FAYETTE County
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Purchasing Department
140 Stonewall Avenue West, Ste 204
Fayetteville, GA 30214
Phone: 770-305-5420
www.fayettecountyga.gov

October 22, 2024

Subject: Request for Proposals 2493-P: PSAP and Tower Sites Enhancements
Gentlemen/Ladies:

Fayette County, Georgia, is seeking proposals from qualified vendors for enhancements to the public safety answering point (PSAP) and tower site grounding/earthing systems, which will include facility interior and/or exterior (civil) upgrades. The sites provide support for the radio communications system that supports mission-critical public safety communications within the county. The proposed grounding system enhancements will provide protection for public safety personnel, the facility, and the equipment, which provide public safety services to the community.

A mandatory pre-proposal conference will be held Friday, November 15, 2024, at 1:30 pm at the project site located at 110 Volunteer Way, Fayetteville, GA 30215 to provide an opportunity for you to become familiar with the project, and to ask questions.

Questions concerning this Request for Proposals should be addressed to Colette Cobb in writing via email to ccobb@fayettecountyga.gov. Questions will be accepted until **3:00pm Friday, November 19, 2024.**

Purchasing Department office hours are Monday through Friday 8:00 a.m. to 5:00 p.m. The office telephone number is (770) 305-5420.

Please return your response to the following address:

Fayette County Purchasing Department
140 Stonewall Avenue West, Suite 204
Fayetteville, Georgia 30214

RFP Number: **2493-P**
RFP Name: **PSAP and Tower Sites Enhancements**

Your envelope must be sealed and should show your company's name and address.

Proposals will be received at the above address until 3:00pm on Tuesday, November 26, 2024, in the Purchasing Department, Suite 204. Proposals will be opened at that time.

Proposals must be signed to be considered. Late proposals cannot be considered. Emailed proposals cannot be considered.

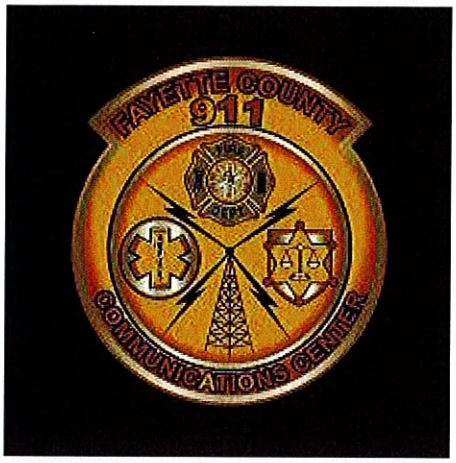
If you download this Request for Proposals from the county's website, it will be your responsibility to check the website for any addenda that might be issued for this solicitation. The county cannot not be responsible for a vendor not receiving information provided in any addendum.

Thank you for participating in the solicitation process.

Sincerely,

Ted L. Burgess
Chief Procurement Officer

TLB/cc



Fayette County, Georgia

Request for Proposals # 2493-P
for
Fayette County PSAP and Tower Sites Enhancements

Issued: October 30, 2024

Fayette County, Georgia, (County) invites proposals from qualified vendors for the enhancements to the Public Safety Answering Point (PSAP) and tower sites grounding/earthing system and civil enhancements. The systems provide support for the radio communications system which supports mission-critical public safety communications within the county.

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1. SCOPE OF WORK

1.1. PROJECT OVERVIEW

Fayette County, Georgia, (County) invites proposals from qualified vendors for enhancements to the public safety answering point (PSAP) and tower site grounding/earthing systems, which will include facility interior and/or exterior (civil) upgrades. The sites provide support for the radio communications system that supports mission-critical public safety communications within the county. The proposed grounding system enhancements will provide protection for public safety personnel, the facility, and the equipment, which provide public safety services to the community.

The work presented in Section 1.3, Scope of Work – Detailed by Task, is to be proposed and priced. Each sub-section shall be given a separate cost. This will allow the County the leeway to add or subtract from the quote as needed. Respondents shall quote the job as if all tasks are to be completed. The County is aware that any items subtracted from the original quote will need to be re-quoted in the future.

Appendix A, numbered as Sections 4 through 8 for clarity, provides technical guidance to prospective Respondents regarding the proper and anticipated methods that shall be used to complete the Scope of Work (SOW) detailed in Section 1.3. The means, method, and workmanship detailed within Appendix A (Sections 4–8) shall be applied by the successful Respondent to properly complete the SOW and obtain final acceptance by the County.

1.2. SCOPE OF WORK – GENERAL

The SOW entails enhancing the PSAP's and tower sites' exterior and interior grounding systems and providing updates to exterior and/or interior finishes (civil work). The locations of the PSAP and ten County radio sites are provided in Section 1.2.1.

The PSAP and shelter grounding and civil enhancements are needed for the exterior compound, grounding electrode system, ancillary metallic equipment, and radio frequency (RF) cable shield grounding, as specified in Section 1.3 of this document.

Shelter interior grounding enhancements are needed for grounding and bonding techniques, conductor properties and sizing, cable tray, alternating current (AC) power, surge protection, ancillary metallic equipment, and uninterruptible power supply (UPS), as specified in Section 1.3 of this document.

1.2.1. The PSAP location is as follows:

110 Volunteer Way
Fayetteville, GA 30215

The tower site locations are as follows:

Site Name	Address	Owner
Prime	116 Volunteer Way, Fayetteville	Fayette County (CC)
1044307 Crown Atlantic	221 Hilo Road, Fayetteville	Crown Castle
1205042 CC Woolsey	288 Mud Bridge Road, Fayetteville	Crown Castle
Brooks	101 Railroad Avenue, Brooks	Crown Castle
Porter Road	431 Porter Road, Fayetteville	American
West Bridge	1479 N Highway 92, Fayetteville	Crown Castle
Swanson Road	365 Swanson Road, Tyrone	American
Tyrone Downtown	147 Commerce Drive, Tyrone	American
Peachtree City	153 Willowbend Road, Peachtree City	Peachtree City
SR54	1305 W Highway 54, Fayetteville	Fayette County

The successful Respondent (Contractor) shall assume responsibility for all inspections, underground cable and pipe locating, and proper waste disposal per local, state, and federal regulations.

1.3. SCOPE OF WORK – DETAILED BY TASK

The purpose of this Request for Proposal (RFP) for PSAP and radio site exterior and interior enhancements is to assist in providing site longevity and safety for personnel and equipment temporarily or permanently located at the PSAP and ten Fayette County communication sites.

In general, these specifications and accompanying supporting documents describe the work to be done, methods to be used, and the materials to be furnished. The work shall consist of and comply with Motorola R56®, *Standards and Guidelines for Communication Sites*, (R56)-based site installation and grounding methods. Therefore, if not stated, it is implied that all alterations and additions to the project shall be properly grounded/bonded per the current Motorola R56 standard or this RFP; the more stringent shall apply.

Work shall be planned, coordinated, and conducted with minimal interruption of service to existing critical systems.

The SOW, detailed by phase and task, is summarized below. Respondents shall describe this work in their proposal and shall price Sections 1.3.1 and 1.3.2 separately. Respondents shall use the pricing form provided in Appendix H.

The project will take place in two phases—the PSAP and Tower Sites, respectively. Phase 1 (PSAP) shall be performed and scheduled to be complete immediately. Phase 2 (Tower Sites) may be scheduled to coincide with Phase 1 or to follow directly after.

1.3.1. Phase 1 – PSAP Enhancements

The following PSAP enhancements shall be made to the County-owned and shared equipment at the site:

1.3.1.1. Have the rooftop lightning protection system (LPS) inspected, deficiencies corrected, and UL or Lightning Protection Institute-Inspection Program (LPI-IP) certification brought up to date.

a. Bond gas line to the lightning protection system (LPS) per National Fire Protection Association (NFPA) 780, *Standard for the Installation of Lightning Protection Systems*.

1.3.1.2. Have the existing building ground ring modified and/or enhanced.

a. Measure existing ground ring resistance to earth, as practicable.
b. Inspect and remake all test well ground rod connections by using exothermic welds.
c. Remove the multiple connections from the dispatch, emergency operations center (EOC), information technology (IT), and other areas.
d. Connect the building interior grounding system to the current ground ring by minimally, NFPA 70®, *National Electrical Code®*; Telecommunications Industry Association (TIA) 607, *Generic Telecommunications Bonding and Grounding (Earthing) for Customer Premises*; and Motorola R56. The more stringent shall apply.
e. Have a state engineer stamp the modifications.
f. Bond exterior metallic items within 10 feet of the grounding system or a grounded object to the ground ring (e.g., generator fence, flagpole, exterior lights).
g. Clean up and remake bonding connections.

1.3.1.3. Verify all building ground electrodes per NFPA 70, *National Electrical Code*, requirements are properly bonded to a common bonding bar (CBB).

a. This will include generator and separately derived systems.

1.3.1.4. Install a proper building grounding bonding backbone system. It shall minimally include:

a. Primary bonding bus (PBB) at telecommunications (telco) demarcation (demarc) area. The existing bus bar within the electrical room will be replaced.
b. Install secondary bonding bus (SBB) in the main distribution frame (MDF) and dispatch.
c. Properly bond the existing operator station secondary bonding bus (OSBB) within each dispatch station to the grounding system.
d. Bond the raised floor system to each area's main SBB and at each OSBB.

1.3.1.5. Install proper surge protection devices (SPDs) on the systems noted below. The SPDs will be installed in a cascading arrangement, typically primary, secondary, and point of use.

a. Telecom
b. Data
c. RF
d. Power
e. Metallic cabling entering the building (e.g., card readers, cameras, etc.)

1.3.1.6. Properly bond main distribution frame (MDF) racks and equipment to grounding system.
   a. This will need involvement from the County's vendors.
   b. Properly secure racks to concrete floor below.
   c. Use grommets or insulating material to protect cabling coming through floor.
   d. Use proper power distribution units (PDUs) to power equipment.

1.3.1.7. Remove electrical plugs beneath the raised floor area.

1.3.1.8. Properly bond operator station metallic equipment to OSBB.

1.3.1.9. Properly bond the SBBs located in the EOC back to the PBB.
   a. The conductors shall be sized according to Motorola R56 Table 5-3.

1.3.1.10. Remove old abandoned/unused cabling from MDF and dispatch.

1.3.1.11. Ensure proper separation of cable groups as required by NFPA, TIA, and Motorola R56.
   a. This will include installation of overhead cable tray within the MDF area.

1.3.1.12. Install a proper entry port for the RF cabling entering the MDF area.
   a. The entry port shall have twice the required ports for the existing cables, minimally.
   b. There shall be an external ground bus bar (EGB) installed beneath the entry port to accept the bonding of the RF cable shield kits.
   c. The EGB shall bond to the exterior ground ring with two main-sized (same size as the exterior ground ring) tin-plated copper conductors. The conductors shall be encased in schedule 80 polyvinyl chloride (PVC) conduits.
   d. An SBB shall be installed inside the facility to accept the bonding of the RF cable SPDs.

1.3.1.13. Replace the carpet within the MDF area with new electrostatic discharge (ESD)-compliant carpet.
   a. The carpet shall be bonded properly to the grounding system.

The facility has gone through two renovations. Reference Appendices B and C for the renovation drawings.

Additional direction and assumption details can be found in the later sections to assist vendors with providing their proposal.

1.3.2. Phase 2 – Tower Sites Enhancements

The County owns two of the ten tower sites. The two County-owned sites will have the entire exterior of the site (e.g., tower, fence, ground rings, etc.) and shelters enhanced to the requirements of this RFP and Motorola R56; the more stringent shall apply.

1.3.2.1. The following are site enhancements to be made to all tower site exteriors:

   a. Properly install tin-plated copper tower ground bus bars (TGBs).

b. Properly bond the ice bridge and posts. Correct any ice bridge imperfections.
c. Bond ice bridge-mounted masts to the grounding system.
d. Verify that all RF cables have the ground kits installed and bonded to the grounding system.
e. Verify RF cables are supported at 3-foot intervals.
f. Verify RF and other metallic sheathed cables have ground kits installed at the top, mid-point, and bottom of tower, and before entering the entry port or shelter.
g. Verify RF cables have a drip loop and/or slight slope upon entering the entry port.
h. Ensure the entry port is properly bonded to the EGB.
i. Verify the proper RF cable boots are installed and/or plugs and caps at entry port.
j. Properly bond the EGB to the exterior grounding system.
k. Replace all exterior mounting hardware with stainless steel or hot-dipped galvanized.
l. Resurface rusting supports and equipment chassis.

1.3.2.2. The following additional site enhancements shall be made to the two County-owned tower site exteriors.

a. Repair the existing compound fence and make repairs to any existing guy fence areas and grounding as needed.
b. Repair the incoming electrical and telcom services.
c. Install a 2/0 American wire gauge (AWG) main-sized bare tin-plated copper Motorola R56-compliant in-ground grounding system. This shall include, but not be limited to, the following.
    - Tower ring
    - Shelter ring
    - PBB to ring
    - Fence post bonding
    - Tower bonding
    - Exterior metallic ancillary equipment
    - Tower grounding bus bar (TGB) – 2 conductors
    - Exterior ground bus bar (EGB) – 2 conductors
d. Bond the fence fabric to the grounding system with No. 2 AWG bare copper conductors.
e. Install ground radials from each leg per the requirements of American National Standards Institute (ANSI)/TIA-222-I, *Structural Standard for Antenna Supporting Structures, Antennas and Small Wind Turbine Support Structures*.
f. Upgrade the tower lighting to current light emitting diode (LED) lighting technology.
g. Install a lightning rod on top of the tower. A copper rod shall not be used on the tower.
h. Test the enhanced grounding system earth/ground resistance and record according to Motorola R56.
i. Properly grade the site shall according to Section 4 of this RFP.

1.3.2.3. The County-owned concrete shelters shall be reconditioned, which shall include the following items, minimally. The three new shelters at the 1205042 CC Woolsey site, the 1044307 Crown Atlantic site, and Tyrone Downtown are excluded.

a. Repair all exterior and interior electrical systems deficiencies.
b. Properly bond all exterior and interior metallic chassis and equipment to the grounding system.

c. Re-stain/seal and the exterior shelter walls.
d. Repaint the exterior metallic shelter framework (trim) with comparable to existing color.
e. Entirely repaint the shelter door to match the exterior trim. Remove all hardware and door seals and install new.
f. Replace any exterior deteriorating and/or moldy caulking with matching caulk.
g. Repair any flooring imperfections. Before final acceptance, properly clean and seal the flooring.
h. Replace the door locking mechanism and key per the County's directions.
i. Properly repair any roof imperfections and properly coat the roof with a white silicone-based roof coating.
j. Properly repair and recoat any interior wall and ceiling imperfections.
k. Install new LED light fixtures, including existing emergency/exit lighting.
l. Perform a thorough cleaning of the shelter interior before project final acceptance.

1.3.2.4. The interior of the existing shelters shall be brought up to current Motorola R56 standards and others as noted within this RFP. This shall include, but not be limited to, the following items:

a. Install proper interior perimeter bonding bus (IPBB) conductors. An existing halo may be reconfigured.
b. Bond all ancillary metallic objects to the IPBB.
c. Repair existing conduit runs.
d. Correct any improper bonding within the electrical panels and disconnects to eliminate ground loops.
e. Bond all conduit runs.
f. Properly bond all cable/ladder trays.
g. Install proper fire extinguishers.
h. Install safety kit.
i. Install eye wash station.
j. Ensure emergency lighting and exit signs are operational; repair as necessary.
k. Ensure fire extinguishers, both CO_2 and ABC, are in place and inspect.

1.3.2.5. Install a mobile generator jack and manual transfer switch (MTS) per the requirements of NFPA 1225, *Standard for Emergency Services Communications*, on all existing shelters. The County's three new shelters are already complete, which is the basis of design for equipment to be used.

1.3.2.6. Provide Motorola R56-compliant AC SPDs.

a. Type 2B on the main service disconnect.
b. Type 2A on the critical equipment panel.

1.3.2.7. Install Motorola R56-compliant SPDs on all incoming telcom lines and properly bond cable shielding.

a. Terminate telcom cabling on a 66-punch block within the shelter.

1.3.2.8. Install Motorola R56-compliant SPDs on all incoming alarm lines and properly bond cable shielding.

1.3.2.9. Remove and properly dispose of the tower site's unused UPS units.
a. Rack-mounted UPS units shall be supplied and properly energized for equipment within the shelter at the Peachtree City site.

Additional direction and assumption details can be found in the later sections to assist vendors with providing their proposal.

1.3.3. Standards

1.3.3.1. Compliance standards, minimally, are as follows:
- National Electrical Contractors Association (NECA) standard No. 1
- NFPA 70, *National Electrical Code*, and NFPA 70E

1.3.3.2. Unless otherwise modified herein, construction procedures shall be in accordance with the following:
- Motorola R56, *Standards and Guidelines for Communications Sites*, 68P81089E50-B, most current version of this document
- American Society for Testing of Materials (ASTM)
- Occupational Safety and Health Administration (OSHA)
- Uniform Building Code (UBC)
- Federal, state, and local codes and regulations (e.g., National Environment Protection Agency [NEPA], State Historical Preservation Office [SHPO], Tribal Historic Preservation Officer [THPO], Maximum Permissible Exposure [MPE], etc.)

1.3.3.3. Electrical equipment and devices shall be listed, approved, or certified by UL, when available.

1.3.3.4. Installation of electrical equipment, power distribution, lighting and outlet assemblies, and alarm and grounding systems with associated wire ways and wiring shall comply with the most recent edition of NFPA 70, *National Electrical Code*.

1.3.3.5. Where local ordinances or the Authority Having Jurisdiction (AHJ) specify higher standards than those represented in these specifications, the local ordinances or AHJ shall govern.

1.3.4. Multiple References

1.3.4.1. Where two or more standards are specified to establish quality, the successful Respondent shall conform to or surpass the requirements of both standards.

1.3.4.2. In the case of a conflict between reference standards, the more stringent requirements shall be enforced, unless contract documents specifically indicate less stringent requirements are acceptable.

1.3.4.3. The successful Respondent shall consult the County's Representative or the County for direction before proceeding if uncertainties about requirements exist.

1.3.4.4. Where copies of standards are needed for proper performance of work, the successful Respondent shall obtain such copies directly from the publication source.

2. COUNTY GENERAL TERMS AND CONDITIONS

1. **Definitions:** The term "Contractor" as used herein and elsewhere in these Terms and Conditions shall be used synonymously with the term "successful Respondent." The term "County" shall mean Fayette County, Georgia.

2. **Preparation of Offers:** It shall be the responsibility of the Respondent to examine specifications, scope of work, schedule and all instructions that are part of this request for proposal. Failure to observe any of the instructions or conditions in this RFP may result in rejection of the offer.

   All specifications and information contained in this request for proposal, unless specifically excepted in writing by the Respondent and such exceptions being included with the offer, will form the basis of the contract between the successful Respondent and the County. The Respondent should take care to answer all questions and provide all requested information.

3. **Submission of Offers:** Respondents must submit their proposal, along with any amendments issued by the County, in a sealed opaque envelope with the following information written on the outside of the envelope:

   a. The Respondent's company name,
   b. The RFP number, which is 2493-P, and
   c. The "reference" which identifies the proposal, which is "Fayette County PSAP and Tower Sites Enhancements".

   Price schedules shall be placed in an additional opaque sealed envelope, identified as the price schedule, and enclosed in the sealed envelope with the proposal.

   Mail or deliver one (1) original proposal, signed in ink by a company official authorized to make a legal and binding offer, and five (5) additional hard copies with one (1) electronic copy on flash drives to:

   Fayette County Government
   Purchasing Department
   Attention: Contracts Administrator
   140 Stonewall Avenue West, Suite 204
   Fayetteville, GA 30214

4. **Timely Receipt**: Offers not received by the time and date of the scheduled proposal opening will not be considered, unless the delay is a result of action or inaction by the County.

5. **Open Offer**: The offer, once submitted and opened, shall remain open for acceptance for a period of at least six months from the date of the opening unless this timeframe is specifically excepted to in your offer.

6. **Corrections or Withdrawals:** The Respondent may correct a mistake or withdraw a proposal before the proposal opening date by sending written notification to the Director of Purchasing. Proposals may

be withdrawn after the opening only with written authorization from the Director of Purchasing.

The County reserves the right to waive any defect or irregularity in any proposal received.

In case of discrepancy between the unit price and the extended or total price, the unit price shall prevail.

7. **Trade Secrets – Confidentiality:** If any person or entity submits a bid or proposal that contains trade secrets, an affidavit shall be included with the bid or proposal. The affidavit shall declare the specific included information which constitutes trade secrets. Any trade secrets must be either (1) placed in a separate envelope, clearly identified and marked as such, or (2) at a minimum, marked in the affidavit or an attached document explaining exactly where such information is, and otherwise marked, highlighted, or made plainly visible. See Georgia law at O.C.G.A. § 50-18-72 (A)(34).

8. **Site Conditions**: Respondents are urged to visit the sites to familiarize themselves with site conditions. Upon submission of an offer, it is understood that the Respondent is acknowledging their acceptance of all site conditions.

9. **Ethics – Disclosure of Relationships**: Before a proposed contract in excess of $10,000.00 is recommended for award to the Board of Commissioners or the County Administrator, or before the County renews, extends, or otherwise modifies a contract after it has been awarded, the Contractor must disclose certain relationships with any County Commissioner or County Official, or their spouse, mother, father, grandparent, brother, sister, son or daughter related by blood, adoption, or marriage (including in-laws). A relationship that must be reported exists if any of these individuals is a director, officer, partner, or employee, or has a substantial financial interest in the business, as described in Fayette County Ordinance Chapter 2, Article IV, Division 3 (Code of Ethics).

   If such relationship exists between your company and any individual mentioned above, relevant information must be presented in the form of a written letter to the Director of Purchasing. You must include the letter with any bid, proposal, or price quote you submit to the Purchasing Department.

   In the event that a contractor fails to comply with this requirement, the County will take action as appropriate to the situation, which may include actions up to and including rejection of the bid or offer, cancellation of the contract in question, or debarment or suspension from award of a County contract for a period of up to three years.

10. **Evaluation of Offers:** The evaluation of offers and the determination as to acceptability of services offered shall be the responsibility of the County. Accordingly, to ensure that sufficient information is available, the Respondent may be required to submit literature, samples, or other information prior to award. The County reserves the right to obtain clarification or additional information from any firm regarding its proposal. The County reserves the right to select a responsive, responsible firm on the basis of best value that is deemed to be most advantageous to the County. The County further reserves the right to reject any proposal, or all proposals, and to re-release the RFP.

11. **Non-Collusion:** By responding to this request for proposals, the Respondent shall be deemed to have represented and warranted that the proposal is not made in connection with any other vendor submitting a separate response to this RFP and is in all respects fair and without collusion or fraud.

12. **Ability To Perform:** The Respondent may be required, upon request, to provide to the satisfaction of the County that it has the skill, experience, and necessary facilities, as well as sufficient financial and human resources, to perform the contract in a satisfactory manner and within the required time. If the available evidence is not satisfactory to the County, the County may reject the offer.

13. **Notice to Proceed**: The County shall not be liable for payment of any work done or any costs incurred by any Respondent prior to the County issuing a written notice to proceed.

14. **Payment Milestones and Timing**: Payments shall be made based on the successful Respondent meeting specific milestones, unless otherwise agreed by both parties and included in the resulting contract. The following payment terms are for a prime vendor turn-key solution. If separate contracts are awarded for selected project elements or the County selects to delete tasks, payment milestones will be adjusted accordingly.

