NASH COUNTY BOARD OF ADJUSTMENT
REGULAR MEETING
MONDAY, MAY 23, 2022 AT 6:00 P.M.
FREDERICK B. COOPER COMMISSIONERS ROOM
CLAUDE MAYO, JR. ADMINISTRATION BUILDING - THIRD FLOOR
120 WEST WASHINGTON STREET
NASHVILLE, NC 27856

MEETING AGENDA

1. Call to Order.

2. Determination of a Quorum.

3. Review of Board Membership Changes.
   
   **End of Term:** Tommy Bass, Chairman
   **Resignation:** Terry Williams, Alternate Member
   **Promoted to Regular Member:** Rodney Hough
   **New Alternate Member #1:** Oscar Bruce
   **New Alternate Member #2:** Emanuel Shell
   **New Alternate Member #3:** Vacant

4. Recognition of the Voting Board Members for the Meeting.

5. Election of Board Officers (Chairman & Vice-Chairman) for 2022-2023 Year.

6. Approval of the Minutes of the January 24, 2022 Regular Meeting.

7. Quasi-Judicial Evidentiary Hearing on Special Use Permit Request S-220501.
   Made by Faulk & Foster on behalf of Verizon Wireless to authorize the construction and operation of a proposed 195-foot monopole wireless telecommunications tower and related equipment compound to be located on the west side of S NC Highway 231, Middlesex, NC 27557 on the southeast corner of the 47.57-acre tract of land owned by Florence Mildred Phillips in the R-40 Single-Family Residential Zoning District.

b. Staff Report.
   Adam Tyson, Planning Director, Nash County
   Susan Rabold, Project Manager, CityScape Consultants, Inc.

c. Board Discussion & Vote.

8. Adjournment.
MINUTES OF THE
NASH COUNTY BOARD OF ADJUSTMENT
REGULAR MEETING
HELD MONDAY, JANUARY 24, 2022 AT 6:00 P.M.
FREDERICK B. COOPER COMMISSIONERS ROOM
CLAUDE MAYO, JR. ADMINISTRATION BUILDING – THIRD FLOOR
120 WEST WASHINGTON STREET
NASHVILLE, NC 27856

BOARD MEMBERS PRESENT

Tommy Bass, Regular Member, Chairman
Kenneth Mullen, Regular Member
Brandon Moore, Regular Member
Rodney Hough, Alternate Member #1
Terry Williams, Alternate Member #2

BOARD MEMBERS ABSENT

Dennis Cobb, Regular Member, Vice-Chairman
William Parker, Regular Member

ATTORNEY TO THE BOARD

Dylan Castellino

STAFF MEMBERS PRESENT

Adam Tyson, Planning Director
Adam Culpepper, Senior Planner
Windy Braswell, Planning Technician

OTHERS PRESENT

Al Collie
Kevin Varnell
1. Call to Order.
   Chairman Bass called the meeting to order at 6:00 p.m.

2. Determination of a Quorum.
   Chairman Bass recognized the presence of a quorum.

3. Introduction of Newly Appointed Alternate Board Member #2: Terry Williams.
   Mr. Tyson introduced new Alternate Board Member #2 – Terry Williams, Senior Pastor at Englewood United Methodist Church – who was appointed to replace Gwen Wilkins upon her appointment to the Board of Commissioners.

   Mr. Tyson also announced the recent appointment of Oscar Bruce as Alternate Board Member #3.

4. Recognition of the Voting Board Members for the Meeting.
   Mr. Tyson recognized the voting board members for the meeting to be Chairman Bass, Mr. Mullen, Mr. Moore, Mr. Hough, and Mr. Williams.

5. Approval of the Minutes of the July 26, 2021 Regular Meeting.
   Mr. Tyson noted that the minutes of the previous July 26, 2021 regular meeting had been delayed and would be submitted to the Board for review and approval at a later date.

6. Quasi-Judicial Evidentiary Hearing on Special Use Permit Request S-220101 made by Sidney A. Collie Jr., the property owner, to combine and expand two existing 1.99-acre land clearing and inert debris (LCID) landfills into a single, larger 9.10-acre LCID landfill at 5801 Taylors Store Rd, Nashville NC 27856 in the A1 (Agricultural) Zoning District.

   Mr. Tyson presented the staff report and supplemental materials related to Special Use Permit Request S-220101 as submitted to the Board in the January 24, 2022 Nash County Board of Adjustment agenda packet including a review of the general requirements for the consideration of a special use permit, a description of the subject property, a description of the specific special use permit request to combine and expand two existing 1.99-acre land clearing and inert debris (LCID) landfills into a single, larger 9.10-acre LCID landfill, and recommended conclusions with supporting findings of fact and permit conditions.

   Chairman Bass asked if the Planning Staff had received any comments or input from members of the public on this matter.

   Mr. Tyson replied no.

   Chairman Bass opened the public hearing on Special Use Permit Request S-220101.

   Mr. Tyson and Mr. Kevin Varnell with Stocks Engineering were sworn in by Chairman Bass in order to provide testimony under oath during the public hearing.

   Mr. Varnell addressed the Board in support of the request on behalf of the applicant. He explained that in the last year, the State had revised a policy that previously allowed for smaller LCID landfills under two acres in size and, as a result, the two previously permitted landfills need to be combined into one large landfill to comply with the updated requirements. He noted that this should also simplify the recordkeeping and reporting process for the owner.
Mr. Hough asked how full the two already existing landfills were.

Mr. Varnell answered that the older, northern landfill was almost full and the newer, southern landfill was between 60% to 75% full.

Chairman Bass asked how high the northern landfill was.

Mr. Varnell estimated a height of about 15 feet in the front with a steeper contour in the rear.

Chairman Bass asked if there had been any problems with the first two landfills.

Mr. Varnell replied that there had not been any issues.

Chairman Bass asked what determines when an LCID landfill is full.

Mr. Varnell replied that it was full when the pile cannot be stacked any higher.

Chairman Bass asked what happens when the landfill is full.

Mr. Varnell explained that the State closure process would require the landfill mound to be covered with two feet of topsoil and seeded with grass.

Chairman Bass asked about the lifespan of the landfill.

Mr. Varnell replied that the lifespan was dependent upon the level of development activity and how quickly material was added to the landfill. He noted that the requested expansion should double the lifespan of the existing landfills.

As there were no additional questions or speakers, Chairman Bass closed the public hearing on Special Use Permit Request S-220101.

BOARD ACTION: Mr. Mullen offered a motion, which was duly seconded by Mr. Moore, to adopt the following conclusions with supporting findings of fact in relation to Special Use Permit Request S-220101.

Conclusions with Supporting Findings of Fact:
(1) The proposed development will satisfy the specific standards required by UDO 11-4.28 for demolition debris landfills because:
   (a) The proposed expanded landfill is located in the A1 (Agricultural) Zoning District and a demolition debris landfill is a land use permitted for development in that district with the required issuance of a special use permit by the Board of Adjustment.
   (b) The proposed location of the expanded landfill is already more than fifty feet (50') from the exterior property lines of the two tracts of land on which it will be located.
   (c) As a required condition of the permit, the existing property line crossing the center of the expanded facility shall be reconfigured such that the landfill will be located a minimum of fifty feet (50') away from any property line.
   (d) As a required condition of the permit, the existing, dilapidated dwelling located at 5841 Taylors Store Rd and owned by the applicant shall be demolished and removed to
ensure that the expanded landfill will be located more than three hundred feet (300') from any residence.

(e) Access to the expanded landfill shall be controlled with a combination of a gated fence and the existing, surrounding vegetation in order to prevent unregulated dumping.

(f) A gravel path shall be used to access the landfill facility in order to minimize dust, which will also be filtered by the surrounding vegetation. The applicant proposes the potential use of a water truck to control dust during exceptionally dry periods if necessary.

(g) The subject property does not include any regulated floodplain areas or known utility easements.

(h) The expanded landfill shall eventually be closed with a minimum of two feet (2') of clean soil, graded to a maximum slope of 3:1, and stabilized with vegetation or in accordance with the applicable standards of the North Carolina Department of Environmental Quality at that time.

(i) A sign shall be posted and maintained at the entrance of the landfill facility, which lists the name and phone number of the current operator, the types of material accepted, the hours of operation, tipping charges, and any other pertinent information.

(2) The proposed development will not materially endanger the public health or safety because land clearing and inert debris (LCID) landfills only accept nonhazardous waste materials that have not historically been associated with groundwater contamination or other public health issues.

(3) The proposed development will not substantially injure the value of adjoining or abutting property because land clearing and inert debris (LCID) landfills have not historically been associated with offensive odors or excessive noise.

(4) The proposed development will be in harmony with the area in which it is to be located because it is an expansion of two previously existing land clearing and inert debris (LCID) landfills that have been authorized for operation on the subject property since 2005 and 2014 respectively.

(5) The proposed development will be in general conformity with the recommendations of the Nash County Land Development Plan because the landfill facility will not require public water or sewer utility service and its operation will be compatible with the agricultural and low-density residential land uses that characterize the designated Rural Growth Area in which it will be located.

The motion was unanimously carried.

**BOARD ACTION:** Mr. Moore offered a motion, which was duly seconded by Mr. Hough, to approve Special Use Permit Request S-220101, subject to the following attached permit conditions:

**Permit Conditions:**

(1) This special use permit replaces the previously issued special use permits (Case File #S-050106 & Case File #S-141001), which authorized the construction and operation of two smaller land clearing and inert debris (LCID) landfills on the same subject property.

(2) The subject property shall be developed for an expanded land clearing and inert debris (LCID) landfill in accordance with the approved site plan as well as in compliance with all other applicable state and local regulations, including the development standards established by UDO 11-4.28 specifically for demolition debris landfills.
(3) The nonhazardous materials accepted by the land clearing and inert debris (LCID) landfill shall be limited to stumps, limbs, leaves, other land clearing and yard waste, concrete, brick, concrete block, uncontaminated soil, gravel, rock, untreated and unpainted wood, and used asphalt ONLY.

(4) The existing property line crossing the center of the expanded facility shall be reconfigured such that the landfill will be located a minimum of fifty feet (50') away from any property line.

(5) The existing, dilapidated dwelling located at 5841 Taylors Store Rd and owned by the applicant shall be demolished and removed to ensure that the expanded landfill will be located more than three hundred feet (300') from any residence.

The motion was unanimously carried.

