



Proposal for the

Study and Report of Emergency Service and Wireless Telecommunications Infrastructure Master Plan

Prepared for:

**Town of
Bedford,
New York**

CityScape
CONSULTANTS, INC.



Prepared by:
CityScape Consultants, Inc.
May 10, 2019

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1. LETTER OF INTEREST

May 10, 2019

Mr. Joseph Lombardo, Chairman
Town of Bedford
Address
Bedford, NY
jlombardo@bedfordny.gov

Dear Mr. Lombardo,

CityScape Consultants, Inc. (CityScape) appreciates the invitation and opportunity to respond to the Town of Bedford's (Town) Solicitation to Bid (STB) For the Study and Report of Emergency Service and Wireless Telecommunications Infrastructure Master Plan (Master Plan). Enclosed herein are four (4) paper copies of our STB response which details our interest in working with the Town on the above referenced project. As requested, a pdf copy has been emailed to Joseph Lombardo (jlombardo@bedfordny.gov).

CityScape actively assists municipalities nationwide in the assessment and studies of wireless infrastructure to enable communities to navigate through the ever-growing and changing telecommunications industry. We have worked exclusively with local government entities for more than 25 years and we are uniquely qualified to assist the Town related to all wireless telecommunications and permitting issues. CityScape has numerous clients in the State of New York and has developed master plans for cities, towns and counties across the country. Each plan is uniquely designed to the specifications of each community.

CityScape is pleased to team up with Federal Engineering, Inc. (**FE**) to produce a town-wide study that will incorporate emergency radio communications and wireless telecommunication infrastructure into a comprehensive plan with the intent to prioritize and preserve Town aesthetics, property values and the historical nature of the community. Federal Engineering specializes in planning, design, vendor evaluation and contract negotiations, and system implementation and test oversight to enhance emergency radio communications. **FE** develops customized tools, solutions, and deliverables based on client needs, while drawing upon their experience with hundreds of public safety radio projects. **FE** has assembled the best in-house team of subject matter experts with direct, hands-on experience planning, designing, and overseeing implementation of public safety radio system upgrades for municipalities and counties across New York State and the nation offering a deep understanding of public safety organizations, regulatory guidance, and cultural frameworks.

Jointly we believe that our creative team approach to the Town's goals and scope of work will identify and aid in the Town's desire to evaluate public safety concerns, enable the development of services in underserved areas while keeping with the Town's preservation of aesthetics and property values.

CityScape and Federal Engineering will provide a dedicated and experienced team to complete the work on the project. Together we are equipped to assist the Town in plotting a course that will enable the Town to proactively plan and evaluate practical opportunities and preferences related to the growth of 5G and beyond.

Thank you for your consideration and the opportunity to provide the Town with details on our collaborative team approach regarding our professional consulting services. By my signature below, I certify that I am authorized to bind CityScape in any and all negotiations and/or contractual matters relating to the above referenced STB.

Please feel free to contact us at the number below if you have any questions. You may also contact Elizabeth H. Smith below should you require additional information or explanation regarding our proposed services. Additional Proposal Contact: Elizabeth H. Smith at 800-438-2851.

Sincerely,



Richard L. Edwards
President, CityScape Consultants, Inc.
7050 W Palmetto Park Rd #15-652
Boca Raton, FL 33433
Rick@CityScapeGov.com
Tel: 877-438-2851 Fax: 877-220-4593

2. PROPOSAL SUMMARY

PROJECT UNDERSTANDING AND APPROACH

The Town of Bedford, New York (Town), is seeking a consultant to perform a town-wide study, generate a report of its findings, and develop an Emergency Services and Wireless Telecommunications Infrastructure Master Plan (Master Plan) for the Town. The Town's Master Plan will address all wireless infrastructure including the inclusion of emergency services on each facility; addressing the gaps of service coverage; while keeping the priority of preserving the current aesthetics, property values, and historical nature of the community. The Town is seeking a solution that increases emergency radio and citizen wireless coverages throughout all areas of the Town.

The Wireless Telecommunications Infrastructure Master Plan is a comprehensive wireless telecommunications study designed to facilitate the creation of an optimized wireless telecommunications environment that promotes efficient network deployment practices in the Town including all public safety aspects. The Master Plan is intended to identify the goals of optimal wireless network coverage throughout the Town while minimizing the visual impacts of the wireless infrastructure.

CityScape Consultants Inc. (**CS**) together with Federal Engineering Inc. (**FE**) proposes the following comprehensive approach for the development of a combined Study and Report of Emergency Service and Wireless Telecommunications Infrastructure Master Plan.

- Federal Engineering will complete a needs assessment, evaluation and study of the current state of the Town's emergency radio system including coverage and capacity capability/deficiencies;
- CityScape will conduct the study and assessment of the current commercial wireless deployment activity in the Town including projections for future wireless deployment;
- CityScape will compile both findings into a comprehensive Emergency Service and Wireless Telecommunications Infrastructure Master Plan.

The team will work directly with designated Town representatives along with the Wireless Facilities Working Group (WFWG) members to facilitate the desired goals and objectives of the Town.

FE's scope of work will be focused on the public safety radio system elements outlined in the Town's STB. **FE** will assess public safety user requirements for emergency communications (both voice and data) and interfaces to other systems. **FE** will evaluate the current state of the Town's radio system, analyze its coverage and capacity capability/deficiencies and assess the ongoing Westchester County emergency telecommunications infrastructure upgrade project. Based on that assessment, recommendations may be made for alternatives necessary to meet users' needs and achieve acceptable mobile and portable radio coverage throughout the Town of Bedford.

CS will focus on the citizens commercial wireless needs as discovered throughout the master planning process. The Town's wireless communication infrastructure is the backbone for anticipating the impending development, therefore all facilities will be inspected. All data will be collected, notated and evaluated for wireless coverage sufficiency. All data will be compiled into an inventory catalog constructing all significant information from each facility. The deployment patterns will be analyzed; Town characteristics will be studied and propagation mapping will showcase wireless coverage deficiencies. Projection analysis will contemplate complete Town wireless coverage. Regulation update recommendations will be made to ensure the Town complies with state and federal recommendations, protects the historic, bucolic character of the Town, but allows for the desired wireless services. The Plan will address the impending 5G deployment and the ramifications for the Town.

3. QUALIFICATIONS

CORPORATE PROFILE – CITYSCAPE CONSULTANTS, INC.

CityScape Consultants, Inc. provides consulting services to a niche market of local government agencies seeking advice and solutions relating to the complexities of wireless communications.

CityScape is a veteran owned business, incorporated in Florida in July 1997 and works in a collaborative effort with local government. CityScape maintains an administrative office in Florida and has engineering and regulatory offices in Atlanta, GA, Greensboro, NC and Washington, D.C.

CityScape CONSULTANTS, INC.



For the past 22 years, *CityScape* has exclusively consulted only to public agencies on wireless communications issues related to wireless telephone, broadband, broadcast and public safety network deployments. **CityScape has no current affiliations with any wireless communication industry companies, service providers, or tower owners and/or construction companies.** Because CityScape is not affiliated with any tower owners or wireless telecommunication service providers this precludes any potential issues or conflicts of interest.

CityScape provides technical information based on factual engineering data related to the necessities in wireless network design to develop policy related decisions. Important in the CityScape program is our expertise and background in Radio Frequency (RF) engineering, legal, and land use planning and zoning disciplines. Our specialized knowledge of the wireless industry can help the City better understand technical and legal options relating to wireless siting, communication policies and planning decisions.

CityScape specializes in working with local governments to promote the communities long range goals, protect aesthetics within the community, manage state or local land use development standards, and aid in the bridging of common concerns for solutions pertaining to wireless communications.

CityScape's menu of radio frequency engineering and land use planning consulting services include:

CITYSCAPE CONSULTANTS, INC.	
● Review of existing wireless communications regulations in local zoning codes and draft text amendment recommendations designed to promote healthy deployment of wireless networks;	● Site lease management administration and consulting for antenna and tower infrastructure proposed on publicly owned property;
● Third party site plan review and permitting consulting;	● Land use strategies designed to control wireless communications deployments;
● Assessment of existing antenna and tower infrastructure;	● Mapping to illustrate theoretical and actual propagation network coverage;
● Network forecasting and gap analysis troubleshooting;	● Educational workshops on network design;
	● Wireless master planning

The Town of Bedford will be well served if assisted by experts that are knowledgeable in all aspects of wireless planning, law and engineering. Radio Frequency consulting is the foundation of CityScape's business practices and we pride ourselves in understanding the needs of the wireless industry and their deployment techniques to help local government navigate this specialized field. Industry and regulatory knowledge paired with governmental expertise is what makes CityScape uniquely qualified to be the City's wireless communication consultant.

