. We will then compile a summary of our findings and present them to the County.



Subscriber Radio Technical Specifications and RFP

FE will prepare the specifications for portable and mobile radios and accessories. Specifications will describe the radios' functional and performance requirements in sufficient detail for vendors to submit consistent proposals and will be verifiable through future testing. Specifications will also incorporate the Subscriber Radio Testing and Verification Program requirements that the vendors must meet including the following:

- Testing environment will include two firetrucks parked parallel running at high idle with a gasoline powered chain saw and a portable generator with an electric ventilation fan running and blowing towards the radio operator standing in the middle.
 - Baseline testing—test environment with no equipment running
 - Operator wearing an air pack
 - Operator wearing an air pack with voice amp
 - Operator wearing an air pack with Blue tooth connectivity
 - Operator wearing an air pack with a PASS alarm activated
 - Operator standing in simulated rain
- Coverage testing
- Durability testing
 - Immerse in bucket of water for five minutes
 - Drop radio from five feet on each side and antennae
 - Test display screen for scratch resistance
 - Allow operator to roll several times on the ground with radio
 - at the waist
 - Immerse in a bucket of water for five minutes after the above testing
 - Place the radio in an oven at 350 degrees for ten minutes
- System security and integrity with current system
- Ability to perform at established system failure criteria

The detailed test procedures to meet the above requirements will be developed by the vendors and submitted to the County for review and approval.

FE has worked with multiple clients to develop and oversee customized testing and verification programs of various manufacturers' radios. We have conducted both subscriber testing similar to that being requested by the County and full-scale tactical tabletop and field exercises to evaluate interoperability and radio performance in real-life operational scenarios. As an example, for the City of Edmonton Fire Department, **FE** conducted extensive subscriber unit testing (noise, durability) to identify radio models from multiple vendors that comply with NFPA requirements.

FE will work with the County to accomplish the following:

1. Identify and document available resources to use during testing such as fire trucks and first responder equipment



2. Establish an overall schedule to complete the program
3. Identify any stakeholders that should be involved during the testing
4. Identify target areas for coverage testing including indoor facilities and fringe coverage areas
5. Identify coverage testing parameters (i.e. portable on hip with a shoulder mic, pass alarms, etc.)
6. Establish final quantities and model types to include in specifications
7. Create an overall program that includes vendor outreach program and agenda for vendor demonstrations of available radios

FE will support the County in its development of a *Rowan County Radio Subscriber Units and Accessories RFP* incorporating the technical specifications, Subscriber Testing and Verification Program requirements, boilerplate terms and conditions provided by the County, and other local purchasing requirements. We will submit the draft RFP to the County for review and comment, update based on the County's review, and submit a final RFP for Rowan County Radio Subscriber Units and Accessories.

Procurement Support for Radio Subscriber Equipment and Accessories

FE will assist the County with the following radio subscriber procurement activities:

- Coordinating vendor demonstrations.
- Overseeing the Subscriber Testing and Verification Program for selected vendors
- Responding to written vendor questions and preparing addenda, as needed.
- Establishing the evaluation criteria and completing a vendor evaluation scoresheet, based on evaluation of the vendor proposals and findings from the Subscriber Testing and Verification Program

FE will conduct an independent, unbiased review of each radio subscriber unit proposal (up to three), researching the proposals for technical compliance to the RFP technical specifications. We will perform an item-by-item comparison of each technical specification and non-technical requirement documenting compliance or non-compliance to each, with concise assessments of non-compliance and relative strengths and weaknesses of each response. We will then compile a summary of our findings and present them to the County.

Following evaluation of the vendor proposals, **FE** will advise the County in its selection of vendors and radio models to participate in the Subscriber Radio Testing and Verification Program. We will finalize the agenda and then schedule the onsite vendor demonstrations and testing. **FE's** technical lead will spend five days onsite to observe vendor demonstrations and report upon the results of the Subscriber Testing and Verification Program.



3.4 Phase III—Project Management and Implementation Support Services

Upon County authorization to proceed to Phase III, **FE** will provide project management and implementation support services. **FE** has worked as the subject matter expert with many clients during implementation and will represent the County's best interests through this process. Our project manager will coordinate with the County to determine which tasks should be support by **FE** based upon the radio system vendor's implementation tasks and schedule, and County's requirements.

Our project plan assumes implementation coordination and management services on a Time and Material basis to support the following tasks:

- Provide project management including oversight of vendors.
- Attend up to two public meetings to explain the project and its impact on the local community.
- Review vendor test plans, observe two days of vendor-conducted acceptance tests, and review and evaluate vendor test results
- Consult with the County to identify and help avoid or mitigate foreseeable system failures due to planning or equipment obsolescence.

3.5 Optional Services

Indoor and Wide Area Coverage Field Testing (Optional)

FE can also provide, as an option, field coverage testing of both outdoor and in-building propagation throughout the County. We use proven equipment to measure signal strength and other properties in sectors and buildings and analyze the results.