7. Adjournment.

There being no further business, Chairman Bass adjourned the meeting at 6:28 p.m.
NASH COUNTY BOARD OF ADJUSTMENT
SPECIAL USE PERMIT REQUEST
STAFF REPORT

File Number: S-220501 (Special Use Permit Request)
Applicant: Faulk & Foster
Developer: Cellco Partnership (DBA Verizon Wireless)
Property Owner: Florence Mildred Phillips
Location: West Side of S NC Highway 231, Middlesex, NC 27557
Tax ID #: PIN # 273200682853 / Parcel ID # 005257
Total Area: Approx. 10,000 Square Feet
Zoning District: R-40 (Single-Family Residential)
Proposed Land Use: 195-Foot Monopole Wireless Telecommunications Tower & Equipment Compound
LDP Classification: Suburban Growth Area
Notice of Public Hearing: Mailed Notice: May 12, 2022 (To Property Owners Within 600 Feet)
Posted Notice: May 12, 2022 (On the Subject Property)
Published Notice: May 13, 2022 (Rocky Mount Telegram)

Consideration of a Special Use Permit:

The Nash County Unified Development Ordinance (UDO) defines a special use permit as "a permit issued by the Board of Adjustment that authorizes the recipient to make use of property in accordance with the requirements of this Ordinance or as well as any additional requirements imposed by the Board of Adjustment" (UDO 2-4.160.)

The North Carolina General Statutes require that the Board follow quasi-judicial procedures when hearing and deciding requests for special use permits. The Board’s decision must be based upon competent, material, and substantial facts and evidence submitted for the record and not upon personal opinions, preferences, speculation, assumptions, or generalized fears related to the case.

Prior to granting a special use permit, the Board shall adopt conclusions with supporting findings of fact which explain how the request satisfies ALL of the requirements established by the UDO. A special use permit request shall be denied if the Board determines that the application is incomplete or that it does not satisfy any one or more of the established requirements.
Also, prior to granting a special use permit, the Board must determine, based upon the information submitted at the public hearing that, if completed as proposed, the development:

(1) Will not materially endanger the public health or safety;
(2) Will not substantially injure the value of adjoining or abutting property;
(3) Will be in harmony with the area in which it is to be located; and
(4) Will be in general conformity with the land development plan or other plans officially adopted by the Board of Commissioners.

The Board may also impose reasonable and appropriate conditions upon the special use permit in addition to the standard requirements established by the UDO, including a condition limiting the specific duration of the time period for which the permit shall remain in effect.

The granting of a special use permit requires a simple majority vote of the Board members present.

Description of the Subject Property:

The subject property is the southeast corner of a 47.57-acre tract of land owned by Florence Mildred Phillips and located on the west side of S NC Highway 231, Middlesex, NC 27557 between the Town of Middlesex to the north and the Nash–Johnston County Line to the south in the R-40 (Single-Family Residential) Zoning District.

The site is approximately one-half mile north of the recently approved Choplin Subdivision, which will include 103 new residential lots on the same side of S NC Highway 231.

The property is located in the Neuse River Basin and it is not located within a regulated floodplain or a designated watershed protection overlay district, meaning that it is not currently subject to stormwater management requirements. There also does not appear to be any riparian stream buffers in the area of the property that is proposed for disturbance.

Description of the Special Use Permit Request:

Special Use Permit Request S-220501 has been submitted by Faulk & Foster on behalf of Verizon Wireless to authorize the construction and operation of a new wireless telecommunications tower on the southeast corner of the subject property in order to provide 4G wireless service to the surrounding area.

The proposed tower would be a non-concealed monopole design with a height of 195 feet (199 feet with the lightning rod). The related ground compound at the base of the tower would consist of a 3,600-square foot fenced equipment area within a larger 10,000-square foot lease area.
UDO Section 11-5 establishes the development standards for wireless communication facilities and a freestanding, non-concealed tower that does not exceed a maximum allowable height of 199 feet (including its lightning rod) is permitted for development in this R-40 Zoning District with the issuance of a special use permit.

Due to the complexity and technical nature of wireless telecommunications, Nash County employs CityScape Consultants, Inc. as an independent, third-party reviewer.

CityScape has reviewed this application and submitted a report dated May 4, 2022, which concludes that the need for the proposed facility in this location is justified due to technological reasons, it is essential in order for the applicant to provide wireless communication services, and it follows Federal guidelines for wireless facility deployment.

The report identifies two specific issues that require the attention of the Board:

1. The Board shall consider whether the proposed standard galvanized gray color of the tower and its antenna will effectively minimize its visual impact on the surrounding landscape and adjacent properties or whether another paint color (such as dark brown, light gray, or white) would be preferable for this specific location; and

2. Because the County typically requires antennas to be “flush-mounted” directly to the exterior of the monopole, the applicant shall provide an engineering explanation based on RF propagation analysis as to why these particular antennas must be mounted on “T”-arms that protrude from the monopole in order to effectively serve the desired coverage area and/or to prevent the need for a wider support structure.

The report further recommends approval conditions for attachment to the special use permit that are detailed in the suggested motions below.

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**Suggested Motions:**

**MOTION #1 – ADOPT CONCLUSIONS WITH SUPPORTING FINDINGS OF FACT:**

I move that the Nash County Board of Adjustment adopts **OPTION ‘A’ or ‘B’ (choose one from below)** related to Special Use Permit Request S-220501.

**NOTE:** The suggested findings of fact below may be revised prior to adoption as necessary to reflect the arguments, evidence, and/or testimony presented during the public hearing held on this request.
OPTION 'A': Conclusions with Supporting Findings of Fact for PERMIT APPROVAL:

(1) The proposed development will satisfy the specific standards required by UDO Section 11-5 for wireless communication facilities because:

(a) A freestanding, non-concealed tower that does not exceed a maximum allowable height of 199 feet (including its lightning rod) is permitted for development in this R-40 Zoning District with the issuance of a special use permit.

(b) The review report prepared by CityScape Consultants, Inc. and dated May 4, 2022 concluded that:

(i) The need for the proposed facility in this location is justified due to technological reasons, it is essential in order for the applicant to provide wireless communication services, and it follows Federal guidelines for wireless facility deployment.

(ii) The signal coverage and propagation maps submitted by the applicant clearly demonstrate a lack of existing wireless coverage in the subject area that justifies the proposed height of the tower, which is necessary in order to improve in-building and in-vehicle service between other existing tower sites and to alleviate wireless capacity issues along S NC Highway 231.

(iii) There are no already existing wireless communication facilities, other elevated structures, or publicly-owned properties located in the vicinity of the subject site that could provide equivalent wireless signal coverage to that of the proposed new tower.

(iv) The tower design will accommodate the antennas and associated equipment necessary for five (5) total wireless service providers in compliance with the County’s minimum requirement for a tower of the proposed height.

(v) The requirement of a concealed (or “stealth”) monopole structure at this location would be inappropriate due to the necessary height of the tower and would likely result in a wider (and therefore more visible) support structure, but the visual impact of the proposed non-concealed tower would be mitigated by its gray color and the use of low-profile antennas.

(2) The proposed development will not materially endanger the public health or safety because:

(a) The ground equipment compound will be surrounded by an eight-foot tall wooden climb-deterrent fence topped with barbed wire.
(b) Documentation submitted by a licensed structural engineer verifies that in the unlikely event of a catastrophic structural failure, the proposed monopole tower would collapse within the confines of the facility’s lease area in compliance with the County’s requirement for the use of “breakpoint technology.”

(c) Statements provided by the applicant certify that the radio frequency emissions from the facility will comply with FCC standards regarding interference with other radio services and prior to the construction of the facility, the applicant must further certify that it will comply with the applicable FCC requirements to protect the public from excessive exposure to electromagnetic radiation.

(3) The proposed development will not substantially injure the value of adjoining or abutting property because:

(a) The submitted impact study report prepared by Michael P. Berkowitz with MPB Real Estate, LLC and dated December 21, 2021 employed appraisal methodology and market data to conclude that the proposed wireless communication facility will not substantially injure the value of adjoining or abutting property.

(b) The operation of the proposed wireless communication facility would be essentially silent, it would not generate any additional traffic beyond that necessary for routine maintenance, and it will be visually screened by both newly planted vegetation within the lease area and existing natural vegetation to remain outside the lease area.

(c) FAA regulations do not require aviation obstruction lighting or marking for a tower of the proposed total height of 199 feet.

(4) The proposed development will be in harmony with the area in which it is to be located because:

(a) The proposed wireless communication facility will provide improved wireless service and capacity to the residents of the surrounding area as well as for drivers passing through the area on S NC Highway 231.

(5) The proposed development will be in general conformity with the recommendations of the Nash County Land Development Plan because:

(a) The plan does not specifically address the development of wireless communication facilities within this designated Suburban Growth Area.

--- OR ---

OPTION ‘B’: Conclusions with Supporting Findings of Fact for PERMIT DENIAL.
In order to deny the special use permit request, the Board needs only to determine that the application is incomplete or to identify any one or more of the applicable standards that the proposed development would fail to satisfy and then adopt findings of fact to support that conclusion based upon the evidence and testimony presented at the public hearing.

**MOTION #2 – APPROVE OR DENY THE SPECIAL USE PERMIT REQUEST:**

*I move that the Nash County Board of Adjustment APPROVES or DENIES (choose one) Special Use Permit Request S-220501, subject to the following attached permit CONDITIONS:*

1. All equipment feed lines shall be routed inside the monopole and all entry ports on the monopole shall be sealed to prevent wildlife intrusion.

2. The applicant shall provide a structural analysis report from a North Carolina Registered Professional Engineer indicating that the tower will support the applicant’s antennas and similar equipment for four (4) additional future collocations.

3. The applicant shall provide an RF exposure report indicating that the proposal will comply with the FCC’s OET-65 human RF exposure requirements.

4. Should the antenna arrays be lowered in the future to a height that is below a removable section of the monopole, the tower owner shall then remove this upper section that is no longer in use.

5. The applicant shall provide the Determination of No Hazard issued by the FAA for the proposed location and tower at the overall height of 199 feet above ground.

6. The proposed structure shall not be lighted and/or painted a highly visible color unless required by the FAA.

7. The monopole and all mounted equipment shall be finished with a shade of gray or other color that the County deems blends best with the surrounding environment.

8. The antennas shall be flush-mounted to the monopole unless the applicant’s RF Engineer provides an explanation as to why this will adversely impact the design of the facility and/or necessitate a wider structure; alternatively, the antenna mounting system shall be designed to achieve as minimal a profile as possible.

9. The tower, once constructed to a 199-foot overall height above ground, shall not be increased in height to or above 200 feet under the provisions of Section 6409(a) of the Spectrum Act of 2012, unless the FAA would not require aviation obstruction lighting and/or marking.
(10) The noise level of the installed standby generator shall not exceed 65 dB at the nearest property line.