Contract Execution (Effective Date)	10%
Design Review	5%
Phase 1 (Section 1.3.1) Complete	20%
Section 1.3.2.1 is completed	10%
Section 1.3.2.2 is completed	15%
Section 1.3.2.3 is completed	10%
Section 1.3.2.4 through 1.3.2.9 are completed	15%
Final Project Acceptance	15%

Payments will be considered on-time if payment is made within thirty (30) days from the date of receipt of an invoice, or the date a correct invoice is received, whichever is the later date.

15. **Unavailability of Funds**: This contract will terminate immediately and absolutely at such time as appropriated and otherwise unobligated funds are no longer available to satisfy the obligations of the County under the contract.

16. **Severability**: The invalidity of one or more of the phrases, sentences, clauses or sections contained in the contract shall not affect the validity of the remaining portion of the contract. If any provision of the contract is held to be unenforceable, then both parties shall be relieved of all obligations arising under such provision to the extent that the provision is unenforceable. In such case, the contract shall be deemed amended to the extent necessary to make it enforceable while preserving its intent.

17. **Indemnification**: The Contractor shall defend, indemnify and save the County and all its officers, agents and employees harmless from all suits, actions, or other claims of any character, name and description brought for or on account of any injuries or damages received or sustained by any person, persons, or property on account of any negligent act or fault of the successful offeror, or of any agent, employee, subcontractor or supplier in the execution of, or performance under, any contract which may result from proposal award. The Contractor shall pay any judgment with cost which may be obtained against the County growing out of such injury or damages.

18. **Non-Assignment**: Assignment of any contract resulting from this RFP will not be authorized, except with express written authorization from the County.

19. **Insurance**: The contractor shall procure and maintain the following insurance, to be in effect throughout the term of the contract, in at least the amounts and limits set forth as follows:

    - **General Liability Insurance**: $1,000,000 combined single limit per occurrence, including bodily and personal injury, destruction of property, and contractual liability.

    - **Automobile Liability Insurance**: $1,000,000 combined single limit each occurrence, including bodily injury and property damage liability.

    - **Worker's Compensation**: Workers Compensation as required by Georgia statute.

    - **Professional Liability (Errors and Omissions) Insurance**: $2,000,000 limit per claim and aggregate.

    Before a contract is executed with the successful Respondent, the successful Respondent shall provide Certificates of Insurance for all required coverage. The successful Respondent can provide the Certificate of Insurance after award of the contract but must be provided prior to execution of the contract document by both parties. Certificates shall list an additional insured as follows:

    Fayette County, Georgia
    140 Stonewall Avenue West
    Fayetteville, GA 30214

20. **Bid Bond**: Respondents must include a bid bond with their bid, equal to five percent (5%) of the total amount bid. Bid bonds shall be provided by a surety which appears on Georgia's list of approved sureties administered by the State Insurance Commissioner, or the U.S. Treasury's list of approved bond sureties (Circular 570).

21. **Performance and Payment Bonds**: Prior to execution of a contract, the successful Respondent shall submit performance and payment bonds each equal to 100 percent (100%) of the contract value, provided by a surety which appears on Georgia's list of approved sureties administered by the State Insurance Commissioner, or the U.S. Treasury's list of approved bond sureties (Circular 570).

22. **Termination for Cause**: The County may terminate the contract for cause by sending written notice to the Contractor of the Contractor's default in the performance of any term of this agreement. Termination shall be without prejudice to any of the County's rights or remedies by law.

23. **Termination for Convenience**: The County may terminate the contract for its convenience at any time with 10 days' written notice to the Contractor. In the event of termination for convenience, the County will pay the Contractor for services performed. The County will compensate partially completed performance based upon a signed statement of completion submitted by the Contractor, which shall itemize each element of performance completed.

24. **Force Majeure**: Neither party shall be deemed to be in breach of the contract to the extent that performance of its obligations is delayed, restricted, or prevented by reason of any act of God, natural disaster, act of government, or any other act or condition beyond the reasonable control of the party in question.

25. **Governing Law**: This agreement shall be governed in accordance with the laws of the State of Georgia. The parties agree to submit to the jurisdiction in Georgia, and further agree that any cause of action arising under this agreement shall be required to be brought in the appropriate venue in Fayette County.

Remainder of this page intentionally left blank.

3. INSTRUCTIONS TO RESPONDENTS

3.1. FIRM QUALIFICATIONS

Respondents shall have been actively engaged in the sale of, manufacture of, and/or installation of equipment/services similar to the item(s) proposed in this RFP for a period of at least two years.

3.2. MANDATORY PRE-PROPOSAL CONFERENCE

A mandatory pre-proposal conference shall be held to review this RFP, which will allow Respondents to ask questions. The pre-proposal meeting will be held Friday, November 15, 2024, **starting promptly at** 1:30 p.m. at:

Fayette County 911
Emergency Communications Center (ECC)
110 Volunteer Way
Fayetteville, GA 30215

Potential Respondents shall be required to sign-in at the above address prior to the pre-proposal conference. The meeting shall also include a brief discussion at the 911 Communications Center, located at 110 Volunteer Way, and visits to the two County tower sites, weather conditions permitting.

3.3. RFP QUESTIONS

All questions regarding this RFP shall be directed via e-mail to Colette Cobb at ccobb@fayettecountyga.gov no later than Tuesday, November 19, 2024, at 3:00 p.m. If it becomes necessary to revise any part of this RFP, an amendment will be sent to those vendors receiving the RFP, which will require Respondents to acknowledge the receipt of the amendment.

3.4. SUBMITTAL OF RESPONSES

3.4.1. Proposal Response Requirements

The following information is provided so that all Respondent bids will be formatted the same. Each lettered topic and bulleted items within section 3.4.1 are required. Omission of any item will disqualify the bid. If a Respondent believes that an item is not applicable state, "Not Applicable".

A. Cover Letter: Include the RFP number (2493-P) and title (Fayette County PSAP and Tower Sites Enhancements).

B. Table of Contents

C. Project Understanding and the Proposed Solution

Similar to an Executive Summary, at the beginning of this section response, state your understanding of the services required. Describe the approach you propose to take in addressing the needs addressed by this RFP. Indicate your level of expertise with grounding, electrical, and site installations for mission-critical facilities and tower sites. Identify challenges you will face. Creativity and innovative ideas are encouraged in your response.

D. Company Information Page form is provided in Appendix D.

E. Project Team

- Identify team members who would be assigned to this project. Include a resume for each key team member. Identify the main contact person for the County. Describe each key team member's experience with comparable projects, the role that each member played, and the expected role of each when doing work for this project. The project team may include personnel hired by the firm directly, or a mixture of personnel and outside sub-consultants.

- A brief history of the Respondent submitting the proposal, which includes the company's overall background and experience. Specifically include projects similar to this project.

- A listing and brief history of all subcontractors to be utilized in the fulfillment or completion of the contract awarded as a result of this RFP.

- Provide all certifications and licenses per the RFP for each firm and/or their employees.

F. Contractors Affidavit under O.C.G.A. § 13-10-91(b)(1) form is provided in Appendix E.

G. Non-Collusion Affidavit form is provided in Appendix F.

H. References

- Three references of installations similar in size and scope. References submitted should be no more than five years old. References shall include the name and location of the system, contact person, telephone number, and a brief description of the system.

- The County reserves the right to contact any references supplied for an evaluation of past performance in order to establish the responsibility of the Respondent before the actual award. In executing their response, the Respondent agrees that the County may contact said references and be guided by their information in awarding the contract. The County may also request proof of financial stability from any Respondent, which would be evaluated prior to award.

I. Completed Compliance Matrix; provided in Appendix G.

Appendix G will be used to assist in determining the Respondent's understanding of the requested tasks within the RFP and their intended outcome. Thus, it will be used during the

submittal evaluation in Section 3.4.3. Dependent upon the responses, it could be reason for the immediate disqualification of the Respondent's bid.

To demonstrate total project knowledge and an understanding of the requirements, Respondents shall fill out the "Compliance Matrix". Additional design information may be required from Respondents in certain sections of these requirements.

- The required project specifications are indicated by the words shall, will, must, requirement, or required. If in compliance, Respondents must detail how they will meet the requirements in the SOW. If non-compliant, Respondents must detail why they cannot comply and address whether any part of a requirement can be met.

- Some of the project specifications may be listed as desirable. They are represented by the words should, would, desired, or desirable. Desirable project specifications responses will be considered when evaluating responses, but only after requirements are addressed. These project specifications are not required, but desirable.

The responses, discussions, and representations during negotiation can only be:

- **Understood and Will Comply:** The Respondent meets all specifications and requirements.
- **Clarification:** The Respondent wishes to provide information regarding a specification or requirement for clarification purposes that does not materially affect the operation of the system. A written statement of the clarification must follow this.
- **Exception:** The Respondent does not/cannot meet the specification/requirement.

Respondents shall provide compliance statements in the spreadsheet found in Appendix G for each outline level of this RFP. Respondents shall provide a response to every section with which they do not comply.

J. Pricing

- Detailed pricing broken out by material and labor; Proposal Pricing Summary form is provided in Appendix H.

- Provide a proposed cost and detailed pricing breakdown. Specify the total proposal cost and itemized pricing for both equipment and services, using the pricing form in Appendix H, Proposal Pricing Summary Form, to the greatest extent possible. Each line item shall indicate the Respondent's list cost, including any discounts offered. Costs for services must include the hourly rate and the total number of hours.

K. Balance and Income Statements

Provide a copy of your firm's last two year's balance and income statements as documentation of financial responsibility and stability.

- Pricing shall be valid for a period of not less than six months from the date of submittal.

L. Bid Bond

Include a bid bond with the Respondent's bid, equal to five percent (5%) of the total amount bid. Bid bonds shall be provided by a surety which appears on Georgia's list of approved sureties administered by the State Insurance Commissioner, or the U.S. Treasury's list of approved bond sureties (Circular 570).

M. Training

Stipulate training sessions and additional information not covered in other sections for specialty equipment being installed (e.g., SPDs).

N. Proposed Schedule

Provide a preliminary project schedule with a detailed Gantt style chart. The schedule shall take into consideration the following items, but not limited to:

- A schedule narrative that demonstrates success in staying on schedule with similar projects
- Identification of critical paths and milestones
- How the schedule is controlled
- Thoroughness

O. Signed addenda, if any are issued.

3.4.2. Proposal Submittal Deadline

Responses must be received by Fayette County no later than 3:00 p.m. local Fayetteville, Georgia, time on Tuesday, November 26, 2024. Responses received after that time shall not be accepted. The response shall be enclosed in a sealed envelope clearly labeled as "Fayette County PSAP and Tower Sites Enhancements." Mail or deliver one (1) original proposal, signed in ink by a company official authorized to make a legal and binding offer, and five (5) additional hard copies with one (1) electronic copy on flash drives to:

Fayette County Government
Purchasing Department
Attention: Contracts Administrator
140 Stonewall Avenue West, Suite 204
Fayetteville, GA 30214

3.4.3. Proposal Evaluation Plan

A. An Evaluation Committee will review and evaluate proposals. The points earned for technical merit will comprise 70% of the evaluation score. Criteria for technical merit are, in priority order, as follows:

	Maximum Points
1. Project understanding and the proposed solution	25
2. Project team	20
3. Company's background and experience	15
4. Proposed schedule	10

B. The remaining 30% of the score will be determined by the proposed price, as compared to other responding entities. Proposed prices will be assigned points earned through use of a "variance" weighting method. The lowest offered price will earn the maximum number of points for the Pricing portion of the score. Other proposals' price scores will be calculated based on the variance of their prices from the lowest offered price.

C. The County may, at its discretion, choose one or more of the best-scoring companies to make in-person presentations. If more than one company makes a presentation, the Evaluation Committee will evaluate the presentations and score up to an additional 20 points to the technical score for each company that makes a presentation.

3.5. RESPONDENT RESPONSIBILITIES

3.5.1. Site Coordination

The Contractor shall coordinate any site work with Katye Vogt, Director, Fayette County 911 Communications.

3.5.2. Warranties

3.5.2.1. Warranty–Price

The Contractor warrants the prices quoted in the response are no higher than the Contractor's current prices on orders by others for like deliverables under similar terms of purchase.

The Contractor certifies that the prices in the response have been arrived at independently without consultation, communication, or agreement for the purpose of restricting competition.

3.5.2.2. Warranty–Title

The Contractor warrants that it has good and indefeasible title to all deliverables furnished under the Contract, and that the deliverables are free and clear of all liens, claims, security interests and encumbrances. The Contractor shall indemnify and hold the County harmless from and against all adverse title claims to the deliverables.

3.5.2.3. Warranty–Services

The Contractor warrants and represents that all services to be provided the County under the contract will be fully and timely performed in a good and workmanlike manner in accordance with the highest industry standards and practices; the terms, conditions and covenants of the contract; and all applicable federal, state and local laws, rules or regulations.

The Contractor may not limit, exclude or disclaim the foregoing warranty or any warranty implied by law and any attempt to do so shall be without force or effect.

The warranty shall be subject to the requirements contained in this SOW. If during the warranty period, one or more of the above warranties are breached, the Contractor shall promptly perform the services again in accordance with contract requirements at no additional cost to the County. All costs incidental to such additional performance shall be borne by the Contractor. The County shall endeavor to give the Contractor written notice of the breach of warranty as soon as possible after the discovery of the breach, but failure to give timely notice shall not impair the County's rights under this section.

If the Contractor is unable or unwilling to perform its services in accordance with this SOW and contract requirements as required by the County, then in addition to any other available remedy, the County may reduce the number of services it may be required to purchase under the contract from the Contractor and purchase conforming services from other sources. In such event, the Contractor shall pay to the County upon demand the increased cost, if any, incurred by the County to procure such services from another source.

3.5.2.4. Warranty–Deliverables

The Contractor warrants and represents that all deliverables sold the County under the contract shall be free from defects in design, workmanship or manufacture, and conform to the specifications, drawings and descriptions in the SOW; to any samples furnished by the Contractor to the terms, covenants and conditions of the contract; and to all applicable state, federal or local laws, rules and regulations, and industry codes and standards. Unless otherwise stated in the solicitation, the deliverables shall be new and not used or reconditioned.

Recycled, used or previously installed deliverables shall not be permitted.

The Contractor may not limit, exclude or disclaim the foregoing warranty or any warranty implied by law and any attempt to do so shall be without force or effect.

The warranty period shall be a minimum of two (2) years from the date of Final Acceptance, not the time of actual installation, unless installation was on the date of Final Acceptance. If during the warranty period, one (1) or more of the above warranties are breached, the Contractor shall promptly upon receipt of demand either repair the non-conforming deliverables or replace the non-conforming deliverables with fully conforming deliverables,

at the County's option, and at no additional cost to the County. All costs incidental to such repair or replacement, including but not limited to, any packaging and shipping costs, shall be borne exclusively by the Contractor. The County shall endeavor to give the Contractor written notice of the breach of warranty as soon as possible after the discovery of the breach, but failure to give timely notice shall not impair the County's rights under this section.

If the Contractor is unable or unwilling to repair or replace defective or non-conforming deliverables as required by the County, then in addition to any other available remedy, the County may reduce the quantity of deliverables it may be required to purchase under the contract from the Contractor and purchase conforming deliverables from other sources. In such event, the Contractor shall pay to the County upon demand the increased cost, if any, incurred by the County to procure such deliverables from another source.

If the Contractor is not the manufacturer and the deliverables are covered by a separate manufacturer's warranty, the Contractor shall transfer and assign such manufacturer's warranty to the County. If for any reason the manufacturer's warranty cannot be fully transferred to the County, the Contractor shall assist and cooperate with the County to the fullest extent to enforce such manufacturer's warranty for the benefit of the County.

The Contractor further represents and warrants to the County that the occurrence in or use by the deliverables of past, current or future dates will not adversely affect the performance of such deliverables with respect to date-dependent data, computations, output or other functions (including, without limitation, calculating, comparing and sequencing) and that such deliverables will create, store, process and output information related to or including past, current or future dates without error or omissions, and at no additional cost to the County. At the County's request, the Contractor will provide evidence sufficient to demonstrate such deliverables meet the foregoing.

Documentation of all expressed or implied warranties will be provided to the County on or before the date of Final Acceptance.

3.5.3. Delays

The County may delay scheduled delivery or other due dates by written notice to the Contractor if the County deems it is in its best interest. If such delay causes an increase in the cost of the work under the contract, the County and the Contractor shall negotiate an equitable adjustment for costs incurred by the Contractor in the contract price and execute an amendment to the contract. The Contractor must assert its right to an adjustment within fifteen (15) days from the date of receipt of the notice of delay. However, nothing in this provision shall excuse the Contractor from delaying the delivery as notified.

3.5.4. Submittals

The Contractor shall submit the following information to the County's designated project manager:

A. Shop Drawings shall be first checked by the Contractor for space/dimensional considerations, performance characteristics, and general conformance to these plans and/or specifications and shall be so stamped.

a. One copy of the shop drawings for any item shall be submitted to the Engineer for approval. Drawing size shall be no larger than 11-inch x 17-inch.
b. Submittals shall be grouped according to specification Sections and shall be labeled with the proper name of the project and specification Section. Partial submittals of a group or category will not be reviewed.

B. Test Report. Copy of test reports, as detailed within this document, shall be submitted.

C. As-Built/Record Documents. A set of construction documents shall be continuously marked during progress of construction to show actual routing and makeup, equipment location changes, and variations between the project work, record drawings, and the contract documents. Such markings shall be made neatly and legibly with red felt-tipped pen. This set along with an electronically marked up and professional looking set of as-built document shall be submitted. Submit with operation, maintenance, and warranty data manuals.

D. Installation and Maintenance Manuals. Copies of installation instructions and operation, maintenance, and warranty data instruction manuals shall be furnished for the equipment provided. These manuals shall include parts lists, troubleshooting methods, and calibration instructions. Manuals shall be constructed with hard cover post-type binders. Large sheets shall be neatly folded and installed with posthole reinforcements such that the sheets will unfold without the need to open binder posts. Manuals shall include index, section tabs, approved shop drawings, installation, operation, maintenance and warranty, data instructions packed with equipment, parts lists, and any other data as necessary and/or appropriate for the user to have.

3.5.5. Completion of Installation

A. System Acceptance. System optimization shall be performed to ensure that each system is properly installed and that all components are working properly. This shall include, but not be limited to:

- Equipment is functioning properly.
- Equipment is mounted in the correct location.
- Equipment is rigidly and securely mounted.
- Equipment is installed in a neat and visually professional manner.
- Equipment is clean.
- Equipment and cabling are clearly and properly labeled per ANSI/TIA-606-D, *Administration Standard for Telecommunications Infrastructure*, standards. Coordinate final labeling scheme and tags with the County.

- The training of operations personnel is complete.

3.5.6. Final Testing and Acceptance

A. Work shall, upon completion, be subjected to such tests as are required under industry standards and/or specified herein. Acceptance of the work by the County's project manager shall be contingent upon satisfactory completion of these tests. Actual tests required shall be specified under their respective sections.

B. Prior to completion, the work shall be subjected to a careful and thorough visual inspection to detect erroneous or loose connections, presence of foreign objects or materials, poor workmanship, compliance with drawings, or other abnormal conditions.

C. Test reports shall be tabulated by the Contractor including the pertinent readings or observations, as well as a statement of the method and specific equipment employed and shall be filed with the County's project manager as part of the permanent project record. In cases of test failure, refer to the appropriate specification section herein for specific direction as to how to proceed or manufacturer's requirements. A second test shall be conducted upon completion of repairs, adjustments, or replacements.

D. The Contractor shall provide calibrated test equipment as required for tests.

E. The selected Respondent shall test, verify, and document that each facility's electrical and mechanical systems are functioning properly.

F. At substantial completion, the selected Respondent shall conduct a site walk at each location with the County's representative to complete punch lists.

G. Substantial completion shall be defined as when the Respondent has completed the installation, so it is fit to be used for its intended purpose.

- The selected Respondent shall correct punch-list items within 30 days of substantial completion, unless otherwise noted in contract documents.

H. Closeout Documentation

Closeout documents are required to be submitted within 30 days of project substantial completion.

Project substantial completion is defined as when the project installations are completed and turned over for use to the owner, and all systems are functional (e.g., grounding, electrical, etc.). At that time there will be a final walk-through, and a punch list generated. The Contractor will have 30 days to complete punch list items and submit closeout documents.

Closeout documents shall be submitted by two printed copies in a hard back binder, properly tabbed, with individual sheets punched for binding. The following are required tabs as applicable to the project. Also, there shall be one copy on a thumb drive and provided by downloadable PDF file

catalogued in folders to coincide with the hard binder tabs. Project pictures, included on the thumb drive and PDF file, shall be listed by date or task.

TABS (as applicable)

1. Cover Page
    - Project title
    - Owner information
2. Table of Contents listed per tabs.
3. Design Team List - Company Name, Point of Contact, Address, Phone, Website
4. Contractor/Subcontractor List - Company Name, Point of Contact, Address, Phone, Website, Credentials (up to date of installation, minimally), Certificate of Insurance
    - General Contractor
    - Electrical Contractor
    - Any additional contractors
5. RFP (copy of original bid document(s)
    - Add notation of addendums/amendments, etc.
6. Approved Engineered drawings and/or calculations (11-inch x 17-inch folded for pullout viewing)
    - Architectural
    - Structural (e.g., floor loading calculations [300lb/sq ft per Motorola R56], microwave and other tower loading calculations, etc.)
    - Mechanical
    - Manufactured equipment or structures
7. Permits
    - Federal
    - State
    - Local
8. Approved and installed submittals
    - Product specifications (i.e., model/serial, manuals) (e.g., installation, maintenance, etc.)
9. Additional/Substituted Materials Installed
    - Product specifications (i.e., model/serial, installation, maintenance)
10. Redlined/As-built drawings – show changes, conceptual or engineered design, and equipment layouts

11. Bills of lading (if applicable) for major components/materials

12. Certificates of origin of materials as required by the RFP

13. Inspections

    - Electrical
    - Fire System
    - Others as applicable

14. Certificates of Occupancy/Compliance

15. Testing Methods and Results

    - Grounding includes soil resistivity and earth ground resistance. The test shall be logged and provided on proper format accordingly to the Institute of Electrical and Electronics Engineers (IEEE) and Motorola R56 (current revision) requirements. The more stringent shall apply.
    - Tower Structure – provide documentation and photos as necessary to provide the following, but not limited to.
        - Vertical alignment and plumb
        - Bolts tight and torqued to specification
        - No damaged or missing structural members
        - No signs of stress or vibration
        - Climbing ladders and other devices installed correctly
        - Labels and tags
    - Foundations – provide documentation and photos as necessary to provide the following, but not limited to.
        - Concrete finish/lack of cracks/blemishes
        - Backfilling and grading
    - RF cable sweeps and system functionality results
    - Generator as required by the RFP and NFPA 70, *National Electrical Code*; NFPA 110, *Standard for Emergency and Standby Power Systems*; and NFPA 1225, *Standard for Emergency Services Communications*. The more stringent shall apply.
    - Borings according to the project and ANSI/TIA-222-I, *Structural Standard for Antenna Supporting Structures, Antennas and Small Wind Turbine Support Structures*
    - Compaction tests
    - Acceptance test plans as required by the RFP
    - Others as applicable

16. Warranties

    - Project warranty given by Contractor per requirements of the RFP
    - Copies of filled out and submitted equipment warranties by the Contractor on behalf of the County

17. Pictures

    - To be included on a thumb drive and provided by downloadable PDF only
    - Photographs minimally and as applicable shall be for the following:

- Beneath grade or behind wall/ceiling surfaces for the mechanical, electrical, and grounding systems, which will include depth, connections, and routing
  - Project progress pictures
  - Overall finished project pictures. Provide the following pictures, but not limited to.
    1. Tower or antenna structure multiple north, south, east, and west directional views
    2. Ice bridge with orientation to building and tower
    3. RF grounding kit installed on tower and entry port locations
    4. Fence
    5. Shelter exterior and interior multiple pictures showing installations
    6. Generator and automatic transfer switch (ATS) wiring and grounding connections
    7. Electrical disconnects, transfer switch, and major component connections and installations
    8. Above-grade exterior and interior bonding and grounding installations and connections
    9. Major component and/or system installations with detailed photos of equipment name plate showing equipment specifications (e.g., model, serial, part number, etc.)
  - System testing showing method and testing equipment information

I. A two-year warranty for all equipment and labor shall begin at substantial completion, unless otherwise noted in contract documents.

