Watauga County

Request for Proposal (RFP)
Powder Horn Tower for the Watauga County Public Safety Simulcast System

Due Date: October 10th, 2025

To: Will Holt, Emergency Services Director
814 West King Street
Boone, NC 28607
828-264-4235 (P)
Email – Will.Holt@watgov.org

PURPOSE

The County of Watauga is accepting sealed proposals from qualified individuals or firms for the provision of the tower for the Powder Horn site. The tower work shall be compliant with all federal, state, and local requirements as documented in the individual bid invitations and supporting documentation along with any other applicable building code requirements.

SCOPE

Watauga County is constructing a public safety simulcast radio system with a combination of new and existing towers. Current towers must be brought up to designed load capacity in accordance with the requirements of the tower owner.

The successful bidder shall provide all management, supervision, personnel, engineering, equipment, tools, materials, subcontractors, transportation, permits and licensing necessary to meet the requirements set forth in the individual bid invitations for each site.

Architects must be properly licensed and registered as required by Chapter 83A of the North Carolina General Statutes. Engineering and Land Surveying consultants must be properly licensed and registered as required by Chapter 89C of the North Carolina General Statutes.

PROPOSAL REQUIREMENTS

All questions related to this RFP shall be directed to:

Marty Randall, 10-18 Consulting
828-527-2416
Marty.Randall@1018consulting.com

Attachment A includes all pertinent construction documents. In addition, the County is requiring a mandatory site walk on September 30th at 11:00am meeting at the Emergency Services Department located at:

184 Hodges Gap Rd
Suite D
Boone, NC 28607

Proposal Content

The written proposal should provide background information about the company, its employees, and its experience with related projects and clients. It should cover the experience of the firm as well as any consultants on the proposed team. For the purposes of the RFP, the term "company" shall refer to the prime respondent of this RFP or, in other words, the company with whom Watauga County will contract. The term "consultant" shall refer to all consultants which the

prime respondent will include on the project team. The proposal shall clearly delineate any experience, background, etc. between the prime "company" and "consultants."

Specifically, the RFP should address the following information. Firms may submit their standard qualification package supplemented by a cover letter or attachments as necessary to comply with this request.

Proposers shall possess all permits, licenses and professional credentials necessary to supply product and perform services as specified under this RFP. Minimum qualifications of the system designer and lead acceptance test personnel shall include both of the following:

Firm's Submission

The firm's submission shall follow the guidance in each bid invitation. The County reserves the right to reject any and all proposals, and to terminate the Request for Proposals process at any time.

SELECTION CRITERIA

Selection Process:

The Emergency Services Director and the County's consultant will serve as the selection committee for all applicants deemed eligible and qualified, seeking the advice and input of such other local officials as they may deem appropriate. A recommendation will be made to the Watauga County Board of Commissioners for its approval.

Evaluation Criteria:

By way of example, but not limitation, the following considerations will be utilized during the selection process from the submitted and eligible proposals:

- The thoroughness of the proposal regarding the tasks addressed in the Scope section of the RFP.
- The firm's experience in designing public safety towers and tower modifications
- The successful experience of the staff proposed to be assigned to this project to perform the type of work required.
- The firm's financial ability to undertake the work and assume liability for the project.
- The firm's proven ability to complete tasks on time.
- Project approach and methodology.
- Overall performance on past projects, as evidenced by previous contracts.
- Overall consideration of design elements.

Watauga County reserves the right, at its sole discretion, to accept a response that does not satisfy all requirements but which, in the County's sole judgment, sufficiently demonstrates the ability to produce, deliver, design, permit and construct a tower or tower modification to satisfy the major requirements set forth in this RFP. The County reserves the right to interview any or all respondents to this RFP, or to ask for additional information or clarifications. By completing

and submitting to Watauga County's RFP, the firm allows the County to call any person, business, group or organization that may have information to determine the firm's ability to complete the project as presented.

The County expects to complete its evaluation process to select a qualified partner, but reserves the right to change key dates and actions as the need arises.

PROPOSAL AND SUBMISSION DEADLINES

Project schedule milestones and dates are as follows:

Milestone	*Date*
Request for Proposals Published	September 17, 2025
Deadline for RFP Questions	September 26, 2025
Mandatory Site Walk	September 30, 2025
RFP Proposals Due Date	October 10, 2025
Board of Commissioners Hire Firm	October 21, 2025

 BIDDER: _____

WATAUGA COUNTY, NC BID #	INVITATION FOR BIDS –Powder Horn
	Bids will be publicly opened: October 10th at 2:00pm
	Questions Due by September 26th
Refer ALL Inquiries to: Marty Randall Telephone No. 828-527-2416	Commodity: Install New Tower at 340 Deer Run Road, Stony Fork NC 28607. Coordinates N 36 10 31.78, W 81 30 51.21
E-Mail: marty.randall@1018consulting.com	Using Agency Name: Watauga County Emergency Services
(See page 2 for mailing instructions.)	

NOTICE TO BIDDERS

Sealed bids, subject to the conditions made a part hereof, will be received at **814 W. King Street, Boone NC 28607** **until 2:00 PM** on the day of opening and then opened, for furnishing and delivering the commodity as described herein. Refer to page 2 for proper mailing instructions.

Bids submitted via facsimile (FAX) machine in response to this Invitation for Bids will not be acceptable. Bids are subject to rejection unless submitted on this form.

EXECUTION

In compliance with this Invitation for Bids, and subject to all the conditions herein, the undersigned offers and agrees to furnish and deliver any or all items upon which prices are bid, at the prices set opposite each item within the time specified herein. By executing this bid, I certify that this bid is submitted competitively and without collusion (G.S. 143-54).

Failure to execute/sign bid prior to submittal shall render bid invalid.

Late bids are not acceptable.

BIDDER:		FEDERAL ID OR SOCIAL SECURITY NO.	
STREET ADDRESS:		P.O. BOX:	ZIP:
CITY & STATE & ZIP:		TELEPHONE NUMBER:	TOLL FREE TEL. NO (800)
PRINCIPAL PLACE OF BUSINESS ADDRESS IF DIFFERENT FROM ABOVE (SEE INSTRUCTIONS TO BIDDERS ITEM #21):			
TYPE OR PRINT NAME & TITLE OF PERSON SIGNING:		FAX NUMBER:	
AUTHORIZED SIGNATURE:	DATE:	E-MAIL:	

Offer valid for 120 days from date of bid opening unless otherwise stated here: ____ days

ACCEPTANCE OF BID

If any or all parts of this bid are accepted by Watauga County, NC, an authorized representative of Watauga County, NC shall affix their signature hereto and this document and the provisions of the Instructions to Bidders, special terms and conditions specific to this Invitation for Bids, the specifications, and the North Carolina General Contract Terms and Conditions shall then constitute the written agreement between the parties. A copy of this acceptance will be forwarded to the successful bidder(s).

FOR Watauga County, NC USE ONLY

Offer accepted and contract awarded this ____ day of _____, 20____, as indicated on attached certification,

by _____ (Authorized representative of Watauga County, NC).

In an effort to support the sustainability efforts of Watauga County, North Carolina we solicit your cooperation in this effort.

It is desirable that all responses meet the following requirements:

- All copies should be printed **double sided**.
- All submittals and copies should be printed on **recycled paper with a minimum post-consumer content of 30%** and indicate this information accordingly on the response.
- Unless absolutely necessary, all bids and copies should **minimize or eliminate use of non-recyclable or non re-usable materials** such as plastic report covers, plastic dividers, vinyl sleeves, and GBC binding. Three-ringed binders, glued materials, paper clips, and staples are acceptable.
- Materials should be submitted in a format which allows for **easy removal and recycling** of paper materials.

MAILING INSTRUCTIONS: Send two fully executed bid documents. Address envelope and insert bid name as shown below. It is the responsibility of the bidder to have the bid in this office by the specified time and date of opening.

DELIVERED BY US POSTAL SERVICE	DELIVERED BY ANY OTHER MEANS SEND SUCH AS FEDX, UPS, ETC. FOR NEXT DAY
814 W. King Street Boone, NC 28607	814 W. King Street Boone, NC 28607

Watauga County, NC Tower Construction Project

Boone, North Carolina

Scope of Work – Watauga County, NC proposes to install a communications tower site per the following specifications at a site in Watauga County, North Carolina. All work shall comply with applicable North Carolina Building Codes and ANSI/TIA/EIA Standards. If the following Specification calls for a condition that is greater than the TIA/EIA Standards or North Carolina Building Codes, use the specifications shown in this document. All work shall be coordinated with Watauga County, NC. The tower and all appurtenances shall be installed and affixed with the highest quality of workmanship. The selected Contractor will advise Watauga County, NC's Contracting Officer and Marty Randall (10-18 Consulting 828-527-2416 marty.randall@1018consulting.com) two weeks in advance of the date the work will start. The contractor will provide Marty Randall weekly project progress reports and immediately report any abnormal conditions encountered during construction.

As a minimum, the Tower and Foundation shall be designed to the requirements of ANSI/TIA/EIA-222-G, including released addendums. Design with Geotechnical Report provided, the tower manufacturer shall ensure the proper development of anchor roads and anchorage materials.

COMPLETION DEADLINE: Work should be **completed within 90 days of receipt of materials, not counting bad weather days.**

If the above time is not possible, state completion time in days from contract issue. _____ Days

Understand all requirements in the Scope of Work **Yes_____** **No_____**

CONTRACTING OFFICER

This project will be under contract with Watauga County, NC and will be under the direction of the Contracting Officer. The Contracting Officer will be:

Will Holt
Watauga, NC
Office:828-264-4235
Cell: 828-434-3491

NOTE: Any questions prior to issue of a contract should be directed to marty.randall@1018consulting.com as stated on page one of this document.

Understand the Contact information as listed above **Yes_____** **No_____**

CONTRACTOR REQUIREMENTS

The Contractor shall submit the following items with their bid:

1. A drawing of the tower profile sealed by a **North Carolina Registered Engineer**.
2. A list of all antennas and appurtenances that were considered in the tower and foundation designs.
3. Tower foundation design drawings, with a complete set of **DESIGN CALCULATIONS** showing the reactions of the tower on the foundation, sealed by a **North Carolina Registered Engineer**.
4. The Contractor awarded this project must submit a set of final erection drawings, sealed by a **North Carolina Registered Engineer** to the Contracting Officer and Marty Randall for written approval before starting the project. **If these drawings are submitted on paper they must also be accompanied by digital copies. We must have these drawings in digital format.**
5. The proposal from the tower manufacturer must specifically state that all pricing will be honored for the duration of this contract.
6. Contractor must supply a rigging plan for tower erection. If the contractor intends to use a gin pole for tower erection, then they must provide a copy of their gin pole certification and load charts. All gin pole certifications and load charts must be current, must be sealed by a qualified engineer licensed in the state of North Carolina, and must state they are in compliance with ANSI/TIA-322. All rigging plans must be in compliance with ANSI/TIA-322 and ANSI/ASSE A10.48 and completed by a qualified engineer licensed in the state of North Carolina.
7. Each bid must be accompanied by a bid bond, for an amount equal to 5% of the total base bid, at the time the bid is filed with the County. No bid shall be considered if the bond is not received simultaneously with the bid. Bid bonds may be submitted in any form allowed under the laws of North Carolina including cash, cashier's check, certified check or surety issued bid bond.
8. Performance and payment bonds are required once bid is awarded.

Bids and tower designs that are submitted for opening will be submitted by Watauga County, NC to a Third-party **North Carolina Registered Engineer** for review of design accuracy and compliance before an award can be made. This is the reason for requiring the above-listed items to be sent with the bid response. Watauga County reserves the right to accept or reject any or all bids and to waive minor irregularities.

Two complete copies of your bid response must be submitted with your package. Failure to submit the above-listed items will forfeit your bid.

Understand Contractor Requirements Process **Yes_____** **No_____**

BIDDING INSTRUCTIONS

Contractors bidding on this project must fully acquaint themselves with the following specifications, any attachments to this Invitation for Bid and conditions at the Designated Construction Site (DCS). The contractor is required to visit the DCS to fully understand any potential obstacles that would prevent speedy completion of this project. Any questions concerning any portion of the work or interpretation of documents should be referred to Marty Randall and the Contracting Officer.

Bids must be submitted on this form and must reach Watauga County, NC **by 2:00pm** on the date specified on Page one,

above. All parts of this form must be completed for consideration. **Send two copies of this bid document.**

Understand Bidding Instructions **Yes_____** **No_____**

PRE-AWARD ENGINEERING REVIEW

Bids and tower designs submitted for this IFB will be submitted by Watauga County, NC to a third-party engineering firm for design accuracy and compliance with all stipulated standards and building codes before an award can be made. A low responsible bid failing this engineering review will be invalid and the bid will be awarded to the next lowest responsible bidder that meets the Engineering Review requirements.

Understand Pre-Award Engineering Review Process **Yes_____** **No_____**

PROJECT DESCRIPTION

This project shall consist of the furnishing and installation of a communications tower, per the following and any attached specifications.

Understand Project Description **Yes_____** **No_____**

COORDINATION OF THE WORK

The Tower Contractor shall notify Marty Randall and the Contracting Officer to coordinate a construction start date at least two weeks prior to the desired construction time. Contractor must contact Matt Fields ***(matt.fields@ets-pllc.com 919-427-6609)*** at least 2 weeks prior to construction to coordinate the staking of the tower location. Failure to give advance notice may result in delay of the starting date. Failure to give advanced notice may result in the Contractor's crew being on site and unable to perform and work.

Understand the Coordination Requirement **Yes_____** **No_____**

DESIGN CAPACITY REQUIREMENT

The tower must be designed so that when installed with **all loading** as shown in the ANTENNA LOADING REQUIREMENTS TABLE that follows, the tower **superstructure** and **substructure** **shall NOT exceed 95% of its capacity**. If, upon evaluation by a third party, **Engineered Tower Solutions**, the design computes to be at a greater stress level than specified, the bid will not be accepted. Each bidder must provide as part of the bid submission package **design calculations** verifying that this Design Capacity Requirement is met. This tower shall be designed for a 0-ft fall radius per the contract documents. A Fall Zone letter must be included from the tower manufacturer stamped by a NC licensed engineer. Additionally, each bidder shall record either the **Rated Capacity** and/or the **Percent of Stressed Value** in the space provided below.

Rated Capacity _____ **Percent of Stressed Value** _____

Understand the Design Capacity Requirement. **Yes_____** **No_____**

PERMITS

Permits are required for this tower installation. The contractor is responsible for obtaining permits and scheduling inspections with the permitting office. The County is not exempt from permits. Contact Watauga County for permitting information.

Understand the Permit Process **Yes_____** **No_____**

FOUNDATION INSPECTION MANAGEMENT

Prior to Construction Start, the Tower Contractor will obtain the services of third party **Engineered Tower Solutions *("ETS")*** to oversee, inspect, and document each phase of the foundation construction to ensure compliance with the Tower Manufacturer's Tower Design Drawings and Specifications. ***(Watauga County, NC has a contract with ETS to perform these inspections with no more than two trips being made by ETS. Fees will be paid by Watauga County, NC for all initial inspections. Additional inspections due to non-conformity with contract documents are at the contractor's expense. For scheduling, email Matt Fields: (matt.fields@ets-pllc.com 919-427-6609)*** prior to Construction Start, all materials to be used in the construction of the foundation shall be inspected to ensure compliance with the Tower Manufacturer's Tower Design Drawings and Specifications. The Tower Contractor shall immediately report to Marty Randall and the Contracting Officer any deviations found during the on-site pre-construction start inspection and present a correction plan. The Tower Contractor shall provide to Marty Randall and the Contracting Officer, a written report, sealed by **Engineered Tower Solutions** that completely documents all results of the foundation oversight and inspection process,

including a comprehensive set of digital photographs

Understand the Inspections Management Process **Yes_____** **No_____**

CONCRETE: COMPLIANCE WITH MIX SPECIFICATIONS & STRENGTH TESTING

The Tower Contractor will obtain the services of the third party, **Engineered Tower Solutions *("ETS")***, to ensure proper oversight of the concrete pouring process and the inspection and recording of each concrete delivery ticket for compliance with the Tower Manufacturer's Tower Design Drawings and Specifications. The Tower Contractor shall ensure the third party, (***ETS)***, takes all steps to ensure competent monitoring of the concrete sampling process used during the concrete pouring process, and to ensure accurate recording of the time of day each sample was taken. ***(Watauga County, NC has a contract with ETS to perform the concrete testing. Fees will be paid by Watauga County, NC. This includes sampling, breaks, and reports. For scheduling, email Matt Fields: (matt.fields@ets-pllc.com 919-427-6609)).*** The Tower Contractor shall provide to Marty Randall and the Contracting Officer, a written report, sealed by (***ETS)*** that completely documents the compliance with mix specifications, and a detailed presentation of the concrete testing, to include a comprehensive set of digital photographs.

Understand Concrete Compliance and Testing Process **Yes_____** **No_____**

TOWER GROUND INSPECTION

The Tower Ground inspection will be conducted by 10-18 Consulting. Mr. Marty Randall, marty.randall@1018consulting.com Cell 828-527-2416, must be contacted at least 72 hours prior to requiring this inspection.

Understand Grounding Inspection Process **Yes_____** **No_____**

EXPEDITE CONSTRUCTION

It is expected that the contractor will expedite completion of the project, taking full advantage of the weather and other favorable working conditions.

Understand Post Construction Inspection Process **Yes_____** **No_____**

POST CONSTRUCTION INSPECTION (PCI)

Upon completion of the tower the Tower Contractor will obtain the services of the third party **Engineered Tower Solutions *("ETS")*** to conduct the Post Construction Inspection ***("PCI")***, and to generate a complete report documenting the findings of the Inspection. ***(Watauga County, NC has a contract to provide this service. Fees will be paid by Watauga County, NC for all initial inspections. Additional inspections due to non-conformity with contract documents are at the contractor's expense. For scheduling, email Matt Fields: (matt.fields@ets-pllc.com 919-427-6609)).*** In the event any deviation from the Tower Manufacturer's Design Drawings and Specifications is found during, or as a result of the PCI, the Tower Contractor shall provide to the Contracting Officer, a **red-lined** copy of each Drawing and/or Specification that clearly documents each deviation along with Engineer of Record (EOR) approval if applicable.

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Understand Final Inspection Process **Yes_____** **No_____**

CONTRACTOR LICENSES

The Tower Contractor, and/or the subcontractor designated by the Tower Contractor, performing work on this tower, must be licensed to operate a contracting business in the State of North Carolina as required under NCGS 87.

NC General Contractors License Number_____

The Contractor installing the tower must comply with the North Carolina Department of Labor's Tower Climbing rules that were adopted in February 2005 and any following revisions.

Understand Requirements for Contractor Licenses **Yes_____** **No_____**

CONSTRUCTION & MATERIALS

The tower shall be constructed of **hot-dipped** galvanized steel with solid round, or angular members. The tower may be either solid weld or knockdown construction. All components of the tower including but not limited to bolts, nuts, mounting brackets, torque arms, etc. shall, at a minimum, be **hot-dipped** galvanized. The tower shall conform, at a minimum, to the North Carolina Building Code Chart 1606, Basic Wind Speed and any county/jurisdictional specified requirements.

The Tower must have climbing facilities on each tower leg for installation and maintenance. **Tower Contractor must provide and install a safety cable at the climbing ladder.**

Understand Construction and Materials **Yes_____** **No_____**

EROSION CONTROL

The Contractor will be responsible for Erosion Control practices and any fines levied if not practiced.

Understand Erosion Control Methods and responsibilities **Yes_____** **No_____**

STRUCTURE SPECIFICATIONS TABLE

Please enter Yes or No that you meet the specification in the Right-hand column

Item	Description	Comply Yes or No
1	Location is 340 Deer Run Road, Stony Fork NC 28607 Latitude N **36° 10' 31.78" North** Longitude W 81° 30' 51.21"	
2	Tower is to be a self-supporting structure.	
3	Tower Height is to be **176-ft AGL with a 0-ft Fall Zone.**	
4	Tower will be positioned on the DCS as indicated in the attached Construction Drawings.	
5	The Tower Structure shall utilize solid round or angle structural steel members. No other materials or shapes will be given consideration. Note all members must be hot dipped galvanized to prevent corrosion.	
6	All structural bolts must meet the ASTM A325 or A490 Specification.	
7	The Tower Contractor will provide all materials to Complete the Tower & Foundation Installation.	
8	The Tower Contractor will build the Foundation and erect the Tower.	
9	The Tower Contractor will provide a detailed set of foundation drawings (sealed by a North Carolina Registered Engineer) showing all details including all rebar sizes and quantities, and concrete volumes. The Tower Contractor shall install the tower foundation. The Tower Contractor may construct the foundation using the most cost-effective method. The type of foundation presented in this Bid shall be designed and constructed in accordance with the Geotechnical Parameters specified in the Subsurface Exploration Report provided by Engineered Tower Solutions. That document is an attachment to this IFB.	
10	Any damage to the access road, thru the housing development, from construction of this tower must be repaired by the contractor so to restore road to the original condition. If there are repairs required to the existing access road in order to construct the tower those repairs must be included in the bid. The contractor is responsible for tower construction. Civil work will be completed by Civil contractor.	
11	All back-fill for grading tower base must be compacted and tamped. This would be 8 inches of fill and adding moisture if need between each tamping.	
12	As a minimum this Tower and Foundation shall be designed to the requirements of ANSI/TIA-222G, including released addendums.	
13	One hot-dipped galvanized expanded metal Vertical Cable/Wave-Guide Ice-Bridge, capable of mounting twenty (20) lines. Waveguide bridge shall be installed between the tower and shelter per the design drawings. The width of the Horizontal Cable/Wave-Guide Ice-Bridge shall be installed by the civil contractor.	
14	The Tower shall have a safety fall protection system incorporating a 3/8" stainless steel cable meeting OSHA/ANSI specifications installed the full height of the structure on one tower leg with full height step pegs. Additionally, step pegs are required on the other two legs to the height of the mid markers.	
15	The Tower Contractor shall install one (1) #2/0 AWG bare tinned copper conductor between the base of each tower leg and a 10-ft ground rod at each tower leg. The top of the ground rod must be at least 3-ft below finished grade. Each of these #2/0 AWG bare tinned copper conductors shall be Exothermically Bonded to the ground rod, tower leg, and tower halo ring. Grounding must be in compliance with Motorola R56 specifications and standards **NOTE: All grounding shall conform to construction drawings.** **NOTE: A representative of Watauga County, NC shall inspect the connections to the ground rods prior to filling the trench. This inspection does not eliminate the requirement for installing**	

	inspection tubes. The Tower Contractor shall notify the Contracting Officer at least forty-eight (48) hours prior to schedule and conduct this inspection.	
17	The Civil Contractor is responsible for providing and installing a temporary power pole on the site for use during construction. Civil contractor is responsible for removing the temporary power pole once permanent power has been installed at the DCS.	
18	Tower Contractor is required to submit best and final price for this effort. Change orders will only be considered for circumstances or unusual situations not included in the contract documents. Any change orders must be approved in writing before work is started. Customer understands any additional work requested may incur additional costs outside of this contract pricing.	
19	The Tower Contractor shall provide Tinned Copper Ground Bars (TCGBs) capable of attaching a minimum of twenty (20) ground kits. Tower must include a 6' lightning rod at the top of structure. **NOTE: The TCGB shall be mechanically attached directly to the Tower Structure with Stainless Steel Hardware using pre-drilled holes in the Tower Structural Steel provided expressly for this purpose.** The TCGBs shall be installed at approximately ten 10-ft AGL at the base of the cable ladder. The Tower Contractor shall install a sufficient length of #2/0 AWG bare tinned copper conductor between this TCGB and the tower halo ring closest to the cable ladder. A second set of TCGB's to be install at the approx. 150 ft level with the TCGB's bonded to the tower structure. **Exothermic Bonding** shall be used to provide the electrical connections of the #2/0 AWG bare tinned copper conductor to the TCGB and the ground ring.	
20	The Tower Contractor shall provide and install antenna mounts in accordance with the included **Antenna Mount Schedule (AMS)** and **Antenna Loading Requirements**.	
21	The location of the site is as shown on the attached drawings.	
22	Excess soil created from foundation installation must be removed from the site. If soil is suitable, it may be used for backfilling and tower foundation leveling.	
23	**The Tower Contractor shall remove all tower construction materials and debris from the site.**	
24	**Bidding contractors must attend a mandatory pre-bid site walk on September 30th at 11:00AM.**	

ANTENNA MOUNT SCHEDULE (AMS)

Contractor to provide and install the following Antenna Mounts on the Tower

Item #	Antenna Mount Description	Comply Yes or No
1	Two 6-ft standoff sidearm mounts with stabilizer at 155-ft	
2	Two 6-ft standoff sidearm mounts with stabilizer at 135-ft	
3	One 6-ft standoff sidearm mounts with stabilizer at 155'-ft	
4	One Microwave 4.5" Pipe Mount at 110-ft. with ice shield	

6' standoff mounts must be rated to accommodate listed antennas in Antenna Mounting table. If an alternate mount is used specifications must be provided by the manufacturer.

ANTENNA LOADING REQUIREMENTS:

Refer to attached TEP Tower Procurement Document for tower specifics, antennas and required loading.

TOWER COST BREAKDOWN:

1. Total cost of tower materials only $_____

2. Total cost of all other services, including: $_____
   a. **All shipping**
   b. Complete Installation
   c. Engineering Services
   d. All Inspections

3. Total cost to construct the tower[1]. $_____
   (Sum of Item-1 and Item-2, above)

4. Price per cubic yard for rock removal $_____

LIST OF ATTACHMENTS

1. Subsurface Exploration Report, prepared by **Engineered Tower Solutions.**
2. Construction Drawings, prepared by **Engineered Tower Solutions.**
3. Bid Document
4. Antenna Datasheets
5. Addendum #1

Call the Contracting Officer prior to the opening date if you did not receive these attachments.

_____

Addendum 1 Powder Horn Tower Bid

1) Antennas listed on the Tower Procurement as DB220 should be specified as DB224 for tower loading purposes.
2) Tower foundation type is optional per the bid document; pad and pier is recommended due to site topography. Access with a drilling equipment will be difficult at best.