CITYSCAPE KEY PROJECT STAFF MEMBERS

CityScape professionals have been working exclusively with local government for two decades, bringing more than 125 combined years of experience in assisting governments with assessing the needs of communications facilities.

CityScape maintains all key disciplines in which a community should consider and require when choosing a wireless consultant: Telecommunications Attorney; FCC Licensed RF Engineers; NY State Registered Professional Engineer; Land Use Planners and key personnel with direct experience in developing and managing wireless telecommunications facilities. Not only has CityScape never lost a challenge, but we have been selected to provide expertise to communities to assist overcoming the adversarial recommendations of others.

CityScape's expertise is derived from its vast experience in RF engineering for the broadcast and the wireless communications industry. CityScape is qualified to consult with the City on communications projects because of our dedicated team, our philosophy, and our enthusiasm for ensuring local government is properly represented before the wireless industry. CityScape has completed thousands of wireless reviews, developed ordinances and regulations, developed and implemented numerous wireless master planning projects for communities nationwide.

All CityScape projects are collaborative efforts between both organizations, all working together to attain the common goals outlined in the various aspects of any wireless project, from master planning to wireless facility application reviews. Every CityScape team member strives to work in partnership with each client to meet all specific goals and expectations.

All proposed project work will be completed and performed under the direction of the following professional staff team members and RF engineering experts. Each project team member will be directly assigned to the project work proposed herein and will be available at all times for consultation with the City. **CityScape does not allow client location to compromise its professional and personal commitment to meet client expectations regardless of location.**

CityScape is proud to have tenure of working exclusively with local government entities and providing timely and unbiased information and recommendations to many long-term clients.

RICHARD L. EDWARDS

President

CityScape

EXPERIENCE

- 22 years CityScape Principal
- 30 years Broadcast Engineering

AREAS OF EXPERTISE

- Designed and installed combined FM radio systems for multiple facilities including nation's highest powered facility
- National Chairman for Broadcast Frequency Coordination
- Created new programs for NFL and staffed all cities for local game day frequency coordination
- Served on Steering Committee for HDTV
- Created a national wireless/broadcast transmission receiving tower firm
- Expert Witness on matters regarding radio frequency (RF) emissions

GENERAL BACKGROUND

Rick Edwards "Rick" is President/Owner and senior engineer with more than 50 years of professional broadcast FCC licensed RF engineering experience. Rick is President and Owner of CityScape. Rick directs all planning and engineering staff and provides oversight over all technical projects including wireless application review and expert testimony. Rick is considered an industry expert in RF engineering and is sought out for his expertise and knowledge. Rick has been in the forefront of leading edge technology during his 40 years professional experience and continues to stay ahead of the curve for future technology in all areas as it relates to communications. His specialty is creating new, effective and creative methods for deployment of wireless infrastructure. As leader of CityScape's engineering efforts, Rick has reviewed and managed thousands of new tower and collocation/modification application reviews. Rick seeks answers that are a win/win for both municipality and the wireless service provider. Rick's engineering planning includes, but is not limited to wireless application reviews for representation of coverage objectives, significant gaps, alternative sites utilizing solid land use law and policy from a federal, state and local perspective.

Rick has been twice elected by his peers to serve on the National District of Directors of the Society of Broadcast Engineers and is a past Chairman of the National Frequency Coordination Committee. Rick has served as an expert speaker on radio frequency propagation at past National Association of Broadcasters convention.

RELEVANT PROJECT EXPERIENCE

Hillsborough, CA

- Consulted with neighborhood association to secure reversal of Town decision to allow 26 new small wireless nodes on telephone poles; Town received erroneous information from its counsel and consultant regarding necessity of permitting in residential area; CityScape demonstrated applicable law supporting denial by Town; which was upheld by appeal by judicial decision.

Rye, NY

- Consulted with residents to challenge City council's initial decision to permit 40 new small wireless facilities; highlighted inaccuracies and false statements in applications which gave City basis to deny; Denial was judicially affirmed on appeal by applicant.

Dane County, WI

- Wireless Broadband Provider seeking new tower claimed existing alternative tower would not work; CityScape demonstrated errors in application that once corrected would permit collocation on existing facility.

Pompey, New York

- CityScape recommended compliance with existing height limits in regulations; applicant challenged and lost on appeal.

Savannah, GA

- Cityscape proposed 4 provider DAS system in lieu of single user poles in downtown corridor; Cityscape proposal adopted and implemented by City in fully concealed street light system.

Durham, NC

- Applicant proposed tower with excessive height; CityScape demonstrated to City how lower height facility could still meet objectives and be ordinance compliant.

PROFESSIONAL AFFILIATIONS

- Member AFFCE
- Licensed Amateur Radio Operator
- Federal Communications Commission General Class License
- Certified Technical Personal Communications Industry Association
- US Coast Guard Merchant Marine Officer Master Grade

ANTHONY T. LEPORE

Vice President and Communications Attorney

CityScape

<p>EDUCATION</p> <ul style="list-style-type: none"> • Boston University (B.S.) Suffolk University (J.D.) <p>EXPERIENCE</p> <ul style="list-style-type: none"> • 22 Years CityScape Principal • 30 years Communications Attorney <p>AREAS OF EXPERTISE</p> <ul style="list-style-type: none"> • Communications Law • Radio and Television Regulatory Compliance and Transactional Work • Local Wireless Infrastructure Regulations • Wireless site leasing and negotiations • Federal, State and Local Regulatory expertise 	<p>GENERAL BACKGROUND</p> <p>As Vice President and co-owner of CityScape Consultants, Inc., Anthony Lepore directs and provides guidance and oversight related to all wireless communications consulting to local governments on state and federal wireless regulatory issues. Anthony has more than 30 years' experience in communications regulation and is considered one of the most knowledgeable authorities regarding wireless communications regulation. Anthony has an extensive background and experience in developing compliant communications regulation and is conversant with currently applicable federal and state regulations applicable to local government, including the Telecommunications Act of 1996 and subsequent federal and state regulations and decisions affecting the placement of wireless infrastructure.</p> <p>Anthony is based in Washington D.C., where his background and focus has been on matters specifically focused on communications regulations and ancillary communications matters, such as FCC licensing and regulatory matters, representing clients engaged in both established and emerging communication technologies, including radio and television broadcasting, tower management services, mobile radio and interactive data services, and communications equipment manufacturers. Anthony can assist your local community in navigating the various state and federal protocols that govern wireless placement, as well as assisting local communities who opt to lease their public property for wireless infrastructure.</p>
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RELEVANT RECENT PROJECT EXPERIENCE

Pittsfield, MA

- Developed local infrastructure regulations for small wireless facilities in public right of way.
- Developed regulations for other wireless infrastructure.

Worcester, MA

- Collaborated on development of small wireless license agreement for use of public right of way.
- Developed local regulations compliant with federal rules on wireless infrastructure.

Morehead City, NC

- Developed local wireless infrastructure regulations compliant with applicable federal and state law.

Sedona, AZ

- Provided consultation to City Council in developing wireless regulations for community.
- Furnished information outreach to local residents on wireless siting issues.

Mount Vernon, NY

- Planning Commission Consultant on all wireless siting applications, including representation at public hearings.

Wellington, FL

- Collaboration with Village Attorney on development of wireless regulations.
- Project manager on behalf of Village for wireless industry working group project regarding regulation content.