1. The warranty shall include all labor and materials to correct any deficiencies.

2. All deficient equipment shall be replaced with new. An additional one-year warranty, which includes labor and material, of the newly installed equipment shall begin after the correction of the deficiency has been accepted by the County.

J. The selected Respondent shall conduct follow-up inspections, if required.

K. Acceptance of the site will not be granted until all testing has been completed, reviewed, and approved by the County.

3.5.7. Completion Date

After the County submits the Notice to Proceed to the successful Respondent, the project shall be completed within 260 working days. A project completion date includes the final acceptance and completed closeout documents.

3.5.8. Liquidated Damages

Time is critical and of the essence for completion of this project. If the project is not completed as required by the contract and within the time stated in the contract, then the Contractor shall be obligated to pay the County as liquidated damages, but not as a penalty, the amount of $500.00 per calendar day for each and every day beyond the completion time stated in the contract until the project is completed. The County may deduct this amount from any funds still due to the Contractor, only if the amount due the Contractor is greater than the damages.

3.6. ACCURACY OF INFORMATION

The Contractor is solely responsible for conducting its own independent research, due diligence or other work necessary for the preparation of responses, negotiation of contracts and the subsequent delivery of services pursuant to any contract. The County takes no responsibility for the completeness, or the accuracy of any information presented in the RFP or otherwise distributed or made available during this selection process or during the term of any subsequent contract.

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APPENDIX A – TECHNICAL RECOMMENDATIONS AND SPECIFICATIONS (SECTIONS 4 THROUGH 8)

NOTE: Appendix A, numbered as Sections 4 through 8 for ease of reference, provides technical guidance to prospective Respondents of the proper and anticipated methods to complete the SOW contained in Section 1.3. The means, method, and workmanship detailed within this appendix shall be applied by the Contractor to properly complete the SOW and obtain final acceptance by the County.

4. SITE DEVELOPMENT

4.1. SITE

4.1.1. The Contractor shall keep the project site neat and free from the accumulation of waste material and debris.

4.1.2. The Contractor is responsible for removal of concrete spoils generated from the tower project.

A. The Contractor shall take pictures of the tower compound at the start of the project.

B. The County 911 Director or designated person(s) shall be informed of existing spoils.

4.1.3. Onsite burning shall not be allowed anywhere on the property.

4.1.4. The Contractor shall conduct a site walk with the Owner and Owner's Representative to identify any areas requiring special attention prior to beginning work.

4.2. EXISTING STRUCTURES AND UTILITIES

4.2.1. Shall be modified as specified in Section 1.3.

4.3. REMOVAL OF EXISTING INFRASTRUCTURE AND EQUIPMENT

4.3.1. Shall be modified as specified in Section 1.3.

4.4. WATER AND DRAINAGE

4.4.1. The Contractor shall grade the soil around the tower area to assure proper drainage and prevent water accumulation. Water drainage shall not be toward the building or adjacent properties.

A. Grading and tower compound finishing shall be coordinated with the AHJ to ensure that the tower grading dovetails with any existing or future site plan.

4.5. SITE PREPARATIONS

4.5.1. The Contractor shall converse and illustrate with the Owner and/or Owner's Representative on a final design of the site development work for review and comment by the Owner prior to commencing final system design.

4.5.2. The Contractor shall implement erosion control measures, as necessary, during the performance of work for the duration of the project.

4.5.3. The Contractor or its subcontractor(s) shall comply with Department of Environmental Resources and Bureau of Water and Soil Conservation guidelines for Erosion and Sedimentation (E&S) Control.

4.5.4. The Contractor shall clear areas, as applicable, to be occupied by permanent construction of trees, brush, roots, stumps, logs, wood, and other materials and debris in accordance with these specifications. Subgrades for fills shall be cleaned and stripped of vegetation, sod, topsoil, and organic matter.

4.5.5. The Respondent shall carefully examine and study existing conditions, difficulties, and utilities affecting execution of work. Later claims for additional compensation due to additional labor, equipment or materials required due to difficulties encountered shall not be considered.

4.5.6. Protection

A. The Contractor shall protect and maintain benchmark, monument, property corner, and other reference points, re-establishing them by Registered Professional Surveyor if disturbed or destroyed, at no cost to the County.

B. The Contractor shall locate and identify existing utilities that are to remain and protect them from damage, re-establishing them if disturbed or destroyed, at no cost to the County.

C. The Contractor shall install protection such as fencing, boxing of tree trunks, or other measures as approved by the Owner or Owner's Representative.

4.5.7. The Contractor shall conduct operations with minimum interference to public or private accesses and facilities; maintain ingress and egress at times; and clean or sweep any roadways daily or as required by the governing authority. At such times as deemed necessary by the Owner, dust control shall be provided with water sprinkling systems or equipment provided by the Contractor or its subcontractor(s).

4.5.8. When appropriate, the Contractor shall provide traffic control as required, in accordance with contract documents, the U.S. Department of Transportation *Manual of Uniform Traffic Control Devices*, and the Georgia Transportation Cabinet requirements.

4.6. UTILITIES

4.6.1. Existing Utilities

A. The existing utilities shall be modified as described within Section 1.3.

B. Prior to start of construction or any disturbance in the immediate area of the site, the Contractor shall call Georgia 811 in accordance with the Georgia Underground Facility Protection Act (GUFPA).

C. The Contractor shall be responsible for the coordination of locating and marking existing underground public and private utilities prior to the start of excavation.

D. Neither the Owner nor Engineer shall be responsible to the Contractor for damages because of the Contractor's failure to protect utilities encountered in the work.

E. The Contractor shall not interrupt utilities serving neighboring residences, unless permitted and approved by the AHJ, and then only after arranging to provide temporary utility services according to indicated requirements.

4.7. SECURITY FENCING

4.7.1. The Contractor shall furnish material and installation for repair of the perimeter security chain-link fence at the two County-owned tower sites. The tower/shelter compound fence shall be used only for reference on facility security fence style.

4.7.2. The Contractor shall reference Unified Facilities Criteria (UFC) 4-022-03, *Security Fences and Gates*, for material and installation clarification.

4.7.3. The specifications described below are minimal.

4.7.4. Framework: Type I or Type II Steel Pipe

A. Type I: Schedule 40 steel pipe with 1.8 ounces of zinc coating per square foot of surface area conforming to ASTM F1083, *Standard Specification for Pipe, Steel, Hot-Dipped Zinc-Coated (Galvanized) Welded, for Fence Structures*; or,

B. Type II: Pipe manufactured from steel conforming to ASTM A1011, Standard Specification for Steel, Sheet and Strip, Hot-Rolled, Carbon, Structural, High-Strength Low-Alloy, High-Strength Low-Alloy with Improved Formability, and Ultra-High Strength. External surface triple coated per ASTM F1043, Standard Specification for Strength and Protective Coatings on Steel Industrial Fence Framework. Type II pipe shall demonstrate the ability to resist 1,000 hours of exposure to salt spray with a maximum of 5 percent (5%) red rust in a test conducted in accordance with ASTM B117, *Standard Practice for Operating Salt Spray (Fog) Apparatus*.

C. Coatings shall be applied inside and out after welding.

D. Unless otherwise noted, Type II framework shall be provided.

E. Pipe shall be straight, true to section, and conform to the following weights:

Table 1: Type I and Type II Steel Pipe Specifications

Pipe Size Outside Diameter	Type I Weight Lb./Ft.	Type II Weight Lbs./ Ft.
1⅝"	2.27	1.84
2"	2.72	2.28
2½"	3.65	3.12
3"	5.79	4.64
3½"	7.58	5.71
4"	9.11	6.56
6⅝"	18.97	

4.7.5. Fabric

A. Aluminized fabric shall be manufactured in accordance with ASTM A491, *Standard Specification for Aluminum-Coated Steel Chain-Link Fence Fabric*, and coated before weaving with a minimum of 0.4 ounces of aluminum per square foot of surface area. The steel wire and coating shall conform to ASTM A817, *Standard Specification for Metallic-Coated Steel Wire for Chain-Link Fence Fabric and Marcelled Tension Wire*. Fabric shall be 9-gauge woven in a 2-inch diamond mesh. The top selvage shall be twisted and barbed. The bottom selvage shall be knuckled.

B. Zinc-coated fabric shall be galvanized after weaving with a minimum 1.2 ounces of zinc per square foot of surface area and conform to ASTM A392, *Standard Specification for Zinc-Coated Steel Chain-Link Fence Fabric*, Class I. Fabric shall be 9-gauge wire woven in a 2-inch diamond mesh. The top selvage shall be twisted and barbed. The bottom selvage shall be knuckled.

C. The fabric shall be extended to within 2 inches off firm finished grade and anchored using a horizontal bottom rail.

4.7.6. Fence Posts

Table 2: Fence Post Specifications

Fence Posts TYPE I - II		
Fabric Height	**Line Post O.D.**	**Terminal Post O.D.**
Under 6'	2"	2½"
6'–9'	2½"	3"
9'–12'	3"	4"

4.7.7. Gate Posts

Table 3: Gate Posts Specifications

Gate Posts Type II		
Single Gate Width	**Double Gate Width**	**Post O.D. Type II**
Up to 6'	Up to 12'	3"
7'–12'	13'–25'	4"

4.7.8. Rails

A. Rails shall be $1^{5}/_{8}$-inch outside diameter (O.D.).

4.7.9. Braces

A. Brace rails shall be $1^{5}/_{8}$-inch O.D.

B. Steel truss braces shall be minimal nominal diameter of ⅜-inch with turnbuckle tensioners.

4.7.10. Tension Wires

A. Tension wires shall not be used in lieu of specified top and bottom rails.

B. When tension wires are permitted; they shall be interwoven within the fabric at the top and bottom or fabric may be attached with wire ties or hog nose rings.

4.7.11. Fabric Tension Bar

A. The bar shall be threaded through the last vertical link of fabric and attached to line, terminal, or gate posts respectfully by galvanized tension bands.

4.7.12. Fabric Ties

A. The ties shall be minimally 9-gauge steel.

B. The tie coating shall be electrolytically compatible with the fence fabric and other fence components.

C. When installed, minimally, on tension wires, the ties shall be installed by three full twists.

D. When hog nose rings are used on tension wires, they shall be minimally 9-gauge steel.

4.7.13. Post Footings

A. The posts minimum footing shall be as noted below or by manufacturer specifications. The more stringent shall apply.

B. No footing shall be less than four times the post diameter.

C. Gate posts footing per post diameter are as listed below.

1. For an 8-inch diameter post, install a 40-inch diameter footing
2. For a 6-inch diameter post, install a 36-inch diameter footing
3. For a 4-inch diameter post, install a 24-inch diameter footing

D. The depth of the footing shall be 42 inches, minimally.

1. The posts shall be suspended to a 36-inch post depth allowing a 6-inch footing pocket beneath.

E. The footings shall be filled with 4,000 pounds per square inch (psi) concrete, minimally.

4.7.14. Post Capping

A. Each post shall receive a top capping to inhibit collection of debris, weather, and insect migration. The top capping may consist of, but not be limited to, top guard supports, top rail loop caps, or termination caps. The capping shall be secured with tamperproof screws or welding.

4.7.15. Fasteners, Clamps, Hardware, and Ties

A. Hot-dipped galvanized steel shall be used on aluminum and galvanized steel fence installation.

4.7.16. Top Guards (Outriggers)

A. Top guards will support three rows, minimally, of 12-guage barbed wire equally spaced on the top guard. The top guard will increase the fence height by 1 foot, minimally.

4.7.17. Barbed Wire

A. Barbed wire consists of two wires twisted together forming a strand. Two- or four-point barbs are tightly wrapped and held in place at specified intervals; reference ASTM A121, *Standard Specification for Metallic-Coated Carbon Steel Barbed Wire*, and ASTM F1665, *Standard Specification for Poly(Vinyl Chloride) (PVC) and Other Conforming Organic Polymer-Coated Steel Barbed Wire Used With Chain-Link Fence*.

4.7.18. Drainage Ditches, Utility Openings, and Tunnels

A. Protective measures to inhibit unwanted access to the site at any ditch, opening, or tunnel greater than 96-square inch in area, with the smallest side being more than 6 inches shall be properly secured.

4.7.19. Fence Installation

A. General: Fence installation shall conform to ASTM F567, *Standard Practice for Installation of Chain-Link Fence*.

B. Component Placement: Posts, rails, bracing, and tension wires shall be placed on the inside of the fence, to inhibit tampering.

C. Height: Fence height shall be as indicated on contract drawings. If no height is indicated, the compound fence shall be 7-feet high, plus 1-foot for barbed wire.

D. Post Spacing: Line posts shall be uniformly spaced between angle points at intervals not exceeding 10 feet.

E. Post Alignment: Posts shall be installed vertical within plus or minus 2 degrees (°) in any direction.

F. Post Foundation: Foundations shall be per requirements in Section 4.7.13, Post Footings.

G. Bracing: Gate, terminal, and end posts shall be braced back to adjacent line posts with horizontal brace rails and diagonal truss rods. The rod shall extend from near ground level to within 6 inches of fabric top of the adjacent post.

H. Top Rail: Top rails shall be installed through the line post loop caps connecting sections with sleeves to form a continuous rail between terminal posts. The connecting sleeves, with a 6-inch minimal length, shall allow for expansion and contraction of the rail. A top rail with a 3-inch swage end is acceptable in lieu of a connecting sleeve.

I. Bottom Rail: Bottom rails shall be installed at 2 inches parallel to the ground in a way that will prevent even a small child from crawling underneath. These rails shall further be installed so the use of a pry bar will not allow them to bend for anyone to crawl under the fence. The Contractor should contemplate pegging these rails to meet this requirement.

1. Fencing shall have a bottom rail instead of a tension wire.

J. Fabric: The fabric shall be pulled taut with the bottom selvage 2 inches above grade. The fabric shall be fastened to the terminal posts with tension bars threaded through mesh and secured with tension bands at maximum 15-inch intervals. The fabric shall be tied to the line posts and top rails with tie wires spaced at a maximum of 12 inches on posts and within 4 inches from top and bottom of post. The fabric shall be tied to the rails on intervals of 24 inches maximum and within 4

inches from posts. The fabric shall be attached to the bottom rail with top rings at maximum 24-inch intervals.

K. Top Guards: Guards shall be permanently installed at an outward (away from the protected site) at a 45° angle on top of each fence line, terminal, and gate post. The guards shall be attached with tamperproof screws or by welding. They will support three rows of barbed wire, minimally. The guards shall be the same material as the fencing material, reference ASTM F626, *Standard Specification for Fence Fittings*.

L. Barbed Wire: Three rows of 12.5-guage barbed wire, equally spaced, shall be installed on permanently post mounted support arms, pulled taut and firmly installed in the slots of the line, terminal, and gate post support arms. The wire shall be of the same material component as the fencing material.

1. The barbs shall be, minimally, 4-point and spaced at 5 inches on centers.

M. Drainage Ditches, Utility Openings, and Tunnels: Should the fence cross a ditch or drainage swell, a possible method of securing the opening would be to install ⅜-inch diameter rods, electrolytically compatible with the fence material and with the environment, driven vertically 18 inches into the ground on 4-inch centers. The rods may be woven through the fence fabric or affectively attached to the bottom rail to provide security for these areas. Other securing methods may be valid.

The Contractor shall submit its method of securing for approval.

4.7.20. Fence Finishing

A. Fencing fabric, posts, rails, hardware, and other components that become scratched or exhibit more than a minimal damage shall be replaced, not repaired.

4.8. SECURITY FENCE GATES

4.8.1. Security fence gates are designed for access control into a restricted zone. The design for gate installation must consider the following items, but not be limited to:

A. Pedestrian traffic
B. Reversing devices to inhibit accidental closure on approaching vehicles
C. Traffic flow
D. Open and closing cycles
E. Types of vehicles entering the restricted zone
F. Site operational security plan
G. Electrical needs for gate access control, opener, lighting, and security surveillance systems
H. Closed-circuit television (CCTV)
I. Intercom

4.8.2. Pedestrian and vehicular gates should be separated and clearly labeled.

4.8.3. Gates: Frame assembly of 2-inch O.D. pipe Type I or Type II with welded joints. Weld areas shall be repaired with zinc-rich coating applied per manufacturer's directions. The fence fabric shall match the fence posts, gateposts, and gates. Gate accessories, hinges, latches, center stops, keepers, and necessary hardware shall be of a quality required for industrial and commercial application. Latches shall permit padlocking.

A. The gate shall be secured by a locking latch that can be secured by a padlock provided by the County. A personnel gate may use a latch assembly that includes a pin-type mechanism that secures the gate by causing a pin to enter the top of the fence and a socket secured in concrete at the bottom.

B. The construction of the gate shall include reinforcing to prevent sagging or bending.

4.8.4. Personnel Gate: Two 4-foot personnel gates shall be installed. The locations shall be approved by the County or its Representative.

A. A single swing gate shall be installed for the personnel gates.

B. The gates shall open and close in both directions.

C. The gates shall move freely and be installed plumb and level.

D. The gates shall open unto grade that is parallel to gate bottom or at a slight downward grade.

E. When closed, the gates shall maintain a 2-inch or less distance from the bottom rail to the road or firm soil surface. The gates shall not drag, and ample distance shall be accounted for surface upheaval during seasonal freeze-thaw periods.

F. Gate latching hardware shall be installed to accepted County-supplied padlocks. The padlocks shall be accessible from the interior and exterior.

G. The fence height and type shall match or exceed the fence specification. Barbed wire shall be installed in a manner not inhibiting the opening and closing of the gates.

4.8.5. Vehicular Gate: Double swing gates shall be installed, per existing site conditions. Adjustments to the location may be made with approval from the County or their representative.

A. The gate shall run parallel along the fence line upon opening.

B. The gate shall move freely and be installed plumb and level.

C. The gate shall open unto grade that is parallel to gate bottom or at a slight downward grade.

D. When closed, the gate shall maintain a 2-inch or less distance from the bottom rail to the road or firm soil surface. The gate shall not drag, and ample distance shall be accounted for surface upheaval during seasonal freeze-thaw periods.

E. The gate shall be secured by a locking latch that can be secured by a padlock provided by the County. This latch assembly shall include a pin-type mechanism that secures the gate by causing a pin to enter the top of the fence and a socket secured in concrete at the bottom.

4.9. GATE OPERATOR

4.9.1. The personnel gates shall be manual operation.

4.9.2. The vehicular double swing gate shall be manual operation.

4.10. SECURITY FENCE SIGNAGE REQUIREMENTS

4.10.1. The fence requires appropriate signage with respect to, but not limited to, authorization of admittance, security monitoring, and Fayette County contact information.

4.10.2. The County will provide the proper wording for the required signage.

4.11. SECURITY FENCE GROUNDING

4.11.1. The fence grounding shall be completed per specifications of this RFP.

4.12. SITE FINISHING

4.12.1. The enclosed area of the tower compound shall be graded level and tamped with sod and large stones removed.

4.12.2. Vegetation stop and aggregate shall be applied to the entire compound area (the area inside the fencing) and 6 inches beyond the fencing.

A. Backfilled soil shall be graded level and tamped.

1. Care shall be given not to damage any underground cabling, grounding, or other infrastructure.

B. Sod, large rocks, and other debris shall be removed.

1. A smooth flat surface is required.

C. A water permeable (to allow drainage) weed blocking fabric shall be installed over the top soil to at least 6 inches outside the perimeter fence.

1. Aggregate shall be applied 6 inches in depth and consist of American Association of State Highway and Transportation Officials (AASHTO) #10 coarse aggregate.

2. The stone shall be raked level and evenly dispersed in the compound.

3. The stone shall be filled in beyond the outside of the perimeter fence for 2 feet; until it meets the roadway surface.

D. Pre-existing sub-course, and grassy areas that have been excavated, shall be returned to their original condition.

1. The sub-course shall be restored to meet erosion control and site drainage requirements.

2. Certified compaction testing is required.

4.13. DISPOSAL

4.13.1. The Contractor shall remove surplus soil material, unsuitable topsoil, obstructions, demolished materials, and waste materials including trash and debris, and legally dispose of them off County property.

A. The Contractor shall separate recyclable materials produced during site clearing from non-recyclable materials.

B. The Contractor shall store or stockpile without intermixing with other materials.

C. The Contractor shall transport recyclable materials to recycling facilities.

4.14. RESTORATION

4.14.1. The Contractor shall restore surface features, including vegetation, at areas disturbed by work of this section. The Contractor shall re-establish original grades, unless otherwise indicated. If sod has been removed, the Contractor shall replace it as soon as possible after backfilling is completed. The Contractor shall restore areas disturbed by trenching, storing of dirt, and other activities to their original condition. This shall include application of topsoil, fertilizer, lime, seed, sod, sprig, and mulch, as required.

4.15. AREA PERIMETER AND SIGNAGE REQUIREMENTS

4.15.1. The radio site requires appropriate signage to indicate the presence of electromagnetic RF radiating equipment.

4.15.2. Coordination with the County shall be required to finalize signage and perimeter marking requirements.

4.15.3. Signage shall be installed, as appropriate, to inform public and professional personnel of the area entry requirements.

4.15.4. The Contractor shall post applicable warning signs in accordance with Motorola R56 guidelines, Federal Communications Commission (FCC), and OSHA rules.

5. POWER DISTRIBUTION AND UTILITIES

5.1. MANUAL TRANSFER SWITCH (MTS)

5.1.1. An MTS with mobile docking station. Reference the Tyrone Downtown site for basis of design.

5.1.2. An MTS provides the County the ability to connect an optional portable generator into the shelter power system. The MTS shall be installed by the Contractor as follows:

A. The MTS shall be double-throw 2-pole that will break all non-grounded line conductors.

B. The MTS and docking station shall be installed outside of the structure.

C. Metallic enclosures for the MTS and jack shall be grounded per Section 6, Grounding, within this specifications document.

D. When in use the portable generator chassis shall be grounded to the exterior grounding system per NFPA 70, *National Electrical Code*.

5.2. OLD UPS SYSTEM

5.2.1. The Contractor shall remove the old UPS and electrical system with the exception of the remote bypass switch.

A. The equipment shall be disposed of according to local, state, and federal law requirements.

B. Proof shall be provided to the County for those items needing proof of proper disposal (e.g., batteries, any other possible environmental hazard).

6. GROUNDING

6.1. GENERAL

6.1.1. The Contractor shall ensure the site, structures, equipment, and its systems contained therein are Motorola R56-compliant and, for any differences to the proposed work and Motorola R56, the Contractor shall install to Motorola R56 standards.

A. The Owner's Representative may be able to assist in obtaining a copy of the latest revision of Motorola R56 or a copy can be requested by contacting a Motorola sales representative.

B. The Contractor shall provide, for the County-owned sites, a grounding electrode system with an earth/ground resistance of **5 ohms** or less. The use of chemical ground electrode enhancement material shall not be used.