Site Name:	Powder Horn Mountain
Site Address:	340 Deer Run Road, Stony Fork, NC 28607
Latitude:	36.1754950 °
Longitude:	-81.5142249 °
Structure Type:	Proposed 176.0-ft Self Support Tower
Contact Information:	Contact the owner with questions regarding the content of this Document. All questions or concerns shall be directed to the contact stipulated in the Bid Document.
Design Capacity:	The tower shall be designed so that, once installed with all loading as shown in Table 1 - Design Antenna/Coax Loading, the tower superstructure and substructure shall **NOT exceed 95% of its capacity**. If, upon evaluation, the design computes to be at a greater stress level than specified the bid will not be accepted. All bidders must provide design calculations verifying that this Design Capacity Requirement is met; see "Deliverables" for details.
Materials:	Tower structures shall utilize structural steel round or polygonal poles only. No other materials or shapes shall be given consideration. Structural bolts must meet the ASTM A325 specification, or equivalent if approved by the design engineer of record.
Design Fall Radius:	☐ No Fall Radius Required ☒ Fall Radius Required from Centerline of Tower: 0-ft
Standard:	☒ As a minimum, all towers shall be designed to the requirements of ANSI/TIA-222-G, including released addendums
Design Wind Speed:	☒ 115 mph ultimate 3-second gust wind speed (converted to an equivalent 89 mph nominal 3-second gust wind speed per Section 1609.3.1 for use with TIA-222-G) as required by the 2018 North Carolina State Building Code (2015 IBC) and ASCE 7-10.
Structure Class:	☐ Structure Class I – Low Hazard ☐ Structure Class II – Significant Hazard (Default) ☒ Structure Class III – Substantial Hazard
Risk Category:	☐ Risk Category I – Low Hazard ☐ Risk Category II – Moderate Hazard (Default) ☐ Risk Category III – Substantial Hazard ☒ Risk Category IV – Essential Hazard (Essential Communications)
Topographic Category:	☒ Category I – No abrupt changes in general topography (Topographic effects are already considered in the prescribed windspeed above per the 2018 NCBC Chapter 3). ☐ Category II – Structures located at or near the crest of an escarpment ☐ Category III – Structures located in the upper half of a hill ☐ Category IV – Structures located in the upper half of a ridge ☐ Category V – Wind speed up criteria based on a site-specific investigation (see attached)
Exposure Category:	☐ Exposure B – Urban and Suburban Areas ☒ Exposure C – Open Terrain where Exposure B or D does not apply. ☐ Exposure D – Flat, Unobstructed Shorelines
Design Ice Loading:	☐ ANSI/TIA-222-H: x.xx inch escalating with a xx mph 3 second gust wind speed ☒ ANSI/TIA-222-G: 0.75 inch escalating with a 30 mph 3 second gust wind speed ☐ ANSI/TIA/EIA-222-F: x.xx inch escalating with an xx mph fastest mile wind speed

Seismic:
- ☒ Seismic Ss: 0.245 / Seismic S1: 0.095 / Seismic TL: 12
- ☐ Ss exceeds 1.0. Seismic loads shall be evaluated in accordance with the Standard

Tower Finish:
- ☒ Galvanized
- ☐ Painted per FAA Advisory Circular AC 70/7460-1K
- ☐ Painted per Local Requirements

All structural steel products shall be hot dip galvanized in accordance with ASTM A123 specifications. Tower manufacturer shall produce documentation verifying the appropriate galvanizing process is utilized. All steel hardware shall be galvanized in accordance with ASTM A153 or ASTM B695 specifications

Tower Lights:
- ☒ Not Required
- ☐ Tower lighting system with E2 Avian Compliant Obstruction Lighting System (white strobes by day, and red lights at night). Beacons and Obstruction lights shall be all LED and Dual Red/White medium intensity and shall meet the requirements of FAA Advisory Circular AC 70/7460-1K. Towers 200-ft to 350-ft
- ☐ Tower lighting system with E2 Avian Compliant Obstruction Lighting System (white strobes by day, and red lights at night). Beacons and Obstruction lights shall be all LED and Dual Red/White medium intensity and shall meet the requirements of FAA Advisory Circular AC 70/7460-1K. A lighting system by Drake Lighting, that complies with the FAA regulation, is required. Towers over 350-ft

Grounding:
- ☒ Grounding, lightning protection, and surge protection systems shall be installed as required in compliance with R56 specifications and the construction documents. Coordinate with the Duke Energy bid administrator for the portion of tower grounding scope of work as shown in the construction documents. Minimum of the tower ground ring, connections from the ring to the tower, the bottom tower ground bar, and the connection from the tower ground ring to the bottom ground bar shall be included.

Climbing Facilities:
- ☐ Not Required
- ☒ A safety fall protection system incorporating a 3/8" diameter stainless steel cable meeting OSHA/ANSI specifications shall be installed the full height of the structure one tower leg and another full height cable on a full height face mounted external ladder. Additionally, step pegs are required on the other two legs to the height of the mid markers.
- ☐ A safety fall protection system incorporating a 3/8" diameter stainless steel cable meeting OSHA/ANSI specifications shall be installed the full height of the pole with full height step pegs.

Ice Bridge:
- ☒ Not required; Another contractor to provide
- ☐ Provide an option for Ice Bridge

Transmission Ladder:
- ☐ Not required; carrier to provide
- ☒ Provide (1) Transmission Ladder. Include "per foot" pricing.

Foundation:
- ☐ Provide Preliminary Design using Presumptive Soil Parameters per the TIA-222-G Standard (Annex F). A Geotechnical Report will be provided later for the final foundation design.
- ☒ Design with Geotechnical Report provided. In accordance with ANSI/TIA-222-G, Annex A, Section A.9.0, the tower manufacturer shall ensure the proper development of anchor rods and anchorage materials.

Antenna Mounts:
- ☐ Not required; Antenna Mounts provided by carrier.
- ☒ Provide mounts per Table 1 – Design Antenna/Coax Loading

Additional Design Requirements

Structural Guidelines:

All leg capacities for lattice towers shall be computed utilizing a global effective length factor (K) of 1.0. All leg capacities shall be calculated utilizing the working points between panel points. Utilizing the side (gusset) plate length to reduce the un-braced length of the leg is not permitted. Leg members must consist only of steel solid rod and angle members. Tubular steel leg members are not permitted (Not applicable to monopoles).

For round leg latticed towers, bracing member capacities shall be calculated considering the effective length to be the span between the weld lines of the gusset plates at the face of the round legs for both out-of-plane and in-plane buckling modes (Not applicable to monopoles).

Hardened galvanized flat washers (ASTM F436) shall only be used in fully tensioned bolted connections and connections that utilize oversized or slotted holes.

Linear Appurtenances:

The tower analysis model shall include all feed lines, feed line ladders, step pegs, climbing ladder and safety climb.

Discrete Appurtenances:

Effective Projected Area (EPA)A for antennas shall be determined according to TIA-222-G, Section 2.6.9.2, Design Wind Force on Appurtenances. If antenna or mount areas are specified, the provided values shall be used in lieu of calculated values. If height, width, and depth dimensions are provided by the antenna manufacturer, the panel shall be treated as a flat rectangular panel. Force coefficients shall be determined based on antenna aspect ratios and multiplied by the projected areas to calculate front and side EPAs.

Wind tunnel test results shall NOT be used unless the results have been provided to ETS and proposed effective areas have been approved. Back-calculating wind areas from published antenna manufacturer's wind loads are prohibited.

Deliverables: [Once awarded, Final Deliverables shall bear the seal of a North Carolina Professional Engineer]

A PDF softcopy of all deliverables shall be sent to ETS for recording purposes. All tower designs shall be complete with the following:

- General Notes
- Profile drawing (with tower reactions, design drawings, materials grades and referenced codes and standards shall be clearly shown)
- Foundation design drawings
- Supporting design calculations for tower and foundation
- Listing of main structural members
- Mount documentation specifically showing total EPA

Table 1 - Design Antenna/Coax Loading

EXISTING ANTENNA SCHEDULE								
OWNER	**QTY.**	**SIZE (FT)**	**TYPE**	**MANUFACTURER - ANTENNA MODEL NUMBER**	**ANTENNA AZIMUTH**	**MOUNT ELEVATION**	**LEG**	**CABLE (QTY.) TYPE**
WATAUGA COUNTY	1	-	OMNI	RFI - CC807-11	--	155'-0"	A	(1) 7/8" & (1) 1/2"
WATAUGA COUNTY	1	-	OMNI	RFI - CC807-11	--	155'-0"	B	(1) 7/8"
WATAUGA COUNTY	1	-	TTA	TTA	--	154'-0"	--	--
WATAUGA COUNTY (FUTURE)	1	-	DIPOLE	DECIBEL - DB220	--	155'-0"	C	(1) 7/8"
WATAUGA COUNTY	1	-	OMNI	RFI - CC807-11	--	135'-0"	A	(1) 1-5/8"
WATAUGA COUNTY	1	-	OMNI	RFI - CC807-11	--	135'-0"	B	(1) 1-5/8"
WATAUGA COUNTY (FUTURE)	1	-	DIPOLE	DECIBEL - DB220	--	135'-0"	C	(1) 7/8"
WATAUGA COUNTY	4		PANEL	Cellular Carrier	--	120'-0"	A,B,C	--
WATAUGA COUNTY	1	-	DISH	COMMSCOPE - HX6-6W-6WH	295.5°	110'-0"	C	(1) EU63
WATAUGA COUNTY (FUTURE)	1	-	DISH	COMMSCOPE - HX6-6W-6WH	--	110'-0"	A	(1) EU63
WATAUGA COUNTY	4		PANEL	Cellular Carrier	--	80'-0"	A,B,C	--
WATAUGA COUNTY (FUTURE)	1	-	DIPOLE	DECIBEL - DB220	--	40'-0"	B	(1) 7/8"

Note 1: Builder will supply side arms with side struts for only the omni and dipole antennas listed as current (4 total). However, engineer shall design the tower so that all omni and dipole antennas, including future (7 total), have side arms with side struts considered in the design loading.

Note 2: Builder will supply pipe mounts, high wind kits, and ice shields for only the dish antennas listed as current (1 total). However, engineer shall design the tower so that all dish antennas, including future (2 total), have pipe mounts, high wind kits, and ice shields considered in the design loading.

Appendix A

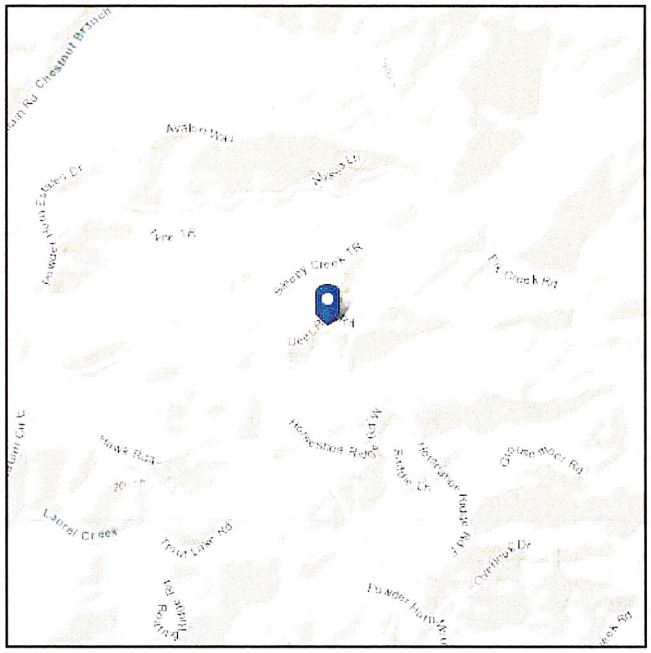
Verification of Design Loads

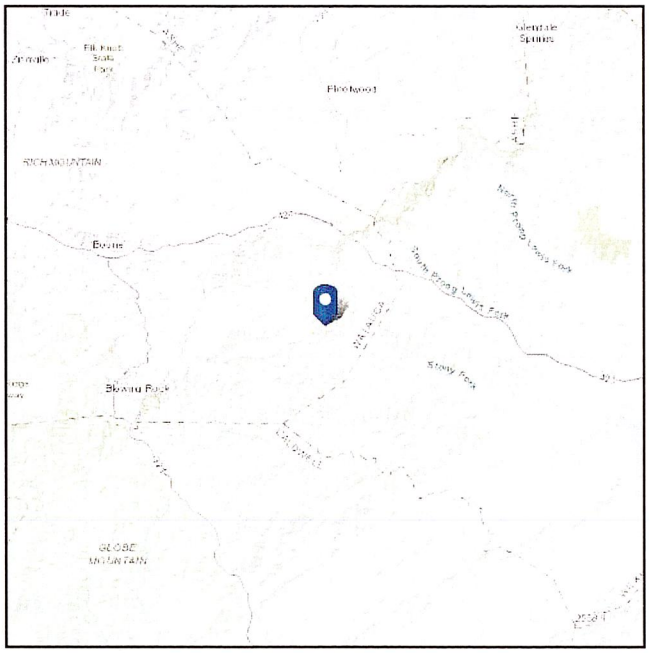
ASCE Hazards Report

Address:
No Address at This Location

Standard: ASCE/SEI 7-10
Risk Category: II
Soil Class: D - Stiff Soil

Latitude: 36.175495
Longitude: -81.514225
Elevation: 2120.6906013561916 ft (NAVD 88)





Wind

Results:

Wind Speed	115 Vmph
10-year MRI	76 Vmph
25-year MRI	84 Vmph
50-year MRI	90 Vmph
100-year MRI	96 Vmph

Data Source: ASCE/SEI 7-10, Fig. 26.5-1A and Figs. CC-1–CC-4, and Section 26.5.2, incorporating errata of March 12, 2014
Date Accessed: Fri Jul 18 2025

Value provided is 3-second gust wind speeds at 33 ft above ground for Exposure C Category, based on linear interpolation between contours. Wind speeds are interpolated in accordance with the 7-10 Standard. Wind speeds correspond to approximately a 7% probability of exceedance in 50 years (annual exceedance probability = 0.00143, MRI = 700 years).

Site is not in a hurricane-prone region as defined in ASCE/SEI 7-10 Section 26.2.

ASCE
AMERICAN SOCIETY OF CIVIL ENGINEERS

Seismic

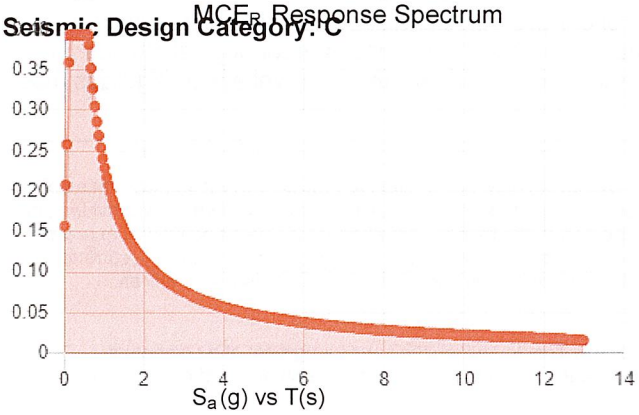
Site Soil Class: D - Stiff Soil

Results:

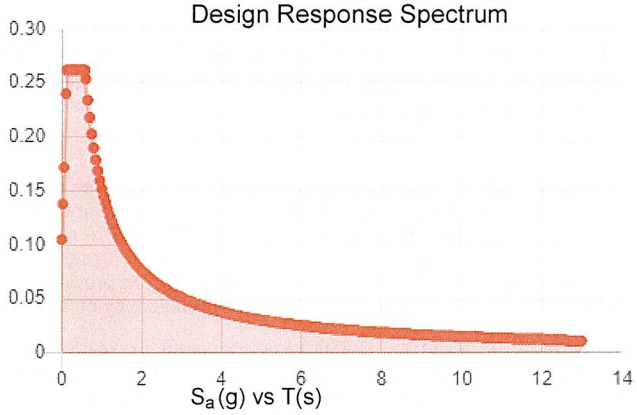
S_S :	0.245	S_{D1} :	0.152
S_1 :	0.095	T_L :	12
F_a :	1.6	PGA :	0.124
F_v :	2.4	PGA_M :	0.192
S_{MS} :	0.393	F_{PGA} :	1.553
S_{M1} :	0.229	I_e :	1
S_{DS} :	0.262		

Seismic Design Category: C

MCE_R Response Spectrum



Design Response Spectrum



Data Accessed: **Fri Jul 18 2025**

Date Source:

USGS Seismic Design Maps based on ASCE/SEI 7-10, incorporating Supplement 1 and errata of March 31, 2013, and ASCE/SEI 7-10 Table 1.5-2. Additional data for site-specific ground motion procedures in accordance with ASCE/SEI 7-10 Ch. 21 are available from USGS.

Ice

Results:

Ice Thickness:	0.75 in.
Concurrent Temperature:	15 F
Gust Speed	30 mph
Data Source:	Standard ASCE/SEI 7-10, Figs. 10-2 through 10-8
Date Accessed:	Fri Jul 18 2025

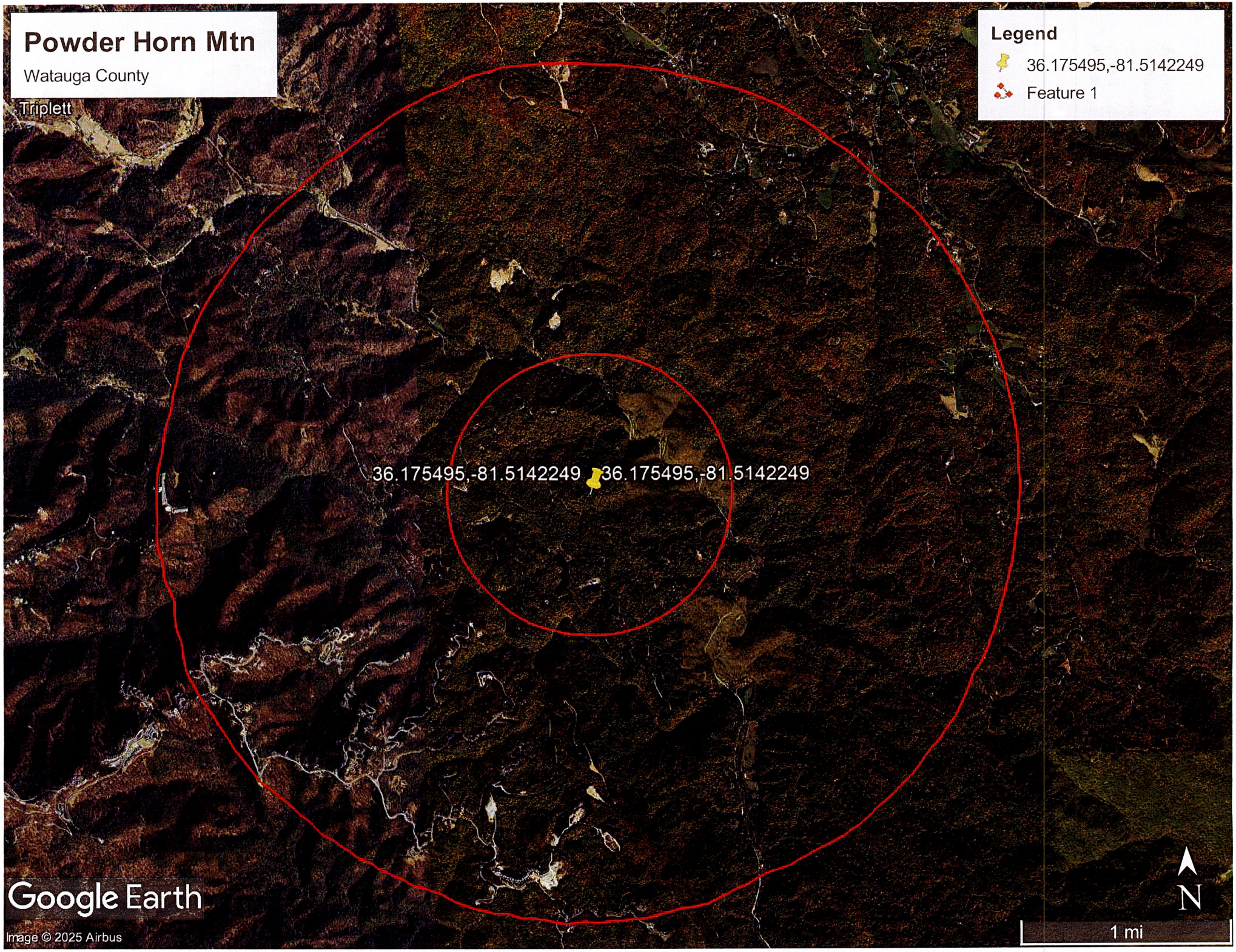
Ice thicknesses on structures in exposed locations at elevations higher than the surrounding terrain and in valleys and gorges may exceed the mapped values.

In the Appalachian Mountains, ice thicknesses may vary significantly over short distances.

Values provided are equivalent radial ice thicknesses due to freezing rain with concurrent 3-second gust speeds, for a 50-year mean recurrence interval, and temperatures concurrent with ice thicknesses due to freezing rain. Thicknesses for ice accretions caused by other sources shall be obtained from local meteorological studies. Ice thicknesses in exposed locations at elevations higher than the surrounding terrain and in valleys and gorges may exceed the mapped values.

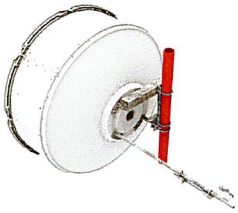
Appendix B

Site Vicinity and Location Map


Powder Horn Mtn
Watauga County
Triplett
Legend
36.175495,-81.5142249
Feature 1
36.175495,-81.5142249
36.175495,-81.5142249
Google Earth
Image © 2025 Airbus
N
1 mi

HX6-6W

Base Product



1.8m | 6ft ValuLine® High Performance, High XPD Antenna, dual-polarized, 5.925 – 7.125 GHz

Product Classification

Product Type	Microwave antenna
Product Brand	ValuLine®

General Specifications

Antenna Type	HX - ValuLine® High Performance, High XPD Antenna, dual-polarized
Polarization	Dual
Side Struts, Included	1
Side Struts, Optional	1

Dimensions

Diameter, nominal	1.8 m | 6 ft

Electrical Specifications

Operating Frequency Band	5.925 – 7.125 GHz
Gain, Low Band	38.3 dBi
Gain, Mid Band	39.1 dBi
Gain, Top Band	39.9 dBi
Boresite Cross Polarization Discrimination (XPD)	33 dB
Front-to-Back Ratio	70 dB
Beamwidth, Horizontal	1.8 °
Beamwidth, Vertical	1.8 °
Return Loss	26 dB
VSWR	1.1
Radiation Pattern Envelope Reference (RPE)	7376
Electrical Compliance	ACMA FX03_6b, 6p7b | ETSI 302 217 Class 3 | IC 3059A | IC 3064A | US FCC Part 101A

HX6-6W

Cross Polarization Discrimination (XPD) Electrical Compliance	ETSI EN 302217 XPD Category 2

Electrical Specifications, Band 2

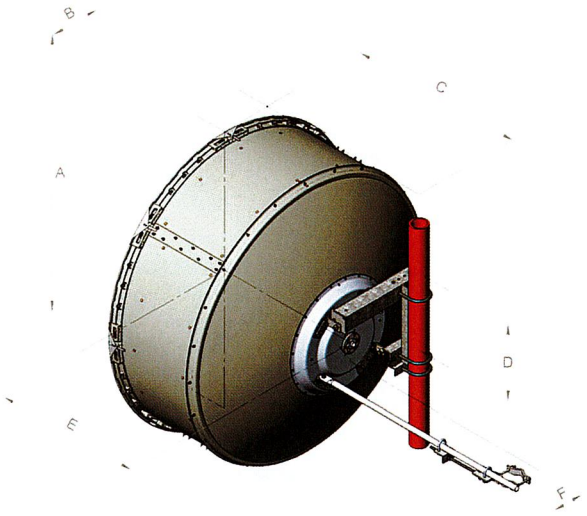
Operating Frequency Band	5.725 – 5.850 GHz
Gain, Mid Band	38.4 dBi
Beamwidth, Horizontal	2 °
Beamwidth, Vertical	2 °

Mechanical Specifications

Compatible Mounting Pipe Diameter	115 mm–120 mm | 4.5 in–4.7 in
Fine Azimuth Adjustment Range	±15°
Fine Elevation Adjustment Range	±5°
Wind Speed, operational	200 km/h | 124.274 mph
Wind Speed, survival	200 km/h | 124.274 mph

HX6-6W

Antenna Dimensions and Mounting Information



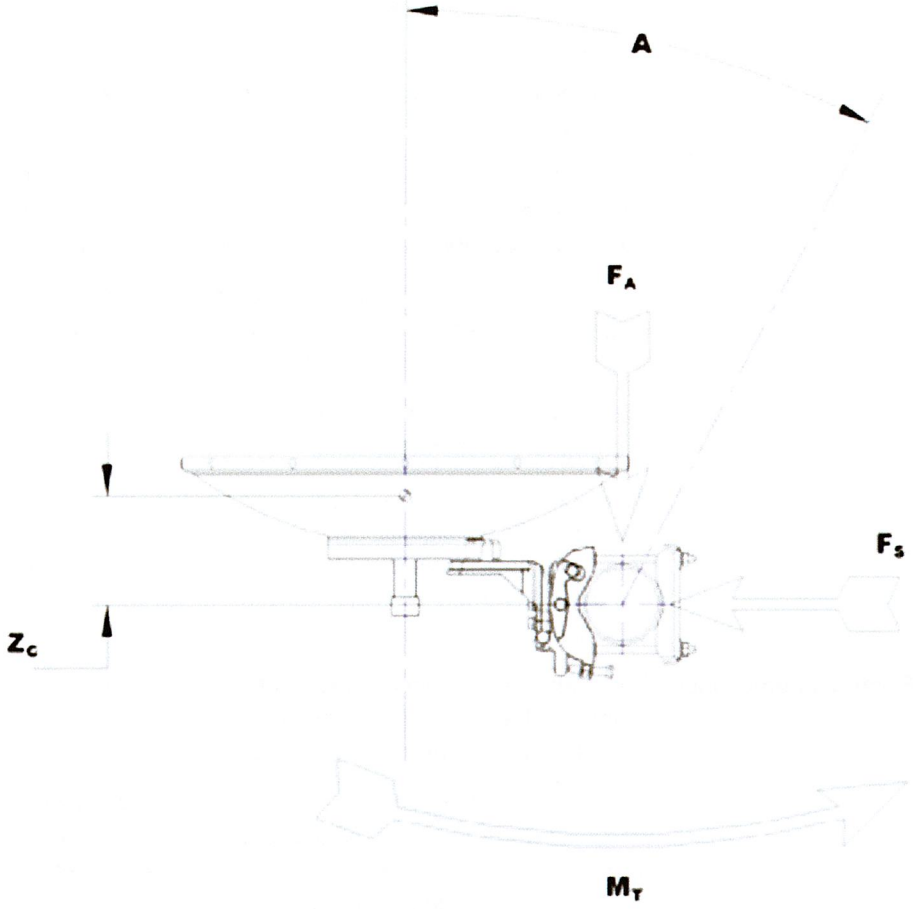
Dimensions in inches (mm)						
Antenna size, ft (m)	A	B	C	D	E	F
6 (1.8)	74.8 (1899)	13.4 (340)	47.5 (1206)	20.9 (530)	39.4 (1001)	8.4 (214)

Wind Forces at Wind Velocity Survival Rating

Axial Force (FA)	6960 N | 1,564.671 lbf
Angle α for MT Max	-130 °
Side Force (FS)	1566 N | 352.051 lbf
Twisting Moment (MT)	3923 N-m | 34,721.477 in lb
Force on Inboard Strut Side	4075 N | 916.097 lbf
Zcg without Ice	363 mm | 14.291 in
Zcg with 1/2 in (12 mm) Radial Ice	541 mm | 21.299 in
Weight with 1/2 in (12 mm) Radial Ice	237 kg | 522.495 lb

HX6-6W

Wind Forces at Wind Velocity Survival Rating Image



Packaging and Weights

Weight, net	85 kg | 187.393 lb

Regulatory Compliance/Certifications

Agency	Classification
ISO 9001:2015	Designed, manufactured and/or distributed under this quality management system

* Footnotes

Operating Frequency Band	Bands correspond with CCIR recommendations or common allocations used throughout the world. Other ranges can be accommodated on special order.