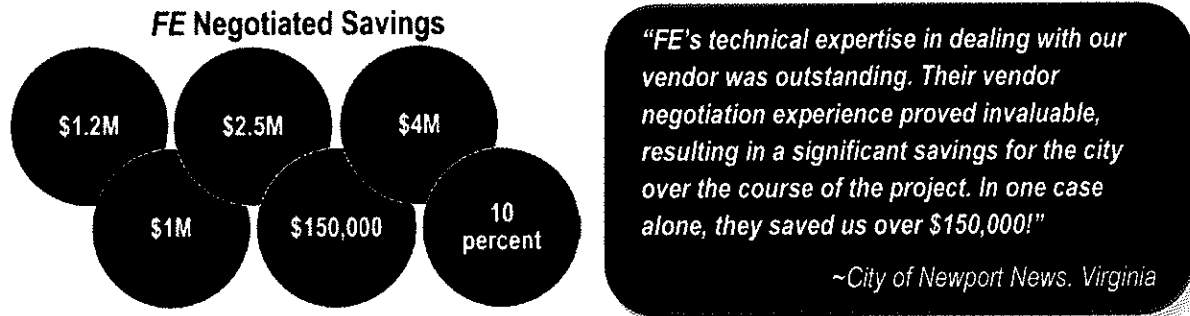
Some of our clients have insisted upon this testing; however, history has shown that conducting in-building and/or field testing analyses of existing networks, although this generates more money for consultants, may be of minimal value to the project owner. These measurements tend to reflect the performance of the existing system and do not, typically, reflect the performance of the envisioned system which will have newer technology radios with different transmission characteristics. Therefore, if the County intends to replace the current system with a new P25 system, the money for field testing the old system would be better spent elsewhere.

Contract Negotiations (Optional)

FE can provide the County with experienced contract negotiations support. Our specialists have considerable experience negotiating public safety radio and microwave systems, equipment, and services, with a proven track record of saving millions of dollars for our clients. Because of their dealings with radio and microwave system vendors on a regular basis, they have insights into vendors' negotiation methods and practices and can assist the County in resolving disputes. For example, **FE** saved the City of El Paso approximately 10 percent of the system costs as a result of our involvement and in one of our current county



projects in Virginia, our negotiations resulted in a savings of approximately 40 percent of the total cost of the system.



PSAP Technology Consulting Services (Optional)

Over the past decade, the proliferation of information technology in public safety has led to the development of disparate systems that do not communicate with one another. The integration of these systems is in the best interest of public safety and makes sound business sense for the County. However, the process of acquiring a new technology such as a CAD/RMS system can seem overwhelming. As an option, **FE** can support the County in the integration of existing CAD or specification and procurement of a new CAD/RMS system(s).

Industry standards, architecture specifications, security, and other mandated requirements must also be considered while developing the architecture and operations processes, policies, and operational workflow. **FE** team members are proficient in industry standards pertaining to CAD/RMS solutions. We benchmark industry standards against our clients' processes and document the changes needed for improvement. In all our workshops, focus groups, and interviews we include consideration of standards, best practices, and policies applicable to public safety and information technology.

FE uses industry standards as a starting point to define the functionality of a CAD, RMS, or mobile data system, based on County needs, to efficiently interface and share information with other systems both internally and externally.

FE recognizes the importance and increasing reliance that public safety operations and management place on automated systems and technologies. We recognize that CAD systems are essential components of a public safety and emergency response system. **FE** staff has extensive experience managing and supporting public safety agencies and technologies. We have gained an in-depth understanding of the complexities involved and alternatives available in designing and implementing myriad public safety technical solutions. Our team understands how these solutions need to be integrated as seamlessly as possible into an operational environment.



Comprehensive Implementation Oversight (Optional)

Our scope of work includes implementation support of the tasks called out in the County's RFP. As an option, **FE** provides comprehensive project management services throughout the Implementation Process. Any of these services can be provided upon request, at an additional cost:

- Coordinate and participate in an Implementation Kickoff Meeting to discuss project goals, objectives, tasks, schedule, and deliverables with County and the selected vendor
- Participate in monthly project status teleconferences, or as required
- Participate in monthly on-site project status meetings
- Assist in the development of project execution processes as they relate to milestone processing, effective communications across teams, roles and responsibilities, and documentation formats
- Review frequency plans and license applications as required
- Review system fleet mapping
- Maintain an independent punchlist
- Assist the County in resolving vendor issues, oversee the vendor's punch list development and resolution process, identify any vendor performance issues, and make appropriate recommendations to County
- Coordinate with County project management personnel

FE can provide unbiased and objective implementation management services including oversight of delivery, installation, and testing of the new system as described below:

Detailed System Design and Acceptance Test Plan Reviews/Modifications per Review

- Detailed system design and ATPs (vendor produces and presents; **FE** reviews)
- Shop drawings including structures (vendor produces; **FE** reviews)
- Test plans (vendor develops; **FE** reviews)
- Cutover/migration plans (vendor develops; **FE** reviews)
- System backup and failure plans (vendor develops, **FE** reviews)
- Requirements Tracking Matrix and punch list (**FE** maintains)

Regulatory Management

- FCC licensing
- NEPA/environmental impact reporting (if applicable)
- Site leasing and local zoning/planning (if applicable)

Equipment Inspections

- Equipment list (vendor produces, **FE** reviews)
- System component delivery (vendor orders, **FE** verifies)
- Requirements Tracking Matrix and punch list (**FE** maintains)



Installation Inspections

- Site installation inspections (vendor executes; **FE** observes and/or verifies)
- Site inspections-workmanship, structural and civil work (vendor executes; **FE** observes and/or verifies)
- Requirements Tracking Matrix and punch list (**FE** maintains)

Factory Testing

- Factory testing (vendor tests; **FE** observes and reviews test results)
- Requirements Tracking Matrix and punch list (**FE** maintains)

Field and Coverage Testing

- Backhaul system path testing (vendor tests; **FE** participates and reviews test results)
- Network management system performance testing (vendor tests; **FE** participates and reviews test results)
- System integration testing (vendor tests; **FE** participates and reviews test results)
- Rework unaccepted tests (vendor tests; **FE** participates and reviews test results)
- Requirements Tracking Matrix and punch list (**FE** maintains)

System Acceptance Testing

- Final system acceptance test inspection and certification (vendor tests; **FE** participates, reviews, evaluates, and provides recommendation)
- Requirements Tracking Matrix and punch list (**FE** maintains)

"The City and County of Denver Radio Project is a complex undertaking with a very aggressive timeline. We are very satisfied with FE's ability to meet our project schedule and they have exceeded our expectations. We recommend FE as a valued partner"

~ Gary Pasicznyk, Director, Agency Services, Technology Services, City and County of Denver

3.6 Ability to Perform and Project Schedule

FE currently has active public safety communications projects around the country. We have more than 50 senior consultants to engage projects, and a select group of strategic partners who augment **FE's** staff and expertise. Our team has the depth of resources with the broad range of skills necessary to successfully complete the scope of the County's services fully, on time, within budget, and in a high-quality manner. We have a proud history of completing our projects on time and within budget. We have never had a project end in default and most of our projects result in repeat business.

FE has invested in web-based resource management tools to enable daily project tracking and resource loading per staff member by month and quarters. To manage adequate staffing of our projects, Mr. John Murray, Executive Vice President/ Chief Operating Officer, meets regularly with the Directors of Operations to review the assignment of every resource in the company to provide the necessary skills and knowledge to succeed in the work ahead. Through these discussions and employing automated resource allocation systems, he forecasts resource needs for the upcoming 12-to-18 months, allowing for long-term planning.



Rowan County, North Carolina

Radio Communications Consulting

We provide a timeline of our proposed schedule below. This tentative schedule can be accelerated or delayed to meet the County's needs and will be finalized with the County's project manager upon award. *FE* will commit the staff and resources needed to meet the County's scope and schedule.

Task	Anticipated Duration (Business Days)	Weeks from NTP
Phase I—Needs Assessment and Recommendations		
Project Startup Activities and Planning	10 days	2
Documentation RFI/Review	5 days	3
Project Initiation, Site Visits, User Interviews	5 days	4
Existing System Analysis	3 days	5
Needs Assessment & Requirements Definition	2 days	5
<i>Draft of System Needs Assessment & Requirements Report</i>	4 days	6
Present report, client review, final report	6 days	8
Technical Analysis and Recommendations	3 days	9
Governance and Financial Analysis	3 days	10
<i>Draft of Analysis and Recommendations Report</i>	3 days	11
Present report, client review, final report	6 days	12
Phase II—RFP Procurement System Upgrades		
System Infrastructure Specifications and RFP	15 days	15
System Infrastructure Procurement Process (RFIs, vendor evaluation)	30 days	21
Subscriber Equipment Specs, Vendor Test Program Development, and RFP	15 days	24
Subscriber Equipment Procurement Process (RFIs, vendor evaluation)	30 days	30
Vendor Testing and Verification Program / Vendor Demos	5-10 days	32
Phase III—Implementation Oversight		
Project Management and Oversight Services	60 days	44



4 PROJECT TEAM AND PERSONNEL

FE has carefully selected our team to meet Rowan County's project needs. Our team has experience within the State of North Carolina, having worked on projects with Buncombe, Orange, and Yadkin Counties, giving us unique insight to the region.

The in-house personnel proposed for this project have extensive experience assisting clients upgrade radio systems and enhance system performance to fully meet user expectations. Our in-house staff of consultants, engineers, and technical experts have worked on hundreds of mission critical RF systems and operations.