(11) Testing of the generator shall be limited to between 9:00 a.m. and 4:00 p.m. Monday through Friday and not for a period to exceed one hour.
Figure 2. Proposed Tower Elevation Sketch
Figure 3. Site Plan
Figure 5. Service Coverage without Proposed Site
Figure 6. Service Coverage with Proposed Site
May 4, 2022

Mr. Adam Tyson, Planning Director
Nash County Planning & Inspections
120 W. Washington Street, Suite 2110
Nashville, NC 27856

APPLICANT: Faulk & Foster, on behalf of Cellco Partnership d/b/a Verizon Wireless
PROVIDER SITE ID/NAME: 436811 / Simon
ADDRESS: South NC Highway 231, Middlesex, NC 27557 (E-911 Address to be Determined)
COORDINATES: N 35° 44’ 51.66”, W 78° 12’ 05.05”
PROPOSED STRUCTURE: 195-foot Monopole Tower plus 4-foot Lightning Rod

Dear Mr. Tyson,

At your request, on behalf of the County of Nash ("County"), CityScape Consultants ("CityScape"), in its capacity as telecommunications consultant for the County, has considered the merits of an application submitted by Faulk & Foster, on behalf of Cellco Partnership, d/b/a Verizon Wireless ("Verizon" or "Applicant"), for a Special Use Permit to construct a one hundred and ninety five (195) foot non-concealed monopole tower (199 feet including lightning rod) and associated sixty by sixty foot (60’ x 60’, 3,600 square foot) fenced ground equipment compound, within a one hundred by one hundred (100 x 100) foot leased area, to be located along South North Carolina Highway 231 in Middlesex, on property zoned R-40 and owned by Florence Mildred Phillips, see Figure 1. The tower and ground compound will be built among existing vegetation in the southeast corner of the of the subject 47.57 acre parcel. The purpose of the proposed facility is to bring new Verizon LTE (4G) wireless service to the area surrounding the proposed facility location.

The Applicant proposes to erect a non-concealed monopole, in which all tower-mounted equipment including the antennas and radios are mounted outside the pole shaft and thus visible,. The centerline of the Verizon antennas would be 190 feet above ground level. The Applicant stated that the tower will be designed to accommodate the antennas and associated equipment of five (5) total carriers, thus complying with the County’s minimum number of collocators for a tower of the proposed height, see Figure 2. Applicant states that the tower and equipment area will be secured by a perimeter wooden climb-deterrent fence of eight (8) feet in height, topped with three strands of barbed wire, with a 12-foot-wide double swing gate on the east side of the enclosure. Constructed as proposed, the fence would ensure that the ground-level equipment within the enclosure is shielded from view.

The proposal has been evaluated from the following perspectives:
• Whether the proposed facility meets County Code 11-5; and

• Whether the proposed facility, as specified, is justified due to technological reasons and is essential for the Applicant to provide its wireless communication services; and

• Whether the proposed facility will follow the guidelines of the Telecommunications Act of 1996, the Nash County Ordinance and all other pertinent rules and regulations.

**Nash County Planning Requirements Review**

CityScape had preliminary discussions with the Applicant on November 5, 2021 regarding the proposed site and the processes for filing an application for the proposed new tower. The Applicant submitted the site review package in February and CityScape received approval from the County to begin review of the application and supporting documents on February 18, 2022. After reviewing the application materials for consistency with the County’s Code Section 11-5 titled, Wireless Communications Facilities, CityScape deemed the application incomplete because nine (9) different development standards were not addressed by the Applicant. The standards needing to be addressed for completion was provided to the County and the Applicant via e-mail on February 28, 2022.

The Applicant responded by addressing the comments on April 4, 2022. CityScape reviewed the supplemental information and deemed the application complete on April 29, 2022.

The Applicant provided responses to all the items in Section 11-5, however two answers require additional attention from the County should the County decide to grant approval of the request to build a new tower in this location. Specifically, Section 11-5.5.3.a.v. states,

> “New freestanding antenna support structures shall be configured and located in a manner that shall minimize adverse effects including visual impacts on the landscape and adjacent properties. New freestanding WCF’s shall be designed to match adjacent structures and landscapes with specific design considerations such as architectural designs, height, scale, color, and texture.”

The Applicant is proposing a standard galvanized gray monopole which could be painted (including all future antenna) with a color of the County’s choice should the County think that a dark brown, light gray or white painted monopole would fit best with the geographic location of the proposed tower. CityScape recommends the County consider this option and if the County decides the monopole and the antenna should be painted, then the make the paint color a condition of approval of the proposed new tower.
Section 11-5.5.3.iv. states, “New antenna shall be flush-mounted, unless it is
demonstrated through RF propagation analysis that flush-mounted antennas will not meet the
network objectives of the desired coverage area.” The Applicant addresses this development
standard in writing by stating, “Page C13 of the attached site plans within the general notes
illustrate that Kenwood flush mount antenna will be used at this location. In addition, before and
after photo sims have been provided demonstrate the flush mount antenna design.”

Cityscape verified the note is provided on page C13 and the photo simulations do show
the flush mount antennas. However, the County Code defines flush-mounted as, “any antenna or
antenna array attached directly to the face of the support structure or building such that no
portion of the antenna extends above the height of the support structure or building ....” and the
tower illustration on right side of page C13 shows standard antenna platform mounts.
Furthermore, the Kenwood “flush-mount” does protrude from the side of the tower (see footnote
on page 4 of this report) and as noted in paragraph two (2) under the sub heading Siting
Alternatives Hierarchy and Least Obtrusive Profile Preferences of this report, it may not be
possible to flush-mount the proposed nine (9) antennas physically on the monopole at the same
elevation (190 feet) due to a lack of space between the antennas, unless a wider structure is
erected.

Justification for a New Site

The Applicant is proposing to build the subject facility in order to fill a service gap in
Verizon’s LTE wireless services in the southernmost part of the County, particularly along State
Highway 231, see Figures 5 and 6. Since a wireless carrier facility has limited frequency
spectrum with which to service subscribers, it cannot process a large number of service requests.
As the population density increases and smartphone usage rises at a steep rate, service requests to
one or more of a service provider’s sites may exceed the capacity of the sites to process all
requests, which can result in dropped calls, connection failures and greatly reduced data transfer
speeds. To keep up with the number of subscriber connection requests, carriers often must
augment their networks with new facility sites, even in locations where the signals from existing
nearby facilities are adequate. Often applicants for new facilities, to demonstrate that a service
gap exists in their network, will submit signal coverage maps showing the geographic coverage
of the network both without the proposed site and including the proposed site. The lack of signal
currently in the area where the proposed Verizon facility is to be built is self-evident in Figure 5,
but often signal and capacity gaps go hand in hand.

The Applicant addressed Section 11-15.8.4.a, which requires an examination of all
elevated structures that might be suitable for use by Verizon. As part of this demonstration, in the
document titled “Supplemental Compliance Statement In Response To Cityscape’s 2/28/2022
Review Comments”, the Applicant provided a search ring Google aerial map. The Applicant’s
search area is a simple circle that is approximately 0.41 mile in radius, which is reasonable for an antenna height of 190 feet above ground, and the proposed site is 0.28 mile south of the search ring’s center. CityScape determines the location and area of the search ring to be credible, given that the search area is roughly equidistant from four surrounding adjacent (hand-off) Verizon sites, see Figures 5 and 6. The Applicant states that there are “no existing wireless communications facilities within the geographic search ring.” CityScape agrees with this determination and furthermore, we have examined aerial photographic maps of the search area and found no structures with enough elevation to attach equipment to that would provide coverage equivalent to that of the proposed new structure.

**Siting Alternatives Hierarchy and Least Obtrusive Profile Preferences**

According to the Applicant’s real property consultant, the land in the parent parcel is currently used for agricultural purposes. The adjoining properties are determined to be a mix of residential, mobile home and agricultural uses, vacant land and a used car dealership across the highway.

The Applicant has chosen to construct a non-concealed monopole. Section 15-3.c, paragraph iv requires a new freestanding structure to be “configured and located in a manner that shall minimize adverse effects including visual impacts on the landscape and adjacent properties.” The Applicant states that a concealed tower is not viable, but will mitigate the visual impact by painting the monopole a “galvanized steel – gray” color and installing Kenwood low profile¹ antenna mounts consisting of three (3) “T”-arms attached to the monopole, each holding three (3) antennas and two (2) remote radio units. Applicant states that the photo simulations include the low-profile design.

The Applicant did not provide a sufficient engineering-based explanation as to why the nine (9) proposed antennas cannot be flush-mounted to the exterior of the monopole at 190 feet elevation where the pole width tapers to a minimum. But as previously mentioned in this report, and as CityScape acknowledges, this may not be possible due to lack of spacing between antennas. If that is the case, the use of “T”-bars as standoffis instead of a platform mount, with the overall antenna mount profile kept to a minimum, appears to be a reasonable compromise.

For the Applicant to utilize a freestanding, non-concealed tower, Section 11-5.7 of the Ordinance requires the Applicant to first demonstrate that it cannot use (1) a concealed attached wireless facility, (2) a collocated or combined facility on an existing antenna structure and (3) a freestanding concealed wireless facility. The Applicant states there are no existing wireless facilities.

¹ The Applicant uses the term “flush-mounted antennas” to describe its proposed antenna mounting system; however, the mounts are not “flush-mounted” in the sense that the antennas would be installed directly to the exterior of the monopole. The antennas would be mounted on “T”-arms that connect to and stand off from the monopole.
structures or public property within the search ring. This addresses 1 and 2 of the Sitings Alternatives Hierarchy, Section 11-5.7. Regarding Alternative 3 (concealed), the Applicant provided a supplemental statement indicating that a concealed design “is simply not appropriate in this instance” at the 195-foot height and that the design proposed by the Applicant is meant to mitigate the visual obtrusiveness. Furthermore, the Applicant states that “stealth facilities are viable when they can be deployed at a scale comparable to” a non-concealed monopole. CityScape believes this is a reasonable explanation and that requiring a concealed facility such as a stealth monopole would result in a wider supporting structure because the antennas must fit inside the monopole, thus having a greater visual impact. Last, since there are no County-owned or public-owned property within the search ring, only the last alternative remains, 4c, which is what the Applicant is proposing.

Analysis of Proposed Site and Antenna Height

CityScape finds that the propagation maps submitted by the Applicant clearly demonstrate a lack of coverage in a substantial area. The analysis and our recommendations herein are largely limited to the specific information which can be attributed to Verizon. CityScape is reasonably comfortable accepting this information and believes the proposed antenna height of one hundred ninety (190) feet above ground is justified. For a mobile phone to be dependable in erratic terrain such as exists in this area, there must be reasonable antenna elevation, not just above the tree line but to enable the antennas to “look” well over the ambient tree height in rough terrain situations. Also, the 195-foot monopole height is supportable with collocations of up to four future collocated providers. But with the antennas generally at these heights, it is possible the signal would scatter for miles causing substantial interference, when the objective is to cover a short distance and hand off to an adjacent facility. For this to work well, Verizon must use a substantial amount of beam tilt (where the signal is purposely aimed towards the ground below the horizon) to achieve a higher density of RF energy behind hills and into valleys.

Currently, as indicated in Figure 5, residential in-building and in-vehicle service is not contiguous between the existing sites and in the desired coverage area. The proposed site, see Figure 6, will improve in-building and in-vehicle service in the areas between the existing sites and may help with capacity issues along Highway 231 and adjacent areas.