PROFESSIONAL AFFILIATIONS

- Member Federal Communications Bar Association (FCBA)
- Member Massachusetts and Florida Bar

JONATHAN N. EDWARDS

Professional Engineer

CityScape

EDUCATION	GENERAL BACKGROUND
Georgia Tech (Electrical Engineering)	<p>Jon Edwards is a Professional Engineer and serves as CityScape's lead engineer on all projects, including, engineering analysis for application review, propagation mapping and master planning and RF expert testimony. Jon is responsible for overseeing all engineering projects including electrical power design, telecommunication and antenna design and wireless facilities.</p> <p>After receiving his bachelor's degree from the Georgia Institute of Technology in 1996, Jon worked mainly in communications engineering. In the private sector, Jon has designed hundreds of new wireless facilities from the concept, filing federal construction applications and acquiring facility licenses from the FCC. Jon has more than 22 years of RF engineering and electrical engineering experience in frequency allocation and signal coverage optimization in radio and television bands as well as power systems layout and design.</p> <p>Jon currently serves on the Board of Directors for the Association of Federal Communications Consultant Engineers and is the liaison to the FCC. Jon is in his twentieth year of broadcast and wireless engineering and is a registered Professional Engineer in the States of New York, Georgia, Florida, Virginia, and North Carolina.</p>
QUALIFICATIONS	
<ul style="list-style-type: none"> • Institute of Electrical Electronics Engineers (IEEE) • Broadcast Technical Society • Society of Broadcast Engineers • Professional Engineer, Florida, New York, North Carolina, Virginia • National Association of Broadcasters 	

RELEVANT RECENT PROJECT EXPERIENCE

Teton County, WY

- Cellular Infrastructure Review

Sedona, AZ

- Master Plan Design
- Cellular Infrastructure Review

Grand Junction, CO; Teller County, CO

- Site Assessment and Wireless Master Planning, Propagation mapping

Town of Southold, NY

- Cellular Infrastructure Review
- Public Hearing support

Mount Vernon, NY

- Cellular Site Reviews
- Rooftop Inspections

Lake Success, NY; Huntington Bay, NY

- Small Wireless analysis
- Public Hearing support

West Palm Beach, FL

- Cellular Site Reviews to include new tower, broadcasting, building rooftops and small wireless facilities

PROFESSIONAL AFFILIATIONS

- Member/Board of Directors Association of Federal Communications Consulting Engineers (AFCCE)
- Registered Professional Engineer in States of North Carolina, Georgia, Florida, Virginia and New York

SUSAN RABOLD

Project Manager

CityScape

EDUCATION	GENERAL BACKGROUND
<ul style="list-style-type: none"> • Master of Pastoral Studies, Loyola University New Orleans, 2008 • Bachelor of Science, Environmental Geography, University of North Carolina at Greensboro, 1986 	<p>Susan Rabold is Project Manager for CityScape and she is the lead in all wireless master planning projects and infrastructure assessments and provides consultation on ordinance and application reviews, hearing attendance and wireless workshop presentations. Susan has a Bachelor of Science in Geography with a concentration in Environmental Studies from the University of North Carolina at Greensboro, and has 30 years of local government planning experience.</p>
EXPERIENCE	
<ul style="list-style-type: none"> • 18 years CityScape • 10 years City Planning 	<p>Susan began her planning career as zoning administrator for the City of High Point, North Carolina and after four years with the City of High Point, Susan joined the staff at the City of Greensboro, where she served as the Technical Review Committee Administrator. Responsibilities included review of all site, subdivision and group development plans for compliance with watershed protection, flood zoning, landscaping and other Ordinance development standards. Susan developed a Wireless Communications Development Plan that concentrated on marketing the City's publicly owned properties to the wireless providers, generating in excess of \$11 million over a twenty-five year period for the City of Greensboro. The past 18 years, Susan has assisted many communities nationwide in the drafting and adoption of numerous Wireless Communications Ordinances, assessment of public properties, lease negotiations and the development of Comprehensive Wireless Master Plans.</p>
AREAS OF EXPERTISE	
<ul style="list-style-type: none"> • Wireless communications master planning project management • Analysis, Reporting and Presentation of Rezoning • Conditional use permitting • Policy proposals for planning and zoning • Presentations on wireless planning 	

RELEVANT RECENT PROJECT EXPERIENCE

Sedona, AZ; Grand Junction CO; Nassau County, FL; Fernandina Beach, FL; West Palm Beach, FL; Worcester, MA; Chapel Hill, NC; Matanuska-Susitna Borough, AK; Juneau, AK

- Managed master planning projects including assessments of infrastructure, related mapping, public meetings, public policy amendments and coordination of project stakeholders

Lake Success, NY; Huntington Bay, NY

- Managed and coordinated review of batch small wireless facility deployment installations including site application reviews and presentation of materials at related public hearing meetings

Garfield County, CO; Moffat County, CO; Teller County, CO

- Provided support for public safety initiative broadband studies including assessment of infrastructure and anchor institutions, and mapping scenarios for wireless and hybrid wireless systems

Granville County, NC; Johnston County, NC; Wendell, NC; Botetourt County, VA; Buckingham County, VA; Mecklenburg County, VA

- Provider of expert testimony at public hearings on behalf of public clientele for new wireless infrastructure.

PROFESSIONAL AFFILIATIONS

- Presenter at numerous conferences and workshops sponsored by North Carolina Institute of Government, North Carolina American Planning Association, Indiana Association of Cities and Counties, and various State Municipal Leagues, Attorney Associations and American Planning Association Annual Conference and Council of Government functions.

ELIZABETH H. SMITH

Government Relations Manager

CityScape

<p>EDUCATION</p> <ul style="list-style-type: none"> Marketing/Journalism, University of Central Florida <p>EXPERIENCE</p> <ul style="list-style-type: none"> 8 years CityScape 10 years ABC Broadcasting 10 years Guy Gannett/Paxson/Clear Channel Broadcasting <p>AREAS OF EXPERTISE</p> <ul style="list-style-type: none"> Regulatory Expertise Marketing and Presentations Public Property Leasing Consultation Wireless Master Planning Consultation 	<p>GENERAL BACKGROUND</p> <p>Elizabeth Smith provides consultation on leasing, regulations, application reviews, attendance at meetings and hearings and assessment of wireless infrastructure. Elizabeth is a University of Central Florida graduate with a degree in Marketing/Journalism. She immediately went into the broadcast industry specializing in radio communications. Elizabeth was an award-winning marketing/communication professional and business owner and comes to CityScape with over 25 years business experience. Elizabeth has served as Government Relations Manager over the last 8 years with CityScape, working closely with all clients establishing strategies to meet and exceed their individual needs.</p> <p>Elizabeth works extensively with the Regulatory Department on ordinance updates ensuring compliance with state and federal regulations as it relates to macro and small wireless facilities in and out of rights-of-way. Elizabeth is the point of contact for many communities for site application reviews and works closely on all master planning projects.</p> <p>Elizabeth has represented CityScape and presented wireless communications trends at local and national conferences across the country.</p>
<p>RELEVANT PROJECT EXPERIENCE</p> <p>Coral Springs, Florida</p> <ul style="list-style-type: none"> Point of contact/liaison for all wireless communication issues within the City. Regulatory Consultant – working with the City's wireless communication ordinance for facilities in and out of the rights-of way. Public Property Leasing Consultant – working on all lease consents, new facilities and collocation agreements. Site Review Management Wireless Master Plan Coordinator <p>Homer, Alaska</p> <ul style="list-style-type: none"> Point of Contact Liaison RFP Consultant for City Tower Project – wrote and solicited bids on behalf of the City to build a new tower prior to grant money running out. <p>Coconut Creek, Florida</p> <ul style="list-style-type: none"> Point of contact/liaison for all wireless communication issues within the City. Regulatory Consultant – working with the City's wireless communication ordinance for facilities in and out of the rights-of way. Public Property Leasing Coordinator – working with City and providers regarding site walks, meetings presentations. Site Review Management Wireless Master Plan Coordinator <p>Springdale, Utah</p> <ul style="list-style-type: none"> Regulatory Consultant for regulations dealing with specific aesthetic concerns. <p>Southold, New York</p> <ul style="list-style-type: none"> Point of Contact Liaison for wireless site applications. 	<p>PROFESSIONAL AFFILIATION</p> <ul style="list-style-type: none"> Presentations and exhibition at American Planning Association conferences. Virginia APA North Carolina APA Presented to Senate Committee Dept of Commerce on behalf of local government

CORPORATE PROFILE - FEDERAL ENGINEERING, INC.

Federal Engineering, Inc. began 36 years ago and has a rich history of providing assessment, system analysis and design for public safety communications technology. Public safety communications consulting 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.

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



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.

<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

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 in undertaking this project. A sampling of our knowledge includes the following:

Land Mobile Radio Systems

- Trunked
- Simulcast
- Multicast
- Analog
- Digital

Land Mobile Radio Technologies

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

Broadband/Advanced Wireless Technologies

- LTE
- WiMAX
- WiFi
- Integrated voice and data

Frequency Bands	Manufacturers' Systems and Equipment	Backhaul Systems
○ Low band	○ Harris (M/A-COM)	○ Microwave
○ T-band	○ Motorola	○ T-carrier
○ VHF	○ Tait	○ Optical fiber
○ UHF	○ Airbus DS (Cassidian)	
○ 700/800 MHz	○ EF Johnson	
○ 900 MHz	○ Raytheon	
○ 2.4, 4.9, 5.8 GHz	○ DataRadio	
○ Other licensed and unlicensed bands	○ Others	

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 get to 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

FE has been providing consulting services to the State of New York and local agencies for two decades. Our experience in New York includes our engagements with the following entities:

New York State	City of Albany UASI
New York City Transit	Buffalo, Erie County, Niagara UASI
Cortland County	Lewis County
Onondaga County	Ontario County
New York City	Chautauqua County
Metropolitan Transportation Authority	Monroe County
Essex County	Schenectady County
Syracuse-Central New York UASI	Dutchess County
Westchester County	

In **FE**'s 36 years in business, we have never had a project end in default; in fact, we have been called upon to complete projects left unfinished by other consulting firms. We have performed emergency communications consulting services for thousands of public safety agencies across the nation.