C. The Contractor shall propose a remediation design and a proposal that provides the best possible value for the County to review if soil conditions at the site are such that the Contractor cannot reasonably install the ground system to meet this requirement. Use of chemical electrode grounding is not a preferred solution.

6.1.2. The Contractor shall be responsible for installing the tower ground ring earthing system and for coordinating and connecting the tower and associated ground systems to the existing ground ring.

6.1.3. The grounding system shall meet applicable standards; items include, but are not limited to, the following:

A. Sub-terrain
B. Tower
C. Facilities
D. Compound equipment
E. Ice bridge
F. Lighting and controls

6.1.4. The Contractor shall ensure equipment is electrically bonded, grounded and protected in accordance with NFPA 70, *National Electrical Code,* and Motorola R56.

6.1.5. The Contractor shall provide grounding and lightning protection equipment, including surge arrestors, to comply with Motorola R56 and NFPA 70, *National Electrical Code,* requirements of equipment being installed and connected as part of system.

6.1.6. The Contractor shall install proper grounding conductors, per Motorola R56, to bond various pieces of equipment, conduit, trays, etc. together.

6.1.7. There shall only be one grounding system at the Fayette County radio sites. Utility grounds, underground piping, structural steel, concrete reinforcing material, lightning protection, and other grounding components shall be bonded together to form one system. This system is referred to as a single-point ground system.

6.1.8. The main point of connection for all ground conductors within a shelter or building shall be at the primary bonding bus bar (PBB).

A. The PBB shall be bonded to the external grounding electrode system (ground ring) via a properly sized grounding conductor.

B. An interior perimeter bonding bus (IPBB), secondary bonding bus (SBB) and/or rack bonding bus (RBB) may be installed when multiple grounding conductors are needed to bond numerous items to the ground system.

C. The IPBB, SBB and/or RBB will be bonded to the PBB either directly or through one another progressively, per Motorola R56 specifications.

6.2. ADDITIONAL CONCERNS

Several practices shall be followed to allow for neat and secure grounding and wiring.

6.2.1. When stripping insulation from ground conductors, only the required amount of insulation needed to be removed shall be removed.

6.2.2. All ground conductors shall be kept as short as possible.

6.2.3. No braided conductor shall be used in the grounding system.

6.2.4. Grounding/bonding conductor bending radius shall be 8 inches or more and not less than a 90° angle; 120° is preferable. The conductor shall be run in a manner that is direct to the grounding electrode system. No short bends or narrow loops shall be permitted as this would increase the conductor's impedance to ground and may cause flash points. Although, this is not always the most aesthetically pleasing, it is the best method to drain off surges.

6.2.5. Paint or galvanic coating shall always be removed prior to making metal-to-metal connections. After attachment, the connection and bared metal area shall be recoated to prevent oxidation.

6.2.6. Surfaces shall always be clean before making connections.

6.2.7. All metal-to-metal connections shall be treated with anti-oxidant compound to avoid oxidation and corrosion.

6.2.8. All ground connections shall be made in the direction of the direct path to ground.

6.2.9. Proper sized lugs and compression taps shall always be used.

6.2.10. Use of shrink tube or wrapping with electrical tape on compression lugs is encouraged.

6.2.11. Wire and cable ties shall be trimmed back.

6.2.12. Cabling that makes a vertical run up a wall shall be secured with nylon "P-Ring" type cable clamps.

6.2.13. Grounding conductor insulation shall be rated for its environment.

6.2.14. Grounding conductors are to maintain at least 2-inch spacing from other cable. The exception is when conductors come together, as they are entering the same piece of equipment and where they cross over one another at a 90° angle.

6.2.15. Grounding conductors shall be protected against abrasion while passing through metallic enclosures. This must be done per NFPA 70, *National Electrical Code*, standards.

6.2.16. If the hole that the conductor passes through is slightly larger, the conductor shall be bonded to the metallic enclosure. If the hole is larger, enough to accommodate several conductors (allowing at least 2 inches between conductor and ferrous metal enclosures), then the conductor does not have to be bonded to enclosure.

6.2.17. All unused existing grounding components currently present and after completion of the grounding enhancement shall be removed or abated properly.

6.2.18. Where physical damage may occur, the conductor shall be protected by PVC conduit. Generally, a flexible conduit is used, although there may be cases where ridged would work better. Either is acceptable. No metallic conduit shall be used. The conduit shall start 16 inches below grade and extend a minimum of 6 feet above grade or as near to conductor connection as feasibly possible. This is not only for conductor protection but will reduce step potential on the ground near the conductors.

6.2.19. The top of the conduit and around the grounding conductor shall be sealed with a silicone sealant.

6.2.20. Non-conductive strapping on the PVC conduit is preferred.

6.2.21. The conduit and/or grounding conductor shall be supported within 3-foot intervals.

6.2.22. When supporting the grounding conductor itself, non-conductive straps should be used. When using metallic straps, they should be of the same material as conductor or installed per technique of joining dissimilar metals.

6.2.23. All local or jurisdictional codes and safety standards shall be followed. These shall supersede standards and/or procedures mentioned in this document. This includes, but is not limited to, NFPA 70, *National Electrical Code*, and OSHA.

6.3. EXISTING GROUNDING COMPONENTS

6.3.1. The radio communications sites are existing sites.

6.3.2. The Contractor shall install a new grounding system for exterior, tower, shelter, and any other equipment and/or system within the compound as indicated by the SOW.

6.4. GROUND ROD INSTALLATION

6.4.1. The ground rods that are to be used for this project shall be copper-clad steel 10 feet in length and ¾-inch in diameter.

6.4.2. The ground rods shall be constructed of copper-clad steel and should have a slightly beveled (pointed) tip at one end to allow for easier driving of the rod into the earth.

6.4.3. Ground rods shall be driven to a depth of no less than 30 inches below grade. This shall be done by excavating (usually a trench) in the area in which the rod will be driven.

6.4.4. Ground rods shall be driven exactly vertical into the earth. If rock prevents this, the ground rods may be driven at a 45° angle or, in the worst case, laid horizontally in the trench at a perpendicular angle to which the supporting conductor is run. These methods shall only be used in the most extreme of circumstances and are otherwise not recommended.

6.4.5. The ground rods shall be driven 20 feet to 25 feet apart.

6.4.6. If heavy clay soil is encountered, it is strongly recommended that a pneumatic jackhammer be utilized to drive the rods. Clay soil is very hard and manual driving of the rods is next to impossible.

6.4.7. Care shall be used as to not damage the top end of the rods while driving them into the earth. If a ground rod is damaged, a few inches shall be cut off from the end of the rod. The top end of the rod shall be clean and shiny to facilitate a proper exothermic bond.

6.4.8. Attachments to the ground rods shall be done using an exothermic weld. No mechanical connections to the ground rods are permitted under any circumstances.

6.4.9. When the exothermic weld has cooled, it shall be struck with a hammer to ensure a positive weld connection has taken place.

6.5. EXTERIOR GROUND RING SYSTEM

6.5.1. The Contractor shall install a buried ground ring system to provide a common, single-point ground for the shelter, outdoor equipment, and tower.

6.5.2. The top of the ground rod shall be driven to the same depth as the ground ring conductor (i.e., 30 inches deep). They shall be attached to the ground ring by exothermic weld. It may be necessary to dig out additional earth around the top of the ground rod to allow easier CAD weld connection to the ground ring.

6.5.3. A ground ring (exterior shelter grounding system) shall be installed encircling the shelter foundation with a minimum of 3-feet spacing from the shelter foundation.

6.5.4. A second ground ring (tower ground ring) shall be installed encircling the tower base at a minimum of 2 feet from the base of concrete pad or piers.

6.5.5. The tower and shelter rings shall be bonded to one another in two locations in like manner as the building to the shelter. Connections of the two ground ring conductors shall be exothermic weld.

6.5.6. All beneath grade connections and attaching of ground ring bonding jumpers to external ground bus bar (EGB) and tower ground bus bar (TGB) shall be by exothermic weld.

6.6. EXTERIOR EQUIPMENT GROUNDING

6.6.1. The Contractor shall bond all metallic ancillary equipment to the earth grounding system to protect outdoor equipment from possible damage.

6.6.2. Smaller metallic objects shall be attached to the external ground ring as follows:

A. A No. 2 AWG solid tin-plated bare conductor.

B. One end of the conductor shall be exothermically welded to the ground ring.

C. The other end shall be attached to the equipment via two-hole, tin-plated copper, high compression, irreversible lug and stainless-steel bolt, lock washer, and nuts. Nylon lock nuts shall not be used.

D. Where physical damage may occur, the conductor shall be protected by PVC conduit. No metallic conduit is to be used. The conduit shall start 16 inches below grade and extend to a minimal of 6 feet above grade. The top of the conduit and around the grounding conductor shall be sealed with a silicone sealant.

E. Non-conductive strapping on the PVC conduit is preferred.

F. The conduit and/or grounding conductor shall be supported within 3-foot intervals.

G. When supporting the grounding conductor itself, non-conductive straps shall be used. When using metallic straps, they shall be of same material as conductor or installed per technique of joining dissimilar metals.

H. The area to which the lug is to be applied shall have all paint removed (burnished) down to bare metal. The metallic surface shall be treated with anti-oxidant compound approved for lug and surface to which it is attached. After attachment, the connection and bared metal area shall be recoated to prevent oxidation.

6.6.3. A list of smaller metallic objects on the exterior that shall be grounded follows. The list is only for reference and objects include, but are not limited to:

A. Metallic members of incoming telecommunications cables

B. Main telecommunications company (telco) ground
C. Metallic conduits, raceways and piping
D. Heating, ventilation and air conditioning (HVAC) units
E. Ventilation hoods (if not grounded inside)
F. Wall-hung light fixtures
G. Junction boxes
H. Shelter tie-down strapping
I. Shelter metal soffits, fascia and trim pieces
J. Generator quick connection receptacle enclosure
K. Cameras
L. Steel security bollards

6.6.4. Physically larger metallic objects shall be attached to the external grounding system in the same manner as smaller objects, with the exception of using 2/0 AWG bare copper stranded tin-plated conductor.

6.6.5. A list of larger metallic objects on the exterior that shall be grounded to the earth ground system follows. The list is only for reference and objects include, but are not limited to:

A. Generator chassis
B. Generator steps and work platforms; removable platform parts shall have bonding jumpers installed
C. Generator fuel supply tank (if allowed)
D. Large wall-hung cabinets
E. Light poles
F. Flag poles
G. Fence posts
H. Shelter metallic skidding and/or structural support members
I. Ice bridge
J. Tower
K. Storage tanks above or below grade (if allowed)
L. Support masts
M. Any other grounding electrode systems
N. Any pad-mounted equipment (including larger HVAC/ventilation units)
O. Steel shelter housings
P. HVAC units
Q. Steel shelter

6.7. FENCE GROUNDING

6.7.1. Fencing, including posts, rails, fabric, and barbed wire, shall be bonded together and connected to the earth ground system.

6.7.2. Bare tinned copper wire no less than a No. 2 AWG shall be used and exothermically welded to the top and bottom rails for bonding to each corner fence post (on both sides) gate posts, and posts within 40-foot, maximum, intervals on straight runs.

6.7.3. Posts at each corner, both sides of gate, and within 40-foot, maximum intervals on straight runs shall be connected to the earth ground system. 2/0 AWG bare tinned stranded copper wire shall be used for this purpose. The wire shall be exothermically welded to the fence posts. Connections to the ground system shall also be by CAD weld. No mechanical ground connections are permitted.

6.7.4. The gates shall be bonded together in the manner specified above. A flexible gate jumper with a surface equivalent or greater than the cross-section area of 1/0 cable (0.0829 square inch) shall be used to bond the center of each fence gate to the adjacent gate post.

6.7.5. The fence fabric (chain links) shall be bonded to the ground ring at both sides of posts at each corner, within 40-foot intervals on straight runs, wherever the fence run changes direction, where continuity of fabric is broken, and at each gate. The deterrent wire (only if not electrified) at the top of the fence fabric shall be grounded via the conductor that grounds the fence fabric.

A. The fence fabric and deterrent wire shall be bonded to the ground ring via the use of a No. 2 AWG bare solid tinned copper conductor exothermically welded to the adjacent fence post. The fence fabric shall mechanically connect to the conductor via fence fabric ground clamps.

B. A minimum of three clamps shall be utilized, evenly spaced, vertically on the fence fabric and each row of deterrent wire shall be bonded by a clamp. The other end of the conductor shall be bonded to the bottom area of the fence post via exothermic weld.

C. The fence and deterrent bonding conductor shall be run in a manner that it would not cause any incidental contact with any fence component or other metallic objects. This may be accomplished by shielding the non-bonded bare conductor with flexible PVC conduit. Both ends of the conduit shall be sealed from weather and insect migration.

6.8. TOWER GROUNDING

6.8.1. The Contractor shall install a tower ground ring encircling the tower at a minimum of 2 feet from its concrete tower base or leg piers. The tower structure shall be bonded to the tower ring at each leg. The minimum number of ground rods around the ring shall be equal to the number of tower legs. Additional ground rods may be required to maintain proper ground rod spacing requirements.

6.8.2. Tower grounding shall be installed per the following procedure:

A. A 2/0 bare tinned stranded copper conductor ground ring shall be installed.

B. Each tower leg shall be bonded to the tower ground ring via a 2/0 bare tinned stranded copper conductor.

C. The conductor shall be attached to the tower leg via preferably exothermic weld (unless strictly prohibited by manufacturer) or by an irreversible tin-plated copper crimp lug. Two-hole lug is preferred although not always practical due to anchoring restrictions.

D. If by lug, it shall attach to the tower leg by using existing holes or sharing existing mounting bolts. No holes will be drilled in the tower.

E. Stainless steel hardware with lock washer and nut shall be used to fasten lug to tower leg. Nylon locking nuts shall not be used.

F. Tower leg shall be cleaned, and a coating of anti-oxidant compound shall be applied between tower leg and lug. The other end of the grounding conductor shall be attached to the tower ground ring conductor via exothermic weld at the point of attachment of a ground rod. This conductor shall be attached as vertical and downward toward the tower ground ring conductor as possible. Conductor bending radius shall be 8 inches or more and not less than a 90° angle; 120° is preferable.

6.9. ICE BRIDGE

6.9.1. The Contractor shall isolate the ice bridge from the tower.

6.9.2. Bonding jumpers shall be installed where the ice bridge makes a mechanical splice to itself and/or the tower and shelter.

6.9.3. When an ice bridge is supported by the shelter and tower, the use of a slip-joint fiberglass fastener can be used to support the ice bridge to the tower. This will both isolate and allow the bridge seismic adjustment.

6.9.4. A self-supported ice bridge shall have support posts bonded to the ground ring system by a 2/0 bare tinned stranded copper conductor. The conductor shall be exothermically welded to both the leg and ground ring.

6.9.5. A self-supporting ice bridge shall maintain a minimum 6-inch and maximum 24-inch separation from tower and shelter structures.

6.9.6. Ice bridge support legs shall be grounded to the exterior grounding system. Each support leg shall be bonded to either the tower or shelter ground rings to which it is closer. Pairs of support legs (across width of ice bridge) may share a common grounding conductor. This may be accomplished via exothermically welding a tail of equal size to the grounding conductor beneath earth.

6.9.7. Each section of the ice bridge shall be bonded to the support legs via a No. 2 AWG solid tinned copper conductor. The conductor shall be exothermically welded to the leg and shall be attached to ice bridge via exothermic weld or irreversible two-hole high compression tinned lug and stainless-steel hardware including lock washer.

6.9.8. If multiple ice bridge sections are used, they shall be bonded at their splice point via a No. 2 AWG solid tinned copper conductor. The conductor shall be attached by exothermic weld or irreversible two-hole high compression tinned lug and stainless-steel hardware including lock washer.

6.9.9. The area to which the lug is to be applied shall have paint removed (burnished) down to bare metal. The metallic surface shall be treated with an anti-oxidant compound approved for the lug and surface to which it is attached.

6.9.10. The grounding/bonding conductor bending radius shall be 8 inches or more and not less than a 90° angle. The conductor shall be run in a manner that is direct to the grounding electrode system. No short bends or narrow loops shall be permitted as this would increase the conductor's impedance to ground and may cause flash points.

6.9.11. Exothermic welds on legs shall be treated with a coating of cold galvanization spray (Valmont #B364 or equivalent) to prevent corrosion and oxidation.

6.10. EXTERIOR GROUND BUS BAR (EGB) INSTALLATION

6.10.1. The Contractor shall position the EGB just below the ice bridge and entry port to the shelter.

6.10.2. The EGB shall be sized according to the number of antenna transmission lines entering the shelter.

6.10.3. The EGB shall be mounted to the shelter beneath the entry port via stainless steel mounting brackets, hardware and insulators (polyester fiberglass; 15 kilovolts (kV) minimum; dielectric-strength; flame-resistant per UL 94, *Standard for Tests for Flammability of Plastic Materials for Parts in Devices and Appliances*, V-0 classification or equal).

6.10.4. The EGB minimal size shall be ¼-inch thick, 2-inches wide and length determined by the number of antenna transmission cables being grounded.

6.10.5. The bar shall be of a tin-plated copper material.

6.10.6. Hole spacing for each connector shall be at least ¾-inch on center. There shall be enough to accommodate a two-hole irreversible crimp connector for each antenna transmission cable grounding conductor.

6.10.7. The EGB shall be bonded to the exterior shelter grounding system via two 2/0 stranded bare tinned copper conductors.

6.10.8. Each conductor shall attach to the bottom left and right corners of the EGB respectively via irreversible high-compression crimp or exothermic weld.

6.10.9. The grounding conductors from the EGB to the ground ring shall be protected by PVC conduit. No metallic conduit shall be used. The conduit shall start 16 inches below grade and extend as close to the

EGB as physically possible. This is not only for conductor protection but will reduce step potential on the ground near the conductors.

6.10.10. The top of the conduit and around the grounding conductor shall be sealed with a silicone sealant.

6.10.11. Non-conductive strapping on the PVC conduit is preferred.

6.10.12. The conduit and/or grounding conductor shall be supported within 3-foot intervals.

6.10.13. When supporting the grounding conductor itself, non-conductive straps shall be used. When using metallic straps, they shall be of the same material as the conductor or installed per the technique of joining dissimilar metals.

6.10.14. The other end of the conductors shall be exothermically connected to the ground ring conductor using an exothermic weld.

6.11. TOWER GROUND BUS BAR (TGB) INSTALLATION

6.11.1. The TGB minimal size shall be ¼-inch thick, 2-inches wide and length determined by the number of antenna transmission cables being grounded.

6.11.2. The bar shall be of a tin-plated copper material.

6.11.3. Hole spacing for each connector shall be at least ¾-inch on center. There shall be enough to accommodate a two-hole irreversible crimp connector for each antenna transmission cable grounding conductor.

6.11.4. A TGB shall be installed at the bottom of the tower below the transmission line grounding kit near the point where the transmission line vertical run meets the horizontal run toward the shelter. When transmission lines are run underground via PVC conduits, the TGB shall be mounted below the top of conduits.

6.11.5. A TGB may be installed at the top of the tower within 6 feet of where the transmission lines turn to run down the tower. This will provide a convenient grounding point for the transmission line ground kits.

6.11.6. Additional TGBs may be installed to maintain maximum spacing between transmission line ground kits at less than 75 feet.

6.11.7. The TGB shall be mounted to the tower frame via conductive fasteners suitable for preventing corrosion from dissimilar metals. This will reduce impedance to earth.

6.11.8. The bottom tower TGB shall be bonded to the tower ground ring via two 2/0 stranded bare tinned copper conductors.

6.11.9. Each conductor shall attach to the bottom left and right corners of the TGB respectively via irreversible high compression crimp fitting connection (12-ton minimal pressure) or exothermic weld.

6.11.10. For irreversible crimp fitting connection, the metallic surface shall be treated with an anti-oxidant compound approved for the lug and surface to which it is attached. The lug shall be fastened to the TGB using $^{3}/_{8}$-16 stainless steel bolts, lock washers and nuts. Nylon locking nuts shall not be used.

6.11.11. The grounding conductors from the TGB to the ground ring shall be protected by PVC conduit. No metallic conduit shall be used. The conduit shall start 16 inches below grade and extend as close to the TGB as physically possible. This is not only for conductor protection but will reduce step potential on the ground near the conductors and deter incidental contact with the tower.

6.11.12. The top of the conduit and around the grounding conductor shall be sealed with a silicone sealant.

6.11.13. Non-conductive strapping on the PVC conduit is preferred.

6.11.14. The conduit and/or grounding conductor shall be supported within 3-foot intervals.

6.11.15. When supporting the grounding conductor itself, non-conductive straps shall be used. When using metallic straps, they shall be of the same material as the conductor or installed per the technique of joining dissimilar metals.

6.11.16. The other end of the conductors shall be exothermically connected to the tower ground ring conductor using an exothermic weld.

6.12. UTILITY SERVICE ENTRANCE GROUNDING

6.12.1. The electrical service entrance, telco entrance and antenna transmission line entrance shall share a common or adjacent wall(s) and be near one another for the utilities to share the PBB. The PBB is the common point for connection of shelter utility electrodes to ground.

6.13. ELECTRICAL SERVICE GROUNDING

6.13.1. The neutral to ground bond for the AC separately derived service entrance conductors shall be made only at the first disconnecting means after the utility meter per NFPA 70, *National Electrical Code*, standards. The grounding electrode from the point of neutral to ground bond shall be bonded to the ground system. This shall be done to keep the continuity of a single-point ground system.

6.13.2. Where there are two or more separately derived AC systems, they shall have their neutral to ground bond run back to the grounding system. This shall be done at the source or at their first means of disconnect. If they share a common neutral to ground bonding point, care shall be taken to remove additional bonding jumpers. This may be the case when the transfer switch for a generator does not switch the neutral and the neutral is common to both generator and utility. Then the generator neutral to ground jumper shall be removed.

6.13.3. The grounding electrode conductor for the electrical service neutral to ground bond shall be established in the main disconnect and bonded back to the shelter common external grounding electrode system.

A. A 2/0 AWG stranded bare tinned copper conductor shall be connected to the disconnect neutral to ground bus.

B. A trench 30-inches deep and as wide as practical in to complete the work shall be excavated from the base of the equipment to the ground ring conductor.

C. The grounding conductor from the disconnect to the ground ring shall be protected by PVC conduit. No metallic conduit shall be used. The conduit shall start 16 inches below grade and extend as close to the disconnect as physically possible. This is not only for conductor protection but will reduce step potential on the ground near the conductors.

D. The conduit shall terminate in the disconnect.

E. The top of the conduit and around the grounding conductor shall be sealed with a silicone sealant if the conduit does not terminate in the disconnect.

F. Measures shall be taken to inhibit incidental contact with other grounded components.

G. Non-conductive strapping on the PVC conduit is preferred.

H. The conduit and/or grounding conductor shall be supported within 3-foot intervals. When supporting the grounding conductor itself, non-conductive straps shall be used. When using metallic straps, they shall be of the same material as the conductor or installed per the technique of joining dissimilar metals.

I. The other end of the conductor shall be exothermically connected to the exterior shelter grounding system conductor using an exothermic weld.

6.14. TELCO SERVICE GROUNDING (AS APPLICABLE)

6.14.1. Outside telecommunication lines and their SPDs shall be grounded to the shelter internal grounding system.

6.14.2. If the telco main ground is external, the ground shall be bonded to the exterior shelter grounding system.

6.14.3. The telco main ground shall be bonded by an independent conductor. Telco metallic components, such as the enclosure, shall have their independent grounds as described in Section 6.6, Exterior Equipment Grounding.

6.14.4. The external demarcation shall have its main ground bonded to the exterior shelter grounding system in the manner described in Section 6.6, Exterior Equipment Grounding.