Ground Site Plan and Collocation Plan

See Figure 3 and 4 depicting the proposed Site Plan and Verizon’s ground equipment detailed drawing. The proposed leased land is a total area of 3,600 square feet. Within this planned area, there will be a proposed sixty-foot by sixty-foot (60’ x 60’) compound to be enclosed by an eight (8) foot wooden fence with barbed wire anti-climbing strands on top and a
12-foot-wide double swing gate on the east side of the fence. This 60’ x 60’ compound has been designed and is shown on the plans to accommodate the equipment of five (5) tenants on the tower. The Applicant is shown to occupy approximately 497 square feet in the northeast section of the enclosed compound. In addition to the tower, Applicant’s equipment, see Figures 3 and 4, would include the following:

- 50 KW standby generator on a 10’ x 3.5’ concrete pad.
- Three (3) site service equipment cabinets on a 10’ x 4’ concrete pad.
- 10’ long equipment rack (H-frame) with a 10’ x 4.5’ ice bridge above it.
- 10’ long x 2’ wide waveguide bridge between the equipment rack ice bridge and the monopole.

According to the construction drawings, the ice bridge and the waveguide bridge would be ten (10) and twelve (12) feet, respectively, above ground level, which means that both would be above the top of the compound fence; however, the existing and proposed planted trees (as they grow) would screen these bridges from view.

On the east side of the fence and extending east beyond the 100’ x 100’ leased area, the Site Plan specifies a 30’ x 60’ vehicle parking and turnaround area and a twelve (12) foot wide gravel access drive connecting to Highway 231. Also, just outside the Verizon equipment area, there would be a multigang meter rack.

According to the submitted plans, Verizon will install its antennas at the center of radiation height of one hundred and ninety (190) feet above ground, see Figure 2. The elevations of the four future collocators are shown in the Figure 2 drawing but their elevations are not specified. Customarily, the vertical spacing between adjacent carrier antenna arrays on a tower ranges from 10 to 15 feet, measured between the centers of the antenna arrays. Assuming a spacing of 12 feet, the future collocation carrier antennas would be at 178, 166, 154 and 142 feet above ground.

**Fall Radius**

The Applicant provided a letter from a North Carolina licensed structural engineer which states that the monopole will be designed so that in the unlikely event of a catastrophic structural failure, the buckled top portion of the monopole would fall within fifty (50) feet of the monopole base, thus collapsing within the facility leased area. CityScape accepts this letter as compliant with the County Ordinance requirement regarding the use of “breakpoint technology.”
FCC Compliance

The Applicant provided the required statements that certify radio frequency emissions from the antenna array comply with FCC standards and that the Applicant will comply with FCC rules regarding interference to other radio services (County Ordinance Section 11-5.8.1, paragraphs d and i); however, the Applicant did not address compliance with the ANSI standards of human exposure to RF emissions as per Section 11-5.5j.

FAA Concurrence with Structure Height

Regarding potential aviation safety impact, the Applicant submitted a Notification of Construction to the Federal Aviation Administration\(^2\) (FAA). As of the date of this review report, an obstruction study has not yet been done by that agency. However, the structure does not exceed the FAA notice criteria at one hundred and ninety nine (199) feet total structure height, and as such would not require aviation lighting or marking. Nevertheless, Section 11-5.8.1g of the County Ordinance requires that prior to issuance of a building permit, the applicant shall provide "a copy of all material submitted by the applicant to the FAA and any such approval if available." Since the tower may not require aviation lighting or marking, it could be left with a metallic galvanized finish or painted another color agreeable to the County.

Conclusion and Recommendations

In conclusion, in the opinion of the undersigned, the Applicant has justified the need for the proposed facility and has followed Federal guidelines for personal wireless facility deployment. CityScape defers to the County to determine whether the proposed non-concealed monopole with the proposed visual impact mitigations meets the intent of the County Ordinance or whether alternative concealment options should be considered.

If the County should approve the proposal, the following approval conditions are recommended:

1. Applicant shall provide approvals from the NEPA and Section 106 offices; and,

2. All equipment feed lines shall be routed inside the monopole and all entry ports on the monopole shall be sealed to prevent wildlife intrusion; and,

3. The Applicant shall provide a structural analysis report from a Registered Professional Engineer in North Carolina indicating that the tower will support the Applicant's antennas and similar equipment for four (4) future collocations; and,

4. The Applicant shall provide an RF exposure report indicating that the proposal will comply with the FCC's OET-65 human RF exposure requirements; and,

\(^2\) FAA Aeronautical Study Number is 2021-ASO-38265-OE.
5. Should the antenna arrays be lowered in the future to a height that is below a removable section of the monopole, the tower owner shall then remove this upper section that is no longer in use; and,

6. The Applicant shall provide the Determination of No Hazard from the FAA for the proposed location and tower at the overall height of 199 feet above ground; and,

7. The proposed structure shall not be lighted and/or painted a highly visible color unless required by the FAA; and,

8. The monopole and all mounted equipment shall be finished with a shade of gray or other color that the County deems blends best with the surrounding environment; and,

9. The antennas shall be flush-mounted to the monopole unless the Applicant’s RF Engineer provides an explanation as to why this will adversely impact the design of the facility and/or necessitate a wider structure; alternatively, the antenna mounting system shall be designed to achieve as minimal a profile as possible; and,

10. The tower, once constructed to 199 feet overall height above ground, shall not be increased in height to or above 200 feet under the provisions of Section 6409(a) of the Spectrum Act of 2012, unless the FAA would not require aviation obstruction lighting and/or marking.

11. The noise level of the installed standby generator shall not exceed 65 dB at the nearest property line; and,

12. Testing of the generator shall be limited to between 9AM and 4PM Monday through Friday and not for a period to exceed one hour.

I certify that, to the best of my knowledge, all the information included herein is accurate at the time of this report. CityScape only consults for public entities and has unbiased opinions. All recommendations are based on technical merits without prejudice per prevailing laws and codes.

Respectfully submitted,

B. Benjamin Evans
Senior Project Engineer

Susan Rabold
Project Planning Manager
Figure 1. Google Site Map
Figure 2. Proposed Tower Elevation Sketch

CityScape Note: This drawing shows an antenna platform which the Applicant will not be using.
Figure 3. Site Plan
Figure 4. Proposed Verizon Equipment Area Detail
Figure 5. Service Coverage without Proposed Site
Figure 6. Service Coverage with Proposed Site
PARENT PARCEL
Property located in Nash County, North Carolina.

All that tract or parcel of land lying and being situated on the west side of South NC Highway 231, located approximately 0.2 miles northeast of the intersection with Smith Road and being in the Drywells Township, Nash County, North Carolina, containing forty-seven and 57/100 acres (47.57 Acres), more or less, and being the same property conveyed to Florence Mildred Phillips by Deed Book 754 pages 400-401, Nash County records, and being more particularly described as follows:

To find the Point of Beginning, Commencing at a 2" pipe found on the western Right of Way of South NC Highway 231 (having a 60' Public Right of Way), and being the corner of said Phillips property and the Aaron A. Creech property as described in Deed Book 1484 pg. 693 and having a North Carolina Grid North (NAD83) value of N 727,800.3730 and E 2,237,023.5150 and being the POINT OF COMMENCEMENT; thence northeasterly with said Right of Way N 18° 37' 05" E 83.82 feet to a point, also being the Point of Beginning for the 30'-foot wide Lessee Non-Exclusive Access, Fiber & Utility Easement; thence leaving said Right of Way N 70° 36' 57" W 20.06 feet to a point; thence S 19° 23' 03" W 35.00 feet to a point; thence N 70° 36' 57" W 30.00 feet to a point being the TRUE POINT OF BEGINNING for the Lessee Premises; thence N 70° 36' 57" W 100.00 feet to a point; thence S 19° 23' 03" E 100.00 feet to a point; thence S 19° 23' 03" W 100.00 feet to the POINT OF BEGINNING.

Bearers based on North Carolina Grid North, NAD83.

Said described parcel containing 0.230 Acres (10,000.00 square feet), more or less and subject to any and all easements, reservations, restrictions and conveyances of record, being as shown in a survey prepared for Verizon Wireless by Summit Design and Engineering Services, PLLC, dated May 14th, 2021.

30' LESSEE NON-EXCLUSIVE ACCESS, FIBER & UTILITY EASEMENT

Together with a 30'-foot wide Lessee Non-Exclusive Access, Fiber & Utility Easement lying and being in the Drywells Township in the town of Middlesex, Nash County, North Carolina, and being a portion of the lands of Florence Mildred Phillips by Deed Book 754 pages 400-401, Nash County records, and being more particularly described as follows:

Commencing at a 2" pipe found on the western Right of Way of South NC Highway 231 (having a 60' Public Right of Way), and being the corner of said Phillips property and the Aaron A. Creech property as described in Deed Book 1484 pg. 693 and having a North Carolina Grid North (NAD83) value of N 727,800.3730 and E 2,237,023.5150 and being the POINT OF COMMENCEMENT; thence northeasterly with said Right of Way N 18° 37' 05" E 83.82 feet to a point being the TRUE POINT OF BEGINNING for the 30'-foot wide Lessee Non-Exclusive Access, Fiber & Utility Easement; thence leaving said Right of Way N 70° 36' 57" W 20.06 feet to a point; thence S 19° 23' 03" W 35.00 feet to a point; thence N 70° 36' 57" W 30.00 feet to a point being the Point of Beginning for the Lessee Premises; thence N 19° 23' 03" E 100.00 feet to a point; thence leaving Lessee Premises S 70° 36' 57" E 30.00 feet to a point; thence S 19° 23' 03" W 35.00 feet to a point; thence S 70° 36' 57" E 19.67 feet to a survey point on said Right of Way; thence with said Right of Way S 18° 39' 19" W 30.00 feet to the POINT OF BEGINNING.

Bearers based on North Carolina Grid North, NAD83.