FE KEY PROJECT STAFF MEMBERS

FE has a deep staff bench of over 50 full-time employees who can provide the services needed for this project and be called upon to provide additional services should the need arise. Unlike some large firms, every one of our employees specializes in public safety communications. We do not rely on subconsultants whose allegiance to our firm and your project might be divided among other projects. **FE's** years of experience, training, and participation in industry organizations means that our subject matter experts are highly skilled at developing creative, affordable solutions to coverage and interoperability challenges.

The proposed project team is familiar with public safety (police, fire, EMS) communications systems, operations and systems methodologies, and possess an extensive track record in communications system upgrades and replacements, operations, design, and implementation management. FE understands the necessity for reliable communications systems for first responders, and we will work closely with the Town to assess existing system performance, conduct user needs assessment, analyze and identify alternatives to improve coverage, and support the development of a Wireless Master Plan to improve emergency communications across the Town.

Project Director Travis LePage is a former resident of New York, and **FE's** President and Executive Sponsor Ronald Bosco and Executive VP/COO John Murray were both born in and grew up in the State. Additionally, the team has worked with several clients in New York, including Cortland, Essex, Erie, Westchester, and Dutchess Counties, to name a few. Additional details about, and resumes for, key team members are provided on the following pages.

We are proud of our longevity, our stability, our “deep bench” of industry-leading technical consultants we offer our clients, and our high percentage of repeat business from our satisfied clients.

TRAVIS LEPAGE, PMP, PMI-ACP

Technical Director



EDUCATION

- Master of Business Administration, Technology Management, State University of New York, 2006, Senator's Scholar
- Bachelor of Science, Telecommunications Engineering, State University of New York, 2002, with Honors

AREAS OF EXPERTISE

- Program and project management
- Public safety communication systems analysis, design, and implementation
- RF spectrum planning and management
- System integration project management

GENERAL BACKGROUND

Mr. LePage is a highly talented and accomplished director on the **FE** team with a demonstrated track record of successfully leading and managing complex multi-million-dollar programs and enterprise/agency-wide projects for state and municipal governments and for public and private organizations. He has several years of experience delivering project results to meet the unique needs, requirements, and expectations of stakeholders.

Mr. LePage is an expert in program and project management; stakeholder requirements analysis; land mobile radio, microwave radio; radio site development; interoperable communications plan development; public safety communications systems; RF spectrum management; and voice/data network engineering.

RELEVANT PROJECT EXPERIENCE

Dutchess County, New York Radio System Assessment, Project Director

- Provided support for migrating users from conventional systems to a UHF or 700 MHz trunked radio system
- Developed a strategic plan for the County to maintain, replace, and evolve their radio communications systems

Ontario County, New York Communications System Consulting, Project Director/Consulting Engineer

- Provided leadership support for the County's implementation of P25 Phase 2 trunked radio system and site enhancements
- Project pin-pointed and closed radio coverage gaps experienced by first responders attempting to communicate in specific geographic areas of the County

Essex County, New York Implementation Support Services, Program Manager

- Managed implementation of a shared public safety radio system in a geographically-challenging region
- Developed numerous technical specifications and procurement documents for materials, equipment, and services and supported the County's procurement processes
- Provided programmatic and civil engineering oversight and quality assurance/quality control services

Fauquier, Culpeper, Rappahannock Counties, Virginia Regional Radio System, Project Director

- Provided subject-matter-expert oversight and leadership support for the design and implementation of regional radio system

PROFESSIONAL ORGANIZATIONS

- Association of Public Safety Communications Officials (APCO)
- Project Management Institute (PMI)

CERTIFICATIONS

- FEMA Certified Incident Commander
- FEMA Certified Operations Section Chief
- NIMS ICS 100/700, 200, 300 and 400
- Leadership Strategies Effective Facilitation
- FEMA Homeland Security Exercise and Evaluation Program Planner

MIKE MANNING

Project Manager/Senior Consultant



EDUCATION

- Associates Degree, General Business, Champlain College

AREAS OF EXPERTISE

- Program and project development and management
- Stakeholder outreach and engagement
- Strategy and milestone development
- Risk management and planning
- Federal grants management

GENERAL BACKGROUND

Mr. Manning is senior consultant with more than 30 years of public safety experience. As a retired Vermont State Police Lieutenant, he has extensive training and experience in leadership, program development and management, as well as project management. His experience includes consultation and stakeholder outreach and engagement, strategies and milestones, risk management, planning, and federal grants management.

As a Statewide Interoperability Coordinator, he worked on multiple local, state, regional and national interoperable communications and public safety broadband efforts. He served as the Homeland Security Field Manager and Section Chief for the Vermont Department of Public Safety, Division of Emergency Management and Homeland Security, providing programmatic management of federal funding and the state's preparedness efforts. He also managed the Vermont Emergency Operations Center.

RELEVANT PROJECT EXPERIENCE

State of Connecticut

- Town of Avon Radio System Replacement
- Town of Bridgeport LMR Analysis
- City of Bristol Communications System Analysis and Implementation

State of New York

- Ontario County Radio System Assessment
- Westchester County Radio System Consulting Services

Commonwealth of Virginia

- Shenandoah County 9-1-1 Emergency Communications Consulting
- Powhatan County Radio System Consulting Services

Commonwealth of Massachusetts

- Essex County Communications Consulting Services

Commonwealth of Pennsylvania

- Adams County 700/800 MHz Radio Consulting Services

State of North Carolina

- Pitt County Radio System Procurement and Implementation Support

State of Maine

- Cumberland County Radio Consulting Technical Support

State of Vermont

- Vermont Department of Public Safety Lifeline Phase II
- VCOMM Lifeline Project, State of Vermont Interoperable Radio Communications Network

PROFESSIONAL TRAINING

- FEMA Certified Incident Commander
- FEMA Certified Operations Section Chief
- NIMS ICS 100/700, 200, 300 and 400
- Leadership Strategies Effective Facilitation
- FEMA Homeland Security Exercise and Evaluation Program Planner

ADAM NELSON

RF Coverage SME



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 16 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:

Regional Projects

- New York City Metropolitan Transit Authority Police Department (MTAPD) 700 MHz Network
- Fauquier, Culpeper, and Rappahannock Counties, Virginia

County Projects

- Dutchess County, New York, PSMR Assessment
- Essex County, New York, Radio Consulting
- Cortland County, New York, Interoperable Emergency Communications System
- Lewis County, New York, System Analysis
- Schenectady County, New York, UCC Tech Support
- Westchester County, New York, PSMR Consulting Services
- Buncombe County, North Carolina, Radio System Design Alternatives and Recommendations
- Caroline County, Virginia, Land Mobile Radio System Design
- Pitt County, North Carolina, VHF System Expansion with Narrowband Migration
- Pittsylvania County, Virginia, Radio System Design Alternatives and Recommendations

Municipal Projects

- New York City Transit/Metropolitan Transit Authority
- City of Bartlett, Tennessee
- City of Portsmouth, 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

- APCO

4. HISTORY OF SIMILAR PROJECTS

CITYSCAPE CONSULTANTS, INC.

CityScape is proud to have tenure of working exclusively with local government entities and providing timely and unbiased information and recommendations to many long-term clients.

CityScape has assisted many communities in all aspects of wireless telecommunications including the development of long-term wireless master plans projecting infrastructure growth up to ten years and effectively streamlining the process for providers to assure those communities proactively setting standards for all future deployment. CityScape has completed and has ongoing projects and application review contracts with many communities in the states of Alaska, Arizona, California, Connecticut, Florida, Georgia, Hawaii, Idaho, Illinois, Iowa, Kansas, New York, North Carolina, Tennessee, Texas, Utah, Virginia, Washington, Wisconsin and Wyoming.