6.14.5. The internal shelter telco components shall be bonded to the internal exterior shelter grounding system. A telco SBB shall be established for grounding telco shields on shielded-pair cable and their SPD.

A. The SBB shall be bonded to the PBB via No. 2 AWG stranded conductor green-jacketed thermoplastic heat and water resistant (THW) conductor.

B. The conductor shall be mechanically bonded to the PBB using a two-hole long-barrel compression lug.

C. When supporting the grounding conductor itself, non-conductive straps shall be used.

D. The area to which the lug is to be applied shall have paint removed (burnished) down to bare metal. The metallic surface shall be treated with an anti-oxidant compound approved for the lug and surface to which it is attached.

E. The lug shall be fastened to the unit using at least ¼-20 stainless steel bolts, lock washers and nuts.

F. The grounding/bonding conductor bending radius shall be 8 inches or more and not less than a 90° angle. The conductor shall be run in a manner that is direct to the grounding electrode system. No short bends or narrow loops shall be permitted as this would increase the conductor's impedance to ground and may cause flash points.

6.15. GAS UTILITY GROUNDING (AS APPLICABLE)

6.15.1. The gas utility for the shelter shall be grounded to the exterior shelter grounding system. It shall be connected after the utility meter (if applicable) and before the first customer equipment shut-off valve.

6.15.2. The gas line to the generator shall be bonded to the ground ring by a 2/0 bare tinned stranded copper conductor.

6.15.3. One end of the conductor shall be exothermically connected to the ground ring conductor using an exothermic weld.

6.15.4. The other end of the conductor shall be mechanically bonded to the gas line via an approved tin-plated copper pipe clamp for the type of fuel line that is present.

6.16. INTERNAL BUS FOR SHELTER GROUNDING

6.16.1. The Contractor shall provide and install an PBB within the shelter as the main point of connection for ground conductors within the shelter.

6.17. INTERIOR PERIMETER BONDING BUS (IPBB)

6.17.1. The Contractor shall install an IPBB to provide a suitable grounding for ancillary equipment, conduits and other non-electronic metallic items back to the PBB.

A. Two equal distant No. 2 AWG (minimal), sized per Motorola R56 Table 5-3, stranded green-jacketed THW conductors originating at the PBB and running in opposite directions around the perimeter of the room

B. Running horizontal along wall and located approximately one foot above the floor

6.17.2. The IPBB shall be supported by 2-inch insulated standoffs at 2-foot intervals.

6.17.3. The two conductors shall be separated from joining by at least 4 inches. They shall meet at an area approximately opposite the PBB.

6.18. GROUND BUS CONDUCTORS

6.18.1. A ground bus conductor shall be used to bond equipment cabinets, racks and other systems. They always terminate at the PBB or SBB. The other end(s) are generally left un-terminated (although insulated with green electrical tape) but can be terminated to the last rack. The ground bus conductor and any extensions shall be of the same size.

A. A No. 2 AWG copper stranded, green-jacketed conductor shall be run the entire length of the cable tray system. If run is greater than 32 feet, the No. 2 AWG shall be sized according to Motorola R56 Table 5-3.

B. One end shall terminate to the room's PBB or SBB via two-holed, tin-plated, copper, irreversible crimp lug.

C. The other end shall terminate to the most extreme rack or left un-terminated in rack with the end insulated with green electrical tape.

D. Ground bus extension conductors may "T" off the ground bus conductor and travel along perpendicular pieces of cable tray. This is to assist in bonding other racks in the shelter. Connections made to the ground bus conductors must always be flowing toward the PBB or SBB by using an irreversible C-type crimp connector.

E. They shall be supported by cable tray inside along bottom outside edge or along the outside wall and/or by the equipment rail (framework). Proper cable separation shall be maintained per Section 6.24, Cable Ladder Tray Grounding.

6.19. PRIMARY BONDING BUS (PBB)

6.19.1. The PBB shall be located as close to the electrical service entrance as possible.

6.19.2. The PBB minimal size shall be ¼-inch thick, 4-inches wide and 12-inches minimum length.

6.19.3. The PBB shall be tin-plated bare solid copper bus bar.

6.19.4. Hole spacing for each connector shall be at least ¾-inch on center. There shall be enough to accommodate multiple two-hole irreversible crimp connectors.

6.19.5. A Harger Type "J" Hole Pattern GBIP144xxJPBB or equivalent shall be used. The "xx" stands for the bar length. This shall be determined by the number of grounds being connected to the PBB, plus approximately 50 percent (50%) for future growth. This bar pattern shall accommodate bonding conductors and IPBB connection.

6.19.6. Stainless steel mounting brackets (at least 2 inches offset from structure) and hardware shall be used.

6.19.7. Insulators shall be polyester fiberglass; 15 kV minimum; dielectric-strength; flame-resistant per UL 94, *Standard for Tests for Flammability of Plastic Materials for Parts in Devices and Appliances*, V-0 classification or equal.

6.19.8. The PBB shall be bonded to the exterior shelter grounding system via a 2/0 stranded bare tinned copper conductor.

6.19.9. The conductor shall attach to the bottom of the PBB via irreversible crimp or exothermic weld.

6.19.10. For irreversible crimp connection, the metallic surface shall be treated with an anti-oxidant compound approved for the lug and surface to which it is attached. The lug shall be fastened to the PBB using ⅜-16 stainless steel bolts, lock washers and nuts. No nylon locking hardware shall be used.

6.19.11. The grounding conductor from the PBB to the exterior shelter grounding system shall exit through the shelter wall or floor at no less than a 135° downward angle (toward exterior ground ring) and be protected by PVC conduit. No metallic conduit shall be used. The conduit shall start 16 inches below grade and extend as close to the PBB as physically possible. This is not only for conductor protection but will reduce step potential on the ground near the conductors.

6.19.12. The top of the conduit and around the grounding conductor shall be sealed with a silicone sealant.

6.19.13. Non-conductive strapping on the PVC conduit is preferred.

6.19.14. The conduit and/or grounding conductor shall be supported within 3-foot intervals.

6.19.15. When supporting the grounding conductor itself, non-conductive straps shall be used. When using metallic straps, they shall be of the same material as the conductor or installed per the technique of joining dissimilar metals. A metallic strap shall not completely encircle the conductor.

6.19.16. The other end of the conductor shall be exothermically connected to the exterior shelter/building grounding electrode system.

6.20. SECONDARY BONDING BAR (SBB)

6.20.1. SBB is used to provide single termination point for shelter interior grounding conductors, equipment bonding conductors and IPBB conductors. The SBB is an extension of the PBB. The SBB is generally installed to connect multiple objects to the internal grounding system. It is customary to see a SBB installed at the telco equipment and another at the entry port for the transmission lines. This is when the utilities enter the shelter on different walls or are not in close proximity.

6.20.2. The SBB minimal size shall be ¼-inch thick, 2-inches wide and 12-inches minimum length.

6.20.3. The SBB shall be a tin-plated bare solid copper bus bar.

6.20.4. Hole spacing for each connector shall be at least ¾-inch on center. There shall be enough to accommodate multiple two-hole irreversible crimp connectors.

6.20.5. A Harger Type "J" Hole Pattern GBI144xxJ or equivalent shall be used. The "xx" stands for the bar length. This shall be determined by the number of grounds being connected to SBB, plus approximately 50 percent (50%) for future growth.

6.20.6. Stainless steel mounting brackets (at least 2 inches offset from structure) and hardware shall be used.

6.20.7. Insulators shall be polyester fiberglass, 15 kV minimum, dielectric-strength flame-resistant per UL 94, *Standard for Tests for Flammability of Plastic Materials for Parts in Devices and Appliances*, V-0 classification or equal.

6.20.8. When the SBB is installed for transmission line and/or telco lines and is physically more than 20 feet from where the PBB bonding conductor to the exterior shelter grounding system enters the earth, an additional bonding conductor from the SBB to exterior shelter ground ring shall be installed.

6.20.9. The additional grounding conductor shall be the same size and attached in a like manner as the PBB conductor to exterior shelter grounding system is installed. Refer to Section 6.19, Primary Bonding Bus (PBB).

6.20.10. The SBB shall be bonded to the PBB via a 2/0 stranded green-jacketed THW or THHN copper conductor. This is if an additional grounding conductor to the exterior shelter grounding system is needed.

6.20.11. The SBB shall be bonded to the PBB via a No. 2 AWG (minimal), sized per Motorola R56 Table 5-3, stranded conductor green-jacketed THW conductor when the additional grounding conductor to the exterior shelter grounding system is not needed.

6.21. INTERIOR SHELTER ANCILLARY EQUIPMENT GROUNDING

6.21.1. All metallic ancillary equipment within 8-feet vertically and 5-feet horizontally of any ground or object being grounded shall be bonded to the PBB, SBB or IPBB. This will be a very labor-intensive task, though one of the most important described in this specification. All ancillary equipment shall be bonded

to the PBB, SBB or IPBB by a No. 6 AWG copper stranded, green-jacketed conductor. Daisy-chaining of equipment is **NOT** permitted except for the grounding of conduit.

6.21.2. A No. 6 AWG copper stranded, green-jacketed conductor shall bond to each object via two-hole tin-plated copper irreversible crimp lug.

6.21.3. The area to which the lug is to be applied to the equipment shall have all paint removed (burnished) down to bare metal. The metallic surface shall be treated with anti-oxidant compound approved for lug and surface to which it is attached.

6.21.4. The lug shall be fastened to the unit using a ¼-inch 20 stainless steel bolts, lock washers and nuts. No nylon locking nuts shall be used.

6.21.5. The other end shall be attached to the PBB, SBB, or IPBB via a two-hole irreversible tin-plated copper crimp lug.

6.21.6. The area to which the lug is to be applied to the bus shall have all paint removed (burnished) down to bare metal. The metallic surface shall be treated with anti-oxidant compound approved for lug and surface to which it is attached.

6.21.7. The lug shall be fastened to the bus using a ⅜-inch 16 stainless steel bolts, lock washers and nuts. No nylon locking nuts shall be used.

6.21.8. When attaching bonding conductor to the IPBB it shall be via a copper "C"-style irreversible copper crimp. Connection shall be wrapped with green insulating electrical tape to inhibit incidental contact.

6.21.9. If a two-hole lug is not feasible for connection to the object, a one-hole will be permissible.

6.21.10. All ground conductors shall be kept as short as possible

6.21.11. Grounding/bonding conductor bending radius shall be 8 inches or more and not less than a 90° angle. The conductor shall be run in a manner that is direct to the grounding electrode system. No short bends or narrow loops shall be permitted as this would increase the conductor's impedance to ground and may cause flash points. Although this is not always the most aesthetically pleasing, it is the best method to drain off surges.

6.21.12. The IPBB has been specifically installed to accommodate connections for ancillary equipment, which include, but is not limited to:

A. Storage cabinets
B. Desk
C. Heater chassis
D. Wall-mount HVAC chassis
E. Ventilation duct/louvers
F. Lights
G. Window/door frames

H. Metallic ceiling grids
I. Metallic raised floor systems
J. Electrical enclosures
K. Conduits
L. Metallic piping systems
M. Exposed metallic building structure members

6.22. DOORS AND FRAMES

6.22.1. Doors and door frames shall be bonded to the grounding system.

6.22.2. The door frame is to be bonded to the IPBB by a No. 6 AWG copper stranded, green-jacketed conductor. A "C"-style copper irreversible crimp connection shall be used to make this connection.

6.22.3. The metal door shall be bonded to the frame using a No. 6 AWG copper highly flexible cable (e.g., welding cable). **No braided conductor shall be used anywhere in this project.** This will help to limit the effect of intermodulation (IM) due to corrosion of the braiding.

6.23. ELECTRICAL PANELS AND CABINETS

6.23.1. The chassis of electrical panels and cabinets shall be bonded to the IPBB.

6.24. CABLE LADDER TRAY GROUNDING

6.24.1. Grounding conductors shall be installed to the interior far side or exterior of the tray. Cable groups shall maintain a 2-inch clearance from other cable groups. Exception: RF transmission cables for transmitting stations shall maintain a 4-inch minimum clearance from the power, data, and signal cable groups.

6.24.2. The cable and/or ladder tray shall be grounded to the PBB or SBB.

6.24.3. A No. 6 AWG copper stranded, green-jacketed conductor shall bond to the tray via two-hole tin-plated copper irreversible crimp lug.

6.24.4. The other end shall be attached to the PBB or SBB via a two-hole tin-plated copper irreversible crimp lug

6.24.5. If the tray is a single straight unit running away from the ground bus, it shall only be required to be bonded at one point back to the PBB or SBB.

6.24.6. If the tray is parallel to the ground bus, it shall be bonded to the PBB or SBB in both directions by two individual bonding conductors.

6.24.7. If the tray is shaped in a "U" configuration and running parallel to the ground bus, it shall be bonded on both sides of the "U" that are closest to the ground bus back to the PBB or SBB.

6.24.8. The tray shall **not** be used as a grounding conductor.

6.24.9. All tray splices and joints, on both sides, shall have a No. 6 AWG copper stranded, green-jacketed conductor bonding jumper with a two-hole irreversible crimp lug on each end.

6.24.10. When the tray, its splicers and interconnecting components are labeled as suitable for grounding purposes, jumpers shall not be required.

6.25. ELECTRICAL SURGE PROTECTION

6.25.1. Power circuits to and from the communications shelter shall be protected by an SPD located at the main power disconnect.

A. An SPD in compliance with UL 1449, *Standard for Surge Protective Devices*, 4th Edition or later, shall be installed at the first disconnect for the utility service.

1. The SPD shall include a surge counter.

B. An SPD in compliance with Motorola R56 shall be mounted on the isolation transformer protecting its primary side.

C. SPDs in compliance with Motorola R56 shall be mounted to provide protection for the generator ATS utility and emergency sides.

D. An SPD in compliance with Motorola R56 shall replace the shelter's existing obsolete main load center panel SPD.

E. SPDs shall be installed on the generator control, alarm, crankcase heater, and battery charging circuits at the generator and within 24 inches of entry of the building interior.

1. SPDs shall comply with Motorola R56 standards and manufacturer specifications.

6.25.2. SPD alarm circuits shall be run back to the shelter's alarm punch down block.

6.25.3. New exterior alarm circuits shall be run beneath grade in PVC schedule-40 conduit.

6.25.4. SPDs shall be installed on alarm circuits within 24 inches of entry into the shelter. Type and location shall be verified with the Owner or Owner's Representative.

6.25.5. Alarm circuits shall be clearly labeled.

6.25.6. The Contractor shall work with the County's alarm monitoring personnel to verify alarm circuit functionality.

6.25.7. The installation of surge protection devices is required at all sites that have communications/ electronic equipment and other electrical equipment. Abnormal electrical surges, over voltage occurrences,

created by lightning or power surges from distribution equipment and/or auxiliary equipment can cause great damage to equipment and harm personnel. Care must be taken to assure safety for personnel, as well as the equipment.

6.25.8. Properly grounding the site on the exterior, as well as the interior, as described in this document is a good defense against personnel and equipment **not** being harmed. That alone is not enough. SPDs must also be installed on all electrical, transmission and communications lines entering the shelter, building or area which houses the communications equipment and/or personnel.

6.25.9. Common Mode SPDs shall **not** be used on AC electrical circuits. These devices may fail in a short circuit situation, which would cause undesirable voltage on the grounding conductor. This is from the neutral being bonded to the ground from the fault. All SPDs used in the United States shall be listed with UL 1449, *Standard for Surge Protective Devices*, 4th Edition or later.

6.25.10. Metal Oxide Varistor (MOV) and Silicone Avalanche Diode (SAD) are the types of SPD that are to be used in communication sites within the United States. They are used together as a hybrid at the building's main electrical disconnect.

6.25.11. Type 2A SPD gives protection for the critical equipment or main service entrance panel and branch panels located within the same equipment area. SAD technology shall be used on the primary modules and MOV on the secondary modules.

A. Normal mode type only; no common mode shall be used.

B. Primary module is SAD rated at 20 kiloamperes (kA) per phase, per polarity, minimum energy absorption.

C. Secondary module is MOV.

D. SPDs shall be certified to meet Motorola R56 requirements.

E. Enclosure rating of National Electrical Manufacturers Association (NEMA) 4.

F. Shall have integral over-current protection device rated at 25,000 amps for short circuit.

G. SPD shall be fed by a copper No. 6 AWG conductor or larger. The overcurrent device shall govern if larger than No. 6 AWG is needed. The conductor shall minimally be sized by the overcurrent device in which it is attached, per NFPA 70, *National Electrical Code*.

H. Indicator lamps shall be visible to monitor SPD status.

I. A set of form "C" dry contacts rated at a minimal of 250 volts alternating current (VAC) and 2 A with power factor of 1 for remote alarming shall be integral in the SPD.

J. No. 22 AWG copper wire or larger shall be used for remote alarming.

K. Shall be UL 1449, *Standard for Surge Protective Devices*, 4th Edition or later, listed.

L. SPD testing results by a UL-approved lab shall be made available.

6.25.12. Type 2B SPDs shall be used to provide protection for other equipment panels located within the same equipment room. This includes a shelter main disconnect feeding an ATS.

A. Normal mode type only; no common mode shall be used.

B. Primary modules are MOV.

C. Suppression components are to be voltage limiting, not voltage switching.

D. Shall have integral over-current protection device rated at 25,000 amps for short circuit.

E. SPDs shall be certified to meet Motorola R56 requirements.

F. Enclosure rating of NEMA 4.

G. SPD shall be fed by a copper No. 6 AWG conductor or larger. The overcurrent device shall govern if larger than No. 6 AWG is needed. The conductor shall minimally be sized by the overcurrent device in which it is attached, per NFPA 70, *National Electrical Code*.

H. Indicator lamps shall be visible to monitor SPD status.

I. A set of form "C" dry contacts rated at a minimal of 250 VAC and 2 A with power factor of 1 for remote alarming shall be integral in the SPD.

J. No. 22 AWG copper wire or larger shall be used for remote alarming.

K. Shall be UL 1449, *Standard for Surge Protective Devices*, 4th Edition or later, listed.

L. SPD testing results by a UL-approved lab shall be made available.

6.25.13. Type 3 individual equipment SPDs shall be of receptacle replacement, plug strip or plug-in adapter.

A. Normal mode type only; no common mode shall be used.

B. The plug-in adapter style shall be the type to only plug into a single simplex outlet.

C. Plug strip style may accommodate secondary protection for receptacle, data and telephone.

D. Plug strip style shall have a metallic casing with mounting tabs and an exterior ground stud to accept a No. 6 AWG or larger grounding terminal.

E. No ON/OFF switch required. If furnished, it shall have a physical barrier to avoid nuisance switching.

F. Indicator lamps shall be visible to monitor SPD status.

G. Install on critical loads where located 10-foot conductor length (5-foot circuit length) or more in conductor length from Type 1 SPD.

H. Install on loads where located greater than 50-foot conductor length (25-foot circuit length) from Type 1 SPD.

I. Shall be UL 1449, *Standard for Surge Protective Devices*, 4th Edition or later, listed.

J. SPD testing results by a UL-approved lab shall be made available.

K. If data and/or telephone protection is integral, then the plug strip style shall be UL 1449, *Standard for Surge Protective Devices*, and UL 497, *Standard for Protectors for Paired-Conductor Communications Circuits*, listed.

L. For stand-alone pole or pad mounted cabinets that do not have Type 2A or 2B SPD mounted on utility panelboard, a Type 3 SPD shall be installed on all loads.

6.25.14. Telephone, Data, Alarm, and Control Circuits:

A. Common mode SPDs may be used.

B. SPDs shall be installed on metallic conductors as close as practical upon entry into the shelter.

C. SPDs shall be installed as close as practical to the equipment they are protecting (e.g., generator display, battery charger, fuel gauge, etc.).

D. Interior shelter SPDs shall be bonded to the interior grounding system.

E. Exterior equipment SPDs shall be bonded to the exterior ground electrode system.

F. SPDs installed on 2-pair conductors may be No. 12 AWG green insulated copper conductor of a length no greater than 4 feet.

G. Multiconductor SPDs (greater than 2-pair) shall be No. 6 AWG green insulated copper conductor.

7. COMMUNICATIONS TOWER

7.1. INTENT

7.1.1. The Contractor shall comply with the requirements of their specific subsections or associated tasks. **Adherence to Motorola R56 shall be applicable to all aspects of execution of the RFP.**

7.2. SAFETY

7.2.1. Because the tower installation requires working at heights, the County is very concerned that all work be done in a safe manner. The Contractor must adhere to the requirements below.

A. When any work on an antenna support structure is being performed above ground level, there must be at least two certified competent tower climbers onsite at all times. All personnel working on the tower or in the tower compound must wear hard hats.

B. All tower climbers and their supervisors must have completed an OSHA-approved Tower Climbing Safety and Rescue course, such as those offered by ComTrain or Tractel, within the last five years. At least one person within the Contractor's company must have completed the course within the last year, to bring others in the company up to date with any new changes in safety regulations, requirements, and procedures. The Respondent must submit certification cards for its personnel with its response.

C. An industry-standard rescue bag must be ready at the tower site whenever a climber is working on a tower. The bag must include at least one 400-foot properly rated rescue rope with appropriate safety pulley system and all necessary items to allow the safe lowering of an injured worker. The Contractor must supply evidence that it owns at least one of these kits.

D. All climbers must wear a full-body safety harness—with the appropriate approved shock-absorbing safety lanyard attached to a single D-ring at the top of the climber's back—at all times when on a tower. Each climber must be issued, equipped, and use fall-protection equipment that must ensure a 100-percent tie-off while climbing. All fall-protection and safety equipment must meet ANSI and OSHA standards and may be inspected by the County or its representatives at any time during the project.

E. A pre-climb safety meeting is required before each climbing of an antenna support structure. A log of such meetings is required and may be inspected by the County at any time during the project.

7.3. MARKING AND LIGHTING

7.3.1. Tower obstruction marking and lighting shall be supplied as required by the applicable determination as issued by the Federal Aviation Administration (FAA) for this project and fully compliant with FAA AC #AC70/7460-1K (or latest revision), *Obstruction Marking and Lighting.*

7.3.2. The Contractor shall ensure the obstruction lighting system is installed by registered certified installers for the manufacturer and the installers have completed applicable training programs as required by the lighting system manufacturer. Copies of certification shall be provided to the County.

7.3.3. Unless otherwise required by the Federal Communications Commission (FCC), the Contractor shall provide a dual-obstruction LED lighting system consisting of red lights for nighttime and high or medium intensity flashing white lights for day and twilight per FAA AC #AC70/7460-1M (or latest revision), *Obstruction Marking and Lighting.*

7.3.4. System control circuitry shall be enclosed in galvanized rigid metallic conduit or other approved method to comply with NFPA 70, *National Electrical Code*, as well as local electrical codes in effect at the sites of installation.

7.3.5. System control circuitry shall provide synchronization and intensity control of the obstruction lighting system and shall monitor the overall integrity of the lighting system for component failures or improper operation.

7.3.6. Form C, dry alarm output relay contacts, rated at .3A minimum at 24 volts direct current (VDC)/125 VAC, shall be provided to indicate:

A. Flash head or power failure
B. Side marker lamp failure

7.3.7. The Contractor shall wire alarms to a Contractor-provided Type 66 block located in the communications shelter or equipment room. Alarms shall be clearly labeled.