Gain, Mid Band	For a given frequency band, gain is primarily a function of antenna size. The gain of Andrew antennas is determined by either gain by comparison or by computer integration of the measured antenna patterns.
Boresite Cross Polarization Discrimination (XPD)	The difference between the peak of the co-polarized main beam and the maximum cross-polarized signal over an angle twice the 3 dB beamwidth of the co-polarized main beam.
Front-to-Back Ratio	Denotes highest radiation relative to the main beam, at 180° ±40°, across the band. Production antennas do not exceed rated values by more than 2 dB unless stated otherwise.
Return Loss	The figure that indicates the proportion of radio waves incident upon the antenna that are rejected as a ratio of those that are accepted.
VSWR	Maximum; is the guaranteed Peak Voltage-Standing-Wave-Ratio within the operating band.
Radiation Pattern Envelope Reference (RPE)	Radiation patterns define an antenna's ability to discriminate against unwanted signals. Under still dry conditions, production antennas will not have any peak exceeding the current RPE by more than 3dB, maintaining an angular accuracy of +/-1° throughout
Cross Polarization Discrimination (XPD) Electrical Compliance	The difference between the peak of the co-polarized main beam and the maximum cross-polarized signal over an angle twice the 3 dB beamwidth of the co-polarized main beam.
Wind Speed, operational	For VHLP(X), SHP(X), HX and USX antennas, the wind speed where the maximum antenna deflection is 0.3 x the 3 dB beam width of the antenna. For other antennas, it is defined as a deflection is equal to or less than 0.1 degrees.
Wind Speed, survival	The maximum wind speed the antenna, including mounts and radomes, where applicable, will withstand without permanent deformation. Realignment may be required. This wind speed is applicable to antenna with the specified amount of radial ice.
Axial Force (FA)	Maximum forces exerted on a supporting structure as a result of wind from the most critical direction for this parameter. The individual maximums specified may not occur simultaneously. All forces are referenced to the mounting pipe.
Side Force (FS)	Maximum side force exerted on the mounting pipe as a result of wind from the most critical direction for this

	parameter. The individual maximums specified may not occur simultaneously. All forces are referenced to the mounting pipe.
Twisting Moment (MT)	Maximum forces exerted on a supporting structure as a result of wind from the most critical direction for this parameter. The individual maximums specified may not occur simultaneously. All forces are referenced to the mounting pipe.

DB224-A

1-port omni exposed dipole antenna, 150–160 MHz, 360° HPBW, fixed electrical tilt

- Broad response
- Two-piece mast for ease of shipping

General Specifications

Antenna Type	Omni
Band	Single band
Color	Silver
Grounding Type	RF connector inner conductor and body grounded to reflector and mounting bracket
Performance Note	Outdoor usage
Radiator Material	Aluminum
RF Connector Interface	N Male
RF Connector Location	Bottom
RF Connector Quantity, low band	1
RF Connector Quantity, total	1

Dimensions

Length	6477 mm | 255 in
Net Weight, without mounting kit	15.9 kg | 35.053 lb

Electrical Specifications

Impedance	50 ohm
Operating Frequency Band	150 – 160 MHz
Polarization	Vertical

Electrical Specifications

Frequency Band, MHz	**150–160**
Gain, dBi	8.1
Beamwidth, Horizontal, degrees	360
Beamwidth, Vertical, degrees	16

DB224-A

Beam Tilt, degrees	0
VSWR | Return loss, dB	1.5 | 14.0
Input Power per Port, maximum, watts	500

Mechanical Specifications

Wind Loading @ Velocity, maximum	560.5 N @ 100 mph (126.0 lbf @ 100 mph)
Wind Speed, maximum	130 km/h (81 mph)

Regulatory Compliance/Certifications

Agency	**Classification**
ISO 9001:2015	Designed, manufactured and/or distributed under this quality management system

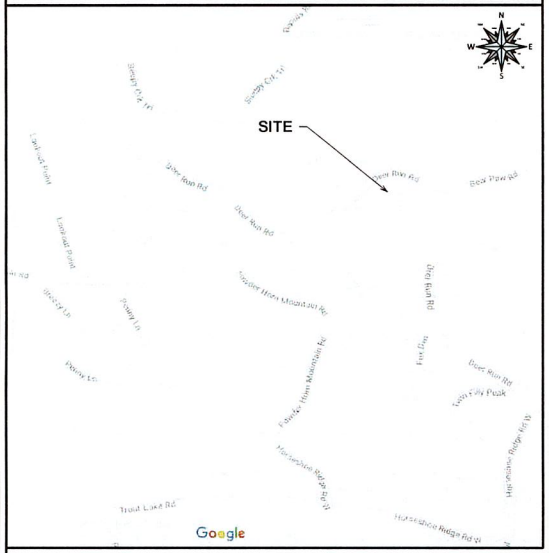
Included Products

DB365-OS	–	Pipe Mounting Kit that consists of two clamps for mounting antennas to round members 1.25 - 3.5 in (35 - 89 mm) OD round members.

* Footnotes

Performance Note	Severe environmental conditions may degrade optimum performance

SITE MAP



GENERAL NOTES

THE FACILITY IS UNMANNED AND NOT FOR HUMAN HABITATION, THEREFORE HANDICAP ACCESS IS NOT REQUIRED FOR ROUTINE MAINTENANCE. THE PROJECT WILL NOT RESULT IN ANY SIGNIFICANT DISTURBANCE OR EFFECT ON DRAINAGE; NO SANITARY SEWER SERVICE, POTABLE WATER, OR TRASH DISPOSAL IS REQUIRED AND NO COMMERCIAL SIGNAGE IS PROPOSED.

SCOPE OF WORK

PROPOSED SCOPE OF WORK INCLUDES THE INSTALLATION OF A NEW 180' SELF-SUPPORT TOWER AND A 11'-6"x19'-0" PREFABRICATED EQUIPMENT SHELTER, WITHIN A 60'-0"x60'-0" CHAIN-LINK FENCED COMPOUND.

CODE COMPLIANCE

ALL WORK AND MATERIALS SHALL BE PERFORMED AND INSTALLED IN ACCORDANCE WITH THE CURRENT EDITIONS OF THE FOLLOWING CODES AS ADOPTED BY THE LOCAL GOVERNING AUTHORITIES. NOTHING IN THESE PLANS IS TO BE CONSTRUED TO PERMIT WORK NOT CONFORMING TO THE FOLLOWING CODES:

- 2018 N.C. BUILDING CODE (2015 IBC W/ AMENDMENTS)
- 2018 N.C. EXISTING BUILDING CODE (2015 IEBC W/ AMENDMENTS)
- 2018 N.C. FIRE CODE (2015 IFC W/ AMENDMENTS)
- 2018 N.C. FUEL GAS CODE (2015 IFGC W/ AMENDMENTS)
- 2018 N.C. MECHANICAL CODE (2015 IMC W/ AMENDMENTS)
- 2018 N.C. PLUMBING CODE (2015 IPC W/ AMENDMENTS)
- 2020 N.C. ELECTRICAL CODE (2020 NEC)

811 Know what's below. Call before you dig.

SITE NAME:
POWDER HORN MOUNTAIN

SITE ADDRESS:
340 DEER RUN ROAD
STONY FORK, NC 28607

LATITUDE & LONGITUDE:
N 36° 10' 31.78", W 81° 30' 51.21"

INDEX OF SHEETS

SITE PHOTO

SITE SUMMARY

SITE TYPE:	NEW CONSTRUCTION
STRUCTURE TYPE:	SELF SUPPORT
STRUCTURE OWNER:	WATAUGA COUNTY
ANTENNA SITE REG. NO.:	TBD
STRUCTURE HEIGHT (AGL):	180' ±
OCCUPANCY TYPE:	UTILITY & MISCELLANEOUS (U)
STRUCTURE LATITUDE:	N 36° 10' 31.78" (36.1754950°)
STRUCTURE LONGITUDE:	W 81° 30' 51.21" (-81.5142249°)
JURISDICTION:	WATAUGA COUNTY
COUNTY:	WATAUGA
PARCEL ID:	2859729120000
GROUND ELEV. (NAVD 88):	2,120.5'
POWER PROVIDER:	B.R.E.M.C.
FIBER PROVIDER:	TBD

PREPARED BY:
ENGINEERED TOWER SOLUTIONS
3227 WELLINGTON COURT
RALEIGH, NC 27615
919-782-2710
www.ets-pllc.com

PREPARED FOR:
CORPORATE SEAL OF WATAUGA COUNTY NORTH CAROLINA

SITE NAME:
POWDER HORN MOUNTAIN

SITE ADDRESS:
340 DEER RUN ROAD
STONY FORK, NC 28607
LATITUDE/LONGITUDE:
36.1754950°, -81.5142249°

SEAL: FIRM #: P-1016

NORTH CAROLINA PROFESSIONAL SEAL 027825 ENGINEER CHRISTOPHER G. PLY
05/30/2025

REV	DATE	DETAILS
0	12/22/2022	CONSTRUCTION
1	02/07/2025	CONSTRUCTION
2	05/30/2025	COMPOUND REDESIGN
3		
4		
5		
6		
7		
8		
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12		
13		
14		

DRAWN BY: FB | CHECKED BY: AS

SHEET TITLE:
TITLE PAGE

SHEET # T-1 | CURRENT REV #: 2 | ETS #: 21099302

GENERAL NOTES

1. ALL SITE WORK SHALL BE COMPLETED AS INDICATED ON THE DRAWINGS AND CARRIER PROJECT SPECIFICATIONS.
2. GENERAL CONTRACTOR SHALL VISIT THE SITE AND SHALL FAMILIARIZE THEMSELVES WITH ALL CONDITIONS AFFECTING THE PROPOSED WORK AND SHALL MAKE PROVISIONS. GENERAL CONTRACTOR SHALL BE RESPONSIBLE FOR FAMILIARIZING THEMSELVES WITH ALL CONTRACT DOCUMENTS, FIELD CONDITIONS, DIMENSIONS, AND SHALL CONFIRM THAT THE WORK MAY BE ACCOMPLISHED AS SHOWN PRIOR TO PROCEEDING WITH CONSTRUCTION. ANY DISCREPANCIES SHALL BE BROUGHT TO THE ATTENTION OF THE ENGINEER PRIOR TO THE COMMENCEMENT OF WORK.
3. ALL MATERIALS FURNISHED AND INSTALLED SHALL BE IN STRICT ACCORDANCE WITH ALL APPLICABLE CODES, REGULATIONS AND ORDINANCES. GENERAL CONTRACTOR SHALL ISSUE ALL APPROPRIATE NOTICES AND COMPLY WITH ALL LAWS, ORDINANCES, RULES, REGULATIONS, AND LAWFUL ORDERS OF ANY PUBLIC AUTHORITY REGARDING THE PERFORMANCE OF WORK.
4. ALL WORK CARRIED OUT SHALL COMPLY WITH ALL APPLICABLE MUNICIPAL AND UTILITY COMPANY SPECIFICATIONS AND LOCAL JURISDICTIONAL CODES, ORDINANCES, AND APPLICABLE REGULATIONS.
5. UNLESS NOTED OTHERWISE, THE WORK SHALL INCLUDE FURNISHING MATERIALS, EQUIPMENT, APPURTENANCES, AND LABOR NECESSARY TO COMPLETE ALL INSTALLATIONS AS INDICATED IN THESE DRAWINGS.
6. PLANS ARE NOT TO BE SCALED. THESE PLANS ARE INTENDED TO BE A DIAGRAMMATIC OUTLINE ONLY UNLESS OTHERWISE NOTED. DIMENSIONS SHOWN ARE TO FINISHED SURFACES UNLESS OTHERWISE NOTED. SPACING BETWEEN EQUIPMENT IS THE MINIMUM REQUIRED CLEARANCE. THEREFORE, IT IS CRITICAL TO FIELD VERIFY DIMENSIONS, SHOULD THERE BE ANY QUESTIONS REGARDING THE CONTRACT DOCUMENTS, THE CONTRACTOR SHALL BE RESPONSIBLE FOR OBTAINING A CLARIFICATION FROM THE ENGINEER PRIOR TO PROCEEDING WITH THE WORK. DETAILS ARE INTENDED TO SHOW DESIGN INTENT. MODIFICATIONS MAY BE REQUIRED TO SUIT JOB DIMENSIONS OR CONDITIONS AND SUCH MODIFICATIONS SHALL BE INCLUDED AS PART OF WORK AND PREPARED BY THE ENGINEER PRIOR TO PROCEEDING WITH WORK.
7. THE CONTRACTOR SHALL INSTALL ALL EQUIPMENT AND MATERIALS IN ACCORDANCE WITH MANUFACTURER'S RECOMMENDATIONS UNLESS SPECIFICALLY STATED OTHERWISE.
8. IF THE SPECIFIED EQUIPMENT CANNOT BE INSTALLED AS SHOWN IN THESE DRAWINGS, THE CONTRACTOR SHALL PROPOSE AN ALTERNATIVE INSTALLATION SPACE FOR APPROVAL BY THE ENGINEER PRIOR TO PROCEEDING.
9. GENERAL CONTRACTOR SHALL BE RESPONSIBLE FOR THE SAFETY OF WORK AREA, ADJACENT AREAS AND BUILDING OCCUPANTS THAT ARE LIKELY TO BE AFFECTED BY THE WORK UNDER THIS CONTRACT. WORK SHALL CONFORM TO ALL OSHA REQUIREMENTS AND THE LOCAL JURISDICTION.
10. GENERAL CONTRACTOR SHALL COORDINATE WORK AND SCHEDULE WORK ACTIVITIES WITH OTHER DISCIPLINES.
11. ERECTION SHALL BE DONE IN WORKMANLIKE MANNER BY COMPETENT EXPERIENCED WORKMEN IN ACCORDANCE WITH APPLICABLE CODES AND THE BEST ACCEPTED PRACTICE. ALL MEMBERS SHALL BE LAID PLUMB AND TRUE AS INDICATED IN THE DRAWINGS.
12. SEAL PENETRATIONS THROUGH FIRE RATED AREAS WITH UL LISTED MATERIALS APPROVED BY LOCAL JURISDICTION. CONTRACTOR SHALL KEEP AREA CLEAN, HAZARD FREE, AND DISPOSE OF ALL DEBRIS.
13. THE SCOPE OF WORK FOR THIS PROJECT IS REPRESENTED BY DARK SHADED LINES AND NOTES. CONTRACTOR SHALL NOTIFY THE GENERAL CONTRACTOR OF ANY EXISTING CONDITIONS THAT DEVIATE FROM THE DRAWINGS PRIOR TO BEGINNING CONSTRUCTION.
14. CONTRACTOR SHALL PROVIDE WRITTEN NOTICE TO THE CONSTRUCTION MANAGER 48 HOURS PRIOR TO THE COMMENCEMENT OF WORK.
15. THE CONTRACTOR SHALL PROTECT EXISTING IMPROVEMENTS, PAVEMENTS, CURBS, LANDSCAPING AND STRUCTURES. ANY DAMAGED PART SHALL BE REPAIRED AT CONTRACTOR'S EXPENSE TO THE SATISFACTION OF THE OWNER.
16. THE CONTRACTOR SHALL CONTACT UTILITY LOCATING SERVICES PRIOR TO THE START OF CONSTRUCTION.
17. GENERAL CONTRACTOR SHALL COORDINATE AND MAINTAIN ACCESS FOR ALL TRADES AND CONTRACTORS TO THE SITE AND/OR BUILDING.
18. THE GENERAL CONTRACTOR SHALL BE RESPONSIBLE FOR SECURITY OF THE SITE FOR THE DURATION OF CONSTRUCTION UNTIL JOB COMPLETION.
19. THE GENERAL CONTRACTOR SHALL MAINTAIN IN GOOD CONDITION ONE COMPLETE SET OF PLANS WITH ALL REVISIONS, ADDENDA, AND CHANGE ORDERS ON THE PREMISES AT ALL TIMES.
20. THE GENERAL CONTRACTOR SHALL PROVIDE PORTABLE FIRE EXTINGUISHERS WITH A RATING OF NO LESS THAN 2-A OT 2-A:10-B:C AND SHALL BE WITHIN 25 FEET OF TRAVEL DISTANCE TO ALL PORTIONS OF WHERE THE WORK IS BEING COMPLETED DURING CONSTRUCTION.

GENERAL NOTES (CONTINUED)

21. ALL EXISTING ACTIVE SEWER, WATER, GAS, ELECTRIC, AND OTHER UTILITIES SHALL BE PROTECTED AT ALL TIMES, AND WHERE REQUIRED FOR THE PROPER EXECUTION OF THE WORK, SHALL BE RELOCATED AS DIRECTED BY THE ENGINEER. EXTREME CAUTION SHOULD BE USED BY THE CONTRACTOR WHEN EXCAVATING OR DRILLING PIERS AROUND OR NEAR UTILITIES. CONTRACTOR SHALL PROVIDE SAFETY TRAINING FOR THE WORKING CREW. THIS SHALL INCLUDE BUT NOT BE LIMITED TO A) FALL PROTECTION, B) CONFINED SPACE, C) ELECTRICAL SAFETY, AND D) TRENCHING & EXCAVATION.
22. ALL EXISTING INACTIVE SEWER, WATER, GAS, ELECTRIC, AND OTHER UTILITIES, WHICH INTERFERE WITH THE EXECUTION OF THE WORK, SHALL BE REMOVED, CAPPED, PLUGGED OR OTHERWISE DISCONNECTED AT POINTS WHICH WILL NOT INTERFERE WITH THE EXECUTION OF THE WORK, AS DIRECTED BY THE RESPONSIBLE ENGINEER, AND SUBJECT TO THE APPROVAL OF THE OWNER AND/OR LOCAL UTILITIES.
23. THE AREAS OF THE OWNER'S PROPERTY DISTURBED BY THE WORK AND NOT COVERED BY THE TOWER, EQUIPMENT OR DRIVEWAY, SHALL BE GRADED TO A UNIFORM SLOPE, AND STABILIZED TO PREVENT EROSION.
24. CONTRACTOR SHALL MINIMIZE DISTURBANCE TO THE EXISTING SITE DURING CONSTRUCTION. EROSION CONTROL MEASURES, IF REQUIRED DURING CONSTRUCTION, SHALL BE IN CONFORMANCE WITH THE FEDERAL AND LOCAL JURISDICTION FOR EROSION AND SEDIMENT CONTROL.
25. NO FILL OR EMBANKMENT MATERIAL SHALL BE PLACED ON FROZEN GROUNDING. FROZEN MATERIALS, SNOW OR ICE SHALL NOT BE PLACED IN ANY FILL OR EMBANKMENT.
26. THE SUBGRADE SHALL BE BROUGHT TO A SMOOTH UNIFORM GRADE AND COMPACTED TO 95 PERCENT STANDARD PROCTOR DENSITY UNDER PAVEMENT AND STRUCTURES AND 80 PERCENT STANDARD PROCTOR DENSITY IN OPEN SPACE. ALL TRENCHES IN PUBLIC RIGHT OF WAY SHALL BE BACKFILLED WITH FLOWABLE FILL OR OTHER MATERIAL PRE-APPROVED BY THE LOCAL JURISDICTION.
27. ALL NECESSARY RUBBISH, STUMPS, DEBRIS, STICKS, STONES, AND OTHER REFUSE SHALL BE REMOVED FROM THE SITE AND DISPOSED OF IN A LAWFUL MANNER.
28. ALL BROCHURES, OPERATING AND MAINTENANCE MANUALS, CATALOGS, SHOP DRAWINGS, AND OTHER DOCUMENTS SHALL BE TURNED OVER TO THE GENERAL CONTRACTOR AT COMPLETION OF CONSTRUCTION AND PRIOR TO PAYMENT.
29. CONTRACTOR SHALL SUBMIT A COMPLETE SET OF AS-BUILT REDLINES TO THE GENERAL CONTRACTOR UPON COMPLETION OF PROJECT AND PRIOR TO FINAL PAYMENT.
30. CONTRACTOR SHALL LEAVE PREMISES IN A CLEAN CONDITION.
31. THE PROPOSED FACILITY WILL BE UNMANNED AND DOES NOT REQUIRE POTABLE WATER OR SEWER SERVICE, AND IS NOT FOR HUMAN HABITAT (NO HANDICAP ACCESS REQUIRED).
32. STRUCTURE IS LIMITED TO PERIODIC MAINTENANCE AND INSPECTION, APPROXIMATELY 2 TIMES PER MONTH, BY CARRIER TECHNICIANS.
33. NO OUTDOOR STORAGE OR SOLID WASTE CONTAINERS ARE PROPOSED.
34. ALL MATERIAL SHALL BE FURNISHED AND WORK SHALL BE PERFORMED IN ACCORDANCE WITH THE LATEST CARRIER GROUNDING STANDARD. IN CASE OF A CONFLICT BETWEEN THE CONSTRUCTION SPECIFICATION AND THE DRAWINGS, THE DRAWINGS SHALL GOVERN.
35. CONTRACTORS SHALL BE RESPONSIBLE FOR OBTAINING ALL PERMITS AND INSPECTIONS REQUIRED FOR CONSTRUCTION. IF CONTRACTOR CANNOT OBTAIN A PERMIT, THEY MUST NOTIFY THE GENERAL CONTRACTOR IMMEDIATELY.
36. CONTRACTOR SHALL REMOVE ALL TRASH AND DEBRIS FROM THE SITE ON A DAILY BASIS.
37. INFORMATION SHOWN ON THESE DRAWINGS WAS OBTAINED FROM SITE VISITS AND/OR DRAWINGS PROVIDED BY THE SITE OWNER. CONTRACTORS SHALL NOTIFY THE ENGINEER OF ANY DISCREPANCIES PRIOR TO ORDERING MATERIAL OR PROCEEDING WITH CONSTRUCTION.
38. ALL CABLE INSTALLATIONS TO FOLLOW MANUFACTURER'S INSTRUCTIONS AND RECOMMENDATIONS.
39. NO WHITE STROBE LIGHTS ARE PERMITTED. LIGHTING IF REQUIRED, WILL MEET FAA STANDARDS AND REQUIREMENTS.

ANTENNA MOUNTING NOTES

1. ALL STEEL MATERIALS SHALL BE GALVANIZED AFTER FABRICATION IN ACCORDANCE WITH ASTM A123 "ZINC (HOT-DIP GALVANIZED) COATINGS ON IRON AND STEEL PRODUCTS", UNLESS NOTED OTHERWISE.
2. ALL BOLTS, ANCHORS AND MISCELLANEOUS HARDWARE SHALL BE GALVANIZED IN ACCORDANCE WITH ASTM A153 "ZINC-COATING (HOT-DIP) ON IRON AND STEEL HARDWARE", UNLESS NOTED OTHERWISE.
3. DAMAGED GALVANIZED SURFACES SHALL BE REPAIRED BY COLD GALVANIZING IN ACCORDANCE WITH ASTM A780.
4. ALL ANTENNA MOUNTS SHALL BE INSTALLED WITH LOCK NUTS, DOUBLE NUTS AND SHALL BE TORQUED TO MANUFACTURER'S RECOMMENDATIONS.
5. CONTRACTOR SHALL INSTALL ANTENNA PER MANUFACTURER'S RECOMMENDATION FOR INSTALLATION AND GROUNDING.
6. PRIOR TO SETTING ANTENNA AZIMUTHS AND DOWNTILTS, ANTENNA CONTRACTOR SHALL CHECK THE ANTENNA MOUNT FOR TIGHTNESS AND ENSURE THAT THEY ARE PLUMB. ANTENNA AZIMUTHS SHALL BE SET FROM TRUE NORTH AND BE ORIENTED WITHIN +/- 5% AS DEFINED BY THE RFDS. ANTENNA DOWNTILTS SHALL BE WITHIN +/- 0.5% AS DEFINED BY THE RFDS. REFER TO ND-00246.

TORQUE REQUIREMENTS

1. ALL RF CONNECTIONS SHALL BE TIGHTENED BY A TORQUE WRENCH.
2. ALL RF CONNECTIONS, GROUNDING HARDWARE AND ANTENNA HARDWARE SHALL HAVE A TORQUE MARK INSTALLED IN A CONTINUOUS STRAIGHT LINE FROM BOTH SIDES OF THE CONNECTION.
3. RF CONNECTION BOTH SIDES OF THE CONNECTOR.
4. GROUNDING AND ANTENNA HARDWARE ON THE NUT SIDE STARTING FROM THE THREADS TO THE SOLID SURFACE. EXAMPLE OF SOLID SURFACE: GROUND BAR, ANTENNA BRACKET METAL.
5. ALL 8M ANTENNA HARDWARE SHALL BE TIGHTENED TO 9 LB-FT (12 NM).
6. ALL 12M ANTENNA HARDWARE SHALL BE TIGHTENED TO 43 LB-FT (58 NM).
7. ALL GROUNDING HARDWARE SHALL BE TIGHTENED UNTIL THE LOCK WASHER COLLAPSES AND THE GROUNDING HARDWARE IS NO LONGER LOOSE.
8. ALL DIN TYPE CONNECTIONS SHALL BE TIGHTENED TO 18-22 LB-FT (24.4-29.8 NM).
9. ALL N TYPE CONNECTIONS SHALL BE TIGHTENED TO 15-20 LB-IN (1.7-2.3 NM).

COAXIAL CABLE NOTES

1. TYPES AND SIZES OF THE ANTENNA CABLE ARE BASED ON ESTIMATED LENGTHS. PRIOR TO ORDERING CABLE, CONTRACTOR SHALL VERIFY ACTUAL LENGTH BASED ON CONSTRUCTION LAYOUT AND NOTIFY THE PROJECT MANAGER IF ACTUAL LENGTHS EXCEED ESTIMATED LENGTHS.
2. CONTRACTOR SHALL VERIFY THE DOWN-TILT OF EACH ANTENNA WITH A DIGITAL LEVEL.
3. CONTRACTOR SHALL CONFIRM COAX COLOR CODING PRIOR TO CONSTRUCTION. REFER TO "ANTENNA SYSTEM LABELING STANDARD" ND-00027 LATEST VERSION.
4. ALL JUMPERS TO THE ANTENNAS SHALL BE 1/2" DIA. LDF AND SHALL NOT EXCEED 6'-0".
5. ALL COAXIAL CABLE SHALL BE SECURED TO THE DESIGNED SUPPORT STRUCTURE, IN AN APPROVED MANNER, AT DISTANCES NOT TO EXCEED 4'-0" OC.
6. CONTRACTOR SHALL FOLLOW ALL MANUFACTURER'S RECOMMENDATIONS REGARDING BOTH THE INSTALLATION AND GROUNDING OF ALL COAXIAL CABLES, CONNECTORS, ANTENNAS, AND ALL OTHER EQUIPMENT.
7. CONTRACTOR SHALL WEATHERPROOF ALL ANTENNA CONNECTORS WITH SELF AMALGAMATING TAPE. WEATHERPROOFING SHALL BE COMPLETED IN STRICT ACCORDANCE WITH INDUSTRY STANDARDS.

GENERAL CABLE AND EQUIPMENT NOTES

1. CONTRACTOR SHALL BE RESPONSIBLE TO VERIFY ANTENNA, TMAS, DIPLEXERS, AND COAX CONFIGURATION, MAKE AND MODELS PRIOR TO INSTALLATION.
2. ALL CONNECTIONS FOR HANGERS, SUPPORTS, BRACING, ETC. SHALL BE INSTALLED PER MANUFACTURER'S RECOMMENDATIONS.
3. CONTRACTOR SHALL REFERENCE THE STRUCTURAL ANALYSIS/DESIGN DRAWINGS FOR DIRECTIONS ON CABLE DISTRIBUTION/ROUTING.