Since the approval of Section 704 of the 1996 Telecommunications Act, the FCC has adopted numerous Declaratory Rulings and Report and Orders regarding local governments' review of wireless telecommunications applications. Advancing technologies and fifth generation (5G) development is having a significant impact upon the economics and aesthetics of many communities and the best results will be achieved through proactive planning and the cooperation of local government, the public and providers. More changes are on the horizon as the wireless industry continues to evolve, and the Town's current land use regulations will require continual oversight and consideration of updates and revisions to remain consistent with current deployment practices and current federal and state guidelines.

CityScape administers and reviews every type of personal wireless service facility applications. As the wireless industry continues to move toward 5G we are seeing an increase in small wireless facility applications in many communities that will affect the landscape of many communities because of applicable federal legislation that impacts local regulation. Currently the NY Legislature has not also enacted small wireless facility legislation (as have 25 other states) so local government currently only needs to be compliant with applicable federal rules relating to regulation of wireless infrastructure, which is more advantageous to the Town to enact regulations to reflect its desires regarding wireless infrastructure. That advantage will remain only until the NY State legislature is lobbied by the wireless infrastructure industry to enact legislation similar to the other 25 states (so far) which will further restrict local government oversight.

CityScape's past performance on projects are delivered in a manner that exceeds expectations as it relates to on-time and on-budget. Quality of work and ability to meet timelines and deliverables are second to none. To follow are three relevant client projects that are currently managed by the CityScape staff. We encourage all references to be checked as CityScape prides itself on excellence in services. Additional references and relevant project information are available upon request.

A comparable Master Plan project that CityScape has developed would be for the Town of Chapel Hill, North Carolina, in which CityScape developed a Master Plan and ordinance to regulate forthcoming 5G small cell installations in public rights of way (ROW) including design aesthetics, safety concerns, and concealment provisions to minimize impact on surrounding environment, as well developed an ordinance for traditional macro infrastructure outside of ROW.

CHATHAM COUNTY – CITY OF SAVANNAH PLANNING COMMISSION

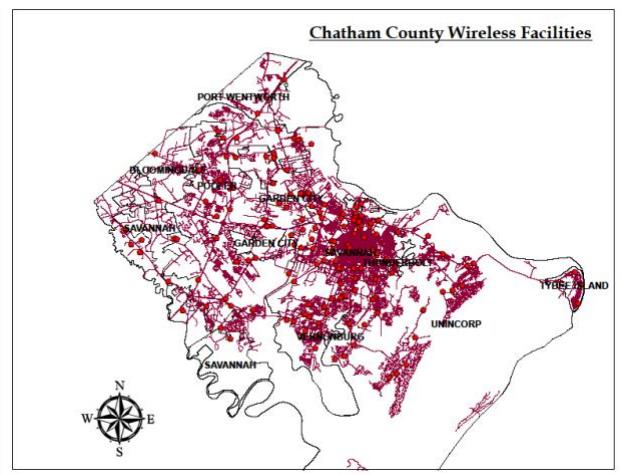
Savannah, GA – USA

Duration 2005 – Present
Geographic Area 632 square miles

The Challenge

The Metropolitan Planning Commission (MPC) is a joint planning agency for the City of Savannah and Chatham County. The City of Savannah is the oldest city in the state of Georgia; is located on the Atlantic Ocean and known for its history and architecture. Prior to 2007, wireless telecommunication facilities were installed on a need basis and economic necessity. Design elements were rarely considered. CityScape was hired by the MPC to address the following goals and objectives relative to future wireless network deployment:

1. To ensure the protection of the health and safety of the public with the development of wireless communication facilities.
2. To protect the public interest, property value and neighborhood harmony with the development of wireless communication facilities.
3. Promote land use efficiency with the collocation of wireless communication facilities to existing structures.
4. To preserve the scenic view sheds and corridors listed in the MPC's 2013 Comprehensive Plan with the development of wireless communication facilities.
5. Amend the current public policies on wireless telecommunications deployment practices to address the community's aesthetic concerns.



Our Solution

Through collaboration with the MPC and industry stakeholders, CityScape developed a hierarchy of design criteria so future towers are less visually obtrusive. CityScape assessed 147 existing tower locations for future collocation possibilities, at a time in American wireless telecommunication deployment practices, when collocation was not a favorable option by the industry.

Key Outcomes



- Review and revisions of existing ordinances and codes relative to wireless telecommunications deployment;
- Development of a comprehensive telecommunications network for the MPC;
- Continued review by CityScape Consultants of all new tower and collocation permit request to assure compliance with established policies and development guidelines.

Client Reference:

Jack Butler, Comprehensive Planner
Chatham County-Savannah Metropolitan Planning Commission
110 E State Street
Savannah, GA 31401
Telephone: +1 912-651-1478
Email: butlerj@thempc.org

CITY OF WEST PALM BEACH

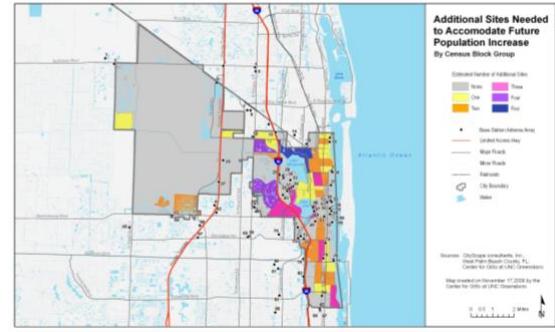
West Palm Beach, FL – USA

Duration 2009 – Present

Geographic Area 58.2 square miles

The Challenge

The City of West Palm Beach is a coastal city with rural and urban characteristics. The western half of the City is rural with less than 1,000 people per square mile and the eastern half is urban with residential densities of 10,000 people per square mile. The City experienced tremendous wireless telecommunications growth in recent years and identified 494 City-owned properties, which they wanted evaluated for best possible use by the industry for new wireless telecommunications infrastructure.



Our Solution

Utilizing Cityscape's master planning process, evaluate the 494 City-owned properties for the best possible use by the wireless telecommunications industry. The Master Plan includes identifying the location of all existing antenna facilities and their corresponding signal coverage conditions; comparing this information to the locations of projected future facility locations deemed necessary utilizing land planning and existing public policy; followed by a series of evaluations founded on land use principles and engineering practices to determine which of the 494 properties will yield the highest and best opportunities for the City.

Key Outcomes

The City provided CityScape a list of 494 City-owned properties as potential locations for new wireless telecommunications infrastructure. From this site listing CityScape identified over one hundred (100) properties to assess as potential sites. CityScape drove to each site and evaluated the possibilities for each of these properties. Many properties were eliminated for one of the follow reasons:

1. The lot size is too small; or
2. The existing land use occupies the majority of the property and there is no space remaining for a tower location; or
3. The existing tower is not appropriate considering the proximity of adjacent land uses; or
4. There is an existing tower or rooftop location that could provide an antenna attachment or collocation opportunity thereby eliminating the need to have a new tower in the vicinity; or
5. Multiple lots of record are available and CityScape selected the one lot that best meets industry standards; or
6. Staff and community members did not think the City-owned land was appropriate for wireless infrastructure; or
7. Deed restrictions would not permit wireless telecommunication facilities.

Consequently twenty-five (25) ideal locations are identified that match the future service needs of the wireless industry. Providing lease space to the wireless telecommunications industry on these properties can gross the City of West Palm millions of dollars over the next twenty years. An example of the inventory is provided below.



Client Reference:

Rick Greene, Development Services Director
City of West Palm Beach
401 Clematis Street
West Palm Beach, FL 33401
Telephone: +1 561-822-1455
Email: rgreene@wpb.org

CITY OF MORRISVILLE

Morrisville, NC – USA

Duration 2005 – Present
Geographic Area 8.3 square miles

The Challenge

The Town of Morrisville is a small town in North Carolina that borders the Cities of Raleigh and Durham both of which are economic hubs in North Carolina. Morrisville is experiencing rapid population growth which has increased by nearly 280% in the last ten years. Concerns over the placement, the total number of new towers needed and how they would look in this growing community (along with a legal suit with the industry regarding tower denial) is what prompted the Town to hire CityScape to assist with their wireless telecommunication master planning process. The following goals for the master plan are a result of a comprehensive public participation process:



1. Protect community aesthetics by planning for well suited, well-designed and inconspicuous telecommunications facilities that fit into the community. Visibility is the primary focus in the review of telecommunications facilities.
2. Manage the number and placement of all antenna, facilities and associated equipment (including building and compound areas) to promote efficient services delivery and avoid an unnecessary number of telecommunications facilities.
3. Ensure the safety of telecommunication facilities and avoid potential damage to people and property.
4. Guide decision-makers and staff by providing a policy framework and design guidance in decisions regarding telecommunication facilities.
5. Address the following community issues relative to new wireless telecommunications infrastructure: height, number of facilities, visibility and aesthetics, noise and falling hazards.
6. Provide community services and public infrastructure to maintain and enhance the quality of life for Town citizens of today; the elderly that have enriched our past and future generations.
7. Update Telecommunications Tower Ordinance that revises language in zoning ordinances regarding cell towers and other telecommunications facilities to allow for this infrastructure while ensuring community safety, appearance and appropriate location.