A. Alarms shall be verified by the County's alarm system personnel.

7.4. TOWER GROUNDING

7.4.1. The Contractor shall provide materials and labor required to ground the tower as specified within this RFP.

7.4.2. The Contractor shall connect this grounding system to the shelter grounding system.

7.4.3. By reference, the requirements and procedures of Motorola R56 electrical grounding are incorporated herein and made a part thereof to the extent applicable in this application. At the minimum, it includes the following requirements:

A. The installation of grounding at the site shall be coordinated with the associated contractor.

B. Copper clad ground rods, each no less than ¾-inch by 10-foot. Each shall be driven to a depth placing the top of each rod no less than 30 inches below grade.

C. Each rod shall be of high strength copper clad steel or solid copper.

D. Rods shall be equally spaced and said spacing shall not be less than twice the length of the driven rods. However, where rods cannot be driven at the required intervals, the Owner's Representative may require additional rods. The Contractor shall contemplate the possibility for rods in excess of the number shown on the site plans.

E. A bonding wire no smaller than 2/0 AWG bare solid tinned copper buried 30 inches below grade shall be used to bond the grounding rods together. CAD weld methods shall be used to attach the interconnecting conductors to the ground wires. No mechanical connections are permitted.

F. Each tower leg shall be connected to the indicated ground rod with bare solid tinned 2/0 AWG copper conductors.

G. No bends or curves with a radius of less than 8 inches or sharper than a 120° angle shall be made in any down conductor or other grounding wire.

H. Tower ground radials shall be installed as required by TIA 222-I, *Structural Standard for Antenna Supporting Structures, Antennas and Small Wind Turbine Support Structures.*

I. The tower ground radials shall be installed at a depth of no less than 30 inches and shall be of the differing lengths as specified in Motorola R56.

J. Ground rods shall be installed at no less than 20 feet but no more than 25-foot intervals along each radial.

K. Ground rods that are to be installed in an area below asphalt shall be installed using an inspection well with a grated cover.

L. Each conductor shall be bonded to its respective tower leg at the tower base. Attachment to the tower structure shall be by CAD weld only.

M. Each conductor shall also be bonded to the grounding rods by CAD weld only. No mechanical connections are permitted.

N. If the tower and shelter foundation design do not permit two ground rings to be installed, foundation are closer than 15-foot apart. One ring shall encircle both the tower and shelter.

7.5. TOWER LIGHTNING PROTECTION SYSTEM (LPS)

7.5.1. Air terminals (lightning rods) shall be properly installed on the tower per NFPA 780, *Standard for the Installation of Lightning Protection Systems*; UL, and this document specification; the more stringent shall apply.

7.5.2. Air terminals shall be stainless steel and minimum Class 2 rating.

7.5.3. Air terminals shall be directly attached to the tower leg top flange plates by approved methods.

7.5.4. When using air terminal extension rods, a proper size and material down lead shall be used and properly attached to the top extreme of the leg.

7.5.5. Copper or copper alloy air terminals, conductors, or attachment hardware shall not be used on galvanized towers. Stainless steel is recommended. Tinned copper is acceptable.

7.5.6. Air terminals shall be placed at the top extreme of each tower leg. Each terminal shall be 24 inches minimum above any obstruction (e.g., lights and antennas).

A. The Contractor shall submit detailed drawings and material lists for review.

B. The LPS design shall be approved by the Owner or Owner's Representative before installation.

C. Tower lighting equipment and antennas mounted 150 feet or greater shall be properly protected by air terminals.

7.5.7. Air terminals on top of towers shall meet tower lighting manufacturer specifications for protection of proposed lighting systems.

A. If they do not, the Contractor shall present a solution to the Owner to bring into compliance.

7.6. ICE BRIDGE

7.6.1. The Contractor shall provide the materials, installation and grounding of the ice bridge structure.

7.6.2. The Contractor shall install an ice bridge and cable support system where an underground conduit system is not being used between the tower and the shelter.

7.6.3. The ice bridge and cable ladders shall be installed between the cable conduit exit point and shelter entry port.

7.6.4. The ice bridge shall be built in accordance with industry standards using hot-dipped galvanized construction.

7.6.5. The ice bridge shall be installed in such a manner that it runs the entire length of distance between the tower and the entry port at the rear of the building.

7.6.6. The ice bridge shall be installed in such a manner that the bridge sections run parallel to both the north and southwest tower faces intersecting at the "Y" leg of the tower and then continuing as a single run towards the entry port.

7.6.7. The ice bridge shall be installed at a height of 2 feet higher than the top of the entry port.

7.6.8. A trapeze system shall be installed allowing for three levels of cable attachment beneath the bridge.

7.6.9. Ice bridge support posts are to be grounded using a 2 AWG solid tinned copper conductor via a CAD weld at the base of the post.

7.6.10. Horizontal bridge sections shall be bonded together using a 2 AWG solid tinned jumper CAD welded between the both sides of the bridge sections.

7.6.11. Horizontal bridge sections shall be bonded to the support posts using a 2 AWG solid tinned conductor CAD welded at both ends.

7.6.12. Each ice bridge support post shall be bonded to the tower earthing system using CAD welds.

7.6.13. No mechanical grounding connections are permitted anywhere on the ice bridge system.

8. SHELTER

8.1. INTENT

8.1.1. The existing shelters shall be retrofitted to meet Motorola R56 requirements and as stated in Section 1.3 of this RFP.

8.1.2. The Contractor shall separately price upgrades to the existing shelter to comply with the latest Motorola R56 standard.

8.1.3. The Owner's Representative and the Contractor shall conduct a walk-through of the shelter to identify any electrical upgrade requirements; the Contractor shall complete identified electrical upgrades provided by an approved change order or approved addendum to the contract.

8.2. LIGHTING

8.2.1. Existing light fixtures shall be repaired as needed and lamps replaced with new.

8.2.2. The exterior wall-mounted light fixture and photo-eye shall be repaired as needed and the lamp replaced with an LED bulb.

8.2.3. The exterior lighting system shall be fed from a separate, appropriately rated breaker.

8.3. FLOOR

8.3.1. The shelter floor shall be cleaned and sealed.

8.3.2. Any defects noted in the flooring shall be brought to the Owner's attention.

8.4. DOORS

8.4.1. The door shall properly close and seal, inhibiting weather from entering.

8.5. ROOF AND DOORFRAME

8.5.1. The used shelter roof shall be coated with a waterproofing membrane.

8.5.2. The door frame and door shall be repainted on the exterior and interior.

8.5.3. The doorframe shall be bonded to the ground perimeter; the door shall be bonded to the frame by a highly flexible insulated bonding jumper (e.g., welding cable); general purpose building stranded wire, like THHN, is not acceptable. Each equal to 1/0 insulated copper wire.

8.6. LOCKS, FINISH, AND OPENINGS

8.6.1. The existing locking mechanism shall be replaced and keyed to the Owner's key system.

8.6.2. Locks shall be constructed of non-corroding materials and shelter locks shall be keyed alike for shelters. Four keys shall be provided to the Owner prior to changeout of any locks.

8.6.3. The door hinges and hardware shall be functional and keyed to Owner's specifications.

8.6.4. Air intake and exhaust openings shall be fitted with hoods to prevent entrance of rain, snow, etc.; joints shall be sealed with compressible, resilient sealant.

8.7. CABLE TRAYS

8.7.1. Cable trays shall be a minimum of 6 inches above equipment racks.

8.7.2. There shall be a minimum of 12 inches between the cable tray and ceiling.

8.7.3. Cable trays shall not be placed under sprinkler heads or smoke detectors.

8.7.4. Cable trays shall be bonded at connection points and connected to the internal grounding system.

8.8. SAFETY EQUIPMENT

8.8.1. Safety equipment shall be permanently located inside the equipment shelter and shall include the following:

A. Fully charged wall-mounted carbon dioxide (CO_2) hand-held auxiliary fire extinguisher, minimum size 7–10 lbs., clearly labeled for electronic equipment fire extinguishing
B. Fully charged wall-mounted Class ABC fire extinguisher, minimum size 20 lbs., clearly labeled for general purpose structural fire only
C. First aid kits

D. Eye wash station; any existing out-of-date bottles shall be replaced.

8.9. SITE PREPARATION

8.9.1. The Contractor shall prepare the shelter for equipment installation.

8.9.2. The Contractor shall bond the shelter single-point ground to the sub-terrain ground system as described in this document.

8.9.3. The Contractor shall test and verify shelter electrical and mechanical systems are functioning properly.

8.9.4. The Contractor shall conduct a site walk with the Owner's Representative to complete a punch list.

8.9.5. The Contractor shall correct punch list items.

8.9.6. The Contractor shall conduct follow up inspection, if required.

8.10. ANTENNA CABLE ENTRY PORTS

8.10.1. Shield grounds shall be connected to the shelter with brass or tinned ground clamps and non-oxidizing (no-ox) compound applied to prevent corrosion.

8.10.2. The PSAP entry port requires ports to house the existing RF cables and to allow for two times for future expansion.

8.10.3. The entry port shall be specifically designed for cabling.

8.10.4. Entry of antenna transmission lines into communications building or room requires weatherproofing and a commercially made port assembly specifically designed for this purpose.

8.10.5. Openings shall be properly booted to provide a good weather seal.

8.10.6. The entry port shall be grounded to the building ground on the outside of the building and/or shelter.

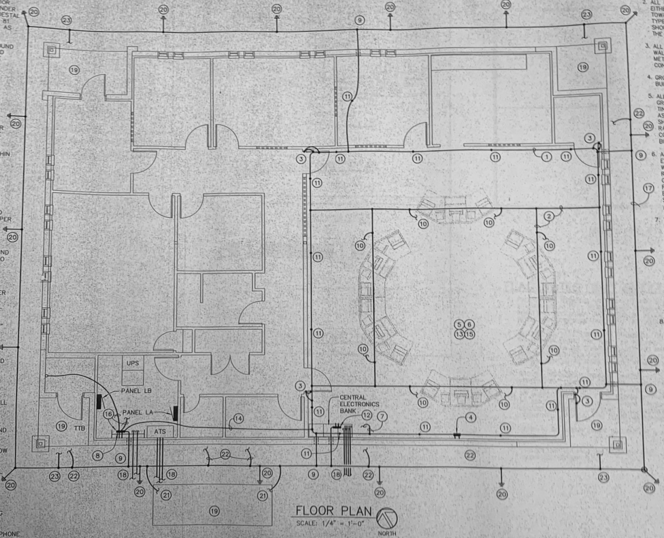
APPENDIX B – ORIGINAL BUILDING GROUNDING DRAWINGS

The drawings can be found on the following pages.

Remainder of this page intentionally left blank.

GROUNDING NOTES THIS SHEET:

1. PROVIDE #2 AWG STRANDED COPPER FOR INTERIOR GROUND RING MOUNTED AT +5" ABOVE SLAB UNDER RAISED FLOOR ON 2" STAND OFFS ON 2'-0" CENTERS MAXIMUM. SEE DETAIL, SHEET E-7.
2. PROVIDE #2 AWG STRANDED COPPER FOR INTERIOR GROUND RING MOUNTED AT +5" ABOVE SLAB UNDER RAISED FLOOR ON PEDESTALS. ATTACH TO PEDESTAL WITH U-BOLT GROUND CLAMP, BLACKBURN BUV 81 OR EQUAL. ROUTE BELOW CONSOLE EQUIPMENT AS SHOWN.
3. BOND DOOR AND DOOR FRAME TO INTERIOR GROUND RING USING #2 AWG GREEN INSULATED STRANDED COPPER WIRE AND TWO-HOLE CONNECTOR. USE PARALLEL CRIMP TYPE CONNECTOR AT GROUND RING. SEE DETAIL, SHEET E-7.
4. GROUND RING SPLICE. SEE DETAIL, SHEET E-7.
5. BOND CABLE TRAY UNDER RAISED FLOOR TO INTERIOR GROUND RING USING TWO-HOLE CONNECTOR AND #2 AWG STRANDED COPPER WIRE. USE PARALLEL CRIMP TYPE CONNECTOR AT GROUND RING. BOND AT ENDS WHERE THEY MEET THE WALL. PROVIDE #6 AWG SOLID COPPER WIRE ACROSS ALL SEPARATE SECTIONS OF CABLE TRAY.
6. BOND ALL SIGNIFICANT METALLIC OBJECTS TO WITHIN 6 FEET TO INTERIOR GROUND RING.
7. BOND LOUVERS TO INTERIOR GROUND RING USING TWO-HOLE CONNECTORS AND #2 AWG STRANDED COPPER WIRE. USE PARALLEL CRIMP CONNECTOR AT GROUND RING.
8. PROVIDE TELCO NEUTRAL GROUND BAR, 3"H x 6"L x 1/4"D. MOUNT AT +2'-0" AT TELCO BOARD. PROVIDE #2 AWG STRANDED TINNED COPPER CONDUCTOR FOR CONNECTION TO BURIED GROUND RING. EXOTHERMICALLY WELD CONNECTION AT BOTH GROUND BAR AND GROUND RING.
9. PROVIDE #2 AWG STRANDED TINNED COPPER GROUND RISER CONDUCTOR FROM INTERIOR GROUND RING TO BURIED GROUND RING. PROVIDE CRIMP TYPE CONNECTOR AT INTERIOR GROUND. PROVIDE 3/4" SLEEVE THROUGH WALL AT A 45° ANGLE. ROUTE CONDUCTOR DOWN TO BURIED GROUND RING AND EXOTHERMICALLY WELD CONNECTION. GROUND RISER FROM TELCO NEUTRAL GROUND BAR SHALL EXIT BUILDING 6" ABOVE GRADE AND PVC SLEEVE SHALL EXTEND INTO THE GROUND.
10. PROVIDE #2 AWG STRANDED COPPER PIGTAIL 10'-0" LONG FOR CONNECTION TO CONSOLE BAY. FINAL CONNECTION TO BAYS BY CONSOLE SUPPLIER/VENDOR.
11. BOND RAISED FLOOR PEDESTAL TO INTERIOR GROUND RING USING U-BOLT GROUND CLAMP. SEE RAISED FLOOR PEDESTAL GROUNDING DETAIL, SHEET E-7.
12. PROVIDE GROUND BAR MOUNTED BELOW CENTRAL ELECTRONIC BANKS UNDER RAISED FLOOR ON PEDESTAL AT +5" ABOVE SLAB. GROUND BAR SHALL BE 3"H x 18"L x 1/4"D COPPER. PROVIDE #2 AWG STRANDED TINNED COPPER CONDUCTOR FOR CONNECTION TO BURIED GROUND RING. EXOTHERMICALLY WELD CONNECTION AT BOTH GROUND BAR AND GROUND RING.
13. BOND FIRE SUPPRESSION SYSTEM COMPONENTS BELOW RAISED FLOOR TO INTERIOR GROUND RING.
14. CONNECT INTERIOR GROUND RING TO TELCO NEUTRAL GROUND BAR IN ELECTRIC TELCO ROOM 014. ROUTE #2 AWG STRANDED COPPER CONDUCTOR IN PVC SLEEVE CONCEALED IN WALL, COORDINATE WITH ARCHITECT.
15. BOND METAL WALL STUDS TO INTERIOR GROUND RING EVERY 25'-0" MINIMUM.
16. CONNECT ELECTRICAL GROUND NEUTRAL BOND, TELEPHONE SERVICE GROUND, AND MAIN COLD WATER PIPE TO TELCO NEUTRAL GROUND BAR WITH #2/0 AWG STRANDED COPPER. EXOTHERMICALLY WELD CONNECTIONS AT GROUND BAR.
17. PROVIDE A #2/0 AWG STRANDED TINNED COPPER GROUND RING BURIED A MINIMUM OF 18" BELOW GRADE. THE GROUND RING SHALL BE INSTALLED 2'-0" AWAY FROM FOUNDATION (MINIMUM UNLESS SHOWN OTHERWISE ON DRAWING).
18. BOND POWER AND TELEPHONE SERVICE CONDUITS, AND 4" GRC CONDUITS TO CENTRAL ELECTRONICS BANK TO BURIED GROUND RING AS THEY CROSS.



FLOOR PLAN
SCALE: 1/4" = 1'-0"

19. BOND REBAR IN CONCRETE FOR BUILDING PAD AND STEPS TO BURIED GROUND RING. EXOTHERMICALLY WELD A #2/0 STRANDED TINNED COPPER CONDUCTOR TO THE REBAR AND CONNECT TO THE BURIED GROUND RING.
20. 5/8" x 8'-0" LONG COPPER CLAD GROUND ROD. 15'-0" SPACING BETWEEN RODS AS SHOWN (NON-LINEAR). TYPICAL FOR ALL GROUND RODS SHOWN. PROVIDE 6" DIA x 2'-0" LONG WHITE SCHEDULE 40 PVC INSPECTION SLEEVE FOR GROUND ROD ON SOUTHEAST CORNER. PROVIDE REMOVABLE COVER (NO TOOLS REQUIRED).
21. BOND FRAME OF GENERATOR TO BURIED GROUND RING. USE TWO-HOLE CONNECTOR AT FRAME AND AN EXOTHERMIC WELD AT BURIED GROUND RING.
22. BOND DOWNSPOUTS ON SOUTH SIDE OF BUILDING, MECHANICAL LOUVERS, WINDOW FRAMES AND OTHER METALLIC OBJECTS ON BUILDING EXTERIOR. CONCEAL GROUND CONDUCTOR INSIDE CONCRETE WALL AND ROUTE IN PVC CONDUIT.
23. FOR CONNECTION TO LIGHTNING PROTECTION SYSTEM DOWNLEAD CONDUCTORS. SEE PLAN, SHEET E-7, FOR LOCATIONS.

GENERAL NOTES:

1. ALL INTERIOR GROUNDING CONDUCTORS SHALL BE #2 AWG STRANDED COPPER. USE T&B 54207, OR APPROVED EQUAL, TWO-HOLE CONNECTOR FOR #2 AWG STRANDED CONDUCTOR.
2. ALL INTERIOR GROUNDING CONDUCTORS SHALL BE EITHER HORIZONTAL OR ROUTED DOWNWARD TOWARD FINAL GROUNDING POINT. ALL CRIMP TYPE CONNECTORS TO THE INTERIOR GROUND RING SHOULD POINT IN THE SHORTEST DIRECTION TO THE EARTH GROUND.
3. ALL GROUNDING CABLE IN CONCRETE OR THROUGH WALLS SHALL BE IN 3/4" PVC CONDUIT. NO METALLIC CONDUIT SHALL BE USED FOR GROUNDING CONDUCTOR SLEEVES.
4. GROUND ALL EXPOSED METALLIC OBJECTS ON BUILDING EXTERIOR.
5. ALL EXTERIOR GROUNDING CONDUCTORS INCLUDING GROUND RING SHALL BE #2/0 AWG STRANDED TINNED COPPER. MAKE ALL GROUND CONNECTIONS AS SHORT AND DIRECT AS POSSIBLE. AVOID SHARP BENDS. ALL BENDS SHALL EXCEED 12" RADIUS AND BE GREATER THAN 90°. GROUNDING CONDUCTORS SHALL BE ROUTED DOWNWARD TOWARD BURIED GROUND RING.
6. ALL EXTERNAL GROUND CONNECTIONS SHALL BE EXOTHERMICALLY WELDED, UNLESS NOTED OTHERWISE. ALL EXOTHERMIC WELDS TO BURIED GROUND RING SHALL BE PARALLEL TYPE, EXCEPT FOR THE GROUND RODS WHICH ARE TEE EXOTHERMIC WELDS. REPAIR ALL GALVANIZED SURFACES THAT HAVE BEEN DAMAGED BY EXOTHERMIC WELDING. USE SPRAY GALVANIZER SUCH AS HOLUB LECTROSOL #15-501.
7. WHERE MECHANICAL CONNECTORS(TWO-HOLE, SPLIT BOLT OR CLAMP) ARE USED APPLY A LIBERAL PROTECTIVE COATING OF AN ANTI-OXIDE COMPOUND SUCH AS "NO OXIDE A" BY DEARBORN CHEMICAL COMPANY ON ALL CONNECTORS. PROVIDE LOCK WASHERS ON ALL MECHANICAL CONNECTORS. USE STAINLESS STEEL HARDWARE THROUGHOUT. THOROUGHLY REMOVE ALL PAINT AND CLEAN ALL DIRT FROM SURFACES REQUIRING GROUND CONNECTIONS. REPAINT TO MATCH EXISTING AFTER CONNECTION IS MADE TO MAINTAIN CORROSION RESISTANCE. ALL GROUND CONNECTIONS SHALL BE APPROVED FOR THE TYPES OF METAL BEING ATTACHED TO.
8. CONTRACTOR SHALL PERFORM A GROUND RESISTANCE TEST USING THE "FALL OF POTENTIAL" METHOD, IN THE PRESENCE OF THE OWNER, PRIOR TO BACKFILLING GROUNDING SYSTEM. SEND RESULTS TO ENGINEER.

ISSUE #1
ISSUED FOR REVIEW
8-15-95

ISSUE #2
ISSUED FOR BIDDING & PERMIT
9-15-95

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FAYETTE COUNTY
FAYETTE COUNTY COMMUNICATIONS BUILDING
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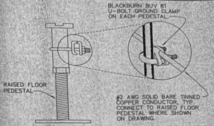
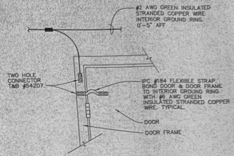


RAISED FLOOR PEDESTAL GROUNDING

NO SCALE



DOOR GROUNDING DETAIL

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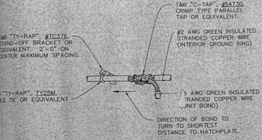

INTERIOR GROUND RING WALL SUPPORT DETAIL

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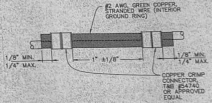

GROUND RING SPLICE DETAIL

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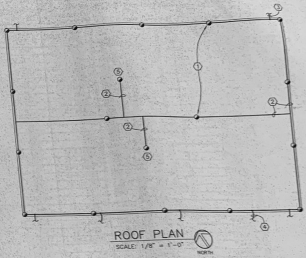
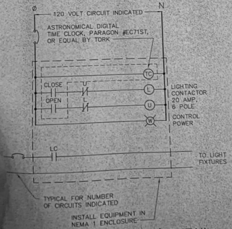


ROOF PLAN

SCALE: 1/8" = 1'-0"

FLAG NOTES THIS SHEET: ⬡

1. PROVIDE AIR TERMINAL ON PARAPET AND ROOF AS INDICATED. MAINTAIN MAXIMUM SPACING OF 20 FEET BETWEEN AIR TERMINALS. PROVIDE MASTIC COMPATIBLE WITH ROOF AND NECESSARY HARDWARE TO SECURELY MOUNT AIR TERMINALS IN A PERMANENT AND RIGID MANNER. AIR TERMINALS SHALL BE 18" IN HEIGHT, TYPICAL.
2. PROVIDE IPC #A28 STRANDED ALUMINUM, OR APPROVED EQUAL, FOR MAIN CONDUCTORS. ROUTE MAIN ALONG THE ROOF OR PARAPET AS INDICATED. SECURE MAIN CONDUCTOR WITH APPROVED FASTENERS, SPACED NO MORE THAN 3 FEET APART. SUPPLY ALL HARDWARE REQUIRED FOR A COMPLETE INSTALLATION. DO NOT PENETRATE ROOF. TYPICAL FOR ENTIRE ROOF INSTALLATION UNLESS NOTED OTHERWISE.
3. PROVIDE IPC #32S STRANDED COPPER, OR APPROVED EQUAL, FOR DOWNLEAD CONDUCTOR. CONNECT DOWNLEAD CONDUCTOR TO MAIN CONDUCTOR ON ROOF. ROUTE DOWNLEAD CONDUCTOR IN PVC CONDUIT CONCEALED IN WALL FROM ROOF TOP TO WHERE CONDUCTOR EXITS BUILDING. PROVIDE 1/2" PVC SLEEVE THROUGH WALL AT 45° ANGLE DOWN TOWARD GRADE. CONNECT TO BURIED GROUND RING WITH EXOTHERMIC WELD. USE BIMETALLIC CONNECTOR FOR DISSIMILAR METALS BEING CONNECTED. TYPICAL FOR FOUR (4) CORNERS.
4. BOND TO SCUPPERS EVERY 20 FEET AT A MINIMUM. TYPICAL ON SOUTH SIDE OF BUILDING.
5. PROVIDE AIR TERMINAL ON ROOFTOP UNIT. COORDINATE LOCATION WITH MECHANICL DRAWINGS.