PREPARED BY:

ENGINEERED TOWER SOLUTIONS
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RALEIGH, NC 27615
919-782-2710
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PREPARED FOR:

SITE NAME:
POWDER HORN MOUNTAIN

SITE ADDRESS:
340 DEER RUN ROAD
STONY FORK, NC 28607

LATITUDE/LONGITUDE:
36.1754950°, -81.5142249°

SEAL: FIRM #: P-1016

NORTH CAROLINA PROFESSIONAL SEAL 027825 ENGINEER CHRISTOPHER G. PLY

05/30/2025

REV	DATE	DETAILS
0	12/22/2022	CONSTRUCTION
1	02/07/2025	CONSTRUCTION
2	05/30/2025	COMPOUND REDESIGN
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DRAWN BY: FB | CHECKED BY: AS

SHEET TITLE:
GENERAL NOTES I

SHEET # **GN-1** | CURRENT REV #: 2 | ETS #: 21099302

GENERAL CABLE AND EQUIPMENT NOTES

1. ALL OUTDOOR RF CONNECTORS/CONNECTIONS SHALL BE WEATHERPROOFED, EXCEPT THE RET CONNECTORS, USING BUTYL TAPE AFTER INSTALLATION AND FINAL CONNECTIONS ARE MADE. BUTYL TAPE SHALL HAVE A MINIMUM OF ONE-HALF TAPE WIDTH OVERLAP ON EACH TURN AND EACH LAYER SHALL BE WRAPPED THREE TIMES. WEATHERPROOFING SHALL BE SMOOTH WITHOUT BUCKLING. BUTYL BLEEDING IS NOT ALLOWED.
2. IF REQUIRED TO PAINT ANTENNAS AND/OR COAX:
   - 2.1. TEMPERATURE SHALL BE ABOVE 50° F.
   - 2.2. PAINT COLOR MUST BE APPROVED BY BUILDING OWNER/LANDLORD.
   - 2.3. FOR REGULATED TOWERS, FAA/FCC APPROVED PAINT IS REQUIRED.
   - 2.4. DO NOT PAINT OVER COLOR CODING OR ON EQUIPMENT MODEL NUMBERS.
3. ALL PROPOSED GROUND BAR DOWNLEADS ARE TO BE TERMINATED TO THE EXISTING ADJACENT GROUND BAR DOWNLEADS A MINIMUM DISTANCE OF 4'-0" BELOW GROUND BAR. TERMINATIONS MAY BE EXOTHERMIC OR COMPRESSION.
4. ALL CONNECTIONS FOR HANGERS, SUPPORTS, BRACING, ETC. SHALL BE INSTALLED PER MANUFACTURER'S SPECIFICATION & RECOMMENDATIONS.NO BOLT THREADS TO PROTRUDE MORE THAN 1-1/2" [.038M].
5. 90 SHORT SWEEPS UNDER ANTENNA ARM. ALL CABLES MUST ONLY TRANSITION ON THE INSIDE OR BOTTOM OF ARMS (NO CABLE ON TOP OF ARMS).
6. USE 90 CONNECTOR AT CABLE CONNECTION TO ANTENNAS.
7. PLACE GPS ON ARM WITH SOUTHERN SKY EXPOSURE AT MINIMUM 6' [1.83] FROM TRANSMIT ANTENNA, WHICH IS 24" [.61M] AWAY FROM CENTER OF POLE.
8. USE 1/2" [.013M] CABLE ON ANTENNAS UNLESS OTHERWISE SPECIFIED.
9. FILL VOID AROUND CABLES AT CONDUIT OPENING WITH FOAM SEALANT TO PREVENT WATER INTRUSION.

FIBER & POWER CABLE MOUNTING

1. THE FIBER OPTIC TRUNK CABLES SHALL BE INSTALLED INTO CONDUITS, CHANNEL CABLE TRAYS, OR CABLE TRAY. WHEN INSTALLING FIBER OPTIC TRUNK CABLES INTO A CABLE TRAY SYSTEM, THEY SHALL BE INSTALLED INTO AN INTER DUCT AND A PARTITION BARRIER SHALL BE INSTALLED BETWEEN THE 600 VOLT CABLES AND THE INTER DUCT IN ORDER TO SEGREGATE CABLE TYPES. OPTIC FIBER TRUNK CABLES SHALL HAVE APPROVED CABLE RESTRAINTS EVERY (60) SIXTY FEET AND SECURELY FASTENED TO THE CABLE TRAY SYSTEM. NFPA 70 (NEC) ARTICLE 770 RULES SHALL APPLY.
2. THE TYPE TC-ER CABLES SHALL BE INSTALLED INTO CONDUITS, CHANNEL CABLE TRAYS, OR CABLE TRAY AND SHALL BE SECURED AT INTERVALS NOT EXCEEDING (6) SIX FEET. AN EXCEPTION; WHERE TYPE TC-ER CABLES ARE NOT SUBJECT TO PHYSICAL DAMAGE, CABLES SHALL BE PERMITTED TO MAKE A TRANSITION BETWEEN CONDUITS, CHANNEL CABLE TRAYS, OR CABLE TRAY WHICH ARE SERVING UTILIZATION EQUIPMENT OR DEVICES, A DISTANCE (6) SIX FEET SHALL NOT BE EXCEEDED WITHOUT CONTINUOUS SUPPORTING. NFPA 70 (NEC) ARTICLES 336 AND 392 RULES SHALL APPLY.
3. WHEN INSTALLING OPTIC FIBER TRUNK CABLES OR TYPE TC-ER CABLES INTO CONDUITS, NFPA 70 (NEC) ARTICLE 300 RULES SHALL APPLY.

STRUCTURAL STEEL NOTES

1. THE FABRICATION AND ERECTION OF STRUCTURAL STEEL SHALL CONFORM TO THE AISC SPECIFICATION FOR MANUAL OF STEEL CONSTRUCTION, LOAD AND RESISTANCE FACTOR DESIGN, 15TH EDITION.
2. UNLESS OTHERWISE NOTED, ALL STRUCTURAL ELEMENTS SHALL CONFORM TO THE FOLLOWING REQUIREMENTS:
   STRUCTURAL STEEL:
   - ANGLE: ASTM A36
   - PIPE/TUBE: ASTM A500-50
   - PLATE: ASTM A36

   A. ALL BOLTS, ASTM A325 TYPE I GALVANIZED HIGH STRENGTH BOLTS.

   B. ALL U-BOLTS, ASTM A193 GRADE B7

   C. ALL NUTS, ASTM A563 CARBON AND ALLOY STEEL NUTS.

   D. ALL WASHERS, ASTM F436 HARDENED STEEL WASHERS.
3. ALL CONNECTIONS NOT FULLY DETAILED ON THESE PLANS SHALL BE DETAILED BY THE STEEL FABRICATOR IN ACCORDANCE WITH AISC SPECIFICATION FOR MANUAL OF STEEL CONSTRUCTION, LOAD AND RESISTANCE FACTOR DESIGN, 15TH EDITION.
4. HOLES SHALL NOT BE FLAME CUT THRU STEEL UNLESS APPROVED BY THE ENGINEER.
5. HOT-DIP GALVANIZE ALL ITEMS UNLESS OTHERWISE NOTED, AFTER FABRICATION WHERE PRACTICABLE. GALVANIZING: ASTM A123, ASTM, A153/A153M OR ASTM A653/A653M, G90, AS APPLICABLE.
6. REPAIR DAMAGED SURFACES WITH GALVANIZING REPAIR METHOD AND PAINT CONFORMING TO ASTM A780 OR BY APPLICATION OF STICK OR THICK PASTED MATERIAL SPECIFICALLY DESIGNED FOR REPAIR OF GALVANIZING. CLEAN AREAS TO BE REPAIRED AND REMOVE SLAG FROM WELDS. HEAT SURFACES TO WHICH STICK OR PASTE MATERIAL IS APPLIED, WITH A TORCH TO A TEMPERATURE SUFFICIENT TO MELT THE METALLICS IN STICK OR PASTED; SPREAD MOLTEN MATERIAL UNIFORMLY OVER SURFACES TO BE COATED AND WIPE OFF EXCESS MATERIAL.
7. A NUT LOCKING DEVICE SHALL BE INSTALLED ON ALL PROPOSED AND/OR REPLACED BOLTS.
8. ALL PROPOSED AND/OR REPLACED BOLTS SHALL BE OF SUFFICIENT LENGTH TO EXCLUDE THE THREADS FROM THE SHEAR PLANE.
9. ALL PROPOSED AND/OR REPLACED BOLTS SHALL BE OF SUFFICIENT LENGTH SUCH THAT THE END OF THE BOLT BE AT LEAST FLUSH WITH THE FACE OF THE NUT. IT IS NOT PERMITTED FOR THE BOLT END TO BE BELOW THE FACE OF THE NUT AFTER TIGHTENING IS COMPLETED.
10. GALVANIZED ASTM A325 BOLTS SHALL NOT BE REUSED.

BOLT TIGHTENING PROCEDURE

1. CONNECTION BOLTS SUBJECT TO DIRECT TENSION SHALL BE INSTALLED AND TIGHTENED AS PER SECTION 8.2 OF THE AISC SPECIFICATION FOR STRUCTURAL JOINTS USING A325 OR A490 BOLTS, LOCATED IN THE AISC MANUAL OF STEEL CONSTRUCTION. THE INSTALLATION PROCEDURE IS PARAPHRASED AS FOLLOWS:
2. FASTENERS SHALL BE INSTALLED IN PROPERLY ALIGNED HOLES AND TIGHTENED BY ONE OF THE METHODS DESCRIBED IN SUBSECTION 8.2.1 THROUGH 8.2.4.
   8.2.1 TURN-OF-THE-NUT TIGHTENING. BOLTS SHALL BE INSTALLED IN ALL HOLES OF THE CONNECTION AND BROUGHT TO A SNUG TIGHT CONDITION AS DEFINED IN SECTION 8.1, UNTIL ALL THE BOLTS ARE SIMULTANEOUSLY SNUG TIGHT AND THE CONNECTION IS FULLY COMPACTED. FOLLOWING THIS INITIAL OPERATION ALL BOLTS IN THE CONNECTION SHALL BE TIGHTENED FURTHER BY THE APPLICABLE AMOUNT OF ROTATION SPECIFIED ABOVE. DURING THE TIGHTENING OPERATION THERE SHALL BE NO ROTATION OF THE PART NOT TURNED BY THE WRENCH. TIGHTENING SHALL PROGRESS SYSTEMATICALLY FROM THE MOST RIGID PART OF THE JOINT IN A MANNER THAT WILL MINIMIZE RELAXATION OF PREVIOUSLY PRETENSIONED BOLTS.
3. TIGHTEN CONNECTION BOLTS BY AISC - "TURN OF THE NUT" METHOD, USING THE CHART BELOW.

BOLT LENGTHS UP TO AND INCLUDING FOUR DIA.

½"	BOLTS UP TO AND INCLUDING 2.0 INCH LENGTH	+⅓ TURN BEYOND SNUG TIGHT
⅝"	BOLTS UP TO AND INCLUDING 2.5 INCH LENGTH	+⅓ TURN BEYOND SNUG TIGHT
¾"	BOLTS UP TO AND INCLUDING 3.0 INCH LENGTH	+⅓ TURN BEYOND SNUG TIGHT
⅞"	BOLTS UP TO AND INCLUDING 3.5 INCH LENGTH	+⅓ TURN BEYOND SNUG TIGHT
1"	BOLTS UP TO AND INCLUDING 4.0 INCH LENGTH	+⅓ TURN BEYOND SNUG TIGHT

BOLT LENGTHS OVER FOUR DIA. BUT NOT EXCEEDING EIGHT DIA.

½"	BOLTS 2.25 TO 4.0 INCH LENGTH	+½ TURN BEYOND SNUG TIGHT
⅝"	BOLTS 2.75 TO 5.0 INCH LENGTH	+½ TURN BEYOND SNUG TIGHT
¾"	BOLTS 3.25 TO 6.0 INCH LENGTH	+½ TURN BEYOND SNUG TIGHT
⅞"	BOLTS 3.75 TO 7.0 INCH LENGTH	+½ TURN BEYOND SNUG TIGHT
1"	BOLTS 4.25 TO 8.0 INCH LENGTH	+½ TURN BEYOND SNUG TIGHT

4. ALL OTHER BOLTED CONNECTIONS SHALL BE BROUGHT TO A SNUG TIGHT CONDITION AS DEFINED IN SECTION 8.1 OF THE SPECIFICATION.

FOUNDATION NOTES

FOUNDATION GENERAL NOTES

1. FOUNDATION INSTALLATION SHALL BE SUPERVISED BY PERSONNEL KNOWLEDGEABLE AND EXPERIENCED WITH THE PROPOSED FOUNDATION TYPE. CONSTRUCTION SHALL BE IN ACCORDANCE WITH GENERALLY ACCEPTED PRACTICES AND IN A GOOD WORKMANLIKE MANNER.
2. CONTRACTOR TO VERIFY DIMENSIONS WITH ORIGINAL TOWER DRAWINGS. ETS SHALL BE NOTIFIED OF ANY DISCREPANCIES BETWEEN FIELD MEASURED DIMENSIONS AND ORIGINAL TOWER DRAWINGS.
3. FOUNDATION DESIGN MODIFICATIONS MAY BE REQUIRED IN THE EVENT THE DESIGN PARAMETERS ARE NOT APPLICABLE FOR THE SUBSURFACE CONDITIONS ENCOUNTERED DURING CONSTRUCTION.
4. FOR FOUNDATION TOLERANCES, SEE ORIGINAL TOWER DRAWINGS.
5. THE FOUNDATION MODIFICATION DESIGN IS IN ACCORDANCE WITH GENERALLY ACCEPTED PROFESSIONAL ENGINEERING PRINCIPLES AND PRACTICES WITHIN THE LIMITS OF SUBSURFACE DATA PROVIDED.
6. THE FOUNDATION DEPTH INDICATED IS BASED ON THE GRADE LINE DESCRIBED IN THE REFERENCE GEOTECHNICAL REPORT. FOUNDATION MODIFICATION MAY BE REQUIRED IN THE EVENT CUT OR FILL OPERATIONS HAVE TAKEN PLACE SUBSEQUENT TO THE GEOTECHNICAL INVESTIGATION.
7. THE FOUNDATION DESIGN ASSUMES THAT INSTALLATION METHODS WILL INCORPORATE THE PROCEDURES RECOMMENDED IN THIS REPORT.
8. THE FOUNDATION DESIGN ASSUMES FIELD INSPECTIONS WILL BE PERFORMED TO VERIFY THAT CONSTRUCTION MATERIALS, INSTALLATION METHODS, AND ASSUMED DESIGN PARAMETERS ARE ACCEPTABLE BASED ON THE CONDITIONS AT THE SITE.
9. THE FOUNDATION DESIGN ASSUMES NO CONSTRUCTION JOINTS, HOWEVER, CONSTRUCTION JOINTS SHALL BE PERMITTED UPON APPROVAL BY THE OWNER/ENGINEER.

EXCAVATION

1. WORK SHALL BE IN ACCORDANCE WITH LOCAL CODES AND SAFETY REGULATIONS. PROCEDURES FOR THE PROTECTION OF EXCAVATIONS, EXISTING CONSTRUCTION, AND UTILITIES SHALL BE ESTABLISHED PRIOR TO BEGINNING WORK.
2. THE SIDES OF THE EXCAVATION SHALL BE ROUGH AND FREE OF CUTTINGS.
3. LOOSE MATERIAL TO BE REMOVED FROM THE BOTTOM OF EXCAVATION PRIOR TO CONCRETE PLACEMENT.

REINFORCING STEEL

1. THE REINFORCING STEEL SHALL CONFORM TO THE REQUIREMENTS OF ASTM A-615, GRADE 60. IT SHALL BE DEFORMED AND SPLICES SHALL NOT BE ALLOWED UNLESS OTHERWISE NOTED.
2. WELDING IS PROHIBITED ON REINFORCING STEEL AND EMBEDMENTS.
3. REINFORCING CAGES SHALL BE BRACED TO RETAIN PROPER DIMENSIONS DURING HANDLING AND THROUGHOUT PLACEMENT OF CONCRETE. WHEN TEMPORARY CASING IS UTILIZED, BRACING SHALL BE ADEQUATE TO RESIST FORCES OCCURRING FROM FLOWING CONCRETE DURING CASING EXCAVATION.
4. SPACERS SHALL BE ATTACHED INTERMITTENTLY THROUGHOUT THE ENTIRE LENGTH OF TIEBACK REINFORCING TO INSURE CONCENTRIC PLACEMENT OF CASING IN EXCAVATIONS.
5. MINIMUM CONCRETE COVER FOR REINFORCEMENT SHALL BE 3" UNLESS OTHERWISE NOTED. APPROVED SPACERS SHALL BE USED TO INSURE A 3" MINIMUM COVER FOR REINFORCEMENT.
6. THE CONCRETE COVER FROM THE TOP OF THE FOUNDATION TO THE ENDS OF THE VERTICAL REINFORCEMENT SHALL NOT BE LESS THAN 3".

FOUNDATION NOTES (CONTINUED)

CONCRETE

1. WORK SHALL BE IN ACCORDANCE WITH THE ACI 318-14, "BUILDING CODE REQUIREMENTS FOR STRUCTURAL CONCRETE AND COMMENTARY".
2. THE CONCRETE SHALL DEVELOP A MINIMUM COMPRESSIVE STRENGTH OF 3000-PSI IN 28 DAYS.
3. ANY CONCRETE EXPOSED TO WEATHER SHALL BE AIR-ENTRAINED AS REQUIRED BY ACI 318-14.
4. PROPORTIONS OF CONCRETE MATERIALS SHALL BE SUITABLE FOR THE INSTALLATION METHOD UTILIZED AND SHALL RESULT IN DURABLE CONCRETE FOR RESISTANCE TO LOCAL ANTICIPATED AGGRESSIVE ACTIONS. THE DURABILITY REQUIREMENTS OF ACI 318-14 SHALL BE SATISFIED BASED ON THE CONDITIONS EXPECTED AT THE SITE.
5. CONCRETE SHALL BE PLACED IN A MANNER THAT WILL PREVENT SEGREGATION OF CONCRETE MATERIALS, INFILTRATION OF WATER OR SOIL, AND OTHER OCCURRENCES THAT MAY DECREASE THE STRENGTH OR DURABILITY OF THE FOUNDATION.
6. FREE FALL CONCRETE MAY BE USED PROVIDED FALL IS VERTICAL DOWN WITHOUT HITTING THE SIDES OF THE EXCAVATION, FORMWORK, REINFORCING BARS, FORM TIES, CAGE BRACING, OR OTHER OBSTRUCTIONS. UNDER NO CIRCUMSTANCES SHALL CONCRETE FALL THROUGH WATER.
7. THE MAXIMUM SIZE OF THE AGGREGATE SHALL NOT EXCEED A SIZE SUITABLE FOR THE INSTALLATION METHODS UTILIZED OR 2/3-CLEAR DISTANCE BEHIND OR BETWEEN REINFORCING. THE MAXIMUM SIZE MAY BE INCREASED TO 2/3-CLEAR DISTANCE PROVIDED WORKABILITY AND METHODS OF CONSOLIDATION SUCH AS VIBRATING WILL PREVENT HONEYCOMBS AND VOIDS.

FINISHING

1. THE TOP OF THE FOUNDATION SHALL BE SLOPED TO DRAIN WITH A FLOATED FINISH.
2. THE EXPOSED EDGES OF THE CONCRETE SHALL BE CHAMFERED 1" X 1".

EPOXY NOTES

1. EPOXY AGENTS SHOULD BE ALLOWED TO CURE ACCORDING TO MANUFACTURERS RECOMMENDATIONS.
2. ALL HARDWARE ASSEMBLY AND MANUFACTURER'S INSTRUCTIONS SHALL BE FOLLOWED; ANY CONTRADICTION BETWEEN THE MANUFACTURER'S RECOMMENDATIONS AND THESE DRAWINGS ARE TO BE BROUGHT IMMEDIATELY TO THE ATTENTION OF THE ENGINEER AND OWNER.
3. ANY CONTRACTOR INSTALLING ADHESIVE ANCHORING SYSTEMS SHALL BE TRAINED, IN PERSON BY A MANUFACTURER'S REPRESENTATIVE, ON THE PROPER INSTALLATION TECHNIQUES. THIS TRAINING SHALL INCLUDE PROPER DRILLING, HOLE CLEANING, AND INSTALLATION METHODS FOR THE ADHESIVE ANCHORING SYSTEM AND CONSTRUCTION CONDITIONS ON THIS PROJECT. ALL TRAINING TO BE CONDUCTED PRIOR TO CREWS STEPPING ON SITE. IT IS THE RESPONSIBILITY OF THE CONTRACTOR TO CONTACT MANUFACTURER REPRESENTATIVE TO SET UP TRAINING, ETS IS NOT RESPONSIBLE FOR ANY COST OCCURRED FOR OR DURING ADHESIVE ANCHORING SYSTEM TRAINING.

SOIL COMPACTION

1. SUBGRADE PREPARATION
   - 1.1. SHAPE TOP OF SUBGRADE TO THE LINES AND GRADES SHOWN ON THE DRAWINGS.
   - 1.2. MAINTAIN TOP OF SUBGRADE IN A FREE-DRAINING CONDITION.
   - 1.3. DO NOT STOCKPILE MATERIALS ON TOP OF SUBGRADE UNLESS AUTHORIZED BY CONSTRUCTION MANAGER.
   - 1.4. FOR SUBGRADES CONSISTING OF IN-PLACE NATIVE SOILS, SOILS SHALL BE FREE OF CUTTING AND OTHER LOOSE MATERIAL AND SHALL MEET THE MINIMUM BEARING CAPACITY REQUIREMENTS NOTES UNDER SOIL STRENGTH
   - 1.5. FOR SUBGRADES CONSISTING OF PLACED STRUCTURAL FILL, STRUCTURAL FILL SHOULD BE PLACED IN 6 INCH LIFTS AND COMPACTED TO A MINIMUM OF 95 PERCENT OF THE MAXIMUM DRY DENSITY AS OBTAINED BY THE STANDARD PROCTOR METHOD
   - 1.6. CONSTRUCT TOP OF SUBGRADE WITHIN ONE INCH OF ESTABLISHED GRADE AND CROSS-SECTION.

SOIL STRENGTH

1. FOUNDATION DESIGN IS BASED ON A 2000 PSF SOIL BEARING CAPACITY. IF OTHER CONDITIONS EXIST, FOUNDATION SHALL BE REDESIGNED. CONTRACTOR SHALL HAVE SOIL BEARING CAPACITY VERIFIED BY A LICENSED PROFESSIONAL GEOTECHNICAL ENGINEER PRIOR TO INITIATION OF CONSTRUCTION ACTIVITIES.

WELDING NOTES

1. ALL WELDING SHALL BE IN ACCORDANCE WITH THE AWS D1.1/D1.1M: 2015 "STRUCTURAL WELDING CODE-STEEL".
2. ALL WELDING SHALL BE PERFORMED BY AWS CERTIFIED WELDERS.
3. CONTRACTOR SHALL RETAIN AN AWS CERTIFIED WELD INSPECTOR TO PERFORM VISUAL INSPECTIONS ON FIELD WELDS. A LETTER AND REPORT SHALL BE ISSUED TO THE CONTRACTOR. CONTRACTOR SHALL SUBMIT LETTER AND REPORT TO TOWER OWNER.
4. GRIND THE SURFACE ADJACENT TO THE WELD FOR A DISTANCE OF 2" MINIMUM ALL AROUND. GRIND THE SURFACE OF THE ROD TO BE INSTALLED FOR A DISTANCE OF 2" MINIMUM ALL AROUND THE AREA TO BE WELDED. ENSURE BOTH AREAS ARE 100% FREE OF ALL GALVANIZING. SURFACES TO BE WELDED SHALL BE FREE FROM SCALE, SLAG, RUST, MOISTURE, GREASE OR ANY OTHER FOREIGN MATERIAL THAT WOULD PREVENT PROPER WELDING.
5. DO NOT WELD IF THE TEMPERATURE OF THE STEEL IN THE VICINITY OF THE WELD AREA IS BELOW 0°F. WHEN THE TEMPERATURE IS BETWEEN 0°F AND 32°F, PREHEAT AND MAINTAIN THE STEEL IN THE VICINITY OF THE WELD AREA AT 70°F DURING THE WELDING PROCESS.
6. DO NOT WELD ON WET OR FROST-COVERED SURFACES & PROVIDE ADEQUATE PROTECTION FROM HIGH WINDS.
7. FOR ALL WELDING, USE E70XX ELECTRODES.
8. AFTER FINAL INSPECTION, THE AREA OF THE WELDS, THE INSTALLATION AND ALL SURFACES DAMAGED BY WELDING OR GRINDING SHALL RECEIVE A COLD-GALVANIZED COATING. THIS COATING SHALL BE APPLIED BY BRUSH. THE GALVANIZING COMPOUND SHALL CONTAIN A MINIMUM OF 95% ± PURE ZINC. THE FINISHED COATING SHALL BE A MINIMUM THICKNESS OF 3 MILS.