Our Solution

Developed the Town of Morrisville Wireless Telecommunications Facilities Master Plan to balance the goals of providing good cell phone service with minimizing impacts from telecommunication facilities on neighborhoods and the community. The plan works to achieve this balance by providing for well-sited, well-designed and inconspicuous telecommunications facilities that fit within the community.

Key Outcomes

- Provided guidance and assistance on establishing public policy to address the challenges outline.
- Established techniques to minimize the visual impacts of telecommunications facilities relative to concealment options, height and placement locations.
- Provided training and relevant material for staff, decision-makers and the public in an effort to enhance the evaluation of new wireless infrastructure applications.
- Addressed ongoing monitoring of all telecommunications facilities to ensure they are being properly maintained.
- Provided business model for the Town explaining how placing new wireless infrastructure on Town owned property could be potential long-term source of revenue to the Town.

Client:

Rodney Wadkins
GIS Manager
Town of Morrisville
P.O. Box 166
Morrisville, NC 27560
Telephone: (919) 463-6197
Email: rwdkins@townofmorrisville.org

FEDERAL ENGINEERING, INC.

FE has a long-standing presence in the State of New York and in New York City, including clients highlighted below.

Provided below are three references at the end of this section, highlighting our experience working with clients to assess needs, identify gaps in performance, and develop plans to address gaps and improve public safety radio communications.



Cortland County, a member of the Central New York Interoperable Communications Consortium (CNYICC), engaged FE to analyze the existing county radio communication system, develop a conceptual design, prepare budget estimates, and prepare FCC licensing of a new emergency communications interoperability system. FE provided procurement support and supervised the implementation of their 7-channel P25 system as well. This project placed special emphasis on interoperability between emergency service agencies both internal and external to Cortland County, including law enforcement, fire, ambulance, emergency management, and other agencies. We also designed a replacement of the county's mobile data system.

"Federal Engineering has produced and delivered on everything they said they would and actually has gone above and beyond what the RFP asked for by assisting our county with our system and operation which required immediate assistance... Bottom line they are a great company that has the interest of the CLIENT set as NUMBER 1, no exceptions."

~Kevin Whitney, Cortland County, New York

In *Lewis County*, also a CNYICC member, *FE* conducted a needs assessment and analysis of alternatives to upgrade the county's public safety radio system. *FE* evaluated the current system; recommended upgrades in equipment to meet current and anticipated needs; provided a cost estimate of the recommended solution; evaluated current and future tower placement; and made radio equipment recommendations. *FE* conducted an on-site interactive Coverage Workshop with the County to determine the best site and frequency plan for the new system.



In *Essex County*, *FE* conducted a feasibility study, reviewed structural compliance, assessed frequency use within "Line A", performed site surveys and inventories, developed site sketches, developed a civil works RFP, and provided implementation support services for the upgrade of the county's Motorola P25 conventional multicast radio system. Additional services included review of civil works proposals, installation oversight, and independent validation and verification of the radio system.



In *Chautauqua County*, *FE* evaluated the county's VHF radio system to assess if narrowbanding the existing equipment was feasible, or if the county should consider a replacement system. *FE* reviewed a sole source vendor proposal and provided design and implementation recommendations and developed a cost analysis of the system to assist the county in their procurement decisions.

In **Erie County**, **FE** was selected as the county's consultant for interoperable communications to provide updates to Erie County's tactical interoperable communications plan (TICP) and channel plan, provide narrowbanding program assistance, and provide a lifecycle cost analysis of their public safety communications system.



FE also completed a project to develop and conduct two homeland security exercise plans for first responders in the **State Capital Region**. We coordinated and executed a Table Top Exercise, conducted a follow-up Functional Exercise, and delivered an After Action Report/Improvement Plan to enhance communications operations in the region. In addition, we reviewed and identified gaps in the existing **Albany Capital Region** TICP including gathering governance and shared channel information from regional UASI partners. We also completed a project to provide TICP development and exercise coordination and execution services for the **Rochester Urban Area Security Initiative (UASI)**.



The **New York Metropolitan Transportation Authority** (NY MTA) engaged **FE** for several projects, including analysis and design of a radio network for the MTA Police Department, relocation of the MTA police dispatch center, and the design of, and procurement support for, **New York City Transit** (NYCT) bus radio system covering the five boroughs and surrounding areas.

ONONDAGA COUNTY, NEW YORK

Tactical Interoperable Communications Planning

Project Dates

2011 – 2012



Relevant Technologies

- Public safety land mobile radio

Project Contact

Mr. Michael Allen
Director, Oswego County E-911
(315) 349-8215
39 Churchill Road
Oswego, NY 13126
MAllen@oswegocounty.com

Project Snapshot

- Analyze procedures and policies for UASI resources and personnel
- Design, conduct, and evaluate TTX
- Design a regional channel-sharing plan
- Establish interoperability partnerships with surrounding jurisdictions
- Perform an interoperable communications gap analysis
- Develop an Interoperable Channels Operations Plan (ICOP)

Project Description

Onondaga County, New York, awarded **FE** a follow-on contract to design, develop, conduct, and evaluate a Homeland Security Exercise and Evaluation Program (HSEEP) tabletop exercise (TTX), create a regional channel-sharing plan, perform an interoperable communications gap analysis, and develop a comprehensive Interoperable Channels Operations Plan (ICOP) for first responders in the five-county region. This followed **FE**'s development of the SCNYU's first TICP, which established the baseline for interoperable communications assets and capabilities within the entire Central New York Region.

Working closely with Regional Stakeholders, **FE** designed, developed, conducted, and evaluated a multijurisdictional / multidisciplinary DHS HSEEP TTX to validate the TICP. **FE** evaluated the TTX and delivered a comprehensive After Action Report/Improvement Plan (AAR/IP) highlighting recommendations relating to the TICP and incident response operations.

FE then designed a regional channel-sharing plan that establishes and improves interoperability, including defining channel names and radio system zone assignments based on user requirements, system capabilities, and radio coverage and developing policy and procedure outlines to govern the use of the shared channels. The plan incorporates countywide, local interoperability, national mutual aid, and statewide channels.

FE performed an interoperable communications gap analysis highlighting interoperable communications gaps and providing recommended courses of action. **FE**'s Interoperable Channels Operations Plan (ICOP), one of the first of its kind in the Nation, documents the channels/talkgroups and operating procedures for intra-county, inter-county, and region-wide events, and provides guidance for the use of the channels/talkgroups while in-route to incidents and while on scene.

FE's work on the regional channel-sharing plan, ICOP, and gap analysis strategically positions the region to establish and improve interoperable communications among and between many agencies and jurisdictions.

CORTLAND COUNTY, NEW YORK

Radio Systems Consulting

Project Dates

2009 – 2014



Relevant Technologies

- VHF / UHF
- 700 / 800 MHz
- Narrowbanding
- P25 digital
- Dispatch console equipment

Project Contact

Kevin Whitney
 Cortland County Deputy Fire Coordinator
 54 Greenbush Avenue
 Cortland, NY 13045
 607-423-2073
 whitney178@hotmail.com

Project Snapshot

- Analyze existing system performance
- Inventory existing system and equipment
- Assess emergency communications needs
- Provide concept design alternatives and recommendation
- Frequency research and analysis
- Procurement support
- Implementation support

Project Description

Cortland County, New York had extremely old VHF and UHF radio systems that were built in the 1970s and 1980s. Faced with the obsolescence of mission critical radio communications equipment, equipment that provided inadequate coverage, were hindered by congested frequencies, and required narrowbanding to meet the FCC's 2013 mandate deadline, the county turned to **FE** for help.

FE employed a phased approach to analyze user needs, along with legacy system functionality, including reliability, coverage, and capacity. We conducted needs assessment interviews with participating agencies and followed up as needed to validate and collect missing information. **FE** teams surveyed radio existing system sites, inventoried equipment, and what equipment could be reused in a narrowbanded system. **FE** then modeled existing coverage and completed other performance measurements and presented our findings to county stakeholders.