Said described parcel containing 0.083 Acres (3,595.97 square feet), more or less and subject to any and all easements, reservations, restrictions and conveyances of record, being as shown in a survey prepared for Verizon Wireless by Summit Design and Engineering Services, PLLC, dated May 14th, 2021.
1.00 GENERAL NOTES
1.01 ALL MATERIALS AND WORKMANSHIP SHALL CONFORM TO THE DRAWING SPECIFICATIONS. ALL WORK SHALL BE DONE IN
ACCORDANCE WITH THE LATEST EDITION OF THE STATE, LOCAL AND NATIONAL CODES, ORDINANCES AND OR REGULATIONS APPLICABLE
TO THIS PROJECT.
1.02 THE CONTRACTOR SHALL BE RESPONSIBLE FOR COORDINATING THE WORK OF ALL TRADES AND SHALL CHECK ALL DIMENSIONS, ALL
DISAGREEMENTS SHALL BE CALLED TO THE ATTENTION OF THE PROJECT MANAGER AND ALL CONSTRUCTION PERSONNEL, INCLUDING
PROCEDURE WITH WORK, WHERE THERE IS A CONFLICT BETWEEN DRAWINGS AND VERIZON SPECIFICATIONS. THE CONTRACTOR
ENGINEER SHOULD BE CONTACTED FOR CLARIFICATION.
1.03 ALL INFORMATION SHOWN ON THE DRAWINGS RELATIVE TO EXISTING CONDITIONS IS GIVEN AS THE BEST PRESENT KNOWLEDGE, BUT
WITHOUT GUARANTEE OF ACCURACY, WHERE ACTUAL CONDITIONS CONFLICT WITH THE DRAWINGS, THEY SHALL BE REPORTED TO THE
PROJECT MANAGER AND OR ENGINEER SO THAT PROPER REVISIONS MAY BE MADE. MODIFICATION OF DETAILS OF CONSTRUCTION SHALL NOT
BE MADE WITHOUT WRITTEN APPROVAL OF THE PROJECT MANAGER AND OR ENGINEER.
1.04 CONTRACTOR SHALL REVIEW AND BE FAMILIAR WITH SITE CONDITIONS AS SHOWN ON THE ATTACHED SITE PLAN AND OR SURVEY DRAWINGS.
1.05 WAVESIDE BRIDGE AND EQUIPMENT CABINETS ARE SHOWN FOR REFERENCE ONLY. REFER TO SEPARATE DRAWINGS FOR SPECIFIC
INFORMATION.
1.06 ALL FINISHED GRADES SHALL SLOPE MINIMUM 1/4 IN./FT. AWAY FROM EQUIPMENT IN ALL DIRECTIONS. CONTRACTOR SHALL SLOPE
SWALES AS REQUIRED ALONG EXISTING TERRAIN TO DRAIN AWAY FROM COMPOUND AND ACCESS DRIVE.
1.07 THE INCURRED TOWER AND TOWER FOUNDATIONS WERE DESIGNED BY OTHERS. TOWER INFORMATION PROVIDED ON THESE PLANS ARE
PROVISED FOR REFERENCE PURPOSES ONLY. NOTIFY ENGINEER OR PROJECT MANAGER OF ANY CONFLICT OR DISCREPANCIES.
CONTRACTOR TO OBTAIN COPY OF TOWER DESIGN DRAWINGS, IF AVAILABLE, FROM VERIZON PROJECT MANAGER TO CONFORM COAX
ROUTING AND ANTENNA MOUNT INFORMATION.
1.08 THE CONTRACTOR SHALL PROVIDE ACCURATE EXCAVATION SLOPPING, SHOULDERING, BRACING, AND CYMV IN ACCORDANCE WITH ALL
NATIONAL, STATE, AND LOCAL SAFETY ORDINANCES.
1.09 UPON COMPLETION OF CONSTRUCTION, CONTRACTOR IS RESPONSIBLE FOR REPAIRING ANY DAMAGE CAUSED BY CONSTRUCTION ACTIVITIES TO
EXISTING ACCESS ROAD AND COMPOUND GRAVEL AREAS. ANY NEW FILL MATERIALS SHALL BE COMPACTED.
1.10 THE CONTRACTOR IS HEREBY NOTIFIED THAT PRIOR TO COMMENCING CONSTRUCTION, HE IS RESPONSIBLE FOR CONTACTING THE
UTILITY COMPANIES INVOLVED AND SHALL REQUEST A VERIFICATION AT THE CONSTRUCTION SITE OF THE LOCATIONS OF THEIR UNDERGROUND UTILITIES AND WHERE THEY MAY POSSIBLY CONFLICT WITH THE PLACEMENT OF IMPROVEMENTS AS SHOWN ON THESE PLANS. THE CONTRACTOR OR ANY SUBCONTRACTOR FOR THIS
CONTRACT WILL BE REQUIRED TO NOTIFY "NORTH CAROLINA 811" 48 HOURS IN ADVANCE OF PERFORMANCE ANY WORK BY CALLING THE TOLL FREE NUMBERS (800) 632-6494 (OR 811). ANY UTILITIES DAMAGED BY CONSTRUCTION ACTIVITY SHALL BE REPAIRED BY THE CONTRACTOR, AT THE OWNER'S EXPENSE.
1.11 CONTRACTOR TO PROVIDE DUMPSITE AND PORTABLE TOILET FACILITY DURING CONSTRUCTION.
1.12 CONTRACTOR TO PROVIDE STYME LOCK OR EQUIVALENT AS APPROVED BY VERIZON PROJECT MANAGER.
1.13 CONTRACTOR TO PROVIDE ANY NECESSARY SIGNAGE PER VERIZON PROJECT MANAGER'S INSTRUCTIONS. SEE DETAIL ON SHEET C1.

2.00 EQUIPMENT FOUNDATION NOTES
2.01 FOUNDATIONS ARE DESIGNED FOR A PRESUMPTIVE ALLOWABLE SOIL BEARING CAPACITY OF 2,500 PSI. CONTRACTOR SHALL VERIFY SOIL CONDITIONS AND
BEARING CAPACITY PRIOR TO CONSTRUCTION.
2.02 EXCAVATE A MINIMUM 18" BELOW PROPOSED EQUIPMENT FOUNDATIONS OF EXPANSIVE, ORGANIC, UNCONSOLIDATED OR OTHERWISE UNACCEPTABLE MATERIAL
AND REPLACE WITH WELL-COMPACTED MATERIAL ACCEPTABLE TO VERIZON.
2.03 CONTRACTOR SHALL BE RESPONSIBLE FOR LOCATING PROTECTING, AND RELOCATING AS REQUIRED SERVICE AND UTILITY LINES IN ACCORDANCE WITH THE
WORK SITE, ALL EXCAVATIONS NEAR THESE LINES TO BE CARRIED OUT WITH EXTREME CAUTION, COORDINATE ALL ALLOCATIONS WITH THE PROPERTY OWNER,
2.04 CONTRACTOR TO CUT-FILL EXISTING COMPOUND SURFACES TO PROVIDE AN AREA AS LEVEL AS POSSIBLE FOR THE EQUIPMENT FOUNDATIONS. ALL FILL AREAS ARE TO
BE FILLED WITH SUITABLE MATERIALS. FILL MATERIALS ARE TO BE PLACED, COMPACTED, AND TESTED IN MAXIMUM LAYERS OF 6". COMPACTION OF ALL FILL
MATERIAL SHALL ACHIEVE 95 PERCENT OF MAXIMUM DRY DENSITY AT OPTIMUM MOISTURE CONTENT IN ACCORDANCE WITH ASTM D 698. ALL TESTS MUST MEET THE MINIMUM SPECIFIED SOIL BEARING CAPACITY. COMPACTION TESTING IS BY THE TECHNICAL TESTING COMPANY DESIGNATED FOR THE PROJECT. SCHEDULING AND COORDINATION IS THE RESPONSIBILITY OF THE GENERAL CONTRACTOR. REPORTS OF ALL TESTING ARE TO BE PROMPTLY DELIVERED OR FAXED TO THE VERIZON WIRELESS PROJECT MANAGER.
2.05 CONCRETE SHALL HAVE A MINIMUM COMPRRESSIVE STRENGTH OF 4,000 PSI AT 28 DAYS AND SHALL BE INSTALLED IN ACCORDANCE WITH THE LATEST REVISION TO
ACI-318 BUILDING CODE REQUIREMENTS FOR REINFORCED CONCRETE.
2.06 CONCRETE SHALL HAVE A SLUMP BETWEEN 3" AND 6".
2.07 FIBERS FOR CONCRETE SHALL BE FIBERWED 650, 100 PERCENT VIRGIN POLYPROPYLENE FIBERIZED FIBERS, 43 PATENTED TECHNOLOGY PATENTED TECHNOLOGY, CONTAINING NO REPROCESSED OUTFIN MATERIALS. THE FIBERS SHALL CONFORM TO ASTM C3135 TYPE II AND MANUFACTURED SPECIFICALLY FOR THE SECONDARY REINFORCEMENT OF CONCRETE.
2.08 THE FIBERS SHALL BE MANUFACTURED IN AN ISO 9001-2008 CERTIFIED MANUFACTURING FACILITY. UNDER OTHERWISE STOCKING, FIBERWED 650 MACRO-SYNTHETIC FIBERS SHALL BE ADDED TO THE CONCRETE AT THE BATCHING PLANT AT THE RECOMMENDED APPLICATION RATE OF 0.8% (0.06 lb/yard3) AND MIXED FOR A SUFFICIENT TIME (MINIMUM 5 MINUTES AT FULL MIXING SPEED) TO ENSURE UNIFORM DISTRIBUTION OF THE FIBERS THROUGHOUT THE CONCRETE. FIBER-REINFORCED CONCRETE MUST BE MANUFACTURED BY FIBERWISE INC., INDUSTRY DRIVE, CHATTANOOGA, TN 37421 USA, TEL: 800-621-1273, WEBSITE: WWW.FIBERWISE.COM
2.09 AT THE REQUEST OF THE VERIZON WIRELESS PROJECT MANAGER, TEST CYLINDERS SHALL BE MOLDED AND LABORATORY CRUSHED IN ACCORDANCE WITH
ASTM C39. THREE CYLINDERS SHALL BE TAKEN FOR EACH DAYS CONCRETE PLACEMENT. CYLINDERS SHALL BE TESTED IN ACCORDANCE WITH THE LATEST
REVISION TO ASTM C39.
2.10 CHAMFER ALL EXPOSED EXTERNAL CORNERS OF CONCRETE WITH 3/4" X 45" CHAMFER, UNLESS OTHERWISE NOTED.
2.11 CONCRETE FORMWORK IS TO BE STRIPPED WITHIN 48 HOURS. VIBRATION OF THE CONCRETE MUST ASSURE THAT HONEYCOMB WILL BE AT A MINIMUM.
MECHANICAL VIBRATION OF ALL CONCRETE IS REQUIRED UNLESS OTHERWISE DIRECTED BY VERIZON WIRELESS PROJECT MANAGER. ABOVE GRACE CONCRETE IS TO BE RUBBED AND PATTEN TO ASSURE SMOOTH SURFACE AT TIME OF FORMS REMOVAL. CONTRACTOR SHALL PROVIDE A BROOM FINISH ON THE TOP SURFACE OF THE EQUIPMENT FOUNDATION UNLESS OTHERWISE DIRECTED BY VERIZON WIRELESS PROJECT MANAGER.
2.12 TOPS OF CONCRETE FOUNDATION MUST BE WITHIN 0.02" ELEVATION REQUIRED.
2.13 TOP OF FOUNDATION FINISH TO BE LEVEL 6.5' IN 12'.
2.14 TOP OF FOUNDATION TO HAVE SMOOTH BROOM FINISH.
2.15 CONTRACTOR SHALL REFER TO DRAWINGS OF OTHER TRADES AND VENDOR DRAWINGS FOR EMBEDDED ITEMS AND DEVICES NOT SHOWN ON THE
STRUCTURAL DRAWINGS. CONTRACTOR SHALL VERIFY PLACEMENT OF EQUIPMENT AND LOCATION OF CONDUIT FOR MANUFACTURERS AND VENDOR
SPECIFICATIONS. IT SHALL BE THE RESPONSIBILITY OF THE CONTRACTOR TO PROVIDE ALL OPENINGS AND SLEEVES FOR PROPER DISTRIBUTION OF ALL
UTILITIES.
1. REFER TO THE SITE PLAN FOR EQUIPMENT PAD LOCATION AND ORIENTATION.
2. RUN 2" FLEX TELCO CONDUIT FROM BOTTOM OF TELCO BOX TO SIDE OF RF CABINET WITH CHASE NIPPLE THROUGH FACTORY KNOCKOUT.
3. RUN (2) 2" FLEX POWER CONDUIT AND (1) 1" ALARM CONDUIT FROM BOTTOM OF ILC TO SIDE OF RF CABINET WITH CHASE NIPPLE THROUGH FACTORY KNOCKOUT.
4. RUN 2" FLEX FIBER CONDUIT FROM BOTTOM OF OVP TO SIDE OF RF CABINET WITH CHASE NIPPLE THROUGH FACTORY KNOCKOUT.
5. RUN (1) 1/2" FLEX POWER CONDUIT FOR EVERY (5) RRU CIRCUITS FROM BOTTOM OF OVP TO SIDE OF RF CABINET WITH CHASE NIPPLE THROUGH FACTORY KNOCKOUT.
6. SUPPORT FLEX CONDUIT ON HORIZONTAL H-FRAME RAILS OR ON VERTICAL SITE STRUTS TO ADD TO H-FRAME FOR CONDUIT/CABLE MANAGEMENT.
7. RUN HYBRID CABLE FOR TOWER MOUNTED RRU'S OVERHEAD ON TRAPEZE SUSPENDED FROM WAVE GUIDE BRIDGE, CLAMPED DOWN ON H-FRAME RAILS, THEN LOOP UNDER OVP AND CONNECT TO BOTTOM OF OVP. ATTACH GROUND KITS TO HYBRID CABLE BEFORE LOOPS UNDER OVP, AND BOND TO TOSCA GROUND BAR AT BASE OF H-FRAME.
8. RUN COAX CABLE FOR GROUND MOUNTED RRU'S (IF USED) OVERHEAD ON TRAPEZE SUSPENDED FROM WAVE GUIDE BRIDGE. TERMINATE COAX ON ICE BRIDGE AND TRANSITION TO JUMPERS JUST BEFORE REACHING H-FRAME. ATTACH GROUND KITS TO COAX CABLE ON TOPSIDE OF ICE BRIDGE POST AND BOND TO TOSCA GROUND BAR NEAR TOP OF POST.
9. INSTALL GPS ANTENNA TO BE MOUNTED TO STANDARD HEIGHT POST WITH EXTENDED MOUNTING RIVET, USING COMMSCOPE GPS-UMOUNTING KIT. MOUNT AS NEAR AS PRACTICAL TO IBOHAB CABINET.
10. BOLT CABS AND GENERATOR TO SLAB USING FASTENERS SPECIFIED BY EQUIPMENT MANUFACTURER IN FACTORY PROVIDED MOUNTING HOLES.
KEY NOTES - CONDUIT, CONDUCTORS, & MISC