PREPARED BY:

ENGINEERED TOWER SOLUTIONS

3227 WELLINGTON COURT
RALEIGH, NC 27615
919-782-2710
www.ets-pllc.com

PREPARED FOR:

CORPORATE SEAL OF WATAUGA COUNTY NORTH CAROLINA

SITE NAME:

POWDER HORN MOUNTAIN

SITE ADDRESS:
340 DEER RUN ROAD
STONY FORK, NC 28607

LATITUDE/LONGITUDE:
36.1754950°, -81.5142249°

SEAL: FIRM #: P-1016

NORTH CAROLINA PROFESSIONAL SEAL 027825 ENGINEER CHRISTOPHER G. FLY

05/30/2025

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SHEET TITLE:

GENERAL NOTES II

SHEET # GN-2 | CURRENT REV #: 2 | ETS #: 21099302

ABBREVIATIONS

ABC	AGGREGATE BASE COURSE
ABS	AIR BREAK SWITCH
A.C.	ASBESTOS CEMENT
A/C	AIR CONDITIONING
A.D.	AREA DRAIN
A.F.F.	ABOVE FINISHED FLOOR
ALT.	ALTERNATE
ALUM.	ALUMINUM
AMP.	AMPERES
A.O.	ACCESS OPENING
APPROX.	APPROXIMATELY
ARCH.	ARCHITECTURAL
ASPH.	ASPHALT
A.T.P.	ANTI-TERRORISM FORCE PROTECTION
A.W.W.A.	AMERICAN WATER WORKS ASSOCIATION
BLDG.	BUILDING
BM.	BENCH MARK
BOC	BACK OF CURB
BOL	BOLLARD
BRG.	BEARING
BVC	BEGIN VERTICAL CURVE
BVCE	BEGIN VERTICAL CURVE ELEVATION
BVCS	BEGIN VERTICAL CURVE STATION
C&G	CURB AND GUTTER
CATV	CABLE TELEVISION
CAP.	CAPACITY
C.B.	CATCH BASIN
CBL.	CABLE
CEM.	CEMENT
CER.	CERAMIC
C.F.M.	CUBIC FEET/MINUTE
C.F.S.	CUBIC FEET/SECOND
C.I.	CURB INLET
C.I.P.	CAST IRON PIPE
CIRC.	CIRCULATING
C.A.	CONSTRUCTION JOINT/CONTRACTION JOINT
C.L.	CENTER LINE
C.M.	CONCRETE MONUMENT
C.M.P.	CONCRETE METAL PIPE
C.M.U.	CONCRETE MASONRY UNIT
C.O.	CLEAN OUT
COL.	COLUMN
CONC.	CONCRETE
COND.	CONDENSATE
CONN.	CONNECTION
CONST.	CONSTRUCTION
CONT.	CONTINUOUS
COR	CONTRACTING OFFICERS REPRESENTATIVE
C.TO C.	CENTER TO CENTER
C.Y.	CUBIC YARD
DET.	DETAIL
DI	DROP INLET
DIA.	DIAMETER
DIFF.	DIFFUSER
DIM.	DIMENSION
D.I.P.	DUCTILE IRON PIPE
DISC.	DISCONNECT
D.A.	DUMMY JOINT
DN.	DOWN
DR.	DRAIN
D.S.	DOWN SPOUT
DW	DOMESTIC WATER
DWG.(S)	DRAWING(S)
EA.	EACH
E.F.	EXHAUST FAN
EG.	EXISTING GRADE
E.I.P.	EXISTING IRON PIPE
E.J.	EXPANSION JOINT
ELEC.	ELECTRIC
EL.	ELEVATION
E.M.	ELECTRIC METER
EOP	EDGE OF PAVEMENT
EQUIP.	EQUIPMENT
EVC	END VERTICAL CURVE
EVCE	END VERTICAL CURVE ELEVATION
EVCS	END VERTICAL CURVE STATION
EXH.	EXHAUST
EXP.JT.	EXPANSION JOINT
EXT.	EXTERIOR
EX./EXIST.	EXISTING
FC	FACE OF CURB
F.D.	FLOOR DRAIN
F.D.C.	FIRE DEPARTMENT CONNECTION
F.E.S.	FLARED END SECTION
F.F.E.	FINISHED FLOOR ELEVATION
FG	FINISHED GRADE
FH	FIRE HYDRANT
FIN.	FINISH FLOOR
FM	FORCE MAIN
FOC	FACE OF CURB
FT.	FOOT, FEET
FTG.	FOOTING
GA.	GAGE
GAL.	GALLON
GALV.	GALVANIZED
GC	GENERAL CONTRACTOR
G.F.E.	GOVERNMENT FURNISHED EQUIPMENT
GIS	GEOGRAPHIC INFORMATION SYSTEM
GL.	GAS LINE
GM	GAS METER
G.P.H.	GALLONS/HOUR
G.P.M.	GALLONS/MINUTE
GND.	GROUND
GOV'T	GOVERNMENT
GV	GATE VALVE
GW	GUY WIRE
HC	HANDICAP
HCP	HANDICAP PARKING
HCR	HANDICAP RAMP
HDW	HEADWALL
HP	HIGH POINT
HSS	HIGH STRENGTH STEEL
HT	HEIGHT
HYD	HYDRANT
ID.	INSIDE DIAMETER
INTX.	INTERSECTION
INV.	INVERT
ISL.	ISLAND
ITL.	INDEPENDENT TESTING LABORATORY
J.B.	JUNCTION BOX
JCT.	JUNCTION
JSOC	JOINT SPECIAL OPERATIONS COMMAND
JT.	JOINT
K	K VALVE
KVA	KILOVOLT AMPERE
KW	KILOWATT
L	LENGTH
LF	LINEAR FEET
LGT	LIGHT
LP	LIGHT POLE
LT	LEFT
MAX	MAXIMUM
MED	MEDIAN
MH	MANHOLE
MIN	MINIMUM
MJ	MECHANICAL JOINT
MON	MONUMENT
MTL	METAL
MW	MONITOR WELL / MICROWAVE
M.U.T.C.D	MANUAL ON UNIFORM TRAFFIC CONTROL DEVICES
N/A	NOT APPLICABLE
NAD 27	NORTH AMERICAN DATUM 1927
NAD 83	NORTH AMERICAN DATUM 1983
NBL	NORTH BOUND LINE
NC	NORMAL CROWN
NEMA	NATIONAL ELECTRICAL MANUFACTURES ASSOCIATION
NIC	NOT IN CONTRACT
NIP	NEW IRON PIPE
N.T.S.	NOT TO SCALE
O.U.	ON CENTER
O.V.	OUTSIDE DIAMETER
OH	OVERHEAD
OHE	OVERHEAD ELECTRIC
ONUS.	OLD NORTH UTILITY SERVICE
OVH	OVERHANG
P/A	PARKING AREA
PC.	POINT OF CURVATURE
PCC	POINT OF COMPOUND CURVATURE
PED	PEDESTAL
PER.	PERIMETER
PGL	PROPOSED GRADE LINE
PI	POINT OF INTERSECTION
PINC	POINT OF INTERSECTION ON CURVE
PIV	POST INDICATOR VALVE
PIV ELEV	POINT OF VERTICAL INTERSECTION ELEVATION
PLT	PLATE
PSF	POUNDS PER SQUARE FOOT
PSF	POUNDS/SQUARE FOOT
PSI	POUNDS/SQUARE INCH
PIV STA	POINT OF VERTICAL INTERSECTION STATION
PT	POINT
PVMT	PAVEMENT
RAD.	RADIUS
RCP	REINFORCED CONCRETE PIPE
REINF.	REINFORCING
REQ.	REQUIRED
REV	REVISED
R.P.Z.	REDUCED PRESSURE ZONE
RT	RIGHT
R/W	RIGHT OF WAY
RWM	RIGHT OF WAY MONUMENT
SAN	SANITARY SEWER
SB	SOIL BORING
SCH	SCHEDULE
SET	SETBACK
SF	SQUARE FEET
SHT	SHEET
SIA	SIAMESE CONNECTION
SIG	SIGNAL
SOTF	SECURITY OPERATIONS TRAINING FACILITY
SP	SIGNAL POLE
SPECS	SPECIFICATIONS
SQFT	SQUARE FEET
SR	STATE ROAD
SS	SANITARY SEWER
ST.	STATION
STD.	STANDARD
STM	STORM
STL	STEEL
SW	SIDEWALK
SWM	STORMWATER MANAGEMENT
T	TANGENT
TBM	TEMPORARY BENCHMARK
TERR	TERRA COTTA PIPE
TEL	TELEPHONE
TOC	TOP OF CURB
TOB	TOP OF BANK
TOS	TOP OF SLOPE
TOW	TOP OF WALL
TP	TELEPHONE POLE
TRANS	TRANSFORMER
TYP.	TYPICAL
U/C	UNDER CONSTRUCTION
U/G	UNDERGROUND
UNO	UNLESS NOTED OTHERWISE
UP	UTILITY POLE
VC	VERTICAL CURVE
VCP	VITRIFIED CLAY PIPE
VIF	VERIFY IN FIELD
WL	WATER LINE
WM	WATER METER
WSEL	WATER SURFACE ELEVATION
WV	WATER VALVE
WTR	WATER
WWF	WIRE WELD FABRIC

LINETYPES

- PARENT PROPERTY BOUNDARY
- ADJACENT PROPERTY BOUNDARY
- EASEMENT
- LEASE AREA
- R/W — RIGHT OF WAY
- SF — SILT FENCE
- X — X — CHAIN-LINK FENCE
- UGW — UNDERGROUND WATER
- UGP — UGP — UNDERGROUND POWER
- OHP — OVERHEAD POWER
- ACP — ALTERNATING CURRENT POWER
- DCP — DIRECT CURRENT POWER
- FO/DC — FIBER/DC POWER COMPOSITE CABLE
- HYBRID — HYBRID CABLE
- UGF — UGF — UNDERGROUND FIBER
- OHF — OVERHEAD FIBER
- MMF — MULTI-MODE FIBER
- SMF — SINGLE-MODE FIBER
- SM6 — FIBER TRUNK - 6 STRAND
- SM12 — FIBER TRUNK - 12 STRAND
- SM24 — FIBER TRUNK - 24 STRAND
- SM48 — FIBER TRUNK - 48 STRAND
- SM96 — FIBER TRUNK - 96 STRAND
- SM144 — FIBER TRUNK - 144 STRAND
- SM288 — FIBER TRUNK - 288 STRAND
- GND — GROUND WIRE
- GAS — GAS LINE
- ETH — ETHERNET CABLE
- CAT6 — CAT6 CABLE
- CAT5 — CAT5 CABLE
- ALM — ALARM CABLE
- C — CONDUIT
- COAX — COAX FEEDLINE
- TFT-402 — COAX FEEDLINE / JUMPER - TFT-402
- PTS1-50 — COAX FEEDLINE / JUMPER - PTS1-50
- LMR-240 — COAX FEEDLINE / JUMPER - LMR-240
- LDF4-50 — COAX FEEDLINE / JUMPER - LDF4-50
- LDF1-50 — COAX FEEDLINE / JUMPER - LDF1-50
- HL4RPV — COAX FEEDLINE / JUMPER - HL4RPV
- FSJ4-50 — COAX FEEDLINE / JUMPER - FSJ4-50
- FSJ1-50 — COAX FEEDLINE / JUMPER - FSJ1-50
- AL4RPV — COAX FEEDLINE / JUMPER - AL4RPV

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PREPARED FOR:

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POWDER HORN MOUNTAIN

SITE ADDRESS:
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STONY FORK, NC 28607

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SEAL: FIRM #: P-1016

NORTH CAROLINA PROFESSIONAL SEAL 027825 ENGINEER CHRISTOPHER G. PLY

05/30/2025

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SHEET TITLE:

GENERAL NOTES III

SHEET # **GN-3** | CURRENT REV #: 2 | ETS #: 21099302

2018 APPENDIX B
BUILDING CODE SUMMARY
FOR ALL COMMERCIAL PROJECTS
(EXCEPT 1 AND 2-FAMILY DWELLINGS AND TOWNHOUSES)
(Reproduce the following data on the building plans sheet 1 or 2)

Name of Project: POWDER HORN MOUNTAIN
Address: 340 DEER RUN ROAD, STONY FORK, NC Zip Code 28607
Owner/Authorized Agent: WATAUGA COUNTY Phone # ( ) - E-Mail
Owned By: ☐ City/County ☐ Private ☒ State
Code Enforcement Jurisdiction: ☐ City ☒ County WATAUGA ☐ State

CONTACT:

DESIGNER	FIRM	NAME	LICENSE #	TELEPHONE #	E-MAIL
Architectural				( )	
Civil	Engineered Tower Solutions, PLLC	Christopher Ply	027825	(919) 523-0952	Chris.Ply@ets-pllc.com
Electrical				( )	
Fire Alarm				( )	
Plumbing				( )	
Mechanical				( )	
Sprinkler-Standpipe				( )	
Structural				( )	
Retaining Walls >5' High				( )	
Other				( )	

("Others" should include firms and individuals such as truss, precast, pre-engineered, interior designers, etc.)

2018 NC CODE FOR: ☒ New Construction ☐ Addition ☐ Renovation
☐ 1st Time Interior Completion
☐ Shell/Core
Phased Construction – Shell/Core
☐ Renovation

2018 NC EXISTING BUILDING CODE: ☒ Prescriptive ☐ Repair ☐ Chapter 14
Alteration: ☐ Level I ☐ Level II ☐ Level III
☐ Historic Property ☐ Change of Use

CONSTRUCTED:(date) _____ ORIGINAL OCCUPANCY(S) (Ch. 3):_____
RENOVATED: (date) _____ CURRENT OCCUPANCY(S) (Ch. 3):_____

RISK CATEGORY (table 1604.5) **Current:** ☐ I ☐ II ☐ III ☐ IV
Proposed: ☐ I ☐ II ☐ III ☐ IV

BASIC BUILDING DATA
Construction Type: (check all that apply) ☐ I-A ☐ I-B ☐ II-A ☐ II-B ☐ III-A ☐ III-B ☐ IV ☐ V-A ☐ V-B
Sprinklers: ☒ No ☐ Partial ☐ Yes ☐ NFPA 13 ☐ NFPA 13R ☐ NFPA 13D
Standpipes: ☒ No ☐ Yes Class ☐ I ☐ II ☐ III ☐ Wet ☐ Dry
Fire District: ☒ No ☐ Yes (Primary) **Flood Hazard Area:** ☐ No ☐ Yes
Special Inspections Required: ☒ No ☐ Yes

Gross Building Area:

FLOOR	EXISTING (SQ FT)	NEW (SQ FT)	RENO/ALTER (SQ FT)	SUB-TOTAL
3rd Floor				
2nd Floor				
Mezzanine				
1st Floor	0	219	0	219
Basement				
TOTAL				

ALLOWABLE AREA
Primary Occupancy Classification: SELECT ONE
Assembly ☐ A-1 ☐ A-2 ☐ A-3 ☐ A-4 ☐ A-5
Business ☐
Educational ☐
Factory ☐ F-1 Moderate ☐ F-2 Low
Hazardous ☐ H-1 Detonate ☐ H-2 Deflagrate ☐ H-3 Combust ☐ H-4 Health ☐ H-5 HPM
Institutional ☐ I-1 Condition ☐ 1 ☐ 2
☐ 1-2 Condition ☐ 1 2 ☐
☐ 1-3 Condition ☐ 1 2 ☐ 3 ☐ 4 ☐ 5 ☐
☐ 1-4
Mercantile ☐
Residential ☐ R-1 ☐ R-2 ☐ R-3 ☐ R-4
Storage ☐ S-1 Moderate ☐ S-2 Low ☐ High-piled
☐ Parking Garage ☐ Open ☐ Enclosed ☐ Repair Garage
Utility and Miscellaneous ☒

Accessory Occupancy Classification(s): _____
Incidental Uses (Table 509): _____
Special Uses (Chapter 4 – List Code Sections): _____
Special Provisions: (Chapter 5 – List Code Sections): _____
Mixed Occupancy: ☒ No ☐ Yes Separation: ____ Hr. Exception: _____

☐ Non-Separated Use (508.3)
The required type of construction for the building shall be determined by applying the height and area limitations for each of the applicable occupancies to the entire building. The most restrictive type of construction, so determined, shall apply to the entire building.

☐ Separated Use (508.4) -
See below for area calculations for each story, the area of the occupancy shall be such that the sum of the ratios of the actual floor area of each use divided by the allowable floor area for each use shall not exceed 1.

$$\frac{\text{Actual Area of Occupancy A}}{\text{Allowable Area of Occupancy A}} + \frac{\text{Actual Area of Occupancy B}}{\text{Allowable Area of Occupancy B}} \leq 1$$

_____ + _____ + ... = _____ ≤ 1.00

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NC APPENDIX B I

SHEET # GN-4 CURRENT REV #: 2
ETS #: 21099302

STORY NO.	DESCRIPTION AND USE	(A) BLDG AREA PER STORY (ACTUAL)	(B) TABLE 506.2[4] AREA	(C) AREA FOR FRONTAGE INCREASE[1,5]	(D) ALLOWABLE AREA PER STORY OR UNLIMITED[2,3]

1 Frontage area increases from Section 506.3 are computed thus:
a. Perimeter which fronts a public way or open space having 20 feet minimum width = _____ (F)
b. Total Building Perimeter = _____ (P)
c. Ratio (F/P) = _____ (F/P)
d. W = Minimum width of public way = _____ (W)
e. Percent of frontage increase I_f = 100 [F/P - 0.25] x W/30 = _____ (%)
2 Unlimited area applicable under conditions of Section 507.
3 Maximum Building Area = total number of stories in the building x D (maximum 3 stories) (506.2).
4 The maximum area of open parking garages must comply with Table 406.5.4
5 Frontage increase is based on the unsprinklered area value in Table 506.2.

ALLOWABLE HEIGHT

	ALLOWABLE (TABLE 503)	SHOWN ON PLANS	CODE REFERENCE[1]
Building Height in Feet (Table 504.3)[2]			
Building Height in Stories (Table 504.4)[3]			

1 Provide code reference if the "Show on Plans" quantity is not based on Table 504.3 or 504.4.
2 The maximum height of air traffic control towers must comply with Table 412.3.1
3 The maximum height of open parking garages must comply with Table 406.5.4

FIRE PROTECTION REQUIREMENTS

BUILDING ELEMENT	FIRE SEPARATION DISTANCE (FEET)	RATING REQ'D	RATING PROVIDED (W/_____* REDUCTION)	DETAIL # AND SHEET #	DESIGN # FOR RATED ASSEMBLY	SHEET # FOR RATED PENETRATION	SHEET # FOR RATED JOINTS
Structural Frame, including columns, girders, trusses							
Bearing Walls							
Exterior							
North							
East							
West							
South							
Interior							
Nonbearing Walls and Partitions							
Exterior walls							
North							
East							
West							
South							
Interior walls and partitions							
Floor Construction Including supporting beams and joists				VFP SHEET C-4.1			
Floor Ceiling Assembly							
Column Supporting Floors							
Roof Construction, including supporting beams and joists							
Roof Ceiling Assembly							
Column Supporting Roof							
Shaft Enclosures - Exit							
Shaft Enclosures - Other							
Corridor Separation							
Occupancy/Fire Barrier Separation							
Party/Fire Wall Separation							
Smoke Barrier Separation							
Smoke Partition							
Tenant/Dwelling Unit/ Sleeping Unit Separation							
Incidental Use Separation							

* Indicate section number permitting reduction

2018 NC Administrative Code and Policies Appendix B for Building

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NC APPENDIX B II

SHEET # GN-5 CURRENT REV #: 2
ETS #: 21099302

PERCENTAGE OF WALL OPENING CALCULATIONS

FIRE SEPARATION DISTANCE (FEET FROM PROPERTY LINES)	DEGREES OF OPENINGS PROTECTION (TABLE 705.8)	ALLOWABLE AREA (%)	ACTUAL SHOWN ON PLANS (%)

LIFE SAFETY SYSTEM REQUIREMENTS

Emergency Lighting: ☐ No ☒ Yes
Exit Signs: ☐ No ☒ Yes
Fire Alarm: ☒ No ☐ Yes
Smoke Detection Systems: ☐ No ☒ Yes ☐ Partial _____
Carbon Monoxide Detection: ☒ No ☐ Yes

LIFE SAFETY PLAN REQUIREMENTS

Life Safety Plan Sheet #: _____

- ☐ Fire and/or smoke rated wall locations (Chapter 7)
- ☐ Assumed and real property line locations (if not on the site plan)
- ☐ Exterior wall opening area with respect to distance to assumed property lines (705.8)
- ☐ Occupancy use for each area as it relates to occupant load calculation (Table 1004.1.2)
- ☐ Occupant loads for each area
- ☐ Exit sign location (1013)
- ☐ Exit access travel distances (1017)
- ☐ Common path of travel distances (1006.2.1 & 2006.3.2(1))
- ☐ Dead end lengths (1020.4)
- ☐ Clear exit widths for each exit door
- ☐ Maximum calculated occupant load capacity each exit door can accommodate based on egress width (1005.3)
- ☐ Actual occupant load for each exit door
- ☐ A separate schematic plan indicating where fire rated floor/ceiling and/or roof structure is provided for purposes of occupancy separation.
- ☐ Location of doors with panic hardware (1010.1.10)
- ☐ Location of doors with delayed egress locks and the amount of delay (1010.1.9.7)
- ☐ Location of doors with electromagnetic egress locks (1010.1.9.9)
- ☐ Location of doors equipped with hold-open devices
- ☐ Location of emergency escape windows (1030)
- ☐ The square footage of each fire area (202)
- ☐ The square footage of each smoke compartment for Occupancy Classification I-2 (407.5)
- ☐ Note any code exceptions or table notes that may have been utilized regarding the items above

PREFABRICATED SHELTER SECTION NOT APPLICABLE

ACCESSIBLE DWELLING UNITS
(SECTION 1107)

UNIT CLASSIFICATION	TOTAL UNITS	ACCESSIBLE UNITS REQUIRED	ACCESSIBLE UNITS PROVIDED	TYPE A UNITS REQUIRED	TYPE A UNITS PROVIDED	TYPE B UNITS REQUIRED	TYPE B UNITS PROVIDED	TOTAL ACCESSIBLE UNITS PROVIDED

ACCESSIBLE PARKING
(SECTION 1106)

LOT OR PARKING AREA	TOTAL # OF PARKING SPACES		# OF ACCESSIBLE SPACES PROVIDED		TOTAL # ACCESSIBLE PROVIDED
	REQUIRED	PROVIDED	96" SPACES	132" SPACES	
TOTAL					

PLUMBING FIXTURE REQUIREMENTS
(TABLE 2902.1)

USE		WATERCLOSETS			URINALS	LAVATORIES			SHOWERS / TUBS	DRINKING FOUNTAINS	
		MALE	FEMALE	UNISEX		MALE	FEMALE	UNISEX		REGULAR	ACCESSIBLE
SPACE	EXIST'G										
	NEW										
	REQ'D										

SPECIAL APPROVALS

Special approval: (Local Jurisdiction, Department of Insurance, SCO, DPI, DHHS, ICC, etc., describe below)

_____

_____

2018 NC Administrative Code and Policies Appendix B for Building

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SEAL: FIRM #: P-1016

NORTH CAROLINA PROFESSIONAL SEAL 027825 ENGINEER CHRISTOPHER G. PLY

05/30/2025

REV	DATE	DETAILS
0	12/22/2022	CONSTRUCTION
1	02/07/2025	CONSTRUCTION
2	05/30/2025	COMPOUND REDESIGN
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SHEET TITLE:
NC APPENDIX B III

SHEET # GN-6 | CURRENT REV #: 2 | ETS #: 21099302

ENERGY SUMMARY

ENERGY REQUIREMENTS:
The following data shall be considered minimum and any special attribute required to meet the North Carolina Energy Conservation Code shall also be provided. Each Designer shall furnish the required portions of the project information for the plan data sheet. If performance method, state the annual energy cost for the standard reference design vs annual energy cost for the proposed design.

Existing building envelope complies with code: ☐ No ☐ Yes (The remainder of this section is not applicable)

Exempt Building: ☐ No ☐ Yes (Provide Code or Statutory reference): _____

Climate Zone: ☐ 3A ☐ 4A ☐ 5A

Method of Compliance: Energy Code ☐ Performance ☒ Prescriptive
ASHRAE 90.1 ☐ Performance ☐ Prescriptive
(If "Other" specify source here) _____

THERMAL ENVELOPE (Prescriptive method only)

Roof/ceiling Assembly (each assembly)
Description of assembly: CONCRETE ROOF + (2) LAYERS OF 1-1/2" RIGID INSULATION + 3/4" OSB PANEL
U-Value of total assembly: 0.10
R-Value of insulation: 9.8
Skylights in each assembly:
U-Value of skylight:
Total square footage of skylights in each assembly:

Exterior Walls (each assembly)
Description of assembly: 4" CONCRETE + 2" THERMAX FOAM INSULATION + 3/4" FRP PANELING
U-Value of total assembly:
R-Value of insulation: R-13
Openings (windows or doors with glazing)
U-Value of assembly:
Solar heat gain coefficient:
Projection factor:
Door R-Values:

Walls below grade (each assembly)
Description of assembly: N/A
U-Value of total assembly:
R-Value of insulation:

Floors over unconditioned space (each assembly)
Description of assembly: N/A
U-Value of total assembly:
R-Value of insulation:

Floors slab on grade
Description of assembly: 5000psi CONCRETE W/ 1/8"x12"x12" STATIC DISSIPATIVE TILE W/ 4" BASE COVE
U-Value of total assembly:
R-Value of insulation:
Horizontal/Vertical requirement:
Slab Heated: NO

2018 APPENDIX B
BUILDING CODE SUMMARY FOR ALL COMMERCIAL PROJECTS
STRUCTURAL DESIGN
(PROVIDE ON THE STRUCTURAL SHEETS IF APPLICABLE)

DESIGN LOADS:

Importance Factors: Snow (I_s) 1
Seismic (I_e) 1.25

Live Loads: Roof N/A psf
Mezzanine N/A psf
Floor N/A psf

Ground Snow Load: N/A psf

Wind Load: Ultimate Wind Speed
Exposure Category (ASCE-7)

PENDING STRUCTURAL ANALYSIS

SEISMIC DESIGN CATEGORY: ☐ C ☐ D
Provide the following Seismic Design P
Risk Category (Table 160
Spectral Response A TBD %g S1 TBD %g
Site Classification ☐ B ☐ C ☐ D ☐ E ☐ F
☐ Field Test ☐ Presumptive ☐ Historical Data
Basic structu ☐ Bearing Wall ☐ Dual w/Special Moment Frame
☐ Building Frame ☐ Dual w/Intermediate R/C or Special Steel
☐ Moment Frame ☐ Inverted Pendulum
Analysis Procedure ☐ Simplified ☐ Equivalent Lateral Force ☐ Dynamic
Architectural, Mechanical, Components anchored? ☐ Yes ☐ No ☐ N/A

LATERAL DESIGN CONTROL: Earthquake ☐ Wind ☒

SOIL BEARING CAPACITIES:
Field Test (provide copy of test report) N/A psf
Presumptive Bearing capacity TBA psf
Pile size, type, and capacity N/A

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3227 WELLINGTON COURT
RALEIGH, NC 27615
919-782-2710
www.ets-pllc.com

PREPARED FOR:
CORPORATE SEAL OF WATAUGA COUNTY NORTH CAROLINA

SITE NAME:
POWDER HORN MOUNTAIN

SITE ADDRESS:
340 DEER RUN ROAD
STONY FORK, NC 28607

LATITUDE/LONGITUDE:
36.1754950°, -81.5142249°

SEAL: FIRM #: P-1016
NORTH CAROLINA PROFESSIONAL SEAL 027825 ENGINEER CHRISTOPHER G. PLY
05/30/2025

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SHEET TITLE:
NC APPENDIX B IV

SHEET # GN-7 CURRENT REV #: 2
ETS #: 21099302

2018 APPENDIX B
BUILDING CODE SUMMARY FOR ALL COMMERCIAL PROJECTS
MECHANICAL DESIGN
(PROVIDE ON THE MECHANICL SHEETS IF APPLICABLE)

MECHANICAL SUMMARY

MECHANICAL SYSTEMS, SERVICE SYSTEMS AND EQUIPMENT

Thermal Zone
winter dry bulb: _____
summer dry bulb: _____

Interior design conditions
winter dry bulb: _____
summer dry bulb: _____
relative humidity: _____

Building heating load: _____

Building cooling load: _____

Mechanical Spacing Conditioning System
Unitary
description of unit: BARD: W24A1-A05XWXXXJ
heating efficiency: 9.00 EER
cooling efficiency: 9.00 EER
size category of unit: 24,000 BTUH

Boiler
Size category. If oversized, state reason.: _____

Chiller
Size category. If oversized, state reason.: _____

List equipment efficiencies: _____

2018 APPENDIX B
BUILDING CODE SUMMARY FOR ALL COMMERCIAL PROJECTS
ELECTRICAL DESIGN
(PROVIDE ON THE ELECTRICAL SHEETS IF APPLICABLE)

ELECTRICAL SUMMARY

ELECTRICAL SYSTEM AND EQUIPMENT

Method of Compliance: Energy Code: ☐ Performance ☒ Prescriptive
ASHRAE 90.1: ☐ Performance ☐ Prescriptive

Lighting schedule (each fixture type)
lamp type required in fixture: 32W FL
number of lamps in fixture: 2
ballast type used in the fixture: ELEC
number of ballasts in fixture: 2
total wattage per fixture: 60
total interior wattage specified vs. allowed (whole building or space by space)
600 vs 331 (ONLY LIT WHEN OCCUPIED)
total exterior wattage specified vs. allowed

Additional Efficiency Package Options
(When using the 2018 NCECC; not required for ASHRAE 90.1)
☒ C406.2 More Efficient HVAC Equipment Performance
☒ C406.3 Reduced Lighting Power Density
☐ C406.4 Enhanced Digital Lighting Controls
☐ C406.5 On-Site Renewable Energy
☐ C406.6 Dedicated Outdoor Air System
☐ C406.7 Reduced Energy Use in Service Water Heating

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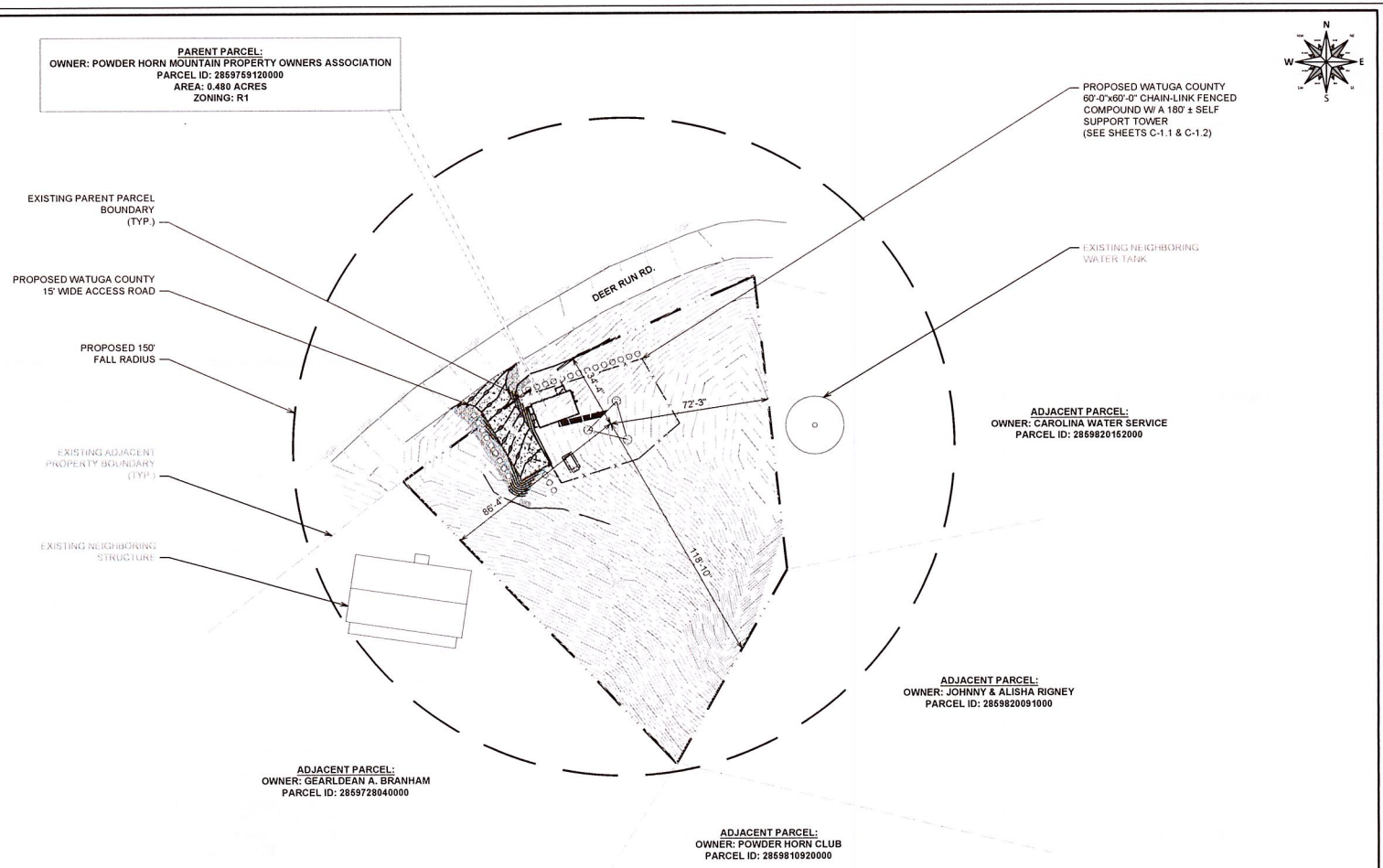
SHEET TITLE:
NC APPENDIX B IV

SHEET # GN-8 | CURRENT REV #: 2 | ETS #: 21099302



PROPOSED TOWER SETBACKS

PROPERTY BOUNDARY LINE	DISTANCE
NORTH	34'-4" ±
EAST	72'-3" ±
SOUTH	118'-10" ±
WEST	86'-4" ±

NOTES

1. SITE PLAN BASED ON SURVEY COMPLETED BY SAM, LLC. DATE 12/13/2022.
2. ALL INFORMATION SHOWN ON THIS PLAN IS FOR REFERENCE ONLY. CONTRACTOR TO VERIFY THAT ALL EXISTING INFORMATION IS AS INDICATED ON THE SITE PLAN, AND NOTIFY THE CONSTRUCTION MANAGER OF ANY DISCREPANCIES. ALL PERTINENT ITEMS AND DIMENSIONS ARE RECOMMENDED TO BE VERIFIED IN THE FIELD. ENGINEERED TOWER SOLUTIONS, PLLC IS NOT LIABLE AND DOES NOT ASSUME RESPONSIBILITY FOR THIS CONTENT.