Our proposed team has years of experience as a cohesive group delivering the best public safety consulting services in the industry. We are a trusted industry advisor to our clients and appreciate the unique needs of public sector agencies. Our team can take the most complex technical information relative to radio communications and present it in ways non-technical audiences can understand.

FE's team brings a wealth of knowledge and understanding to the County's public safety communications project. Each person has significant experience working with clients to upgrade or replace Motorola systems, as well as other relevant technologies, including analog and digital 800 MHz, trunked, P25 Phases 1 & 2, simulcast, VHF/UHF, fire alerting systems, and more.

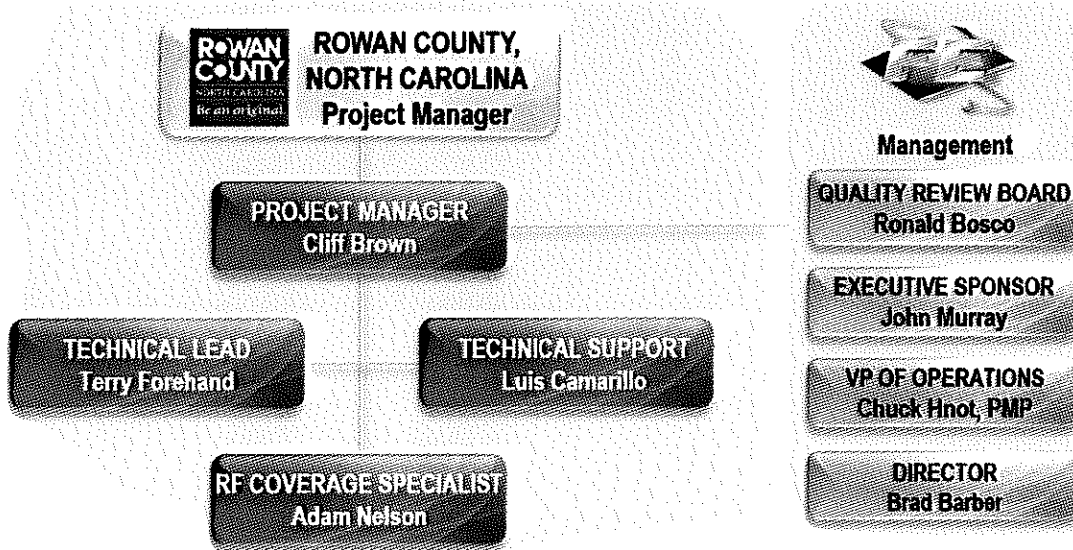


Exhibit 4—Project Organization Chart

The FE team specializes in P25 system upgrade projects in the southeastern United States.

Brad Barber is the project director and alternate project manager for this engagement and will be ultimately responsible for the success of the project. Mr. Cliff Brown will be our



technical project manager for the duration of the project, providing a single point of contact to the County and managing our internal team. They will work closely with our senior technical consultants Terry Forehand and Luis Camarillo, and RF expert Adam Nelson. Our principal owner Ron Bosco leads the QA Board for all projects, and Vice President Chuck Hnot will provide an independent review and quality control of all deliverables.

Our proposed project team is thoroughly familiar with public safety communications systems and operations and systems methodologies. As demonstrated in their resumes, each member of our team possesses an extensive track record in P25 communications system upgrades and legacy system replacements, operations, design, and implementation management. We understand the necessity for reliable communications systems for first responders and the different operating environments faced by police, fire, and EMS responders. Our team will work closely with the County to enhance the system performance and improve overall radio features while increasing interoperability with other systems.

In addition to our proposed staff, **FE's** in-house staff of over 50 qualified radio consultants and subject matter experts are available to assist as needed.

Additional details about and resumes for each team member are provided on the following pages.

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BRADLEY R. BARBER

Director



RELEVANT SKILLS

- Public safety communications project management
- Develop project plans and schedules
- Complete existing systems review and needs assessments
- Conduct stakeholder interviews and capabilities assessment
- Determine system requirements
- Present alternatives
- Conceptual design and specifications development
- Develop procurement documents
- Assist with vendor interviews, selection, contract negotiations
- Supervise system implementation

GENERAL BACKGROUND

Mr. Barber has over 29 years of experience in wireless communications systems and project management. His background includes implementation and management of public safety and commercial wireless communications networks and the operation of enterprise activities in commercial, utility and governmental environments.

With this diverse background in land mobile radio communications, Mr. Barber is actively involved in the technical and operational issues inherent in today's complex and rapidly changing wireless environment such as P25, rebanding, narrowbanding, interoperability, and system lifecycle planning.