A. GALVANIZED RIGID STEEL CAP, TYPICAL.
B. ICE BRIDGE, SEE CIVIL SHEETS FOR ADDITIONAL DETAILS.
C. 3" GALVANIZED RIGID STEEL PIPE, TYPICAL.
D. 1-9/16" X 1-9/16" GALVANIZED STEEL CHANNEL (UNISTRUT #1000) WITH PLASTIC END CAP (UNISTRUT #2860), TYPICAL.
E. 50-1/2" x 1-9/16" HORIZONTAL SUPPORT BRACKET (SEE "RACELINE BRIDGE DETAILS" SHEET). TRU-BOLTS REQUIRED FOR ATTACHMENT IN LEO OF FACTORY PROVIDED "U"-BOLTS.
F. ICE BRIDGE RUNNING TOWARDS TOWER (SEE "EQUIPMENT PAD LAYOUT" SHEET).
G. 2/0 ACSR JUMPER CABLES INTO BOTTOM OF RRU'S, TYPICAL.
H. HYBRID CABLES RUNNING INTO BOTTOM OF RAYCAPS, TYPICAL (SEE NOTE 7 ON "EQUIPMENT PAD LAYOUT" SHEET).
I. 1/8" POWER FLEX CONDUIT RUNNING FROM BOTTOM OF RAYCAPS TO CABINET, TYPICAL (SEE "EQUIPMENT PAD LAYOUT" SHEET).
J. 2" FIBER FLEX CONDUIT RUNNING FROM BOTTOM OF RAYCAPS TO CABINET, TYPICAL (SEE "EQUIPMENT PAD LAYOUT" SHEET).
K. FIBER/POWER JUMPER TO RRU (TYP. FOR EACH RRU).

KEY NOTES - ELECTRICAL EQUIPMENT

L. VERIZON RF BBU'S (MODEL, QUANTITY OF, AND CONFIGURATION DETERMINED BY RF DESIGN).
M. VERIZON RAYCAPS (MODEL, QUANTITY OF, AND CONFIGURATION DETERMINED BY RF DESIGN).
N. VERIZON RF CABINET—FRONT VIEW.
O. FUTURE VERIZON RAYCAPS.

EQUIPMENT RACK DETAILS - REAR

1. EQUIPMENT RACK DETAILS - REAR
2. NOT TO SCALE

NOTE: FOR CLARITY PURPOSES, THE REAR ELEVATION OF THE "H" FRAME ONLY SHOWS EQUIPMENT AND CONDUIT MOUNTED ON THE REAR SIDE. SEE FRONT SHEET FOR DETAILS ASSOCIATED WITH EQUIPMENT AND CONDUIT MOUNTED ON THE FRONT SIDE OF THE "H" FRAME.
FENCE NOTES:
1. USE 3000-PSI CONCRETE, FULLY CONSOLIDATED AROUND THE POST.
2. WHERE THE POST IS SET IN ROCK OR CONCRETE, CORE A HOLE 12" DEEP AND 1" LARGER IN DIAMETER THAN THE POST. SET THE POST AND GROUT IN PLACE USING NON-SHRINK GROUT.
3. ALL POSTS MUST BE PLUMB AND ALIGNED WITH ONE ANOTHER IN BOTH HORIZONTAL AND VERTICAL PLANES.
4. CORNER AND GATE POSTS FOR CHAIN LINK FENCES SHALL EXTEND ABOVE THE TOP STRAND OF BARBED WIRE TO PROVIDE TENSIONING FOR THE BARRED WIRE.
5. PROVIDE MIRRORS AND BRACKETS AT ALL CORNER POSTS WHERE THE FENCE CHANGES DIRECTION BY MORE THAN 30 DEGREES.
6. THE GRADING OF THE SITE AND INSTALLATION OF THE FENCE SHALL PROMOTE FOR NO MORE THAN A 3% GAPP AT THE BOTTOM OF THE FENCE MATERIAL AND FINISH GRADE.
7. CONTRACTOR SHALL PROVIDE HOLD OPEN DEVICES FOR ALL GATES AT THE SPECIFIED OPEN POSITIONS, DRIVEN PIPE TYPE RECEIVERS ARE NOT AUTHORIZED.

SECTION "A-A" 
NOT TO SCALE

SITE COMPOUND SURFACE DETAIL

NOT TO SCALE

WOODEN FENCE AND GATE ELEVATION
C7

SIDE ELEVATION VIEW
C7

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NOTE:
CURRENT DESIGN ANTICIPATES
APPROXIMATELY 14,024 SQ. FT. (0.34
ACRES) OF CLEARING AND GRADING FOR
THE PROPOSED PROJECT. IF ADDITIONAL
CLEARING IS REQUIRED BEYOND WHAT IS
SHOWN IN THE PLANS THE CONTRACTOR
SHALL NOTIFY THE ENGINEER AND/OR
PROJECT MANAGER. IF DURING THE BID
WALK OR CONSTRUCTION IT IS
DETERMINED THAT MORE THAN (1) ACRE
OF LAND IS TO BE DISTURBED FOR
CONSTRUCTION AN EROSION AND
SEDIMENTATION CONTROL PLAN MUST BE
FILED 30 DAYS PRIOR TO
CONSTRUCTION.

GRADING NOTES:
1. THE CONTRACTOR SHALL CLEAR AND GRUB
THE SITE AND PLACE, COMPACT, AND
MOISTURE CONDITION ALL FILL PER THE
PROJECT GEOTECHNICAL ENGINEER
SPECIFICATIONS. ALL FILL IS APPROVED BY THE
GEOTECHNICAL ENGINEER PRIOR TO PLACEMENT.
2. ALL PROPOSED CONTOURS AND SPOT
ELEVATIONS REFLECT FINISHED GRADES.
3. CONTRACTOR SHALL BLEND EARTHWORK
SMOOTHLY TO TRANSITION BACK TO
EXISTING GRADE.
4. PORTIONS OF THE SITE NOT SPECIFICALLY
MENTIONED WITHIN THE GEOTECHNICAL
REPORT SHALL BE COMPACTED TO 95
PERCENT OF THE MATERIALS MAXIMUM DRY
DENSITY WITHIN 3 PERCENT OF OPTIMUM
MOISTURE CONTENT.
5. FILL SHALL BE PLACED IN MAXIMUM 8
INCH LOOSE LOTS.
6. UNDISTURBED AREAS WITHIN 30'
ACCESS/GRESS EASEMENT NOT NEEDED
FOR UTILITY ROUTING TO BE LEFT
UNDISTURBED.
7. GROUND WATER SHOULD BE REASONABLY
EXPECTED ANY DÉ-WATERING OR
MOISTURE CONDITIONING IS THE
RESPONSIBILITY OF THE CONTRACTOR AND
SHOULD BE INCLUDED IN THE CONTRACT
PRICE.
8. SEED ALL DISTURBED AREAS NOT TOPPED
WITH GRAVEL PER SEEDING SCHEDULE ON
DETAILED ON SHEET C9.
9. MAXIMUM SLOPE = 2H:1V UNLESS
OTHERWISE NOTED.
10. MAXIMUM FILL SLOPE = 3H:1V UNLESS
OTHERWISE NOTED.

LEGEND
EXISTING CONTOURS
PROPOSED CONTOURS
LODI BLT FENCE ------- LDD
TPF -- T
EXISTING SPOT ELEVATION A XXX
PROPOSED SPOT ELEVATION • XXXX

1 GRADING & EROSION CONTROL PLAN
SHEET NUMBER:
C8
Erosion Control Notes:
1. Erosion Controls shall be installed prior to construction and shall be adequate to maintain sediment on site.
2. All excavated soils not needed on site for backfill operations shall become property of the contractor and shall be taken off site and legally disposed of.
3. Soil remaining on site shall have silt fence tightly placed around the entire circumference of the pile.
4. Provision erosion controls as necessary to prevent existing soils from draining off site or into existing drainage structures.
5. Erection of erosion controls shall be in accordance with state and local erosion control regulations.