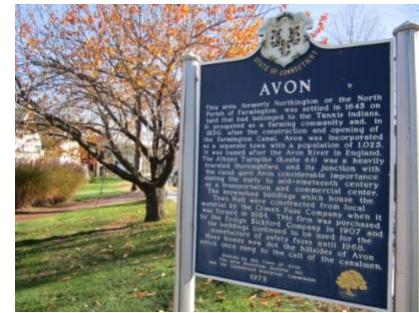
FE developed operational and performance goals from the collected requirements for the new system and improvements. We conducted a spectrum analysis of existing systems to determine available frequencies for the new system and assessed dispatch console equipment and 9-1-1 center general effectiveness. **FE** developed a comprehensive, vendor-neutral RFP and supported the County in the solicitation. Cortland County retained **FE** under separate task order to oversee the system implementation.

Based on **FE**'s design and procurement support, Cortland County implemented a seven-channel countywide P25 radio system that is providing interoperable communications for all county agencies, mission critical radio coverage, capacity, and interoperable voice and data capabilities, while meeting narrowband requirements.

TOWN OF AVON, CONNECTICUT

Radio System Consulting Services

Project Dates
2016 – 2018



Relevant Technologies

- 800 MHz
- P25 digital
- VHF / UHF
- Microwave

Project Contact

Mark Rinaldo
Chief of Police
60 West Main Street
Avon, CT 06001
860-409-4213
mrinaldo@avonct.gov

Project Snapshot

- Existing system review
- Site surveys
- Needs assessment and user interviews
- Alternatives analysis and recommendations
- Coverage analysis
- RFP development and general procurement support
- Implementation support

Project Description

The current Town of Avon has a Motorola public safety radio system infrastructure consisting of three repeater sites in a non-simulcast analog mode, shared by multiple Town Departments, each with their own frequencies, portables and mobiles. The sites are manually selected from the radio dispatch console, portable and mobile units. Selection is made by different CTCSS tones for each repeater receiver (West, Main or East). Only one transmitter is active at one time and all three repeaters transmit the same CTCSS tone. A total of approximately 200 mobile and portable radios are currently in use by Town departments.

FE was selected by the Town of Avon to complete an assessment of their existing public safety communications network, determine the future needs by interviewing system users/subscribers, perform radio site surveys and infrastructure assessments, complete a coverage and capacity analysis of alternatives, present recommendations to Town officials, and assist with procurement and implementation. Procurement tasks include developing of technical specifications for an RFP, draft and publish a vendor RFP, and aid with proposal evaluations and contract negotiations.

PINAL COUNTY, ARIZONA

Public Safety Radio System

Strategic Plan

Project Dates

2010 - 2012



Relevant Technologies

- Land mobile radio

Project Contact

Jay Vargo, Director
 IT Radio Communications
 31 N. Pinal St., Bldg. A
 Florence, AZ 85132
 520-866-6336
 Jay.vargo@pinalcountyaz.gov

Project Snapshot

- Conduct needs assessment
- Perform FCC licenses review
- Deliver Functional Needs Assessment report
- TICP development
- Conceptual design of a new countywide system
- Determine available frequencies
- Establish site parameters
- Establish subscriber equipment characteristics
- Perform coverage analysis
- Evaluate additional sites

Project Description

Pinal County, Arizona contracted with **FE** to study and assesses current radio communications capabilities, identify immediate needs, and provide recommendation for future growth. This included the completion of a countywide public safety radio assessment, tactical interoperability communications plan (TICP), and a conceptual design for building a state-of-the-art countywide radio communications system.

The TICP and conceptual design information will be used to improve interoperability throughout the county and region and provide the detailed information needed for building a new countywide radio communications system. In completing this work, **FE** conducted an FCC license review, produced a *Functional Needs Assessment Report* and delivered a comprehensive TICP utilizing the most up to date guidance and formatting from the DHS.

FE prepared a conceptual design of a future countywide radio system capable of serving all agencies in the county. **FE** determined available frequencies, established site parameters and subscriber equipment characteristics, performed coverage analysis, evaluated additional sites and performed frequency assignment for the new system.

FE is assisting the county and approximately 42 agencies transition from analog wideband radio systems to narrowbanded systems. Services include subject matter expertise in the oversight of the narrowbanding of applicable county-licensed public safety radio channels, as well as affected channels used by agencies within the county. **FE** will assist both the county and non-county agencies in meeting the FCC mandate.

5. RECOMMENDATIONS AND TIMELINES

CityScape proposes the following scope of services to be completed in unison by **CS/FE Team** for the development of the combined Study and Report of Emergency Services and Wireless Telecommunications Master Plan.

SCOPE OF SERVICES

TASK 1: Preliminary Research and Project Initiation

Preliminary Research – This task includes research and acquisition of tower data for fieldwork for the assessments of existing antenna, towers, base stations. The necessary data is gathered from a variety of sources including actual data and permits obtained from the Town, research of FCC registered site locations, direct information from existing service providers and tower owners active in the Town, the Town's GIS, and through actual site visits to each location. **CS/FE Team** will request, review and compile all Town-supplied system documentation and gather relevant information prior to scheduling the wireless facilities assessments. Additionally, extensive research of the community is conducted at this time. Population density, trends of the community, seasonal variables if applicable are all studied for an abundant working knowledge of the Town.

Weekly/Bi-Weekly Project Updates - CityScape will coordinate and establish a regularly scheduled teleconference call between designated Town staff and **CS/FE Team** to aid in maintaining project timelines and goals. The initial conference call will establish goals and expectations of the Town that will facilitate the workflow and timeline requirements. During this call, preliminary data needed from the Town by **CS/FE Team** will be identified, including discussion regarding public-owned properties. CityScape will gather information from staff and the WFWG concerning local wireless issues, policies, priorities, agency interactions, opportunities and begin to establish the process for the Wireless Master Plan with assistance from staff and stakeholders.

Project Initiation Meeting – The **CS/FE Team** will schedule and coordinate a mutually agreeable project initiation meeting.

This meeting will allow for coordination with the Town's participants and a discussion on spectrum and coverage. During the project initiation meeting, a common understanding of the project goals, objectives, and vision will be established and any other pertinent items best understood through a close working relationship between our respective management teams and staffs.

This meeting includes but is not limited to:

- Introduction to Wireless Master Plan process;
- Overview of the pertinent state and federal regulations;
- Overview of wireless network design and deployment practices utilized by the wireless communications industry;
- Overview of concepts behind wireless facilities planning and zoning with emphasis on familiarizing the Town with the Master Planning process;
- An introduction to a working vocabulary;
- A basic but thorough understanding of the technical aspects of the project will provide decision-makers with the background necessary to ensure the development of effective and legally defensible regulations.

TASK 2: Infrastructure Assessments

Infrastructure Assessments - CityScape will assess all wireless antenna, tower and base stations by visiting each site to take pictures and record observations. The fieldwork acquires all pertinent facility information as well as allows for the project team to become familiar with the Town and surrounding areas as all of this information is important in the analysis.

Following the project initiation meeting **FE** will conduct interviews with the Town's WFWG and public safety representatives from County law enforcement, Town of Bedford police, fire, and EMS for one half-day. We will gather information about the existing public safety radio system, its size and characteristics, as well as current and future user needs, including the following, at a minimum:

- Voice performance (on-street coverage and reliability, and security)
- Voice performance (in-building coverage—OPTIONAL task)
- Data requirements and existing systems used for public safety
- Interoperability requirements
- Communications sites (towers, buildings)
- Dispatch consoles and accessory systems
- Microwave backhaul
- Spectrum
- Subscriber functionality
- Emergency backup

FE will assess the collected information to understand the current public safety radio system, infrastructure, and functionality, as well as ongoing user needs and system expectations. If additional information is required, it will be obtained via follow-up telephone calls. Where information is unavailable, **FE** will document appropriate assumptions based upon our experiences with other public safety agencies and networks. Our team recognizes that this task establishes the foundation for all future work, and we will gather sufficient information necessary to accurately document the user needs.

TASK 3: Inventory Catalog

Draft Inventory Catalog – CityScape will prepare and present an initial draft inventory catalog of all existing wireless facilities including the public safety facilities. *Inventory of existing antenna sites include:* photograph; identification by latitude and longitude and street address; tower ownership; type of infrastructure; wireless services provided at each location; and observation of site conditions.

TASK 4: Engineering, Preliminary Mapping and Analysis

CS Engineering, Mapping and Analysis – Commencement and preliminary analysis of initial mapping, which may include:

- Existing inventory mapping;
- Existing infrastructure coverage mapping including all applicable variables (i.e. terrain, topography etc.).
- Special event, population, employment density mapping as applicable;
- Public property and asset mapping (i.e. light poles, traffic lights, ROW parcels, etc.) if applicable;
- Anticipated future coverage and capacity fill-in mapping including macro and small wireless facilities.