RELEVANT PROJECT EXPERIENCE

State of North Carolina

- New Hanover County 800 MHz Rebanding Services and Inside Cabling Design

State of Tennessee

- City of Bartlett Public Safety Communications Upgrade Planning

State of Georgia

- Camden County Communications Consultant
- Henry County LMR System Replacement

State of Florida

- Collier County PSMR Procurement and Implementation Services
- Gainesville Regional Utilities LMR Consulting Services
- City of Gainesville Radio Enhancement Design, Development, and Implementation

Commonwealth of Virginia

- Dinwiddie County Radio Consulting Services
- King and Queen County PSMR Consulting Services
- Middlesex County PSMR Consulting Services
- Orange County Radio Consulting and Engineering Services
- Sussex County PSMR Consulting Services
- Essex County Radio Communications Consulting Services

State of Arkansas

- City of Hot Springs PSMR Assessment thru Implementation

AREAS OF EXPERTISE

- Digital and analog LMR, including trunked, 700/800 MHz, VHF/UHF, and P25
- Emergency Communications Centers/Public Safety Answering Points
- CAD/RMS
- NG9-1-1
- Wide area simulcast radio systems
- Public safety software applications
- System lifecycle analysis

PROFESSIONAL TRAINING

- Motorola systems
- PCIA-Certified Land Mobile Radio Communications Technician

PROFESSIONAL ORGANIZATIONS

- Association of Public Safety Communications Officials (APCO)
- NPSTC Interoperability Committee, 2013- present
- Motorola Trunked Users Group (MTUG) Technical Support Subcommittee
- Motorola Utility Trunked Users Alliance (MUTUAL)
- Motorola Data Users Group (MDUG)



CLIFF BROWN

Project Manager



EDUCATION & TRAINING

- Bachelor of Science, Electrical Engineering, Illinois Institute of Technology

RELEVANT SKILLS

- Public safety communications project management
- Existing system and needs assessments
- Product and services development
- Engineering and conceptual design
- Procurement process (RFP development, vendor proposal review, contract negotiations)
- Network implementation and testing
- Ongoing operations and maintenance

GENERAL BACKGROUND

Mr. Clifton "Cliff" Brown is a highly motivated, creative, and versatile manager in the wireless telecommunications industry, with extensive experience in turning customer needs into deliverable solutions, including planning; product and services development; engineering design; RFP process; site development; network implementation; network testing; and ongoing operations and maintenance. He possesses a clearly demonstrated history of exceeding goals, finding the right people for the job, and challenging them to the highest levels of performance.

Mr. Brown's experience includes the successful program and project management of systems ranging from citywide to nationwide in scope. He is skilled in providing management and oversight in system and network designs to meet customer needs, using leading technologies such as 700/800 MHz, LTE, WiFi, VHF, WiMAX, public safety in-building DAS, P25, MESH-based SmartGrid, broadband backhaul (fiber, MOE, microwave), and cloud-based network management.

RELEVANT PROJECT EXPERIENCE

State of North Carolina

- State of North Carolina NG9-1-1 System Planning and Procurement
- Orange County Infrastructure Upgrade Plan
- Buncombe County Interoperability Assessment and Licensing Review
- Lenoir County Forensic LMR Consulting Services

Commonwealth of Virginia

- King and Queen County Public Safety Communications Consulting Services
- Essex County Public Safety Communications Consulting Services
- New Kent County P25 Phase 2 Radio System Design and Implementation Support
- City of Chesapeake P25 Phase 2 Radio System Procurement and Implementation Support

Commonwealth of Kentucky

- City of Paducah Public Safety Communications Consulting Services
- City of Henderson and Henderson County P25 Phase 2 System Consulting

State of Georgia

- Henry County Public Safety Mobile Radio Consulting
- Camden County Communications Consultant

State of Florida

- Lee County Radio Communications P25 Consulting

AREAS OF EXPERTISE

- Digital and analog LMR, including 700/800 MHz, P25, VHF/UHF, trunked
- LTE
- NG9-1-1
- Broadband
- Microwave/fiber backhaul
- CAD

PROFESSIONAL ORGANIZATIONS

- Institute of Electrical and Electronics Engineers

LICENSES & CERTIFICATIONS

- Professional Engineer, State of Illinois (inactive)



TERRY FOREHAND

Technical Lead



AREAS OF EXPERTISE

- Public safety and private wireless networks
- Needs assessment and solution development
- Voice and data communications network implementation & acceptance testing
- Radio system exercise development and execution
- Radio system budgetary analysis

GENERAL BACKGROUND

Mr. Forehand has over 18 years in designing, implementing, managing, and maintaining land mobile communications systems for the United States Army, local government and private enterprises. He is experienced with P25 systems and broadband systems and has developed interoperable programming templates for trunking and conventional radios and networks. Mr. Forehand has also developed budgetary requirements for communications systems and managed the implementation of complex systems.