Seeding Schedule for Winter / Spring Construction Activities

Seeding Mixture
Species: Ryegrass, Annual Rye Grass, Perennial Ryegrass
Rate (Percent) 120

Prevent erosion of临时 cover from extending beyond June.

Seeding Dates
- February 15 - May 15
- December 1 - May 1

Soil Amendments
Follow recommendations of soil tests or apply 2,000 lb/acre ground agricultural lime and 750 lb/acre 10-10-10 fertilizer.

Mulch
Apply 4,000 lb/acre straw, woodchips, or a mulch covering tool. A silt with biodegradable may be used as a mulch for erosion control.

Maintenance
Reapply if growth is not fully adequate. Inspect and reapply mulch immediately following erosion or other damage.

Seeding Schedule for Summer Construction Activities

Seeding Mixture
Species: Common Bermudagrass
Rate (Percent) 40 - 60 (1-2 lb/1,000 sq. ft)

Seeding Dates
- Dated May 1 - July 1
- Dated August 1 - October 1

Soil Amendments
Apply lime and fertilizer according to soil tests, or apply 3,000 lb/acre ground agricultural lime and 500 lb/acre 10-10-10 fertilizer.

Mulch
Use grass, straw, or other effective erosion control material to cover the top of the soil and kill weeds. The mulch should not extend beyond the temporary cover base. Cover and mulch should be applied to provide a 6-inch layer of mulch on the soil surface by sifting and raking it over the soil.

Maintenance
A minimum of 3 weeks is required for establishment. Inspect and apply mulch frequently. Reapply the following year with 50 lb/acre nitrogen.
**Plan**

**Notes:**
1. Put silt fence or tree protection fence up to ensure construction entrance is used.
2. If construction on the site is such that the mud is not removed by the vehicle traveling over the stone, then the tires of the vehicles must be washed before entering the public road.
3. If a project continues to pull mud and debris on to the public road, the governing authority will clean the area and invoice the financially responsible person as indicated on the financial responsibility form.

**Cross Section**

1. **Construction Entrance**
   - Not to scale

2. **Standard Access Road and Turn-Around Detail**
   - Not to scale
NOTE:
1. ALL MATERIALS FURNISHED BY CONTRACTOR UNLESS OTHERWISE NOTED.

DETAIL A
ANDREW 1 POST WAVEGUIDE BRIDGE KIT (PART # MB-K310-915, OR APPROVED EQUIVALENT)

VERTICAL TRAPEZOID SECTION
HORIZONTAL CABLE SUPPORT SECTION

1. WAVEGUIDE BRIDGE DETAIL
C12
NOT TO SCALE

2. WAVEGUIDE BRIDGE DETAIL (ALT DESIGN - 2 PIPE COLUMNS)
C12
NOT TO SCALE
1. All information on this page is provided by Verizon Wireless and/or others and is shown for illustrative purposes only. Contractor shall contact the Verizon Wireless construction Manager prior to construction for all detailed antenna and coax cable information.

2. Refer to structural analysis by tower owner for analysis of proposed tower.

3. It is understood that Kimley-Horn makes no warranty, whether expressed or implied, findings, designs, recommendations, specifications, opinion, or professional advice relating to the structural adequacy of the proposed tower or attachment of antennas or other appurtenances.

NOTE:

GENERAL CONTRACTOR TO INSTALL KENWOOD TELECOM 22209697-1014-M FLUSH ANTENNA MOUNT. CONTRACTOR TO USE S-BOOMS AND TO MOUNT ANTENNA MOUNTING PIPES ON THE OUTSIDE OF THE BOOMS. CONTRACTOR TO CONFIRM ANTENNA MOUNT MAKE, MODEL, AND CUSTOM CONFIGURATION WITH VERIZON CONSTRUCTION MANAGER PRIOR TO CONSTRUCTION.

GENERAL CONTRACTOR TO INSTALL RAYCAP OVP, NUMBER AND TYPE PER VERIZON CONSTRUCTION MANAGER.

MONOPOLE TOWER ELEVATION

C13

NOTE:

1. All proposed attachments to tower based on tower design drawings by others (see general note 1.07, sheet N1).

2. The tower elevation shown is for reference only.

3. Coax/fiber cable lengths are approximate. Contractor to verify correct length in field at time of construction.

4. Proposed tower will be galvanized steel—gray in color.

ANTENNA ORIENTATION PLAN

C13

(Not to scale, for illustrative purposes only. See structural analysis by others to confirm antenna mount type.)

NOTE:

Refer to RFDS provided by Verizon. Contractor to contact the Verizon Wireless Construction Manager prior to construction for the construction RFDS.
GENERAL LANDSCAPE NOTES:
1. THE LANDSCAPE CONTRACTOR SHALL BE RESPONSIBLE FOR COORDINATION OF HIS WORK WITH THAT OF ALL OTHER CONTRACTORS. THIS PLAN DOES NOT GUARANTEE THE EXISTENCE OF OR NON-EXISTENCE OF ANY UTILITIES PRIOR TO COMMENCEMENT OF ANY WORK. THIS LANDSCAPE CONTRACTOR SHALL VERIFY THE LOCATIONS OF ALL ABOVE-GROUND AND UNDERGROUND UTILITIES.
2. THE QUALITY AND SIZE OF ALL PLANT MATERIAL SHALL CONFORM TO THE MOST CURRENT STANDARDS AS SET FORTH IN ANSI 260.380 - AMERICAN STANDARD FOR NURSERY STOCK.
3. ALL DISTURBED AREAS NOT COVERED BY HARDSCAPE OR PLANT MATERIALS SHALL BE COVERED WITH SEED AND STRAWS.
4. PLANT SUBSTITUTIONS MAY BE PERMITTED ONLY AFTER PRIOR WRITTEN APPROVAL BY THE OWNER OR LANDSCAPE ARCHITECT. THE CONTRACTOR SHALL PROVIDE THE NEAREST EQUIVALENT EXISTING SIZE AND VARIETY OF THE PLANT HAVING THE SAME ESSENTIAL CHARACTERISTICS AS THE PLANT SPECIFIED.
5. MINOR PLANT LOCATION ADJUSTMENTS MAY BE MADE IN THE FIELD TO ENSURE ACCESS TO UTILITIES, JUNCTION BOXES, FREE SPACE OF FUTURE TRUE TREE CANOPY INTERFERENCE AND ALL UNIMPEDED PEDESTRIAN / VEHICULAR CIRCULATION OR ALL PAVEMENTS OR FOUNDATIONS.
6. ALL SHRUB массовок двух об разного морозостойкости должна быть включена в описание с учетом местных условий.
7. THE CONTRACTOR SHALL NOTIFY THE OWNER IMMEDIATELY IF HE ENCOUNTERS ANY UNUSUAL SURFACE OR SUBSURFACE DRAINAGE CONDITIONS, SOIL DEPTH, LATENT SOILS, HARD PAN, UTILITY LINES, OR OTHER CONDITIONS THAT MIGHT IMPACT THE HEALTH AND VIGOR OF THE PLANTS. SHOULD THE CONTRACTOR NOT NOTIFY THE OWNER OF A PROBLEM, HE WARRANTS THAT THE AREAS ARE SUITABLE FOR PROPER GROWTH AND DEVELOPMENT OF ALL PLANTS INSTALLED.
8. THE CONTRACTOR SHOULD VERIFY LANDSCAPING/TREE PLANTING LOCATIONS WITH THE PUBLIC UTILITIES DEPARTMENT TO AVOID CONFLICTS WITH WATER, SEWER, AND GAS LINES.
9. PLANTS SHALL BE PLANTED IN DEVELOPMENT AND APPEARANCE AS TO BE UNQUESTIONABLE SUPERIOR IN FORM, COMPACTNESS AND SYMMETRY. THEY SHALL BE SOUND, HEALTHY, VIGOROUS, WELL-BRANCHED AND DENSELY TOLATED WHEN IN LEAF, AND FREE OF DISEASE AND INSECT ADULT EGGS, PUPAE OR LARVAE. THEY SHALL HAVE HEALTHY, WELL-DEVELOPED ROOT SYSTEMS AND BE FREE FROM PHYSICAL DAMAGE OR OTHER CONDITIONS THAT WOULD PREVENT THRIVING GROWTH.
10. THERE SHOULD BE NO CIRCUITS ON GROUND LEVEL. CIRCUITS SHOULD BE CUT IN AT LEAST ONE PLACE.
11. THE CONTRACTOR SHOULD BE ADMIRED LEADER TO THE TOP OF THE TREE WITH THE LARGEST BRANCHES SPACED AT LEAST 6 FEET APART. THERE CAN BE TWO LEAVES IN THE TOP 30% OF THE TREE IF IT IS OTHERWISE OF GOOD QUALITY.
12. THE TREE CANOPY SHOULD BE SYMMETRICAL AND FREE OF LARGE Voids. CLEAR TRUNK SHOULD BE NO MORE THAN 40% OF TREE HEIGHT UNLESS OTHERWISE SPECIFIED ON THE PLANTING SPECIFICATIONS. CLEAR TRUNKS SHALL BE OF SUFFICIENT HEIGHT TO CLEAR SURROUNDING USES THAT MAY BE IMPACTED BY THE FUTURE GROWTH OF THE TREE.
13. OPEN TRUNKS AND BRANCH WOUNDS SHALL BE LESS THAN 30% OF THE CIRCUMFERENCE AT THE WOUND AND NO MORE THAN 1 INCH TALL. PROPERLY MADE PRUNING CUTS ARE NOT CONSIDERED OPEN TRUNK WOUNDS. THERE SHOULD BE NO CORNS OR BLEEDING, AND THERE SHOULD BE NO SIGNS OF INSECTS OR DISEASE ON MORE THAN 50% OF THE TREE.
14. IF ANY OF THE ABOVE CONDITIONS ARE NOT MET, TREES MAY BE REJECTED.
15. TREE PROTECTION DEVICES MUST BE INSTALLED AND INSPECTED PRIOR TO ANY CLEARING, GRUBBING, OR GRADING OF THE SITE BY THE LOCAL AMBrose.