OVERALL SITE PLAN

1" = 50'-0"

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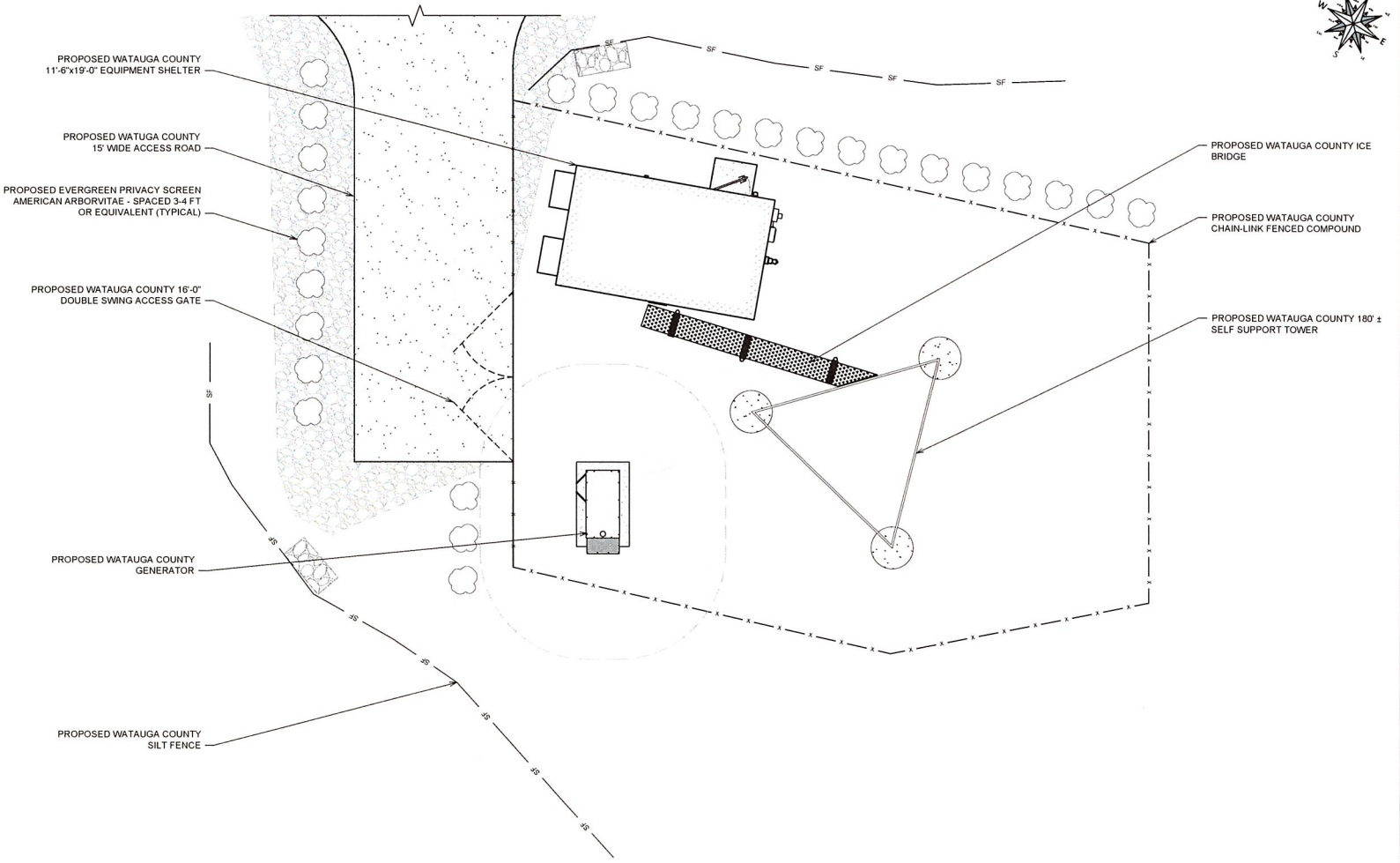
SHEET TITLE:
OVERALL SITE PLAN

SHEET #: C-1.0 | CURRENT REV #: 2 | ETS #: 21099302



DETAILED SITE PLAN

1" = 10'-0"

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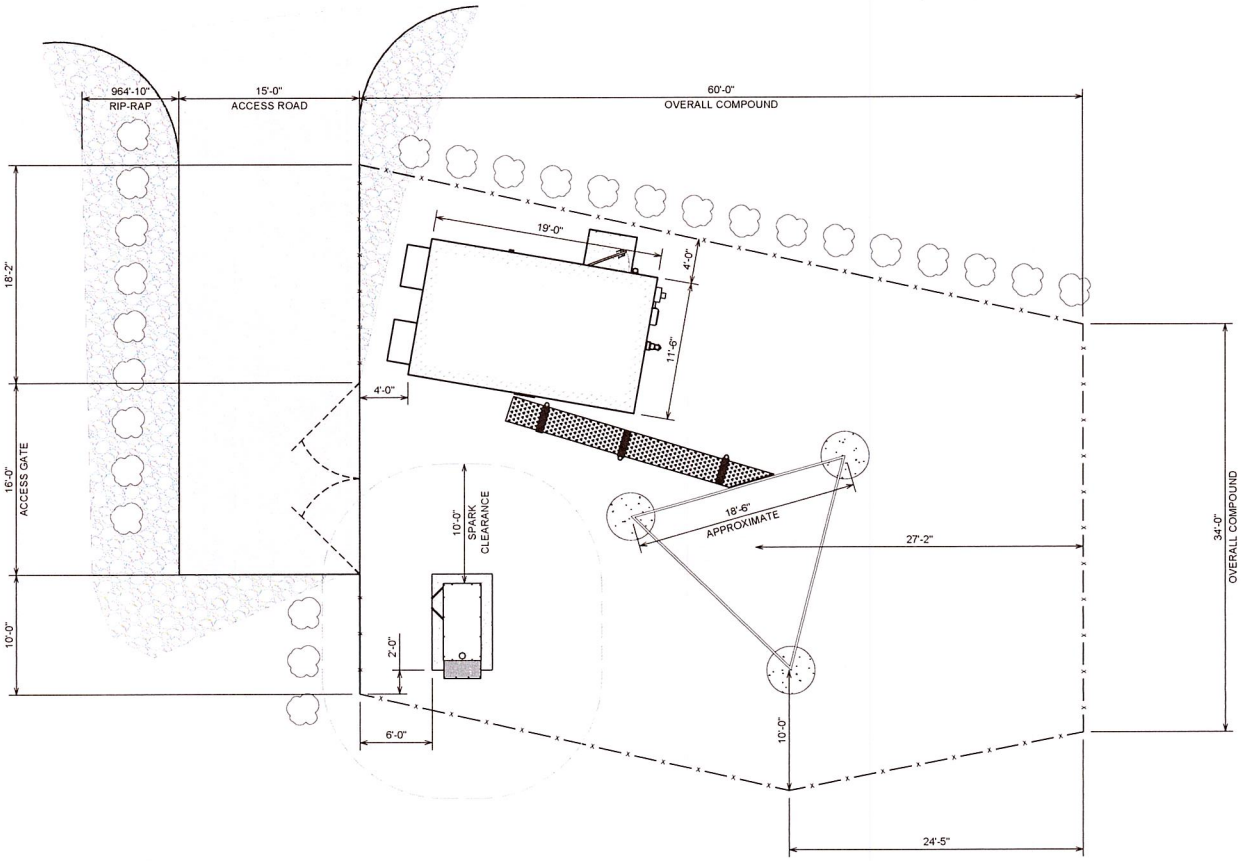
SHEET TITLE:

DETAILED SITE PLAN

SHEET # C-1.1 | CURRENT REV #: 2 | ETS #: 21099302



DIMENSIONED SITE PLAN

1" = 10'-0"

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919-782-2710
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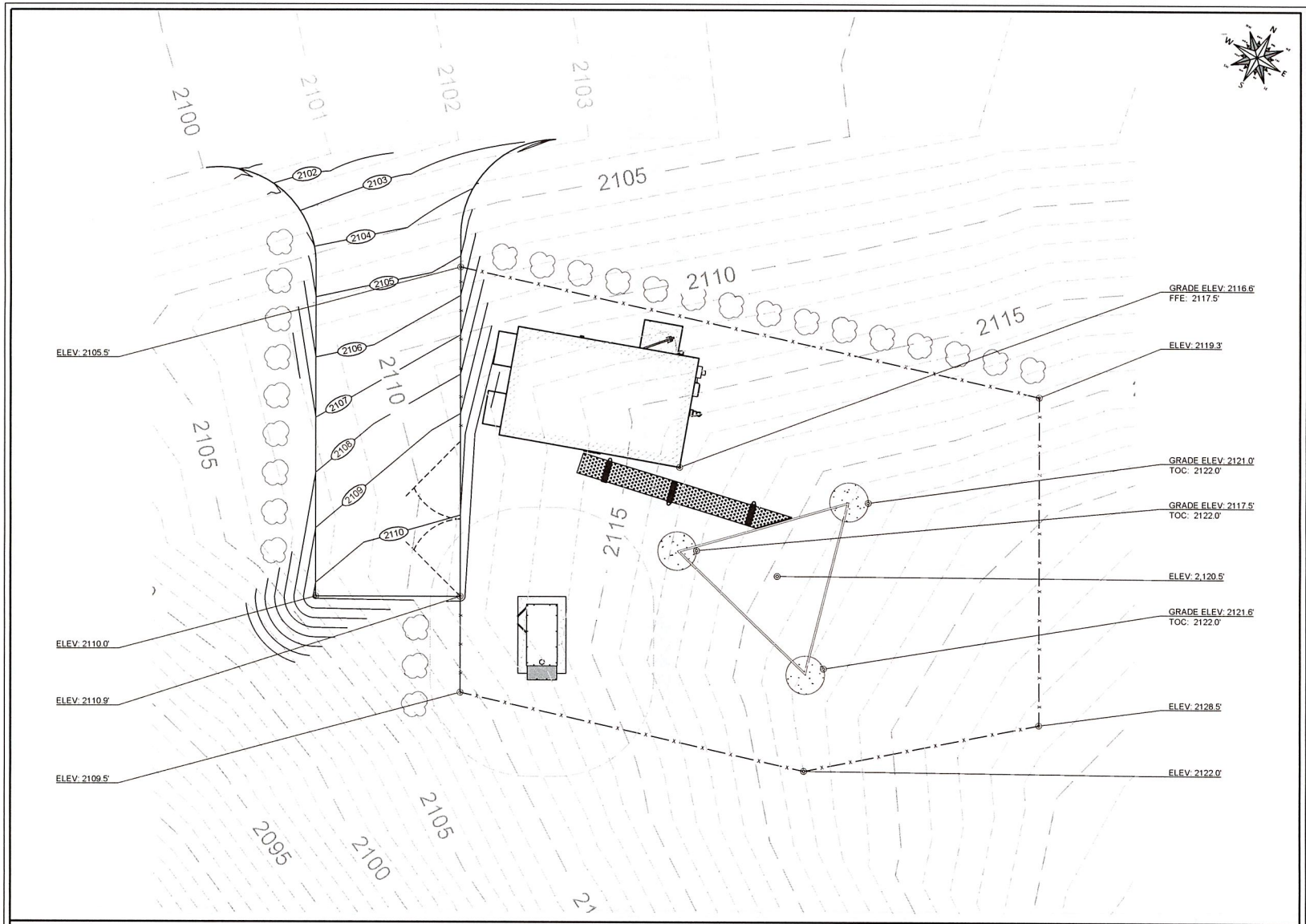
SHEET TITLE:
DIMENSIONED SITE PLAN

SHEET #: C-1.2 | CURRENT REV #: 2
ETS #: 21099302



GRADING PLAN

1" = 10'-0"

PREPARED BY:

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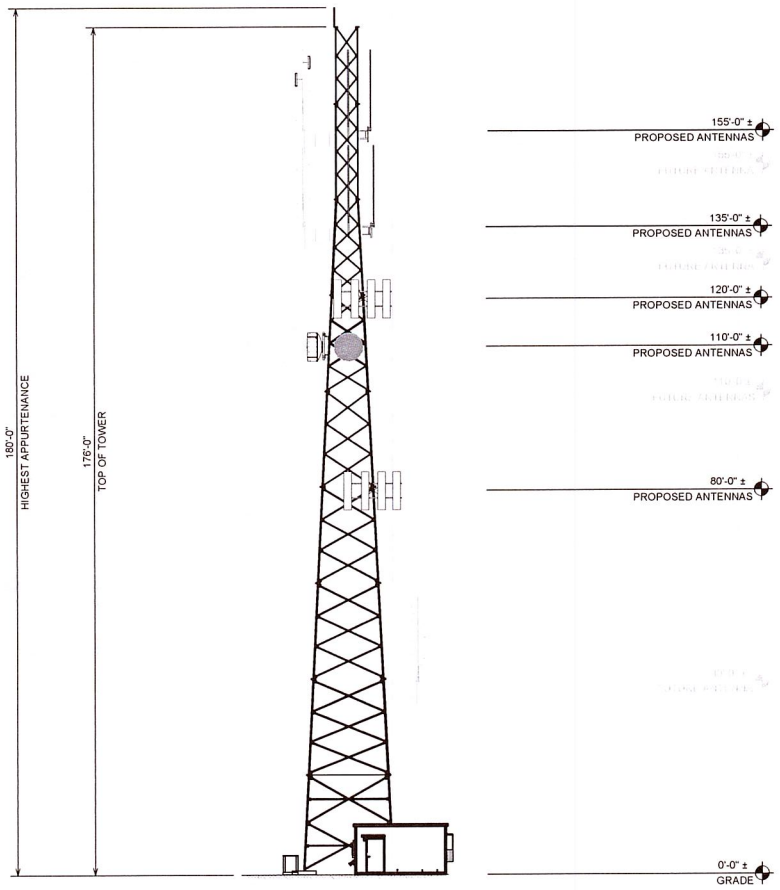
SHEET TITLE:
GRADING PLAN

SHEET # C-1.3 | CURRENT REV #: 2 | ETS #: 21099302



TOWER ELEVATION

1" = 30'-0"

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SHEET TITLE:
TOWER ELEVATION

SHEET # C-2 | CURRENT REV #: 2 | ETS #: 21099302

EXISTING ANTENNA SCHEDULE

OWNER	QTY.	SIZE (FT)	TYPE	MANUFACTURER - ANTENNA MODEL NUMBER	ANTENNA AZIMUTH	MOUNT ELEVATION	LEG	CABLE (QTY.) TYPE
WATAUGA COUNTY	1	-	OMNI	RFI - CC807-11	--	155'-0"	A	(1) 7/8" & (1) 1/2"
WATAUGA COUNTY	1	-	OMNI	RFI - CC807-11	--	155'-0"	B	(1) 7/8"
WATAUGA COUNTY	1	-	TTA	TTA	--	154'-0"	--	--
WATAUGA COUNTY (FUTURE)	1	-	DIPOLE	DECIBEL - DB220	--	155'-0"	C	(1) 7/8"
WATAUGA COUNTY	1	-	OMNI	RFI - CC807-11	--	135'-0"	A	(1) 1-5/8"
WATAUGA COUNTY	1	-	OMNI	RFI - CC807-11	--	135'-0"	B	(1) 1-5/8"
WATAUGA COUNTY (FUTURE)	1	-	DIPOLE	DECIBEL - DB220	--	135'-0"	C	(1) 7/8"
WATAUGA COUNTY	4		PANEL	Cellular Carrier	--	120'-0"	A,B,C	--
WATAUGA COUNTY	1	-	DISH	COMMSCOPE - HX6-6W-6WH	295.5°	110'-0"	C	(1) EU63
WATAUGA COUNTY (FUTURE)	1	-	DISH	COMMSCOPE - HX6-6W-WH	--	110'-0"	A	(1) EU63
WATAUGA COUNTY	4		PANEL	Cellular Carrier	--	80'-0"	A,B,C	--
WATAUGA COUNTY (FUTURE)	1	-	DIPOLE	DECIBEL - DB220	--	40'-0"	B	(1) 7/8"

ANTENNA LAYOUT

3/32" = 1'-0"

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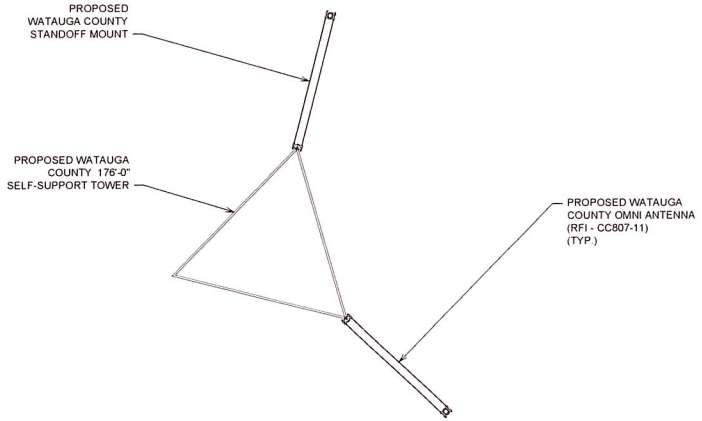
SHEET TITLE:

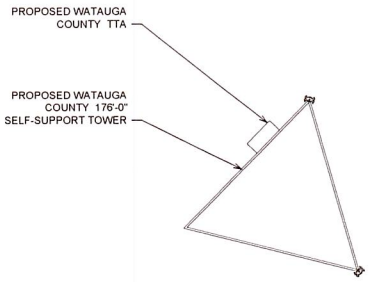
ANTENNA SCHEDULE & LAYOUT

SHEET # C-3 | CURRENT REV #: 2 | ETS #: 21099302



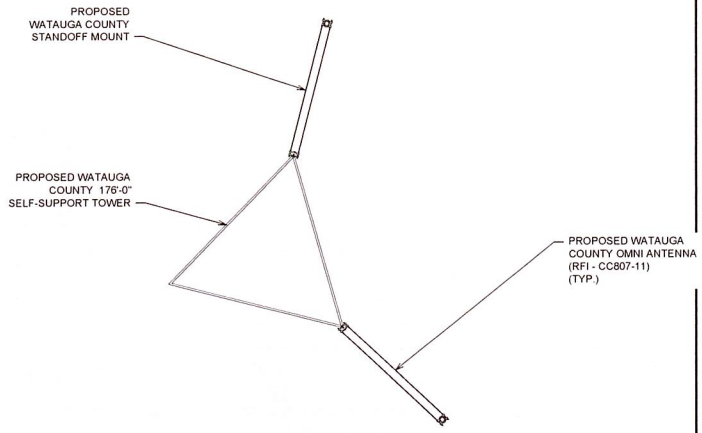
ANTENNA LAYOUT @ 155'-0"

N.T.S



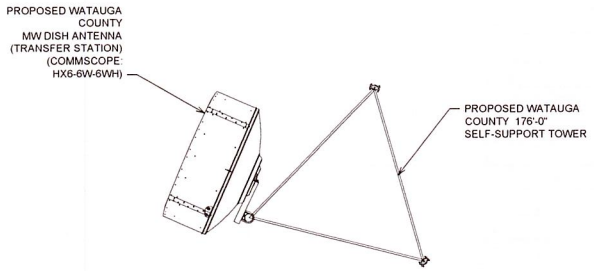
ANTENNA LAYOUT @ 154'-0"

N.T.S



ANTENNA LAYOUT @ 135'-0"

N.T.S



ANTENNA LAYOUT @ 110'-0"

N.T.S

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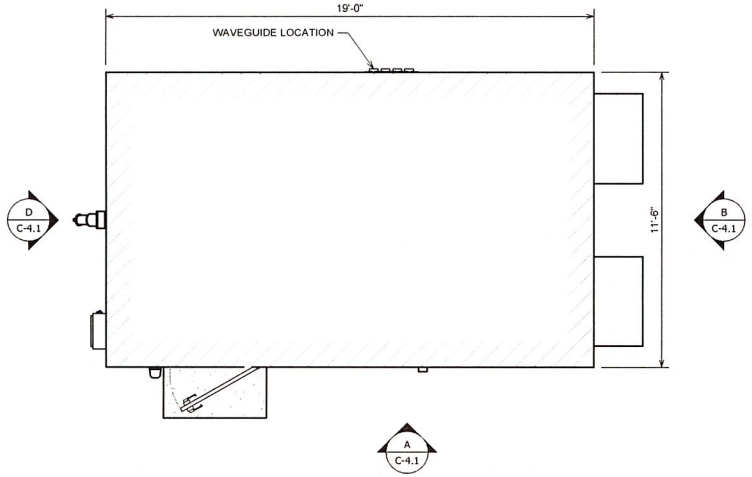
SHEET TITLE:

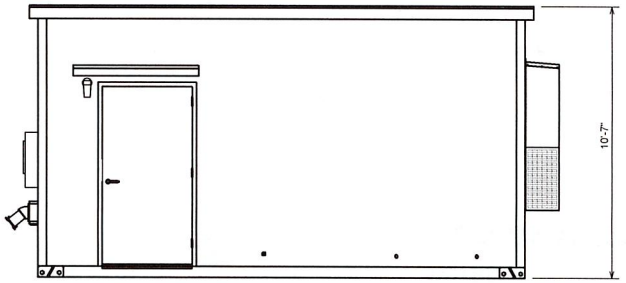
ANTENNA SCHEDULE & LAYOUT I

SHEET # C-3.1 | CURRENT REV #: 2 | ETS #: 21099302

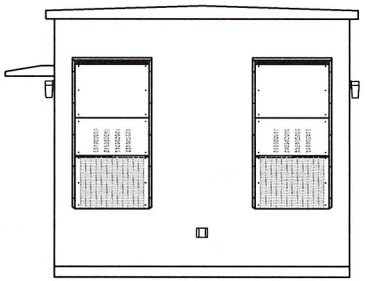
VFP: 11'-6" x 19'-0"
- MODEL #: 7458
- PREFABRICATED SHELTER



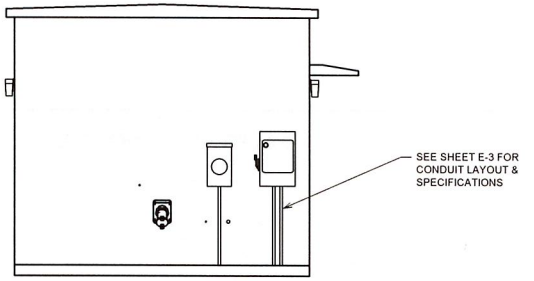
PLAN VIEW
N.T.S.



ELEVATION A
N.T.S.



ELEVATION B
N.T.S.



ELEVATION D
N.T.S.

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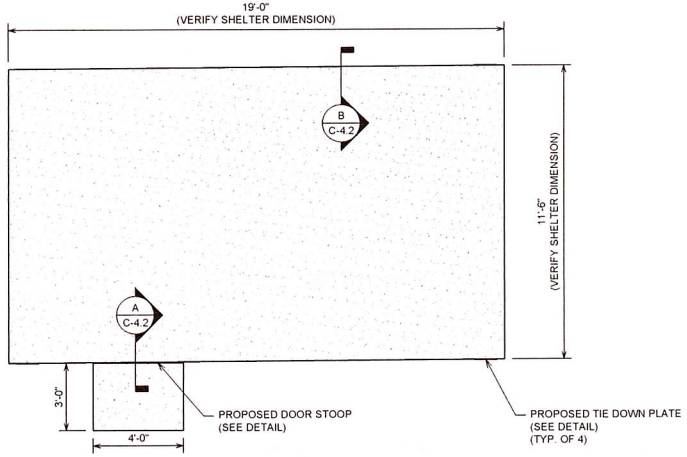
SHEET TITLE:
SHELTER DETAILS

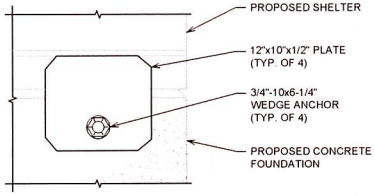
SHEET # C-4.1 | CURRENT REV #: 2 | ETS #: 21099302

NOTES
- SURFACE OF FINISHED SLAB SHALL BE LEVEL AND FLAT WITHIN 1/4"
- CONTRACTOR TO VERIFY WITH MANUFACTURER ACTUAL DIMENSIONS OF SHELTER PRIOR TO LAYING FOUNDATION
- SEE SHEET GN-3 FOR CONCRETE AND FOUNDATION NOTES



SHELTER CONCRETE FOUNDATION PLAN

N.T.S.