LIGHTING CONTACTOR 'LC' DETAIL

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FAYETTE COUNTY, GEORGIA
LIGHTNING PROTECTION PLAN AND DETAILS

DR | LSH | JJ | 08-15-95

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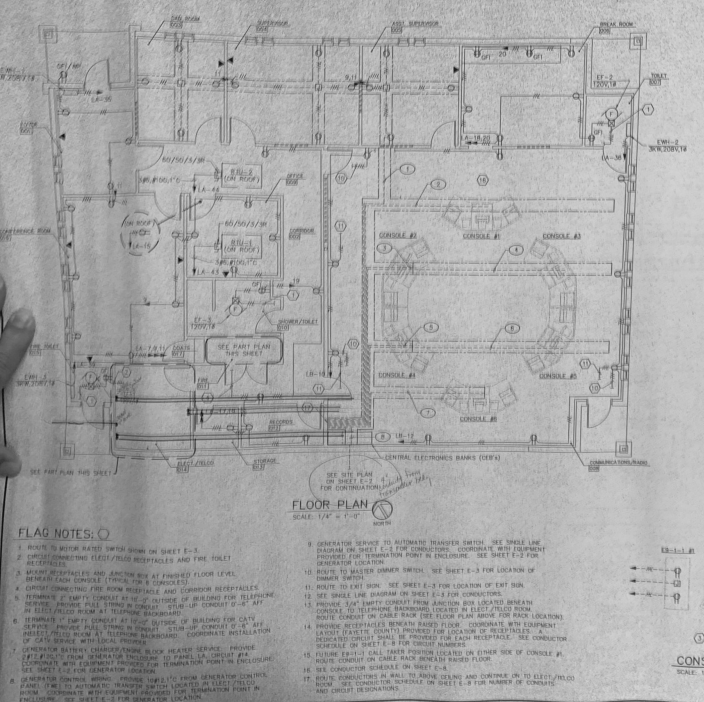
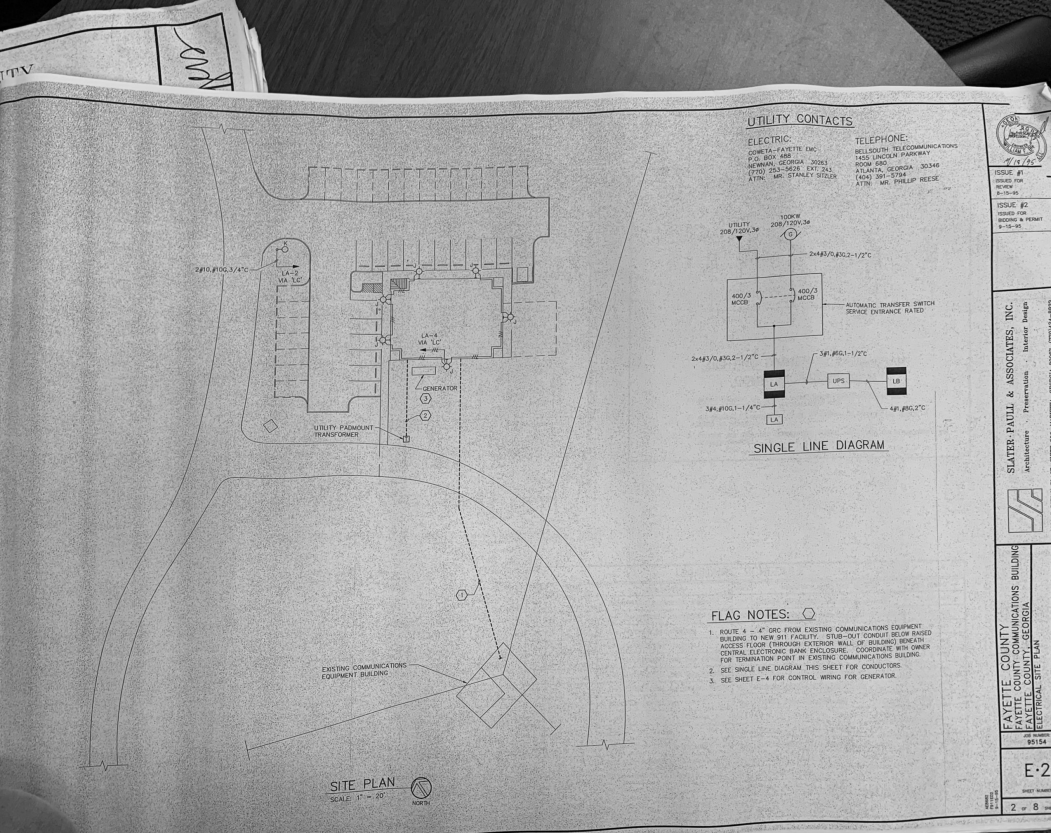
7 of 8 SHEETS



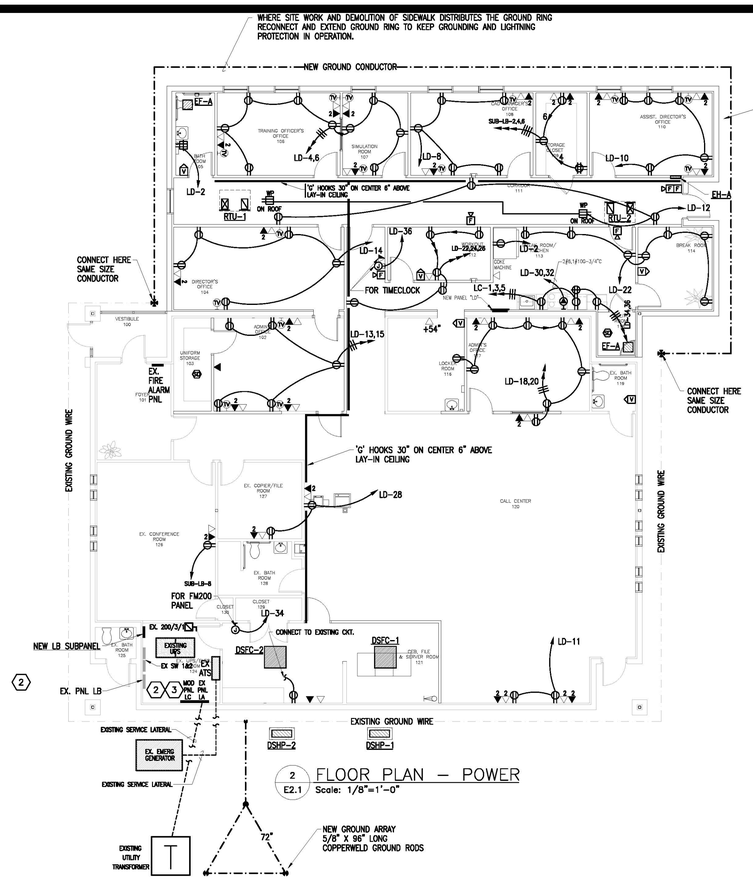


APPENDIX C – 911 AND EOC EXPANSION GROUNDING DRAWINGS

The drawings can be found on the following pages.

Remainder of this page intentionally left blank.

WHERE SITE WORK AND DEMOLITION OF SIDEWALK DISTRIBUTES THE GROUND RING RECONNECT AND EXTEND GROUND RING TO KEEP GROUNDING AND LIGHTNING PROTECTION IN OPERATION.



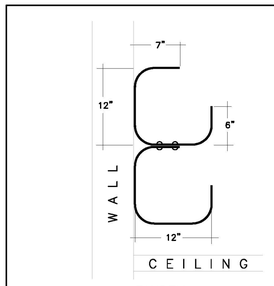
2 FLOOR PLAN – POWER
E2.1 Scale: 1/8"=1'-0"

LIGHTNING PROTECTION SYSTEM

IT IS MANDATORY FOR THE CONTRACTOR TO EXTEND THE LIGHTNING PROTECTION SYSTEM ON THE ROOF BY ADDING AIR TERMINALS, CONDUCTORS, DOWN CONDUCTORS, BONDING TO HVAC EQUIPMENT IN ORDER TO MAINTAIN THE "MASTER LABEL". THIS WORK INCLUDES ALL HARDWARE NECESSARY FOR COMPLETION OF THE SYSTEM. IT IS MANDATORY THAT THE CONTRACTOR HIRE A COMPANY ENGAGED IN THE LIGHTNING PROTECTION BUSINESS FOR THIS WORK.

FIND AND MARK BEFORE DIGGING

IT IS MANDATORY THAT THE CONTRACTOR EMPLOY A TECHNICIAN TO VISIT THE SITE PRIOR TO ANY CONSTRUCTION TO FIND AND MARK ALL UNDERGROUND UTILITIES IN THE AREAS OF THE SITE WHERE WORK IS ANTICIPATED. IN THESE AREAS THE CONTRACTOR SHALL EXTRA CARE WITH EXCAVATION TO PREVENT THE INTERRUPTION OF ANY SYSTEM. IF SERVICES ARE INTERRUPTED THE SYSTEM SHALL BE PUT BACK IN WORK ORDER BY THE END OF THE BUSINESS DAY OR AS SOON AS POSSIBLE AT NO ADDITIONAL COST TO THE OWNER.

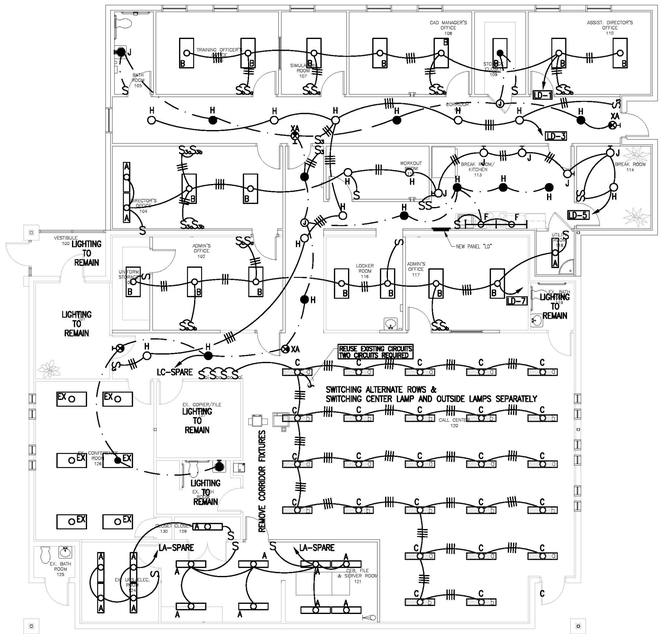


TANDEM
TYPICAL "G" HOOKS

MANUFACTURED FROM EXTRUDED ALUMINUM; ENDS TO HAVE PLASTIC CAPS. TWO FASTENERS PER "G" RING. MOUNT 36" ON CENTER. P. W. INDUSTRIES, INC. OR EQUAL.

GENERAL SCHEME FOR BRANCH CIRCUITS IN BUILDING

PANEL "LA" – NORMAL POWER
PANEL "LB & SUBPANEL LB" – UPS POWER
PANEL "LC" – GENERATOR POWER (8 SEC. DELAY)
PANEL "LD" – NORMAL POWER



1 FLOOR PLAN – LIGHTS
E2.1 Scale: 1/8"=1'-0"

GENERAL NOTES

G1 – REFER TO MECHANICAL EQUIPMENT CONNECTION SCHEDULE FOR ELECTRICAL CRITERIA FOR HVAC AND PLUMBING EQUIPMENT, THIS SHEET.

G2 – REFER TO THE REFLECTED CEILING PLAN FOR THE EXACT LOCATION OF LIGHTING FIXTURES.

G3 – THERE SHALL BE A FACE TO FACE MEETING BETWEEN THE ELECTRICAL CONTRACTOR AND THE USING AGENCY TO REVIEW THE DRAWINGS TO INSURE THAT ITEMS ARE LOCATED CORRECTLY. THIS IS IMPERATIVE.

G4 – COORDINATE ALL KITCHEN EQUIPMENT PRIOR TO ROUGH-IN.

G5 – FURNISH AND INSTALL ALL NECESSARY HARDWARE & SOFTWARE TO INCLUDE THE ADDITIONAL DEVICES ONTO THE EXISTING FIRE ALARM SYSTEM. VISIT THE SITE PRIOR TO BID TO ESTIMATE THE ADDITIONAL CIRCUIT CARD NECESSARY FOR THE NEW ADDITION. THIS SHALL INCLUDE POWER SUPPLIES AND APPLIANCE MODULES.

KEY NOTES

1. LIGHT FIXTURES IN THIS SPACE SHALL BE SWITCHED, 1) ALTERNATE ROWS, 2) INBOARD AND OUTBOARD LAMPS; REUSED EXISTING CIRCUITS.
2. FURNISH AND INSTALL A 60A–2P CIRCUIT BREAKER IN PANEL LP BY REMOVING THREE (3) BRANCH CIRCUITS. FURNISH AND INSTALL A 60A SINGLE PHASE LOAD CENTER TO ALLOW ADDITIONAL CIRCUITS TO BE CONNECTED TO PANEL "LB" WHICH IS ON THE UPS. RELOAD THE THREE (3) BRANCH CIRCUITS PREVIOUSLY MENTIONED ON A 20A–1P BREAKER IN THE NEW LOAD CENTER. SEE PANELBOARD SCHEDULE FOR NEW LOAD CENTER. THE NEW FEEDER FROM EXISTING PANEL "LB" TO THE NEW LOAD CENTER SHALL BE 3#6,1#10G–1"C.
3. FURNISH AND INSTALL A PERMANEN PLAQUE ADJACENT TO PANEL "LA" PER NEC ARTICLE 230.2, "E" AND ALSO FURNISH AND INSTALL A SHUNT TRIP PUSHBUTTON (RED MUSHROOM HEAD WITH PROTECTIVE COVER) TO TRIP THE MAIN CIRCUIT BREAKER IN NEW PANEL "LD" IN CASES OF EMERGENCIES.

PANELBOARD "LC" SCHEDULE (GENERATOR BACKUP)

VOLTAGE: 208 Y120 3 Ph 4 Wire | MAIN: MLO Note 5 | MOUNTING: SURFACE | REMARKS: Provide copper ground bus
BUS SIZE: 100 AMP. | TOTAL LOAD: 17.7 KVA | FAULT DUTY: SEE RISER

CKT NO	DESCRIPTION	LOAD (kVA) LTG	REC	MTR	A/C	HTG	MISC	KIT	BKR	PHASE A	B	C	BKR	KIT	MISC	HTG	LOAD (kVA) A/C	MTR	REC	LTG	DESCRIPTION	CKT NO
1	MICROWAVE		1.20						20/1	2.7			20/1						1.50		COKE MACHINE	2
3	COFFEE MAKER		1.20						20/1		1.4		15/2						0.20		DSFC–1	4
5	TOASTER OVEN		1.50						20/1			1.7	---						0.20		DSFC–1	6
7	EMERG LIGHTS		1.00						20/1	2.5			20/2				1.50				DSHP–1	8
9	SPARE						0.50		20/1		2.0		---				1.50				DSHP–1	10
11	SPARE						0.50		20/1			0.7	15/2						0.20		DSFC–2	12
13	SPARE						0.50		20/1	0.7			---						0.20		DSFC–2	14
15	SPARE						0.50		20/1		2.0		20/2				1.50				DSHP–2	16
17	SPARE						0.50		20/1			2.0	---				1.50				DSHP–2	18
19	SPARE						0.50		20/1	0.5			20/1								SPARE	20
21	SPARE						0.50		20/1		0.5		---								SPACE	22
23	SPARE						0.50		20/1			0.5	---								SPACE	24
25	SPARE						0.50		20/1	0.5			---								SPACE	26
27	SPACE								---		0.0		---								SPACE	28
29	SPACE								---			0.0	---								SPACE	30
31	SPACE								---	0.0			---								SPACE	32
33	SPACE								---		0.0		---								SPACE	34
35	SPACE								---			0.0	---								SPACE	36
37	SPACE								---	0.0			---								SPACE	38
39	SPACE								---		0.0		---								SPACE	40
41	SPACE								---			0.0	---								SPACE	42
	TOTAL kVA	0.0	4.9	0.0	0.0	0.0	4.5	0.0	---	6.9	5.9	4.9	---	0.0	0.0	0.0	6.0	0.8	1.5	0.0	TOTAL kVA	

TOTALS	Lighting:	0.0	X 1.25%=	0.0	1) This circuit breaker to have lock device.
	Receptacles:	6.4	NEC 220.44	6.4	2) Circuit breaker to be "HACR" type.
	Motors:	0.8	NEC 220.18(A)	0.8	3) Provide shunt trip type circuit breaker.
	A/C:	6.0	X 100%=	6.0	4) This shall be a GFI type circuit breaker
	Heating:	0.0	X 100%=	0.0	5) This panel is limited to 30 KVA or 83.3 amperes.
	Miscellaneous:	4.5	X 100%=	4.5	6) Not Used
	Kitchen:	0.0	NEC 220.56	0.0	7) Not Used
	TOTAL KVA	17.7		17.7	8) Not Used
	TOTAL AMPS	49.2		49.2	9) Not used

Phillips Gradick Engineering | CODE KVA | CODE AMPS

PANELBOARD "LD" SCHEDULE (NORMAL POWER – NO BACKUP)

VOLTAGE: 208 Y120 3 Ph 4 Wire | MAIN: 225 MCB NOTE 3 | MOUNTING: SURFACE | REMARKS: Provide copper ground bus
BUS SIZE: 225 AMP. | TOTAL LOAD: 69.1 KVA | FAULT DUTY: SEE RISER

CKT NO	DESCRIPTION	LOAD (kVA) LTG	REC	MTR	A/C	HTG	MISC	KIT	BKR	PHASE A	B	C	BKR	KIT	MISC	HTG	LOAD (kVA) A/C	MTR	REC	LTG	DESCRIPTION	CKT NO
1	LIGHTS	0.80							20/1	2.2			20/1						1.40		RECEPTACLES	2
3	LIGHTS	0.40							20/1		1.4		20/1						1.00		RECEPTACLES	4
5	LIGHTS	0.80							20/1			1.6	20/1						0.80		RECEPTACLES	6
7	LIGHTS	0.90							20/1	1.8			20/1						1.00		RECEPTACLES	8
9	SPARE								20/1		1.0		20/1						1.00		RECEPTACLES	10
11	RECEPTACLES	1.00							20/1			2.0	20/1						1.00		RECEPTACLES	12
13	RECEPTACLES	1.20							20/1	2.2			20/1						1.00		RECEPTACLES	14
15	RECEPTACLES	1.00							20/1		1.0		20/1								SPARE	16
17	SPARE								20/1			0.8	20/1						0.80		RECEPTACLES	18
19	SPARE								20/1	0.8			20/1						0.80		RECEPTACLES	20
21	SPARE								20/1		0.6		20/1						0.60		RECEPTACLES	22
23	SPARE								20/1			1.0	20/1						1.00		RECEPTACLES	24
25	EH–A				2.50				30/2	3.5			20/1						1.00		RECEPTACLES	26
27	EH–A				2.50				---		3.5		20/1						1.00		RECEPTACLES	28
29	WATER HEATER				1.50				20/2			5.5	50/2				4.00				RANGE	30
31	WATER HEATER				1.50				---	5.5			---				4.00				RANGE	32
33	EXT. LIGHTS	1.00							30/2		1.0		20/1								FM200	34
35	EXT. LIGHTS	1.00							---			1.2	20/1		0.20						TIMECLOCK	36
37	RTU–1			5.40					---	10.8			---				5.40				RTU–2	38
39	RTU–1			5.40					50/3		10.8		50/3				5.40				RTU–2	40
41	RTU–1			5.40					---			10.8	---				5.40				RTU–2	42
	TOTAL kVA	8.1	0.0	0.0	16.2	8.0	0.0	0.0	---	26.8	19.3	22.9	---	0.0	0.2	24.2	0.0	0.0	12.4	0.0	TOTAL kVA	

TOTALS	Lighting:	8.1	X 1.25%=	10.1	1) This circuit breaker to have lock device.
	Receptacles:	12.4	NEC 220.44	11.2	2) Circuit breaker to be "HACR" type.
	Motors:	0.0	NEC 220.18(A)	0.0	3) Provide shunt trip type circuit breaker.
	A/C:	16.2	X 100%=	16.2	4) This shall be a GFI type circuit breaker
	Heating:	32.2	X 100%=	32.2	5) Not Used
	Miscellaneous:	0.2	X 100%=	0.2	6) Not Used
	Kitchen:	0.0	NEC 220.56	0.0	7) Not Used
	TOTAL KVA	69.1		69.9	8) Not used
	TOTAL AMPS	192.0		194.3	9) Not used

Phillips Gradick Engineering | CODE KVA | CODE AMPS

PANELBOARD "SUB–LB" SCHEDULE (UPS BACKUP)

VOLTAGE: 208 120 1 Ph 3 Wire | MAIN: MLO | MOUNTING: SURFACE | REMARKS: Provide copper ground bus
BUS SIZE: 60A AMP. | TOTAL LOAD: 9.0 KVA | FAULT DUTY: SEE RISER

CKT NO	DESCRIPTION	LOAD (Kva) LTG	REC	MTR	A/C	HTG	MISC	KIT	BKR	PHASE A	B	BKR	KIT	MISC	HTG	LOAD (Kva) A/C	MTR	REC	LTG	DESCRIPTION	CKT NO
1	EXISTING CIRCUIT		1.00						20/1	3.0		20/1						1.00		FILE SERVER	2
3	EXISTING CIRCUIT		1.00						20/1		2.0	20/1						1.00		FILE SERVER	4
5	EXISTING CIRCUIT		1.00						20/1	3.0		20/1						1.00		FILE SERVER	6
7	SPARE						0.50		20/1		1.0	20/1	0.50							SPARE	8
9	SPARE						0.50		20/1	1.0		20/1	0.50							SPARE	10
11	SPARE						0.50		20/1		1.0	20/1	0.50							SPARE	12
	TOTAL kVA	0.0	3.0	0.0	0.0	0.0	1.5	0.0	---	5.0	4.0	---	0.0	1.5	0.0	0.0	0.0	3.0	0.0	TOTAL kVA	

TOTALS	Lighting:	0.0	X 1.25%=	0.0	1) This circuit breaker to have lock device.
	Receptacles:	6.0	NEC 220.44	6.0	2) Circuit breaker to be "HACR" type.
	Motors:	0.0	NEC 220.18(A)	0.0	3) Provide shunt trip type circuit breaker.
	A/C:	0.0	X 100%=	0.0	4) This shall be a GFI type circuit breaker
	Heating:	0.0	X 100%=	0.0	5) Not Used
	Miscellaneous:	3.0	X 100%=	3.0	6) Not Used
	Kitchen:	0.0	NEC 220.56	0.0	7) Not Used
	TOTAL KVA	9.0		9.0	8) Not used
	TOTAL AMPS	43.3		43.3	9) Not used

Phillips Engineering Group | CODE KVA | CODE AMPS

MECHANICAL EQUIPMENT CONNECTION LEGEND (1)

ITEM NO.	DESCRIPTION	EQUIPMENT CHARACTERISTIC VOLTS	PH	KW	HP	FLA	CIRCUIT	FEEDER	DISCONNECT SWITCH SIZE	PL	FUSE	FEATURES	REMARKS
1	RTU–1	208	3	----	----	44.8	LD–40,42	3#6,1#10G–1"C	60	3	45A	NEMA–3R	----
2	RTU–2	208	3	----	----	44.8	LD–39,41	3#6,1#10G–1"C	60	3	45A	NEMA–3R	----
3	DSFC–1	208	1	----	----	0.8	LC–4,6	2#12,1#12G–1/2"C	30	2	NF	NEMA–1	----
4	DSHP–1	208	1	----	----	15.0	LC–8,10	2#12,1#12G–1/2"C	30	2	20A	NEMA–3R	----
5	DSFC–1	208	1	----	----	0.8	LC–12,14	2#12,1#12G–1/2"C	30	2	NF	NEMA–1	----
6	DSHP–1	208	1	----	----	15.0	LC–16,18	2#12,1#12G–1/2"C	30	2	20A	NEMA–3R	----
7	EF–A	120	1	----	FRA	----	CKT WITH LIGHTS	2#12,1#12G–1/2"C	---	---	---	MRS	----
8	WH–1	208	1	3.0	----	----	LD–29,31	2#12,1#12G–1/2"C	30	2	NF	NEMA–3R	----
9	EH–A	208	1	5.0	----	----	LD–25,27	2#10,1#10G–1/2"C	---	---	---	INTEGRAL	----
10	----	----	---	----	----	----	---	---	---	---	---	---	----

NOTES FOR THIS SCHEDULE.
(1) IT IS THE CONTRACTOR'S RESPONSIBILITY TO COORDINATE ELECTRICAL WITH MECHANICAL EQUIPMENT REGARDING VOLTAGE AND PHASE.
(2) DISCONNECT PROVIDED INTEGRAL TO UNIT BY DIVISION 15.
(3) MRS SHALL BE NEMA 3R FOR DISCONNECTS LOCATED OUTDOORS.
(4) PROVIDE GFI RECEPTACLE IF NOT INTEGRAL TO UNIT. COORDINATE WITH MECHANICAL CONTRACTOR.
(5) CONTROLLED BY WALL MOUNTED SWITCH. SWITCH SHALL BE A TIMER TYPE WITH A 20 MINUTE MAX "ON" TIME.
(6) SWITCH AND CIRCUIT WITH LIGHTS.
(7) PROVIDE SHUNT TRIP BREAKER
(8) DSFC SHALL BE CONNECTED TO CORRESPONDING DSCU. COORDINATE EXACT REQ. WITH EQUIP. SUPPLIER PRIOR TO ROUGH–IN.
(9) DSCU LOAD INFORMATION INCLUDES DSFC.