RELEVANT PROJECT EXPERIENCE

State of North Carolina

- Yadkin County PSMR Implementation Support
- Orange County PSMR Interoperability and Systems Engineering Services

State of Georgia

- Camden County P25 PSMR Needs Assessment
- Henry County P25 PSMR Assessment and Procurement Support

Commonwealth of Virginia

- Rockbridge County P25 Radio System Procurement Support
- Fauquier, Culpeper, and Rappahannock Counties P25 PSMR Upgrade Support
- Caroline County P25 PSMR Upgrade Support
- King and Queen County P25 Radio Communications System Procurement and Implementation Support
- Pittsylvania County PSMR P25 VHF Conceptual Design, Procurement, and Implementation Support

Commonwealth of Kentucky

- City of Paducah Public Safety Radio, Logging, and CPE Consulting Services
- City of Henderson-Henderson County, Kentucky PSMR P25 Needs Assessment and Analysis, and RFP Development
- City of Bowling Green/Warren County PSMR Assessment and Procurement

State of Florida

- Gainesville Regional Utilities 800MHz Radio System Consulting Services
- Nassau County Public Safety Radio Procurement, Implementation, and Maintenance
- City of Lakeland 800 MHz P25 Radio System Upgrade Support
- Alachua County P25 Radio Communications System Upgrade
- Lee County P25 PSMR Communications Upgrade Support

PROFESSIONAL TRAINING

- Radio Repeater Course, U.S. Army
- Satellite Communications Systems Terminal Maintainer Course, U.S. Army
- ASTRO 25 Radio System Management, Motorola

PROFESSIONAL ORGANIZATIONS

- Association of Public Safety Communications Officials (APCO)

CERTIFICATES AND AWARDS

- CENTRACOM Gold Elite Certificate of Achievement, Motorola
- SmartZone Overview Certificate of Achievement, Motorola
- ASTRO 25 Integrated V&D Certificate of Completion, Motorola



LUIS CAMARILLO

Technical Support



EDUCATION

- Master of Science, Information Engineering, and Telecom Engineering, Southern Methodist University
- Bachelor of Science, Telecom Engineering Technology, Texas A&M University

AREAS OF EXPERTISE

- Long Term Evolution
- Public safety mobile radio
- Wireless communications
- RF propagation analysis
- VoIP disaster recovery
- Traffic engineering theory
- Electronic circuit analysis
- Engineering management
- Information technology
- Network management

GENERAL BACKGROUND

Mr. Camarillo is a Certified Telecommunications Engineer with over 10 years of hands-on experience in cellular communications, information technology and land mobile radio. He has valuable knowledge in Project 25 (P25), digital mobile radio (DMR) and long-term evolution (LTE). Mr. Camarillo has designed citywide, countywide, and statewide voice and data systems that meet and often exceed customer requirements. System design activities include user needs assessments, product lifecycle evaluation, radio coverage analysis, and RFP development. Mr. Camarillo's extensive background solidifies his ability to analyze the ever-changing requirements in today's mission-critical environments.

RELEVANT PROJECT EXPERIENCE

State of North Carolina

- Orange County Radio System Upgrade Plan and Coverage Analysis

State of Florida

- City of Gainesville Radio System Enhancement Study
- Lee County P25 Radio Communications Consulting

State of Georgia

- Henry County Public Safety Radio System Replacement Services

Commonwealth of Virginia

- Dinwiddie County PSMR Assessment, Design, Procurement, and Implementation

Commonwealth of Kentucky

- City of Paducah Public Safety Mobile Radio and CPE Consulting Services

State of Tennessee

- Town of Collierville Radio Communications Consulting Technical Support

State of Texas

- El Paso County P25 Radio Communications System Consulting Services
- City of El Paso P25 Radio Communications System Consulting Services

State of New Mexico

- City of Albuquerque LMR System Assessment and Procurement Support
- Santa Fe County PSMR Procurement Consulting Services

PROFESSIONAL ORGANIZATIONS

- Institute of Electrical and Electronics Engineers
- International Association for Radio, Telecommunications and Electromagnetics



ADAM NELSON

RF Coverage Specialist



EDUCATION

- Master's Degree, Geographic Information Systems, The Pennsylvania State University
- Bachelor of Science, Information Technology, University of Phoenix, with honors

RELEVANT SKILLS

- RF propagation prediction/analysis
- RF interference assessment and mitigation
- System capacity planning
- Frequency planning
- Frequency coordination and licensing
- GIS coordination, curation, analysis, and modeling
- Spectrum availability
- Radio infrastructure and performance analysis
- LTE system design

GENERAL BACKGROUND

Mr. Nelson has over 15 years of experience providing consulting services in the fields of public safety, telecommunications, and information technologies. As a member of **FE's** Spectrum Center of Excellence, his specialties include radio frequency prediction and analysis, frequency and capacity planning, interference mitigation, LTE system design and analysis, and spectrum-related efforts pertaining to frequency licensing and coordination.