TIE DOWN PLATE DETAIL

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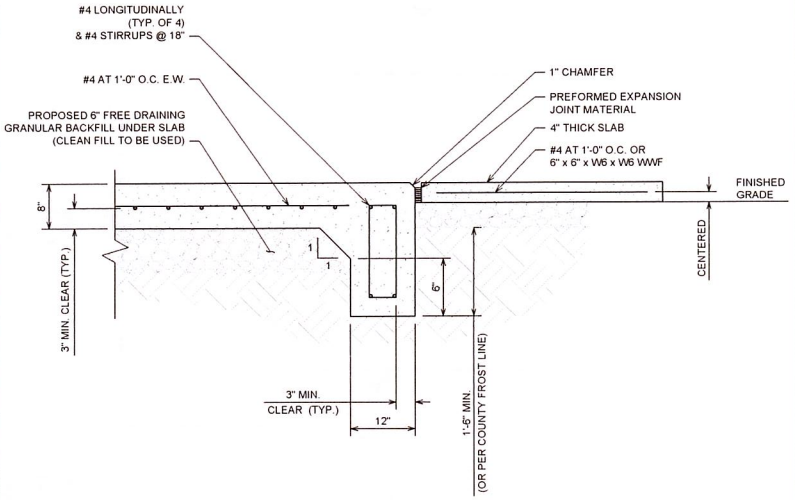
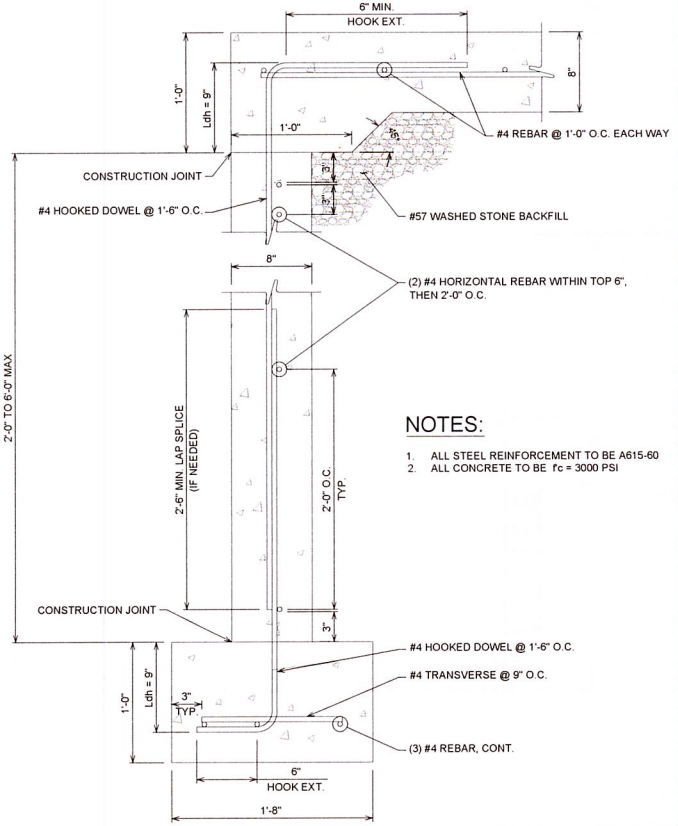


SECTION A DETAIL(TYPICAL AT GRADE)

N.T.S.



NOTES:

1. ALL STEEL REINFORCEMENT TO BE A615-60
2. ALL CONCRETE TO BE f'c = 3000 PSI

SECTION A DETAIL (ON SLOPE)

N.T.S.

PREPARED BY:

ENGINEERED TOWER SOLUTIONS

3227 WELLINGTON COURT
RALEIGH, NC 27615
919-782-2710
www.ets-pllc.com

PREPARED FOR:

CORPORATE SEAL OF WATAUGA COUNTY NORTH CAROLINA

SITE NAME:
POWDER HORN MOUNTAIN

SITE ADDRESS:
340 DEER RUN ROAD
STONY FORK, NC 28607

LATITUDE/LONGITUDE:
36.1754950°, -81.5142249°

SEAL:

FIRM #: P-1016

05/30/2025

REV	DATE	DETAILS
0	12/22/2022	CONSTRUCTION
1	02/07/2025	CONSTRUCTION
2	05/30/2025	COMPOUND REDESIGN
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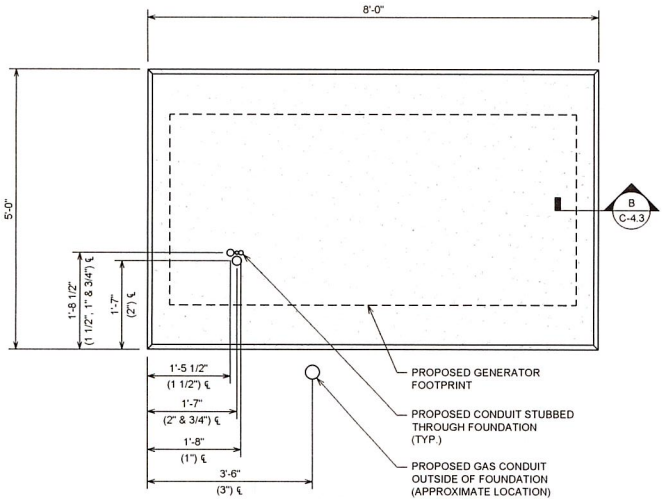
DRAWN BY: FB	CHECKED BY: AS

SHEET TITLE:
SHELTER FOUNDATION DETAILS

SHEET # C-4.2	CURRENT REV #: 2
	ETS #: 21099302



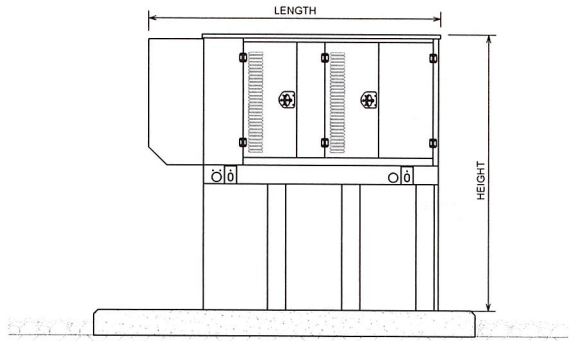
GENERATOR PAD PLAN

N.T.S.

GENERAC - SD050

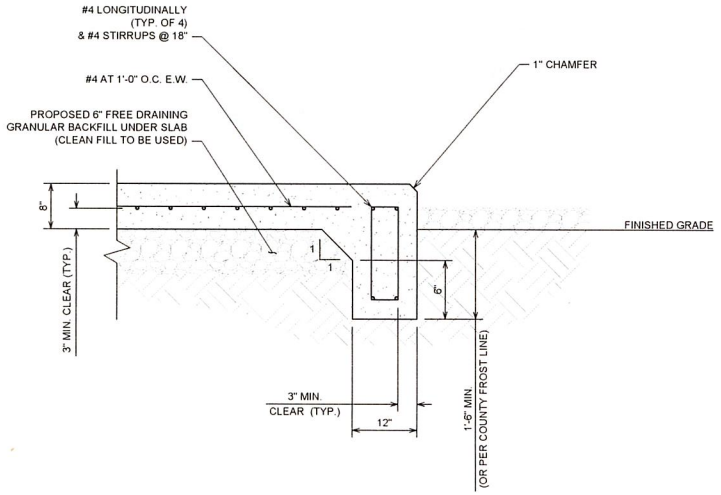
- DIESEL GENERATOR
- STANDARD ENCLOSURE
- 510 GALLON TANK

HEIGHT	WIDTH	DEPTH	WEIGHT
93.00"	47.00"	117.00"	3663 LBS



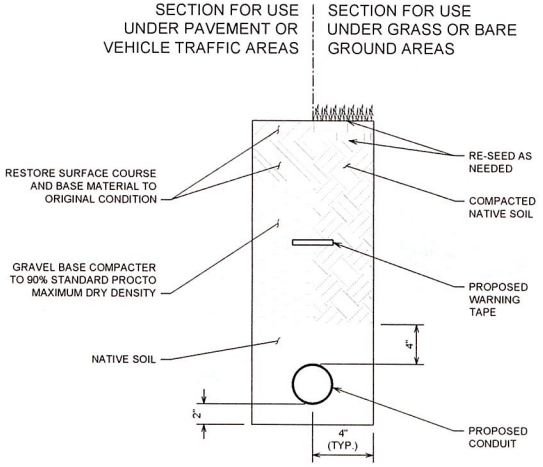
GENERATOR PAD ELEVATION

N.T.S.



SECTION B DETAIL

N.T.S.



TRENCH DETAIL

N.T.S.

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SEAL: FIRM #: P-1016

NORTH CAROLINA PROFESSIONAL SEAL 027825 ENGINEER CHRISTOPHER G. PLY
05/30/2025

REV	DATE	DETAILS
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1	02/07/2025	CONSTRUCTION
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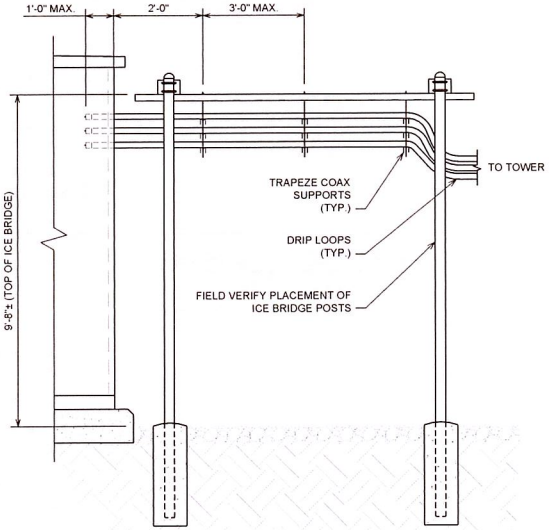
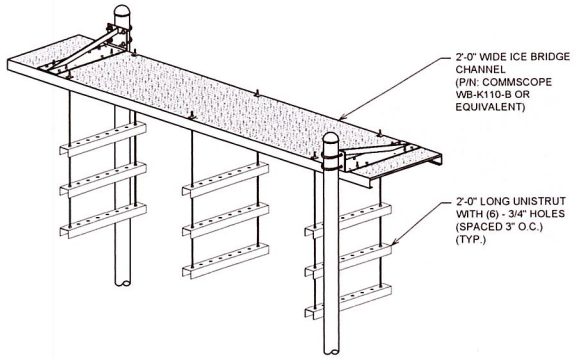
SHEET TITLE:
GENERATOR & GEN. FOUNDATION DETAILS

SHEET # C-4.3 | CURRENT REV #: 2 | ETS #: 21099302



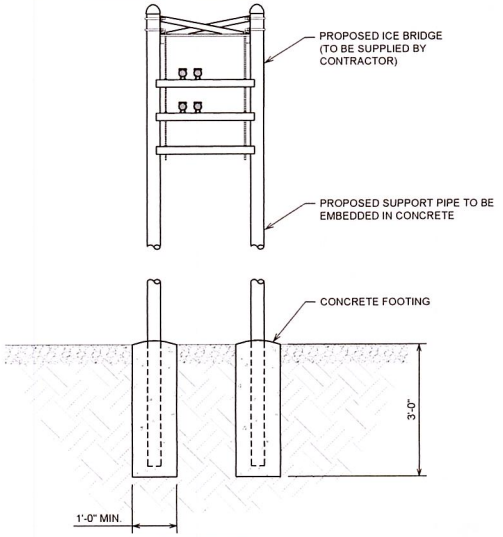
ICE BRIDGE DETAIL

N.T.S.



ISOMETRIC VIEW

N.T.S.



SIDE VIEW

N.T.S.

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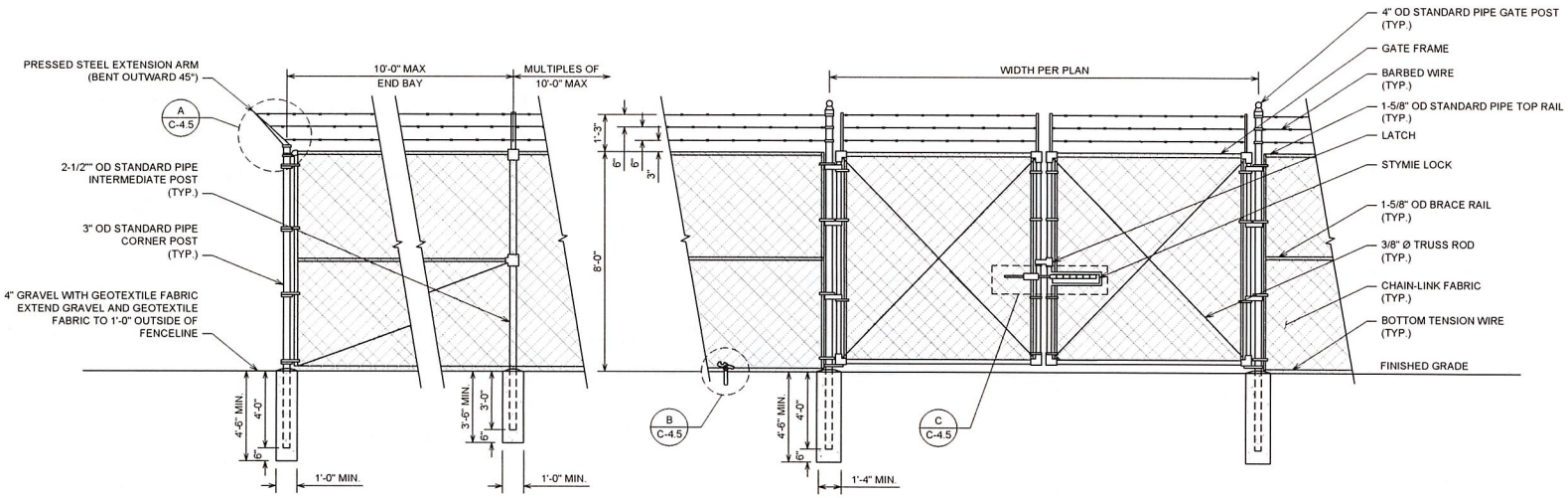
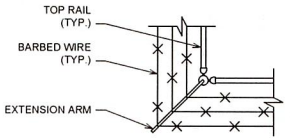
SHEET TITLE:
ICE BRIDGE DETAILS

SHEET # C-4.4 | CURRENT REV #: 2 | ETS #: 21099302

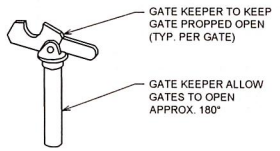


FENCE & DOUBLE SWING GATE DETAIL

N.T.S.

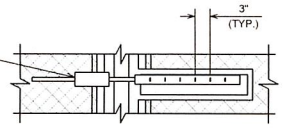


DETAIL A
TYPICAL FENCE CORNER



DETAIL B
GATE KEEPER

CONTRACTOR TO SUPPLY & INSTALL A STYMIE LOCK CAPABLE OF SUPPORTING (6) LOCKS & PROVIDE A RE-ENFORCED OPENING IN THE FENCE AREA CHAIN-LINK FABRIC 4" BELOW THE STYMIE LOCK MECHANISM TO ALLOW ACCESS FROM BOTH SIDES OF THE GATE



DETAIL C
STYMIE LOCK

FENCE & STYMIE LOCK DETAILS

N.T.S.

NOTES

1. ALL MATERIAL AND HARDWARE FOR THE CHAIN-LINK FENCE SHALL BE A HOT DIP GALVANIZED FINISH.
2. CHAIN-LINK FABRIC TO BE 8'-0" HIGH, 9 GA. WIRE, 2" MESH WITH TWISTED SELVAGE TOP AND BOTTOM (PER ASTM A392).
3. BARBED WIRE TO CONSIST OF 3 NO. 12-1/2" GA. GALVANIZED STEEL WORE WITH 4-POINT BARBS OF NO. 14 GA. GALVANIZED STEEL.
4. POST, RAIL AND GATE FITTINGS TO BE PRESSED STEEL OR MALLEABLE CASTING (PER ASTM A153).
5. ALL POSTS SHALL HAVE WEATHER CAPS INSTALLED.
6. POSTS TO SET IN 3,000 PSI CONCRETE. BOTTOM OF CONCRETE TO BE 6" MIN. FROM BOTTOM OF POST.
7. TIE WIRES TO BE 9 GA. ALUMINUM SPACES AT 12" OC POSTS/GATES AND 24" OC RAILS/WIRE.
8. TENSION BARS TO BE 3/16" x 3/4" CARBON STEEL ATTACHED TO TERMINAL POSTS BY MEANS OF BEVELED EDGE BANDS.
9. PROVIDE (2) GATE KEEPER HOLD OPEN DEVICES FOR SWING GATES. GATE KEEPERS TO ALLOW GATES TO OPEN APPROXIMATELY 180 DEGREES.
10. CONTRACTOR TO SUPPLY AND INSTALL A STYMIELOCK CAPABLE OF SUPPORTING (6) LOCKS AND PROVIDE A RE-ENFORCED OPENING IN THE CHAIN-LINK FENCE AREA FABRIC OF 4" BELOW THE STYMIE LOCK MECHANISM TO ALLOW ACCESS FROM BOTH SIDES OF THE GATE.
11. SITE OWNER / CARRIER TO PROVIDE A STANDARD LOCK FOR THE GATE.
12. ALL FENCE POST FOUNDATIONS SHALL BE ROUNDED AT TOP AS SHOWN TO DIVERT WATER AWAY FROM THE POSTS.
13. THE FABRIC SHALL BE SET SO THERE IS NO GAP BETWEEN THE CHAIN-LINK FENCE FABRIC AND THE FINISHED GRADE.
15. 4" OD STANDARD PIPE FOR GATE POSTS.
16. 3" OD STANDARD PIPE FOR ALL CORNER AND END POSTS.
17. 2-1/2" OD STANDARD PIPE FOR ALL INTERMEDIATE POSTS.

NOTES

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NORTH CAROLINA PROFESSIONAL SEAL 027825 ENGINEER CHRISTOPHER G. PLY
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SHEET TITLE:
FENCE DETAILS

SHEET # C-4.5 | CURRENT REV #: 2 | ETS #: 21099302

ELECTRICAL NOTES

1. SCOPE

   A. SHALL INCLUDE ALL LABOR, MATERIALS AND APPLIANCES REQUIRED FOR THE FURNISHING, INSTALLING AND TESTING, COMPLETE AND READY FOR OPERATION OF ALL WORK SHOWN ON THE DRAWING AS SPECIFIED HEREIN:

      A.a. ELECTRIC SERVICE
      A.b. CONDUIT AND RECEWAY
      A.c. CONDUCTORS
      A.d. MISCELLANEOUS MATERIALS
      A.e. TELEPHONE CONDUITS
      A.f. LIGHTNING ARRESTING SYSTEM

2. CODES

   A. THE INSTALLATION SHALL COMPLY WITH ALL LAWS APPLYING TO ELECTRICAL INSTALLATION IN EFFECT WITH THE REGULATIONS OF THE LATEST EDITION OF THE NATIONAL ELECTRICAL SAFETY CODE AND THE ICC, ADMINISTRATIVE RULES WITH THE NATIONAL ELECTRIC CODE, AND ANY LOCAL CODES AND ORDINANCES WITH THE REGULATION OF THE SERVING UTILITY COMPANY. ALL PERMITS REQUIRED SHALL BE OBTAINED AND, AFTER COMPLETION OF WORK, THE OWNER SHALL BE FURNISHED A CERTIFICATE OF FINAL INSPECTION AND APPROVAL.

3. TESTING

   A. UPON COMPLETION OF THE INSTALLATION, OPERATE AND ADJUST ALL EQUIPMENT AND SYSTEMS TO MEET SPECIFIED PERFORMANCE REQUIREMENTS. ALL TESTING SHALL BE DONE BY QUALIFIED PERSONNEL.

4. GUARANTEE

   A. IN ADDITION TO THE GUARANTEE OF THE EQUIPMENT BY THE MANUFACTURER, EACH PIECE OF EQUIPMENT SPECIFIED HEREIN SHALL ALSO BE GUARANTEED FOR DEFECTS OF MATERIAL OR WORKMANSHIP OCCURRING DURING A PERIOD OF ONE (1) YEAR FROM FINAL ACCEPTANCE OF THE WORK BY THE OWNER. WITHOUT EXPENSE TO THE OWNER ALL WARRANTEE CERTIFICATES & GUARANTEES FURNISHED BY THE MANUFACTURERS SHALL BE TURNED OVER TO THE OWNER.

5. COORDINATION

   A. TOWER SUBCONTRACTOR SHALL COORDINATE ALL WORK WITH THE POWER AND TELEPHONE COMPANIES AND SHALL COMPLY WITH ALL SERVICE REQUIREMENTS OF EACH UTILITY COMPANY, IF REQUIRED.

6. EXAMINATION OF SITE

   A. PRIOR TO BEGINNING WORK, THE TOWER SUBCONTRACTOR SHALL VISIT THE SITE OF THE JOB AND SHALL FAMILIARIZE HIMSELF WITH ALL CONDITIONS AFFECTING THE ELECTRICAL INSTALLATION AND SHALL MAKE PROVISIONS AS TO THE COST THEREOF. FAILURE TO COMPLY WITH THE INTENT OF THIS PARAGRAPH WILL IN NO WAY RELIEVE THE TOWER SUBCONTRACTOR OF PERFORMING ALL WORK NECESSARY FOR A COMPLETE AND WORKING SYSTEM OR SYSTEMS.

7. CUTTING, PATCHING AND EXCAVATION

   A. COORDINATION OF ALL SLEEVES, CHASES, ETC., WILL BE REQUIRED PRIOR TO THE CONSTRUCTION OF ANY PORTION OF THE WORK. ALL CUTTING AND PATCHING OF WALLS, PARTITIONS, FLOORS, AND CHASES IN CONCRETE, WOOD, STEEL OR MASONRY SHALL BE DONE AS PROVIDED ON THE DRAWINGS.

   B. ALL NECESSARY EXCAVATIONS AND BACKFILLING INCIDENTAL TO THE WORK UNLESS SPECIFICALLY NOTED OTHERWISE ON THE DRAWING SHALL BE PROVIDED BY THIS CONTRACTOR.

   C. SEAL ALL PENETRATION THROUGH WALL AND FLOORS WITH APPROVED GROUT.

8. RACEWAYS

   A. ALL CONDUCTORS SHALL BE INSTALLED IN CONDUIT. ALL CONDUIT SHALL BE GALVANIZED RIGID CONDUIT OR SCH40 PVC. AS INDICATED ON THE DRAWINGS.

   B. WHERE INSTALLED ON EXTERIORS AND EXPOSED TO DAMAGE, ALL CONDUIT SHALL BE GALVANIZED RIGID CONDUIT. ALUMINUM CONDUIT SHALL NOT BE ALLOWED.

   C. CONCEALED CONDUIT IN WALLS OR INTERIOR SPACES ABOVE GRADE MAY BE EMT.

   D. UNDERGROUND CONDUITS SHALL BE GALVANIZED RIGID CONDUIT OR SCHEDULE 40 PVC AS INDICATED ON THE DRAWINGS.

   E. ALL CONDUIT RUNS SHALL USE APPROVED COUPLINGS AND CONNECTORS. PROVIDE INSULATED BUSHING FOR ALL CONDUIT TERMINATIONS. ALL CONDUIT RUNS IN A WET LOCATION SHALL HAVE WATERPROOF FITTINGS.

   F. PROVIDE SUPPORTS FOR ALL CONDUITS IN ACCORDANCE WITH NEC REQUIREMENTS. ALL CONDUITS SHALL BE SIZED AS REQUIRED BY NEC.

   G. BURIAL DEPTH OF ALL CONDUITS SHALL BE AS REQUIRED BY CODE FOR EACH SPECIFIC CONDUIT TYPE AND APPLICATION.

   H. CONDUIT ROUTES ARE SCHEMATIC. TOWER SUBCONTRACTOR SHALL FIELD VERIFY BEFORE

ELECTRICAL NOTES

   BID. COORDINATE ROUTE WITH WIRELESS CARRIER AND BUILDING OWNER.

9. EXTERIOR CONDUIT

   A. ALL EXPOSED CONDUIT SHALL BE NEATLY INSTALLED AND RUN PARALLEL OR PERPENDICULAR TO STRUCTURAL ELEMENTS. SUPPORTS AND MOUNTING HARDWARE SHALL BE HOT DIPPED GALVANIZED STEEL

   B. SCHEDULE 40 ELECTRICAL CONDUIT WILL BE BURIED TO A DEPTH OF AT LEAST 3 FEET. METALLIC CAUTION TAPE, OR NONMETALLIC CAUTION TAPE WITH 12 AWG TRACING WIRE, WILL BE BURIED TO A DEPTH OF 2 FEET. TRENCHES WILL BE TAMPED AT 12 INCH INTERVALS TO PRECLUDE FUTURE SINKING. TOPSOIL WILL BE PRESERVED AND REPLACED. ALL DISTURBED AREAS SHALL BE RE-SEEDED AND STRAWED PER THE FORT BRAGG SEEDING SPECIFICATION. PULL CORDS WILL BE TIED OFF ON BOTH ENDS OF THE CONDUIT RUNS.

10. EQUIPMENT

   A. ALL DISCONNECT SWITCHES SHALL BE SERVICE ENTRANCE RATED, HEAVY DUTY TYPE.

   B. NEW CIRCUIT BREAKERS SHALL BE RATED TO WITHSTAND THE MAXIMUM AVAILABLE FAULT CURRENT AS DETERMINED BY THE LOCAL UTILITY. TOWER SUBCONTRACTOR SHALL VERIFY MAXIMUM AVAILABLE FAULT CURRENT, AND COORDINATE INSTALLATION WITH THE LOCAL UTILITY BEFORE STARTING WORK.

11. CONDUCTORS

   A. FURNISH AND INSTALL CONDUCTORS CALLED FOR IN THE DRAWINGS. ALL CONDUCTORS SHALL HAVE TYPE THWN (MIN) (75 DEGREE) INSULATION, RATED FOR 600 VOLTS.

   B. ALL CONDUCTORS SHALL BE UL LISTED AND SHALL BE PROVIDED AND INSTALLED AS FOLLOWS:

      B.a. MINIMUM WIRE SIZE SHALL BE #12 AWG.

      B.b. ALL CONDUCTORS SIZE #8 AND LARGER SHALL BE STRANDED. CONDUCTORS SIZED #10 AND SMALLER MAY BE SOLID OR STRANDED.

      B.c. CONNECTION FOR #10 AWG AND SMALLER SHALL BE BY TWISTING TIGHT AND INSTALLING INSULATED PRESSURE OR WIRE NUT CONNECTIONS.

      B.d. CONNECTION FOR #8 AWG AND LARGER SHALL BE BY USE OF STEEL CRIMP-ON SLEEVES WITH NYLON INSULATOR.