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www.ipgarchitects.com

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500 Sugar Mill Road
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Atlanta, GA 30350
Telephone: 770.650.9061
Fax: 770.642.2410
PEG # 208062

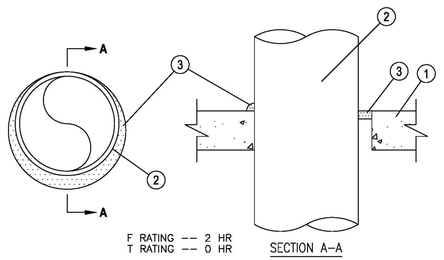
FAYETTE COUNTY
911 CENTER
FAYETTE COUNTY, GEORGIA

GEORGIA REGISTERED PROFESSIONAL ENGINEER
11-31-08

DRAWN	REV.
CHECKED	REV.
JOB #	REV.
DATE OCT. 31, 2008	REV.

FLOOR PLANS
LIGHTS & POWER

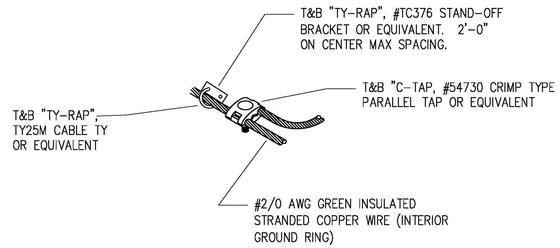
E2.1



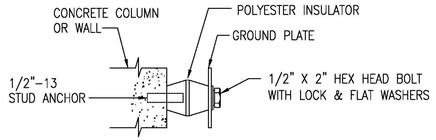
1. FLOOR OR WALL ASSEMBLY -- MIN 2-1/2 IN. THICK REINFORCED LIGHTWEIGHT OR NORMAL WEIGHT (100-150 PCF) CONCRETE. WALL MAY ALSO BE CONSTRUCTED OF ANY UL CLASSIFIED CONCRETE BLOCKS*. MAX DIAM OF OPENING IS 30-7/8 IN.
SEE CONCRETE BLOCKS (CAZT) CATEGORY IN THE FIRE RESISTANCE DIRECTORY FOR NAMES OF MANUFACTURERS.
2. THROUGH-PENETRANT -- ONE METALLIC PIPE OR CONDUIT TO BE INSTALLED EITHER CONCENTRICALLY OR ECCENTRICALLY WITHIN THE FIRESTOP SYSTEM. THE ANNULAR SPACE BETWEEN PIPE OR CONDUIT AND PERIPHERY OF OPENING SHALL BE MIN 0 IN. TO MAX 7/8 IN. PIPE OR CONDUIT TO BE RIGIDLY SUPPORTED ON BOTH SIDES OF FLOOR OR WALL ASSEMBLY. THE FOLLOWING TYPES AND SIZES OF METALLIC PIPES OR CONDUITS MAY BE USED:
A. STEEL PIPE -- NOM 30 IN. DIAM (OR SMALLER) SCHEDULE 10 (OR HEAVIER) STEEL PIPE.
B. IRON PIPE -- NOM 30 IN. DIAM (OR SMALLER) CAST OR DUCTILE IRON PIPE.
C. COPPER PIPE -- NOM 6 IN. DIAM (OR SMALLER) REGULAR (OR HEAVIER) COPPER PIPE.
D. COPPER TUBING -- NOM 6 IN. DIAM (OR SMALLER) TYPE L (OR HEAVIER) COPPER TUBING.
E. CONDUIT -- NOM 6 IN. DIAM (OR SMALLER) STEEL CONDUIT.
F. CONDUIT -- NOM 4 IN. DIAM (OR SMALLER) STEEL ELECTRICAL METALLIC TUBING (EMT).
3. FILL, VOID OR CAVITY MATERIAL* -- SEALANT -- MIN 1/2 IN. THICKNESS OF FILL MATERIAL APPLIED WITHIN THE ANNULUS, FLUSH WITH TOP SURFACE OF FLOOR OR WITH BOTH SURFACES OF WALL. AT THE POINT CONTACT LOCATION BETWEEN PIPE AND CONCRETE, A MIN 1/4 IN. DIAM BEAD OF FILL MATERIAL SHALL BE APPLIED AT THE CONCRETE/PIPE INTERFACE ON THE TOP SURFACE OF FLOOR AND ON BOTH SURFACES OF WALL.
HILTI CONSTRUCTION CHEMICALS, DIV OF HILTI INC -- FS -- ONE SEALANT
*BEARING THE UL CLASSIFICATION MARK

REPRODUCED BY HILTI, INC.
COURTESY OF UNDERWRITERS LABORATORIES, INC.
DECEMBER 04, 2001

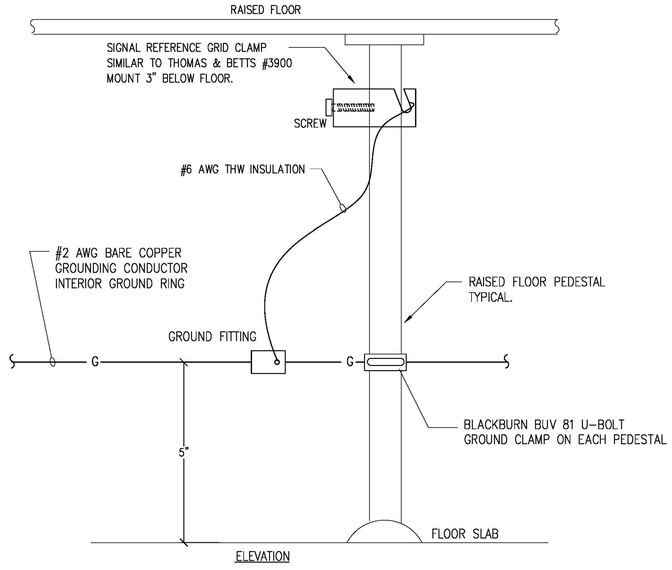
1 E-701 HILTI_FIRESTOP_SYSTEM_C-AJ-1291
SCALE: NONE



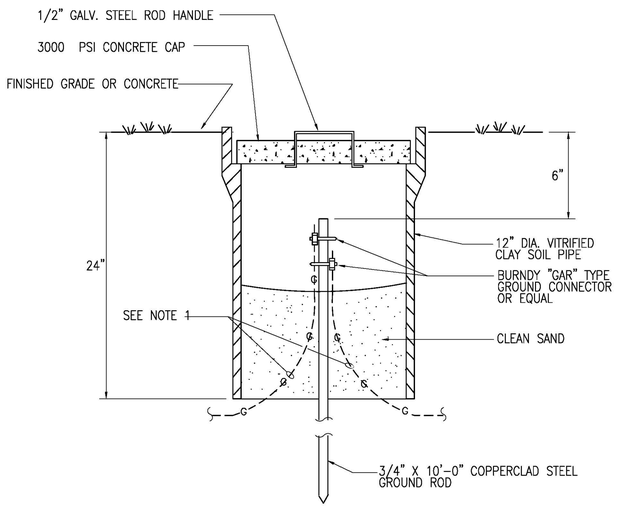
2 E-701 INTERIOR_GROUND_RING_WALL_SUPPORT_DETAIL
SCALE: NONE



4 E-701 SUB-SYSTEM GROUND BUS "SSGB" MOUNTING DETAIL
SCALE:
SYMBOL: SB



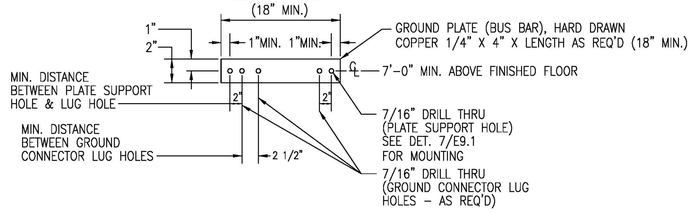
3 E-701 PEDESTAL GROUNDING EOC ROOM 110
SCALE: NTS



6 E-701 DETAIL - GROUND TEST WELL
SCALE: NONE

SYMBOL: ⊕

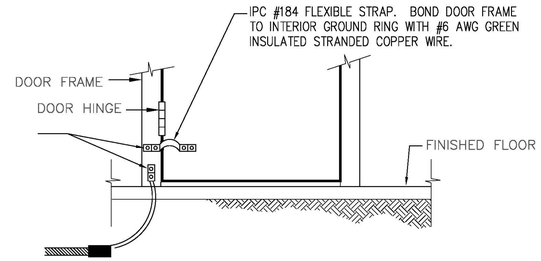
NOTE:
1. FURNISH AND INSTALL #4/0 BARE COPPER GROUND CONDUCTOR.

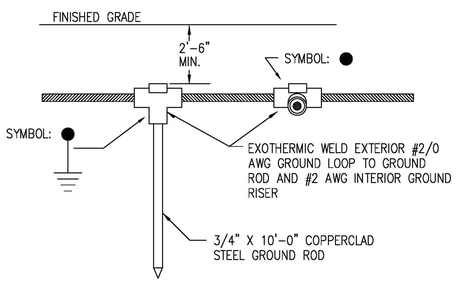


NOTE: BOND THE SHIELD OF SHIELDED CABLE AS REQUIRED.

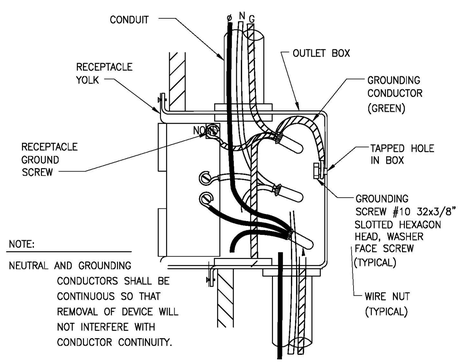
5 E-701 SUB-SYSTEM GROUND BUS "SSGB" DETAIL
SCALE: NONE

SYMBOL: SB



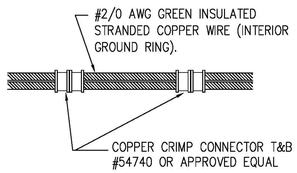


7 E-701 DETAIL - GROUND ROD
SCALE: NONE



8 E-701 RECEPTACLE_BONDING_DETAIL
SCALE:

NOTE: SIMILAR FOR LIGHT SWITCHES



9 E-701 DOOR GROUNDING DETAIL
SCALE: NONE

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Ponte Vedra Beach, Florida 32082
904 285 6565 TELEPHONE

FAYETTE COUNTY EOC

110 Volunteer Way
Fayetteville, Georgia
30215

GEORGIA REGISTERED PROFESSIONAL ENGINEER DENNIS G. CARTER

Print Record
07/26/2013: 80% CD Set for Review
09/23/2013: RELEASE FOR BID
12/02/13 FOR CONSTRUCTION

Revisions

Date 2013-09-23
Job No. 1207007000

Sheet Title
ELECTRICAL DETAILS

Sheet No.
E-701

FOR CONSTRUCTION

FILENAME: \\Server\Projects\13-26 Covalent Fayette EOC\Dwgs\E-701 ELECTRICAL DETAILS.dwg
PAPERSIZE: ----
PENTABLE: ----
PLOTTED BY: CPC10498
PLOTTER: P3P995
PLOTSCALE: 1
PLOT TIME/DATE: Wednesday, November 2

APPENDIX D – COMPANY INFORMATION

RFP #2493-P: Fayette County PSAP and Tower Sites Enhancements

COMPANY

Company Name: _____

Physical Address: _____

_____

Mailing Address (if different): _____

_____

AUTHORIZED REPRESENTATIVE

Signature: _____

Printed or Typed Name: _____

Title: _____

Email Address: _____

Phone Number: _____ FAX Number: _____

PROJECT CONTACT PERSON

Name: _____

Title: _____

Office Number: _____ Cellular Number: _____

APPENDIX E – CONTRACTOR AFFIDAVIT UNDER O.C.G.A. § 13-10-91(B)(1) FORM

The Contractor Affidavit for can be found on the following page.

Remainder of this page intentionally left blank.

Contractor Affidavit under O.C.G.A. § 13-10-91(b)(1)

By executing this affidavit, the undersigned contractor verifies its compliance with O.C.G.A. § 13-10-91, stating affirmatively that the individual, firm or corporation which is engaged in the physical performance of services on behalf of Fayette County, Georgia has registered with, is authorized to use and uses the federal work authorization program commonly known as E-Verify, or any subsequent replacement program, in accordance with the applicable provisions and deadlines established in O.C.G.A. § 13-10-91. Furthermore, the undersigned contractor will continue to use the federal work authorization program throughout the contract period and the undersigned contractor will contract for the physical performance of services in satisfaction of such contract only with subcontractors who present an affidavit to the contractor with the information required by O.C.G.A. § 13-10-91(b). Contractor hereby attests that its federal work authorization user identification number and date of authorization are as follows:

_____
Federal Work Authorization User Identification Number

_____
Date of Authorization

_____
Name of Contractor
2493: PSAP and Tower Sites Enhancements
Name of Project
FAYETTE COUNTY, GEORGIA
Name of Public Employer

I hereby declare under penalty of perjury that the foregoing is true and correct.

Executed on _____, ____, 202__ in (city) _____, (state) _____

_____
Signature of Authorized Officer or Agent

_____
Printed Name and Title of Authorized Officer or Agent

SUBSCRIBED AND SWORN BEFORE ME
ON THIS THE _____ DAY OF _____, 202 ____.

_____
NOTARY PUBLIC

My Commission Expires:

_____

APPENDIX F – NON-COLLUSION AFFIDAVIT FORM

The Non-Collusion Affidavit for can be found on the following page.

Remainder of this page intentionally left blank.

STATEMENT OF NONCOLLUSION

Each Bidder shall complete the following statement in accordance with OCGA 36-91-21(e):

STATE OF_____}
} ss
COUNTY OF_____}

That (s)he is the agent authorized by the Bidder to submit the attached bid. Affiant further states that the Bidder has not been a party to any collusion among Bidders in restraint of freedom of competition by agreement to bid at a fixed price or to refrain from bidding; or with any State, County, or City official or employee as to quantity, quality, or price in the prospective Contract, or any other terms of said prospective Contract; or in any discussions between Bidders and any State, County, or City official concerning exchange of money or other thing of value for special consideration in the letting of a contract.

Affiant further warrants that no person or selling agency has been employed or retained to solicit or secure such contract upon an agreement or understanding for a commission, percentage, brokerage or contingent fee, except bona fide employees or bona fide established commercial or selling agencies maintained by the Contractor for the purpose of securing business.

_____
Name of Contractor

_____
Bidder (Affiant)

Subscribed and sworn to before me this _____ day of _____ , 20 _____

My commission expires: _____

_____ Notary Public

END OF SECTION

APPENDIX G – COMPLIANCE MATRIX

Respondents shall only type an uppercase or lowercase "X" (X or x) when identifying their compliance level. Placing an "X" in the Comply box means the Respondent complies with each and every subsection of that level. If even one subsection is not met, the Respondent much select another compliance level.	**Compliance Level Met**				
	Comply	**Comply (w) Clarification**	**Exception**	**N/A**	
	0	0	0	0	

RFP Section	**Description**	**Compliance Level Met**				
		Comply	**Comply (w) Clarification**	**Exception**	**N/A**	**Respondent's Clarifications and Comments**
1 — Scope of Work						
1.1	Project Overview					
1.2	Scope of Work – General					
1.3	Scope of Work – Detailed by Task					
1.3.1	Phase 1 – PSAP Enhancements					
1.3.2	Phase 2 – Tower Sites Enhancements					
1.3.1	Standards					
1.3.2	Multiple References					
2 — County Terms and Conditions						
3 — Instructions to Respondents						
3.1	Firm Qualifications					
3.2	Pre-proposal Conference					
3.3	RFP Questions					
3.4	Submittal of Responses					

RFP Section	Description	Compliance Level Met				Respondent's Clarifications and Comments
		Comply	Comply (w) Clarification	Exception	N/A	
3.4.1	Proposal Response Requirements					
3.4.2	Proposal Submittal Deadline					
3.4.3	Proposal Evaluation Plan					
3.5	Respondent Responsibilities					
3.5.1	Site Coordination					
3.5.2	Warranties					
3.5.3	Delays					
3.5.4	Submittals					
3.5.5	Completion of Installations					
3.5.6	Final Testing and Acceptance					
3.5.7	Completion Date					
3.5.8	Liquidated Damages					
3.6	Accuracy of Information					
4 — Site Development						
4.1	Site					
4.2	Existing Structures and Utilities					
4.3	Removal of Existing Infrastructure and Equipment					
4.4	Water and Drainage					
4.5	Site Preparations					
4.6	Utilities					
4.7	Security Fencing					
4.8	Security Fence Gates					
4.9	Gate Operator					
4.10	Security Fence Signage Requirements					

RFP Section	Description	Compliance Level Met				
		Comply	Comply (w) Clarification	Exception	N/A	Respondent's Clarifications and Comments
4.11	Security Fence Grounding					
4.12	Site Finishing					
4.13	Disposal					
4.14	Restoration					
4.15	Area Perimeter and Signage Requirements					
5 — Power Distribution and Utilities						
5.1	Manual Transfer Switch					
5.2	Old UPS System					
6 — Grounding						
6.1	General					
6.2	Additional Concerns					
6.3	Existing Grounding Components					
6.4	Ground Rod Installation					
6.5	Exterior Ground Ring System					
6.6	Exterior Equipment Grounding					
6.7	Fence Grounding					
6.8	Tower Grounding					
6.9	Ice Bridge					
6.10	Exterior Ground Bus Bar Installation					
6.11	Tower Ground Bus Bar Installation					
6.12	Utility Service Entrance Grounding					
6.13	Electrical Service Grounding					
6.14	Telco Service Grounding					
6.15	Gas Utility Grounding					

RFP Section	Description	Compliance Level Met				
		Comply	Comply (w) Clarification	Exception	N/A	Respondent's Clarifications and Comments
6.16	Internal Bus for Shelter Grounding					
6.17	Interior Perimeter Bonding Bus					
6.18	Ground Bus Conductors					
6.19	Primary Bonding Bus					
6.20	Secondary Bonding Bus					
6.21	Interior Shelter Ancillary Equipment Grounding					
6.22	Doors and Frames					
6.23	Electrical Panels and Cabinets					
6.24	Cable Ladder Tray Grounding					
6.25	Electrical Surge Protection					
7 — Communications Tower						
7.1	Intent					
7.2	Safety					
7.3	Marking and Lighting					
7.4	Tower Grounding					
7.5	Tower Lightning Protection System					
7.6	Ice Bridge					
8 — Shelter						
8.1	Intent					
8.2	Lighting					
8.3	Floor					
8.4	Doors					
8.5	Roof and Doorframe					
8.6	Locks, Finish and Openings					

RFP Section	Description	Compliance Level Met				Respondent's Clarifications and Comments
		Comply	Comply (w) Clarification	Exception	N/A	
8.7	Cable Trays					
8.8	Safety Equipment					
8.9	Site Preparation					
8.10	Antenna Cable Entry Ports					
Appendix B	**Original Building Grounding Drawings**					
Appendix C	**911 and EOC Expansion Grounding Drawings**					
Appendix D	**Company Information Page Form**					
Appendix E	**Contractors Affidavit under O.C.G.A. § 13-10-91(b)(1) Form**					
Appendix F	**Non-Collusion Affidavit Form**					
Appendix G	**Compliance Matrix**					
Appendix H	**Proposal Pricing Summary**					

APPENDIX H – PROPOSAL PRICING SUMMARY FORM

NOTE: The table below provides a format for the total pricing for the individual tasks in the SOW detailed in Section 1.3.1 and 1.3.2.

Task	Task Description	Materials Cost	Labor Cost	Total Cost
Phase 1 PSAP				
1.3.1.1	Rooftop lightning protection system (LPS)			
1.3.1.2	Existing building ground ring			
1.3.1.3	Verify all building ground electrodes			
1.3.1.4	Install a proper building grounding bonding backbone system			
1.3.1.5	Install proper surge protection devices (SPDs)			
1.3.1.6	MDF racks and equipment			
1.3.1.7	Removal of electrical plugs			
1.3.1.8	Operator station metallic equipment bonding			
1.3.1.9	SBBs located in the EOC			
1.3.1.10	Old abandoned/unused cabling removed			
1.3.1.11	Separation of cable groups			
1.3.1.12	Install a proper entry port			
1.3.1.13	MDF carpet			
Phase 2 Tower Sites				
1.3.2.1	Common site exterior enhancements			
1.3.2.2	Two County-owned site enhancements			
1.3.2.3	County-owned shelter enhancements			
1.3.2.4	Interior of existing shelter R56 upgrades			
1.3.2.5	Installation of mobile generator jack and MTS			
1.3.2.6	Installation of R56-compliant AC SPDs			

1.3.2.7	Installation of telecom SPDs and grounding			
1.3.2.8	Installation of alarm SPDs and grounding			
1.3.2.9	Removal and disposal of shelter unused UPS			
			Total	