- Provide recommendations on filling in identified gaps in coverage;
- Identify strategies to develop revenue from identified public-owned property locations, if applicable.
- **FE** will review data and inventory records provided by the Town and information from the Town's radio system service provider to develop an assessment of the conditions and equipment at each site.

FE Public Safety Analysis and Mapping – Identification of Radio System Coverage Deficiencies and Enhancement Alternatives.

Once **FE** has completed and analyzed the information from the project initiation meeting, user needs interviews, and site/radio antenna data, **FE** will analyze system performance and identify alternatives for improvements in voice coverage and data availability.

FE coverage expert will work with the Town's project manager to determine how coverage plots should be depicted, including color schemes, topology, roads, patrol zones, and other characteristics unique to the Town of Bedford. **FE** will then load the existing transmitter locations and other relevant information into the **FECoverage™** model and generate coverage maps of the current public safety radio system using **FEMapper™**. This will serve as the baseline to begin developing network alternatives.

FE will then provide **FE Team Coverage™**, a powerful tool that interactively involves our clients in the system design process. The **Team Coverage™** experience builds consensus and facilitates "buy-in" of the eventual system and technology. As radio coverage is modeled and gaps are indicated, our subject matter expert will interactively and in real-time manipulate the model and display the effects of changing site equipment or placing additional sites in the network, such as at the Town's Guard Hill site. Workshop attendees will immediately be able to evaluate the impact of these changes and determine what needs to be done to meet user requirements. The interactive analysis will also take into consideration adjacent towns' systems and potential infrastructure sites.

At the conclusion of the workshop, **FE** will produce a mutually agreed upon set of coverage maps, customized to Town of Bedford needs, depicting major geographical landmarks, area topography, highway/road data, jurisdictional boundaries, and desired performance characteristics.

FE Team Coverage™ will be presented via the Internet in a **two-hour workshop**. The coverage workshop will identify areas as desirable locations for new radio system transmitters or receivers, based on both coverage enhancements and Town aesthetic requirements. For each location identified through the Workshop, **FE** will work with stakeholders to identify potential structures in the area – existing towers, water tanks, or buildings – to determine if the Town has any assets that would be suitable for tower sites.

Remote Public Safety Teleconference – **FE** will present a two-hour online workshop as described above.

Public Workshop – **CS** will present the draft inventory catalog, preliminary mapping and initial master plan findings in a presentation workshop to the Town.

Task 5: Ordinance Review and Amendment Recommendations

Review Existing Land Use Development Standards and Processes – Regulatory review is an important part of the master planning process as it serves as the guideline for the ease of wireless deployment while setting design standards. These standards include concealment options for facilities, hierarchy of preferences, cross-reference review to other zoning criteria, including federal and state mandates and codes, permitted use charts, definitions, and other underlying zoning land use development standards will be used to uncover any possible inconsistencies and loopholes.

CityScape will review the materials provided by the Town with particular attention to:

- Strengths and weaknesses of the existing zoning regulations;
- Strategies to enhance the Town's permitting and application review process;
- Strategies to control and prioritize the location of new facilities;
- Strategies to protect the aesthetics in local and National Register historic districts and reduce the visual impact of new facilities and examine possibilities for concealed facilities and design guidelines;
- Compliances with federal and state mandated guidelines;
- Effectiveness of the intent of the zoning regulations and process.

Use of Public Properties – CityScape will address leasing public-owned property based on the public property assessments and the engineering data of the Master Plan and make recommendations on potential properties that could provide the best opportunity to the Town. CityScape will also recommend possible public policy changes that could improve the process to meet the goals and potential opportunities of the Town. Additionally, Town-owned right of way parcels will be addressed.

TASK 6: Draft of Wireless Master Plan

Draft Wireless Master Plan- A preliminary review draft of the Wireless Master Plan will be provided to staff for review, comment, subsequent revision and Town sign off. The draft Wireless Master Plan document shall, at minimum, include:

- Town goals and maps from previous meetings;
- Analysis of population and population density trends, service providers, and public-owned land locations;
- Diagrams and pictures of specific and preferential towers and antenna types agreed to by the Town stakeholders;
- Engineering analysis illustrating the benefit of utilizing certain public-owned sites on revised propagation maps; regulatory recommendations based on master planning process and mapping;
- Wherever applicable, all mapping and data included in the Wireless Master Plan will be provided in ESRI ARCmap compatible format.

Emergency Response Radio System Master Plan – **FE** will develop a draft *Town of Bedford Assessment and Recommendations Report* that summarizes the results of the analysis and assessment activities included above. This report will become part of the Town of Bedford's Wireless Master Plan being developed by CityScape. The content of the report will minimally include:

- A summary of user needs and high-level requirements including coverage and capacity for public safety voice and data
- An overview of the Town's existing public safety radio system including current equipment and site infrastructure. The report will document the antenna locations and the current state of the system, including any equipment concerns.
- Analysis of existing technology and feasibility of new public safety radio technology applications
- Analysis of current radio coverage and challenges and the identified system performance gaps based on user needs, determined through our review of existing system documentation and interviews
- Coverage maps indicating current and potential future coverage, identifying potential new antenna sites that balance the needs of first responders with the Town's requirements for aesthetics and the preservation of property values

- Recommendations on how to move forward to meet the needs of emergency responders and public safety agencies

FE will incorporate comments to the public safety radio system sections and submit the final version to CityScape, for inclusion with the final project deliverable.

Task 7: Project Completion and Submittal of Final Documents

Finalize Master Plan - After all final input, CityScape will finalize the Master Plan to address all previous approved revisions and submit final document for Town review and approval. CityScape will submit the final Plan in electronic PDF format, along with all project deliverables (i.e. final maps and data tables). CityScape will submit the final Wireless Master Plan to staff for its final review, approval and print. Project will be completed upon submittal of all project deliverables of the final Wireless Master Plan and recommendations to the Town. The **CS/FE Team** will be available to the WFWG and designated Town staff to support the acceptance of the Master Plan.

Meeting/Workshop – The **CS/FE Team** will provide a workshop in an onsite meeting with Town stakeholders to present the findings and recommendations of the Wireless Master Plan.

6. MISCELLANEOUS INFORMATION

COST OF SERVICES AND ESTIMATED TIMELINE

The total project fixed cost, including labor, travel, and other direct costs, to develop a Study and Report of Emergency Service and Wireless Telecommunications Infrastructure Master Plan for the Town of Bedford, NY is \$104,750.

Proposed costs for this project are 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 this project.

Scope of service process may be modified/reorganized throughout the process as necessary in order to meet Town requirements and/or timelines.

TASK	TASK TITLE	Quarter			Quarter		
		Month 1	Month 2	Month 3	Month 4	Month 5	Month 6
Task 1	Preliminary Research and Project Initiation	■					
Task 2	Assessments		■	■			
Task 3	Inventory Catalog		■	■			
Task 4	Mapping and Analysis			■	■		
Task 5	Regulatory Review and Amendment Recommendations				■	■	
Task 6	Draft Wireless Master Plan					■	■
Task 7	Project Completion and Final Documents						■

Timeline does not take into consideration required advertisement for public meetings or the clients existing workload or existing public meeting schedules. Staff will schedule any public meetings required with necessary planning and community groups, public notification and arrangements for meeting dates, and times and locations in conjunction with CityScape's calendar. Staff will be responsible for public notification, location, meeting arrangements, and recording of sessions if applicable.

PER DIEM RATES:

If required by the Town, additional services outside of the scope of services may be added in accordance with the rate schedule are below.

Effective January 1, 2019 through December 31, 2019

Regulatory Consultant	\$ 300.00 per hour
Director/Engineering Consultant	\$ 250.00 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

PER DIEM 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).

BASIS OF PROPOSAL

1. This proposal assumes Federal Engineering, Inc. will perform the tasks 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. Any optional or additional tasking will be authorized by mutual agreement of **CS** and Town. 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 CityScape.
3. **CS/FE**'s ability to fulfill this task depends, in part, on the willingness and ability of CityScape, the Town of Bedford, Town 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 **CS/FE** nor can the performance, suitability, or reliability of said systems be warranted by **CS/FE**. **FE** accepts no responsibility or liability to any third party in respect to any information or related content delivered by **CS/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.
4. This proposal assumes a mutually agreeable invoicing schedule for work completed.