His background also includes the management and maintenance of various municipal wireless networks, specifically in the realm of public safety communications. He has participated in all phases of communications system lifecycle from needs assessment, system recommendations, RFP development, through implementation. Mr. Nelson has extensive experience with GIS platforms such as ESRI's ArcGIS. Leveraging his GIS expertise, he has developed web apps, geo-processing tools, and analysis models for various types of communications systems

RELEVANT PROJECT EXPERIENCE

RF Coverage Prediction, Capacity Analysis, Interference Analysis, and/or Channel Planning for the following clients/projects:

County Projects

- Lenoir County, North Carolina
- Orange County, North Carolina
- Pitt County, North Carolina
- Buncombe County, North Carolina
- Camden County, Georgia
- Caroline County, Virginia
- Collier County, Florida
- Dinwiddie County, Virginia
- Henry County, Georgia
- Lee County, Florida
- New Kent County, Virginia
- Sussex County, Virginia

Municipal Projects

- City of Bartlett, Tennessee
- City of Bowling Green / Warren County, Kentucky
- City of Bristol, Connecticut
- City of Chesapeake, Virginia
- Town of Collierville, Tennessee
- City of Gainesville, Florida
- City of Hampton, Virginia
- City of Henderson, Kentucky
- City of Portsmouth, Virginia
- City of Roanoke, Virginia

CERTIFICATIONS AND TRAINING

- Simulcast Radio Systems, Motorola Certified Training
- Integrated Voice and Data Systems, Motorola Certified Training
- RAPTR Certified Training
- ATDI Developer Training
- ArcGIS Developer Training
- Certified GEOINT Professional
- Satellite Communications Systems Terminal Maintainer Course, U.S. Army
- ASTRO 25 Radio System Management, Motorola

PROFESSIONAL ORGANIZATIONS

- Association of Public Safety Communications Officials (APCO)



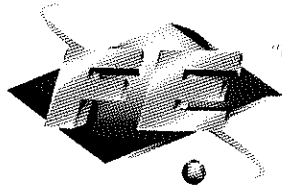


5 COST PROPOSAL (SEPARATELY SEALED ENVELOPE)

As required by the RFP, our cost proposal is included in a separately sealed envelope. It provides project cost, hourly rates, requirements for County support and other assumptions, and responses to terms and conditions described in the RFP.

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"Unleashing the Power of Technology"

**Federal
Engineering®**

Federal Engineering, Inc.

10600 Arrowhead Drive
Fairfax, VA 22030
703-359-8200

November 14, 2018

Rowan County Finance Department
Attention: David Sifford, Purchasing Agent
130 West Innes Street
Salisbury, NC 28144

Dear Mr. Sifford:

Federal Engineering, Inc. (*FE*) is pleased to submit this proposal to Rowan County, North Carolina to serve as radio communications consultant on behalf of the County. The attached cost proposal details the pricing for tasks required for the successful completion of the project as defined in your RFP for Consulting Services for Public Safety Radio Communications and clarified in Addendum 1 dated November 2, 2018.

FE specializes in the planning, assessment, needs analysis, conceptual design, specification, and RFP development to upgrade standards-based P25 digital systems in all frequency bands. We have extensive experience in providing services related to vendor evaluation, contract negotiations, system implementation, and testing oversight.

FE's proposal is complete and compliant with the requirements in the RFP and describes, in detail, how we will accomplish the required tasks. *FE* possesses the permits, licenses, and professional credentials required to perform consulting services as specified in the RFP.

Our senior management team is actively involved in all projects, providing both technical and operational guidance and executive management of the team and our high-quality deliverables. As the founder of *FE*, I will be your contact regarding this proposal and will participate in the negotiation of contractual issues. By my signature below, I hereby authorize submission of this proposal and bind Federal Engineering, Inc. to the terms and conditions of this proposal for a period of 90 days, beginning on the due date for proposals.

My team and I look forward to working with Rowan County on this project.

Sincerely,

Ronald F. Bosco
President and Chief Executive Officer
Federal Engineering, Inc.



Rowan County, North Carolina
Radio Communications Consulting

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Exhibit 1—Cost Breakdown by Task 1





Rowan County, North Carolina

Radio Communications Consulting

COST PROPOSAL

Firm Fixed Price

The total firm fixed price, including labor, travel, and other direct costs, for the Rowan County Radio Communications Consulting project is \$149,341.

FE's proposed price for this project is indicative of the efficiency of our operations, our proven automated tools, our vast experience completing similar projects, and our view of the strategic nature of Rowan County's project. Further, it is not our culture to "up-scope" during contract negotiations or during the project, unless the County adds scope of work beyond that outlined their RFP.

Price Breakdown per Task

A breakdown of activities and proposed costs for services and deliverables is provided in the table below.

Tasks	Description	Cost
Phase I	Needs Assessment and Recommendations	\$78,272
Phase II	RFP Procurement System Upgrade	\$46,143
Phase III	Project Management and Implementation Support Services	\$24,926
	<i>Total</i>	<i>\$149,341</i>

Exhibit 1—Cost Breakdown by Task

The above are the costs for each task and not intended to represent invoicing milestones. There may be multiple invoicing milestones within each task that will be mutually agreed upon.