   C. ALL CONDUCTORS SHALL BE COLOR CODED IN ACCORDANCE WITH NEC STANDARDS.

   D. THE RACEWAY SYSTEM SHALL BE COMPLETE BEFORE INSTALLING CONDUCTORS.

12. PENETRATIONS

   E. TOWER SUBCONTRACTOR SHALL COMPLY WITH UL PENETRATION DETAILS FOR PENETRATIONS OF ALL RATED WALLS, ROOF, ETC.

GROUNDING NOTES

1. ALL ELECTRICAL NEUTRALS, RACEWAYS AND NON-CURRENT CARRYING PARTS OF ELECTRICAL EQUIPMENT AND ASSOCIATED ENCLOSURES SHALL BE GROUNDED IN ACCORDANCE WITH NEC ARTICLE 250. THIS SHALL INCLUDE NEUTRAL CONDUCTORS, CONDUITS, SUPPORTS, CABINETS, BOXES, GROUND BUSSES, ETC. THE NEUTRAL CONDUCTOR FOR EACH SYSTEM SHALL BE GROUNDED BY ONE POINT ONLY.
2. PROVIDE GROUND CONDUCTOR IN ALL RACEWAYS.
3. PROVIDE BONDING AND GROUND TO MEET NFPA 780 - LIGHTNING PROTECTION AS A MINIMUM.
4. ALL GROUNDING SHALL BE INSTALLED IN ACCORDANCE WITH MOTOROLA R-56 GUIDELINES, SECTION 4.

ABBREVIATIONS

A	AMPERE
AFG	ABOVE FINISHED GRADE
ATS	AUTOMATIC TRANSFER SWITCH
AWG	AMERICAN WIRE GAUGE
BCW	BARE COPPER WIRE
BFG	BELOW FINISHED GRADE
BKR	BREAKER
C	CONDUIT
CKT	CIRCUIT
DISC	DISCONNECT
EMT	ELECTRIC METALLIC TUBING
FSC	FLEXIBLE STEEL CONDUIT
GEN	GENERATOR
GPS	GLOBAL POSITIONING SYSTEM
GRC	GALVANIZED RIGID CONDUIT
KA	KILO AMP
KW	KILOWATTS
NEC	NATIONAL ELECTRIC CODE
PH	PHASE
PNL	PANEL
PNLBD	PANELBOARD
PVC	POLYVINYL CHLORIDE
RGS	RIGID GALVANIZED STEEL
SCCR	SHORT CIRCUIT CURRENT RATING
SW	SWITCH
UL	UNDERWRITERS LABORATORIES
V	VOLTAGE
VA	VOLTAGE AMP
W	WATTS
XFMR	TRANSFORMER
XMTR	TRANSMITTER

LEGEND

- EXISTING UTILITY POLE
- LIGHT
- RECEPTACLE
- BREAKER
- TRANSFORMER
- METER
- PANEL
- DISCONNECT
- FUSED DISCONNECT
- LIGHTNING ARRESTOR
- GENERATOR
- GROUND
- GROUND TO NEUTRAL BOND
- GROUND ROD
- GROUND ROD WITH INSPECTION WELL
- CADWELD BOND
- MECHANICAL BOND
- COMPRESSION BOND

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DRAWN BY: FB | CHECKED BY: AS

SHEET TITLE:
ELECTRICAL NOTES

SHEET # **E-1**

CURRENT REV #: 2
ETS #: 21099302

PANEL NAME:	PP1
VOLTAGE:	120 / 240
PHASE:	1
WIRE:	3
BUS AMPERAGE:	200
MAIN CB AMPERAGE:	200
SUPPLY AMPERAGE:	200
MIN. SHORT CIRCUIT RATING:	10 kAIC

LOAD SERVED	VA (WATTS) L1	VA (WATTS) L2	WIRE	BREAKER POLE	BREAKER TRIP	CKT #	PHASE		CKT #	BREAKER POLE	BREAKER TRIP	WIRE	VA (WATTS) L1	VA (WATTS) L2	LOAD SERVED
LIGHTNING ARRESTOR	60		4	2	60A	1	A		2	2	30A	10	3727		ACH2
		60					B							3727	
ACH1	3727		10	2	30A	5	A		6	1	20A	12	540		INTERIOR RECEPTACLES
		3727					B		8	1	20A	12		120	SMOKE DETECTOR
INTERIOR RECEPTACLES	540		12	1	20A	9	A		10	2	125A	1	4950		UPS TECH PANEL PP2
INTERIOR LIGHTS		768	12	1	20A	11	B							4950	
EXTERIOR RECEPTACLE	180		12	1	20A	13	A		14	2	20A	12	180		TWIST LOCK RCPT #1
EXTERIOR LIGHTS		200	12	1	20A	15	B							180	
WATER HEATER JACKET	120		12	1	20A	17	A		18	2	20A	12	180		TWIST LOCK RCPT #2
GEN. BATT. CHGR.		120	12	1	20A	19	B							180	
SPARE	--		--	1	20A	21	A		22	1	20A	--	--		SPARE
SPARE		--	--	1	20A	23	B		24	1	20A	--		--	SPARE
SPARE	--		--	1	20A	25	A		26	1	20A	--	--		SPARE
SPARE		--	--	1	20A	27	B		28	1	20A	--		--	SPARE
SPARE	--		--	1	20A	29	A		30	1	20A	--	--		SPARE
SPARE		--	--	1	20A	31	B		32	1	20A	--		--	SPARE
SPARE	--		--	1	20A	33	A		34	1	20A	--	--		SPARE
SPARE		--	--	1	20A	35	B		36	1	20A	--		--	SPARE
BATTERY CHARGER	2500		10	2	30A	37	A		38	1	20A	--	--		SPARE
		2500					B		40	1	20A	--		--	SPARE
VOLT AMPS	8,727	7,255											9,577	9,157	VOLT AMPS

CALCULATION	L1	L2
TOTAL VOLT AMPERES	17,704	16,412
TOTAL AMPS PER LEG	148	137
AMPS x 125%	185	

PANEL SCHEDULE

N.T.S.

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919-782-2710
www.ets-pllc.com

PREPARED FOR:

SITE NAME:
POWDER HORN MOUNTAIN

SITE ADDRESS:
340 DEER RUN ROAD
STONY FORK, NC 28607

LATITUDE/LONGITUDE:
36.1754950°, -81.5142249°

SEAL: FIRM #: P-1016

NORTH CAROLINA PROFESSIONAL SEAL 027825 ENGINEER CHRISTOPHER G. PLY

05/30/2025

REV	DATE	DETAILS
0	12/22/2022	CONSTRUCTION
1	02/07/2025	CONSTRUCTION
2	05/30/2025	COMPOUND REDESIGN
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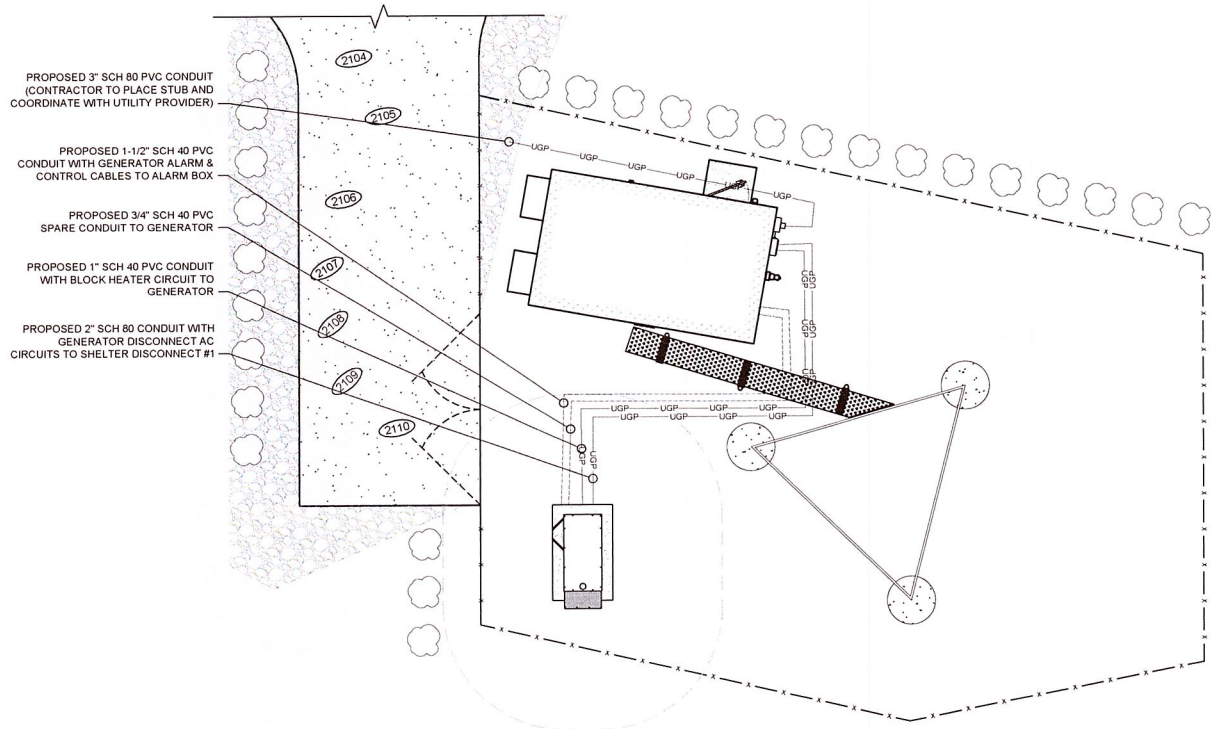
SHEET TITLE:
PANEL SCHEDULE

SHEET # E-2 | CURRENT REV #: 2 | ETS #: 21099302



NOTE

STUB CONDUITS 6" ABOVE FINISHED GRADE. FINISH CONNECTION PER GENERATOR MANUFACTURER'S SPECIFICATIONS. ONLY STRANDED CONDUCTOR SHALL BE USED FOR ALL CONNECTIONS TO GENERATOR.

ELECTRICAL PLAN

1" = 10'-0"

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PREPARED FOR:

CORPORATE SEAL OF WATAUGA COUNTY NORTH CAROLINA

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POWDER HORN MOUNTAIN

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SEAL: FIRM #: P-1016

NORTH CAROLINA PROFESSIONAL SEAL 027825 ENGINEER CHRISTOPHER G. PLY

05/30/2025

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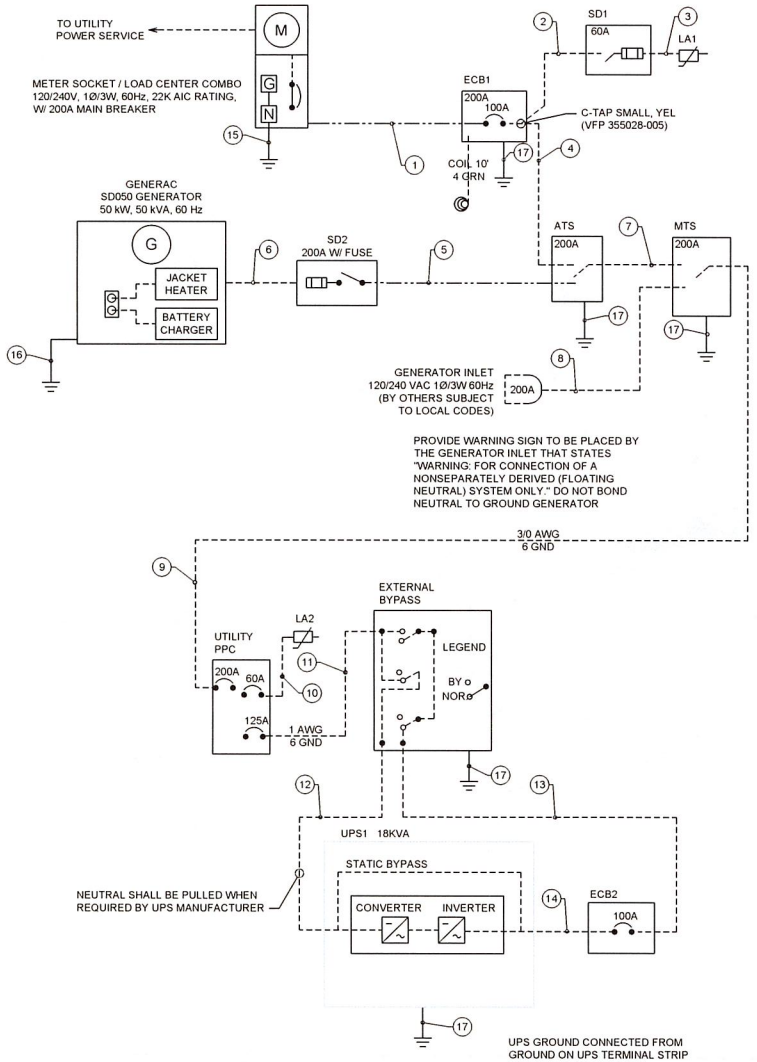
SHEET TITLE:
ELECTRICAL PLAN

SHEET # E-3 | CURRENT REV #: 2 | ETS #: 21099302



CIRCUIT SCHEDULE

	FROM	TO	CONDUCTOR
1	METER / LOAD CENTER	ENCLOSURE W/ CIRCUIT BREAKER (ECB1)	(3) #3/0 + (1) #6 G
2	ENCLOSURE W/ CIRCUIT BREAKER (ECB1)	SERVICE DISCONNECT (SD1)	(3) #4 AWG + (1) #6 G
3	SERVICE DISCONNECT (SD1)	LIGHTNING ARRESTOR (LA1)	(3) #4 AWG + (1) #6 G
4	ENCLOSURE W/ CIRCUIT BREAKER (ECB1)	AUTOMATIC TRANSFER SWITCH	(3) #3/0 + (1) #6 G
5	AUTOMATIC TRANSFER SWITCH	SERVICE DISCONNECT (SD2)	(3) #3/0 + (1) #6 G
6	SERVICE DISCONNECT (SD2)	GENERATOR	(3) 300 kcmil + (1) #4 G
7	AUTOMATIC TRANSFER SWITCH	MANUAL TRANSFER SWITCH	(3) #3/0 + (1) #6 G
8	MANUAL TRANSFER SWITCH	GENERATOR RECEPTACLE	(3) #3/0 + (1) #2/0 G
9	MANUAL TRANSFER SWITCH	LOAD CENTER "UTILITY PP1"	(3) #3/0 + (1) #6 G
10	LOAD CENTER "UTILITY PP1"	LIGHTNING ARRESTOR (LA2)	(3) #4 AWG + (1) #6 G
11	LOAD CENTER "UTILITY PP1"	EXTERNAL BYPASS	(3) #1 AWG + (1) #6 G
12	EXTERNAL BYPASS	UNINTERRUPTED POWER SYSTEM (UPS1)	(3) #1 AWG + (1) #6 G
13	EXTERNAL BYPASS	ENCLOSURE W/ CIRCUIT BREAKER (ECB2)	(3) #1 AWG + (1) #6 G
14	ENCLOSURE W/ CIRCUIT BREAKER (ECB2)	UNINTERRUPTED POWER SYSTEM (UPS1)	(3) #1 AWG + (1) #6 G
15	METER / LOAD CENTER (NEUTRAL & GROUND BOND)	SERVICE ENTRANCE GROUND ROD (BONDED TO SHELTER GROUND RING)	#2 AWG BTSC
16	GENERATOR	GROUND RING	#2 AWG BTSC
17	INTERNAL EQUIPMENT	ISOLATED PHASE GROUND RING	#2 AWG BTSC

NOTES

1. ONE-LINE DIAGRAM & WIRE SIZING PER VFP, INC. SHELTER DRAWING NO. 203953.
2. ALL EQUIPMENT INSIDE SHELTER, INCLUDING ALL GROUNDING IS PRE-INSTALLED AND WIRED BY VFP, INC. CONTACT VFP, INC. ENGINEER OF RECORD IF THERE ARE ANY DISCREPANCIES.
3. THE SHORT-CIRCUIT RATING OF THE TRANSFER EQUIPMENT, BASED ON THE SPECIFIC OVERCURRENT PROTECTIVE DEVICE TYPE AND SETTING PROTECTING THE TRANSFER EQUIPMENT (CAN VARY BETWEEN THE UTILITY AND GENERATOR CONNECTIONS) MUST BE FIELD MARKED ON THE EXTERIOR OF THE TRANSFER EQUIPMENT PER NEC ARTICLE 701.5(D).
4. SERVICE EQUIPMENT MUST BE LEGIBLY MARKED IN THE FIELD WITH THE MAXIMUM AVAILABLE FAULT CURRENT PER NEC ARTICLE 110.24(A). THE FIELD MARKING MUST INCLUDE THE DATE OF WHEN THE FAULT CURRENT CALCULATION WAS PERFORMED AND MUST BE ABLE TO WITHSTAND THE SURROUNDING ENVIRONMENT.
5. ENSURE ALL REQUIRED SIGNS PER NEC ARTICLE 701.7 ARE INSTALLED.
6. LEGALLY REQUIRED STANDBY SYSTEM OVERCURRENT DEVICES MUST BE SELECTIVELY COORDINATED WITH ALL SUPPLY-SIDE OVERCURRENT PROTECTIVE DEVICES PER NEC ARTICLE ARTICLE 701.27.
7. SERVICE ENTRANCE RATED METER / LOAD CENTER MUST HAVE GROUND BOND BETWEEN NEUTRAL AND GROUND, AND BE CODE COMPLIANT CONTAINING UNDERWRITERS LABORATORIES UL-891 AND UL-1008 LABELS, AND MEET NEC AND LOCAL CODES.
8. GENERATOR RECEPTACLE: PROVIDE WARNING SIGN TO BE PLACED BY THE GENERATOR INLET THAT STATES. "WARNING: FOR CONNECTION OF A NONSEPARATELY DERIVED (FLOATING NEUTRAL) SYSTEM ONLY." DO NOT BOND NEUTRAL TO GROUND IN GENERATOR.
9. REFER TO VFP, INC. SHELTER DRAWINGS NO. 203953 FOR ALL ALARM CABLE SCHEMATICS AND CONNECTION DETAILS.
10. LOAD IS NOT TO EXCEED 200A. ELECTRICAL CONTRACTOR TO VERIFY LOAD. IF LOAD DOES EXCEED 200A, CONTRACTOR TO CONTACT VFP, INC. ENGINEER OF RECORD.
11. ALL EXTERIOR ENCLOSURES TO BE NEMA 3 RATED.
12. ALL ELECTRICAL WORK SHALL BE DONE IN ACCORDANCE WITH NATIONAL ELECTRIC CODE.
13. ALL ELECTRICAL MATERIALS, DEVICES, APPLIANCES, AND EQUIPMENT SHALL BE LABELED/LISTED BY UL OR A NORTH CAROLINA APPROVED THIRD PARTY TESTING AGENCY.
14. SUBCONTRACTOR TO LEAVE EXTRA PULL TAPE FOR FUTURE CABLE INSTALL BY OTHERS.
15. SEE SHEETS E-4.1 & E-4.2 FOR PANEL SCHEDULES.
16. SEE SHEET E-2 FOR ROUTES.

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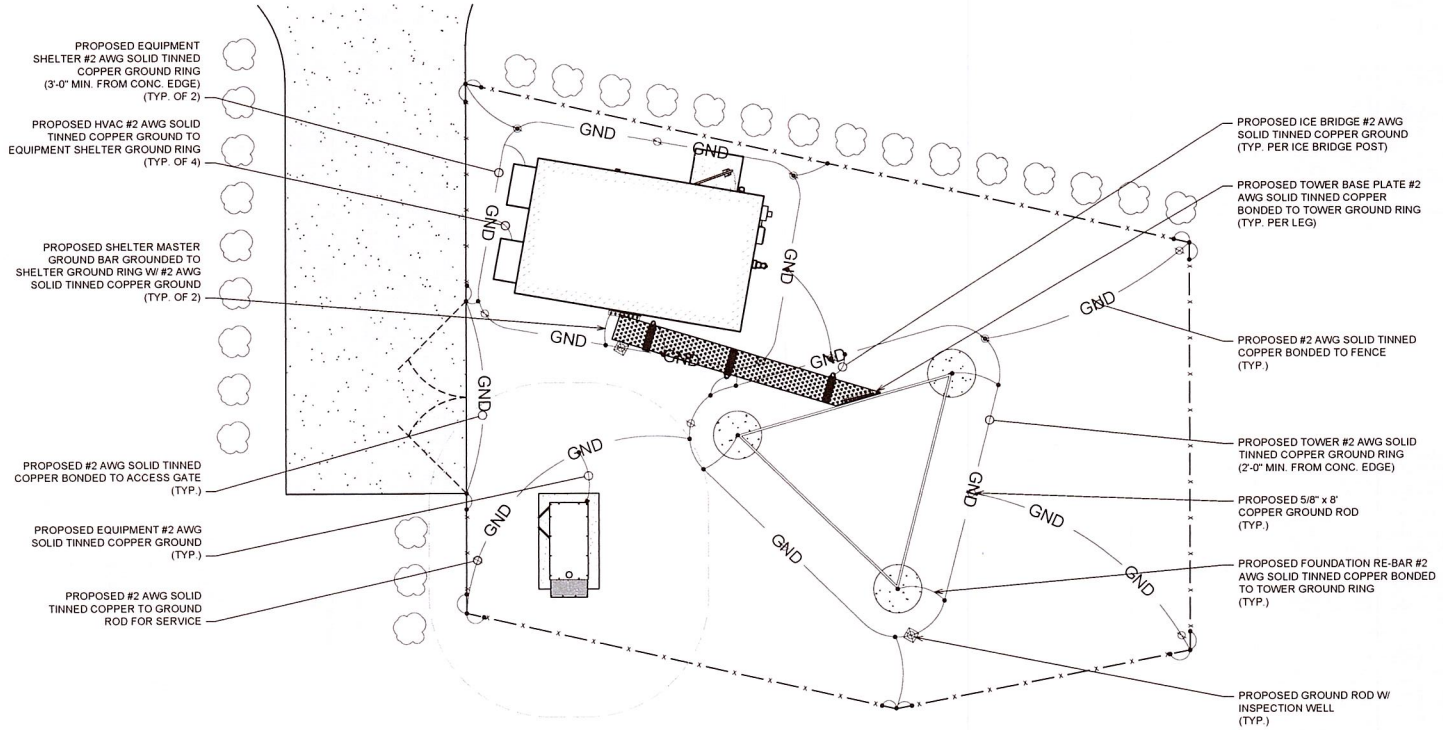
SHEET TITLE:
ELECTRICAL ONE-LINE DIAGRAM

SHEET # **E-4** | CURRENT REV #: 2 | ETS #: 21099302



GROUNDING SYMBOLS:

- GROUND ROD
- GROUND ROD W/ INSPECTION WELL
- CADWELD
- MECHANICAL

GROUNDING PLAN

1" = 10'-0"

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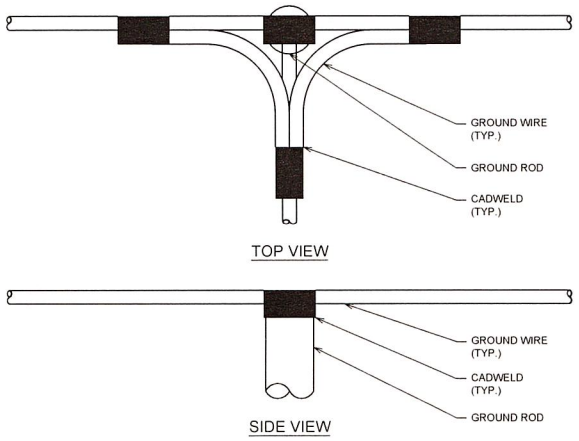
SHEET TITLE:
GROUNDING PLAN

SHEET # G-1 | CURRENT REV #: 2 | ETS #: 21099302

NOTES:
- MINIMUM SPACING OF 1'-0" BETWEEN ALL CADWELDS



CADWELD GROUNDING DETAIL

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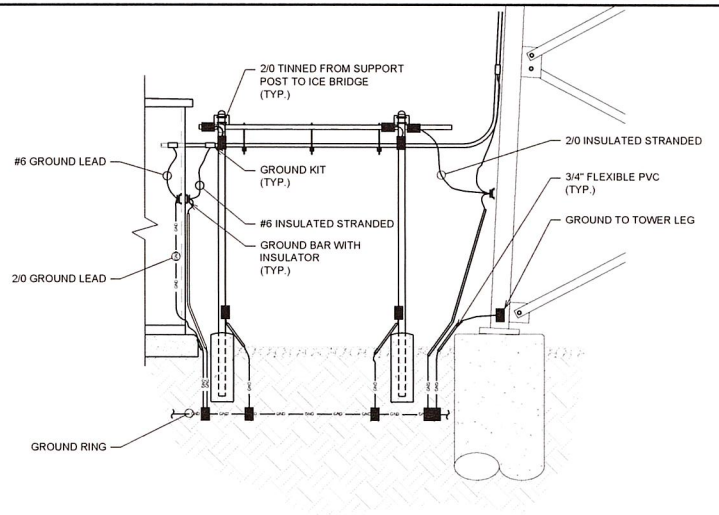
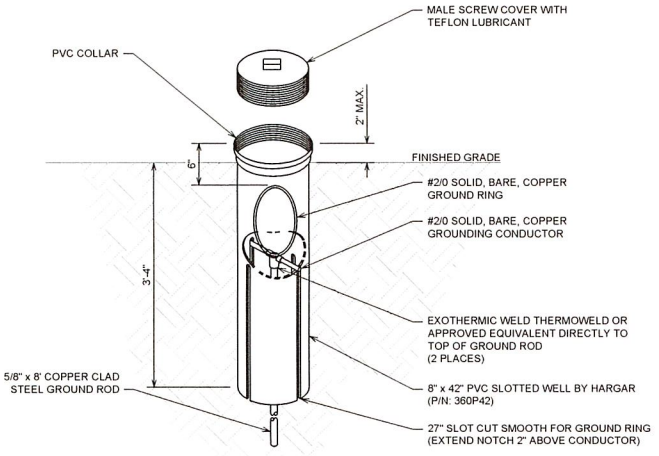


ICE BRIDGE/COAX/GROUNDING BAR ELEVATION

N.T.S.



GROUND ROD WITH INSPECTION WELL

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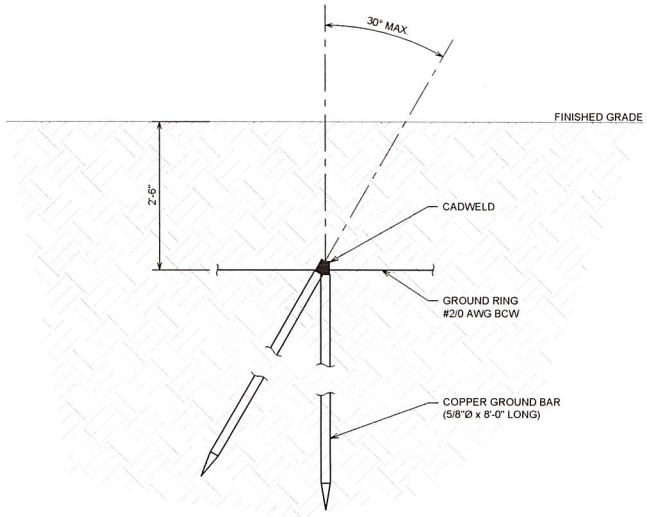

COPPER-CLAD STEEL GROUND ROD

N.T.S.

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SHEET TITLE:
GROUNDING DETAILS

SHEET # G-2 | CURRENT REV #: 2
ETS #: 21099302