Rowan County, North Carolina

Radio Communications Consulting

Hourly Rates

If required by Rowan County, *FE* can provide additional services in accordance with the rate schedule below.

SCHEDULE A

Effective January 1, 2018 through December 31, 2019

Principal	\$ 330.00 per hour
Vice President	\$ 298.00 per hour
Assistant Vice President	\$ 265.00 per hour
Director/Chief Consultant	\$ 233.00 per hour
Senior Consultant	\$ 195.00 per hour
Consultant	\$ 168.00 per hour
Senior Analyst	\$ 140.00 per hour
Analyst	\$ 103.00 per hour
Administrative / Computer Services	\$ 71.00 per hour

TERMS AND CONDITIONS

1. Labor rates do not include state or local taxes.
2. Travel and meals on a per diem basis will be invoiced at actual cost plus 20 percent to account for general and administrative costs.
3. Hours expended for travel in support of any time and materials task orders are billable hours.
4. Invoices will be rendered monthly. All invoices are due and payable 30 days from issuance. Late balances are subject to a finance charge of 1.5 percent per month (or fraction thereof).

Proprietary Notice

This proposal, its contents, and appendices are proprietary to Federal Engineering, Inc. and shall not be disclosed to third parties without prior written permission from Federal Engineering, Inc. Should this proprietary notice conflict with any government procurement regulations, policies, or practices, the government procurement regulations shall take precedence.

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Fairfax, Virginia





Rowan County, North Carolina

Radio Communications Consulting

Basis of our Proposal

1. This proposal assumes Federal Engineering, Inc. will perform the tasks as called out in the technical proposal (excluding optional tasks). The deletion of a task, a significant change in scope of one or more tasks, or use of a phased implementation approach may affect the overall price.
2. **FE** will provide draft and final deliverables electronically to Rowan County, North Carolina.
3. This proposal assumes that the County's Project Manager will schedule meetings, provide meeting facilities, notify attendees, and arrange for onsite visits.
4. Any optional or additional tasking will be authorized by mutual agreement of the County and **FE**. Such tasking will be performed on a time and materials basis in accordance with the rates in Schedule A or on a fixed price basis as mutually agreed upon in a task order by the County and **FE**.
5. **FE's** ability to fulfill this task depends, in part, on the willingness and ability of the Rowan County participants, equipment vendors, service providers, third parties, and others to provide information in a timely manner, and upon the accuracy of the information as supplied. The accuracy of input data, whether provided in electronic or hard copy form, and the recommendations, actions, system designs, system procurements, and license filings resulting therefrom cannot, therefore, be warranted by **FE** nor can the performance, suitability, or reliability of said systems be warranted by **FE**. **FE** accepts no responsibility or liability to any third party in respect to any information or related content delivered by **FE**. This information is subjective in certain respects, and, thus, susceptible to multiple interpretations and may be in need of periodic revisions based on actual experience and subsequent developments.
6. **FE** will review up to three radio infrastructure vendor proposals and up to three radio subscriber equipment vendor proposals. If additional hours are required to review additional proposals, a mutually agreeable amendment to this SOW will be executed by both parties.
7. **FE** will develop the requirements for the Subscriber Testing and Verification Program to be included in the Subscriber Equipment RFP. The testing will be conducted onsite in the County by the selected vendors, as part of the procurement evaluation process. **FE's** senior consultant will spend up to five days (40 business hours) onsite to observe and evaluate the success of each vendors' demonstrations and testing. If additional hours are required for subscriber equipment testing and verification, a mutually agreeable amendment to this SOW will be executed by both parties.
8. The level of effort for Phase III Project Management and Implementation Support Services can vary greatly depending upon the winning equipment vendor's proposal as well as the division of responsibilities among the equipment vendor, County, and Consultant. This proposal, therefore, is based upon a maximum of 148 hours of **FE** senior consultant support and includes onsite attendance at up to two public meetings





Rowan County, North Carolina

Radio Communications Consulting

and two days onsite to observe vendor coverage testing. Project status meetings will be attended via conference calls. If additional onsite trips or hours are required, a mutually agreeable amendment to this SOW will be executed by both parties.

9. This proposal is based upon a contract award on or before December 3, 2018 and start date on or before January 3, 2019 and assumes a 44-week schedule to completion. The schedule for procurement and implementation oversight will be adjusted after determination of the County's procurement schedule and the vendor's final approved implementation schedule. Delays to the project schedule due to actions or lack of actions on the part of the County, County participants, third parties, and others including, but not limited to vendor protests, protracted contract negotiations, and vendor delays may impact the program schedule and/or costs to the County, will be brought to the attention of the County's project manager in a timely manner, and will be reduced to writing via a mutually agreed upon contract amendment.
10. This proposal assumes a mutually agreeable invoicing schedule for work completed.
11. Federal Engineering reserves the right to assign/reassign work efforts and associated costs across tasks and between our professional staff members in order to meet our contractual obligations to the County.