PLANTING LIST

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<td>YEDDA HAWTHORN</td>
<td>BAB 10&quot; SEE PLAN</td>
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LEGEND

- **Eastern Red Cedar**
- **American Holly**
- **Yedda Hawthorn**

**SITE PLAN**

**SCALE:** 1" = 15'

**PLANS PREPARED BY:**
Kimley-Horn

**PROJECT INFORMATION**

- **SITE NAME:** Simon
- **SITE NO.:** 456511
- **PROJECT #:** 2120265
- **SOUTH CAROLINA, WISCONSIN, AND IOWA REGIONS:**
- **MICHIGAN:**
- **MINNESOTA:**
- **VERIZON:**
**ELECTRICAL NOTES**

**1.00 CODES, STANDARDS, & SPECIFICATIONS**

1.01 IT IS THE CONTRACTOR'S RESPONSIBILITY TO ENSURE THAT ALL MATERIALS AND LABOR PERFORMED DIRECTLY OR INCIDENT TO ALL ELECTRICAL WORK DOCUMENTED IN THESE DRAWINGS SHALL BE PERFORMED AND PERFORMED IN CONFORMITY WITH ALL CURRENTLY APPLICABLE CODES, STANDARDS, AND PROFESSIONAL STANDARDS OF CARE TO INCLUDE THE AMERICAN SOCIETY FOR TESTING AND MATERIALS (ASTM), UNDERWITERS LABORATORY (UL), NATIONAL ELECTRICAL MANUFACTURERS ASSOCIATION (NEMA), AMERICAN STANDARDS ASSOCIATION (ASA), NATIONAL FIRE PROTECTION ASSOCIATION (NFPA), AND THE NATIONAL ELECTRICAL CODE (NEC).

1.02 MATERIALS SHALL BE NEW AND SHALL CONFORM TO ALL APPLICABLE CURRENT GOVERNING STANDARDS ESTABLISHED FOR EACH ITEM BY ASTM, UL, NEMA, ASA, NFPA.

1.03 ALL ELECTRICAL WORK SHALL Comply WITH ALL APPLICABLE STATE, COUNTY, AND MUNICIPAL CODES AND ORDINANCES, AS WELL AS ALL CURRENT GOVERNING STANDARDS AND PRACTICES AS REQUIRED BY NEC, NFPA, AS, and NFPA, UBC, US, IEEE, and the LOCAL UTILITY COMPANY.

1.04 ALL ELECTRICAL GROUNDING SHALL COMPLY WITH THE CURRENT EDITION OF THE NEC.

1.05 CONTRACTOR SHALL MAINTAIN A MASTERCLEARANCE OF 36 IN FRONT OF ALL ELECTRICAL EQUIPMENT AS REQUIRED BY NEC. MINIMUM CLEARANCE SHALL BE OBSERVED FOR BOTH THE FRONT AND THE REAR OF THE UNIT H-FRAME RACK AND THE EQUIPMENT H-FRAME RACK.

**2.00 GENERAL**

2.01 CONTRACTOR SHALL BE RESPONSIBLE FOR ALL PERMITS AND ASSOCIATED FEES RELATED TO THE PROJECT AND SHALL DELIVER A COPY OF ALL PERMITS TO THE LOCALITY RESPONSIBLE FOR THE PROJECT.

2.02 CONTRACTOR SHALL SCHEDULE AND PROVIDE ALL INSPECTIONS REQUIRED BY THE JURISDICTION HAVING AUTHORITY.

2.03 CONTRACTOR SHALL PROVIDE ALL APPROPRIATE BUILDING COMPONENTS, ACCESSORIES, ETC., FOR A COMPLETE WORKING ELECTRICAL SYSTEM.

2.04 ALL WORK SHALL BE PERFORMED IN STRICT ACCORDANCE WITH APPLICABLE BUILDING CODES AND LOCAL ORDINANCES, INSTALLED IN A NEAT MANNER, AND SHALL BE SUBJECT TO APPROVAL BY THE ENGINEER.

2.05 CONTRACTOR SHALL PROTECT ADJACENT EQUIPMENT AND FINISHES FROM DAMAGE AND SHALL NOTIFY THE OWNER OF ANY CONDITION OR ITEMS DAMAGED AS A RESULT OF THE WORK.

2.06 CONTRACTOR SHALL REPAIR ANY LANDSCAPING DISTURBED DURING CONSTRUCTION.

2.07 IF CONDUIT RUNS HAVE MORE THAN THREE (3) CONSECUTIVE 90 DEGREE TURNS, THE CONTRACTOR SHALL INSTALL LITE BOXES AS REQUIRED BY NEC.

2.08 CONTRACTOR SHALL INDICATE THE LOCATION OF ALL CAPPED UNDERGROUND SPARE CONDUIT ON THE PROJECT DRAWINGS.

2.09 CONTRACTOR SHALL COORDINATE EXACT ROUTING OF CONDUIT WITH OWNER. ALL CONDUIT SHALL BE ROUTED WITHIN 3 FEET, EITHER SIDE, OF PERIMETER FENCING.

**3.00 MATERIALS**

3.01 ALL EQUIPMENT AND MATERIALS SHOWN SHALL BE CORRECTLY IDENTIFIED AND SPECIFIED OTHERWISE NOTED ON THE DRAWINGS.

3.02 FINAL CONNECTIONS OF EQUIPMENT SHALL BE PERFORMED AND INSTALLED IN ACCORDANCE WITH THE MFG. SPECIFICATIONS. DETAILS, AND DRAWING. THE ELECTRICAL CONTRACTOR SHALL PROVIDE MATERIALS AND EQUIPMENT COMPATIBLE WITH EQUIPMENT SUPPLIED BY VERIZON.

3.03 CONTRACTOR SHALL PROVIDE AND INSTALL PANELBOARDS, SUB PANELBOARDS, AND METER BASES AS SHOWN ON THE DRAWINGS.

3.04 CONTRACTOR SHALL FIELD DETERMINE JUMPER CONDUCTORS, AND SHALL PROVIDE JUMPER CONDUCTORS AS REQUIRED.

3.05 ALL CONDUIT SHALL BE ENSURE WITH THE INSULATION OF THE CONDUIT IN THE CONDUCTOR.

3.06 ALL CONDUIT SHALL BE ENSURE WITH THE INSULATION OF THE CONDUIT IN THE CONDUCTOR.

**4.00 PRE-CONSTRUCTION COORDINATION**

4.01 CONTRACTOR SHALL VISIT THE SITE PRIOR TO BID AND NOTE EXISTING CONDITIONS THAT MIGHT AFFECT THE WORK. ALL SUCH CONDITIONS SHALL BE REPORTED TO THE ENGINEER PRIOR TO BID.

4.02 THE CONTRACTOR SHALL PROVIDE A UTILITY LOCATOR AND SHALL VERIFY THE LOCATION OF ALL UTILITIES PRIOR TO CONSTRUCTION. THE CONTRACTOR IS RESPONSIBLE FOR PROTECTING ALL EXISTING UTILITIES. ANY DAMAGE TO EXISTING UTILITIES SHALL BE REPAIRED AT THE CONTRACTOR'S EXPENSE.

4.03 CONTRACTOR SHALL VERIFY PRIOR TO BID THAT SITE CONDITIONS ALLOW FOR THE PLACEMENT OF THE ELECTRICAL EQUIPMENT AS SHOWN ON THE PLANS.

4.04 CONTRACTOR SHALL COORDINATE WITH LOCAL ELECTRICAL UTILITY REGARDING THE EXACT LOCATION OF THE TRANSFORMER, ALL METERING REQUIREMENTS, AND CONDUIT ROUTING BETWEEN TRANSFORMER AND METER.

4.05 CONTRACTOR SHALL COORDINATE WITH LOCAL TELECOM Utility REGARDING THE EXACT LOCATION OF THE TELECOM SERVICE ENTRY POINT.

4.06 CONTRACTOR SHALL COORDINATE WITH AUTHORITY HAVING JURISDICTION REGARDING LOCAL PROTECTIVE REQUIREMENTS FOR RACEWAY MATERIAL SELECTION AND INSTALLATION.

4.07 CONTRACTOR SHALL PERFORM AN ARC FLASH ANALYSIS AT THE INTEGRATED LOAD CENTER AND PROVIDE ARC FLASH LABEL PER NEC.

4.08 ALL CIRCUIT BREAKERS AND EQUIPMENT SHALL HAVE A MINIMUM ARC RATING OF 12500 AMPS. IF THE RATING OF THE USEFUL TRANSFORMER PROVIDING THE ELECTRICAL SERVICE IS LESS THAN 75 KVA, THE CONTRACTOR SHALL INSTALL A SHORT-CIRCUIT CALCULATION TO DETERMINE THE REQUIRED ARC RATING FOR THE CIRCUIT BREAKERS AND EQUIPMENT.

4.09 CONTRACTOR SHALL INSTALL A MINIMUM ARC RATING OF 12500 AMPS. IF THE RATING OF THE USEFUL TRANSFORMER PROVIDING THE ELECTRICAL SERVICE IS LESS THAN 75 KVA, THE CONTRACTOR SHALL INSTALL A SHORT-CIRCUIT CALCULATION TO DETERMINE THE REQUIRED ARC RATING FOR THE CIRCUIT BREAKERS AND EQUIPMENT.

4.10 CONTRACTOR SHALL INSTALL A MINIMUM ARC RATING OF 12500 AMPS. IF THE RATING OF THE USEFUL TRANSFORMER PROVIDING THE ELECTRICAL SERVICE IS LESS THAN 75 KVA, THE CONTRACTOR SHALL INSTALL A SHORT-CIRCUIT CALCULATION TO DETERMINE THE REQUIRED ARC RATING FOR THE CIRCUIT BREAKERS AND EQUIPMENT.

4.11 CONTRACTOR SHALL INSTALL A MINIMUM ARC RATING OF 12500 AMPS. IF THE RATING OF THE USEFUL TRANSFORMER PROVIDING THE ELECTRICAL SERVICE IS LESS THAN 75 KVA, THE CONTRACTOR SHALL INSTALL A SHORT-CIRCUIT CALCULATION TO DETERMINE THE REQUIRED ARC RATING FOR THE CIRCUIT BREAKERS AND EQUIPMENT.

**5.00 ELECTRICAL NOTES**

5.01 ELECTRICAL NOTES ON THIS DRAWING REFER TO THE CONTRACTOR'S DRAWINGS FOR ADDITIONAL INFORMATION.
KEY NOTES - ELECTRICAL EQUIPMENT

1. **UTILITY METER H-FRAME (SEE DETAIL 1/E4).**
2. **POWER STUB UP (SEE NOTE 4.04 ON SHEET E1).**
3. **EXISTING LIT FIBER HANDHOLE/PEDESTAL (CONTRACTOR TO CONFIRM EXISTENCE AND LOCATION).**
4. **TRAFFIC RATED TELCO VAULT Labeled "VEW FIBER" (SEE NOTE 4.05 ON SHEET E1).**
5. **TELCO BOX (SEE SHEET C4).**
6. **Ciena UNIT, IF NEEDED (SEE SHEET C4).**
7. **INTEGRATED LOAD CENTER (SEE SHEET C4).**
8. **VERIZON CONCRETE EQUIPMENT PAD (SEE SHEET C6).**
9. **VERIZON CONCRETE GENERATOR PAD (SEE SHEET C6).**
10. **DISCONNECT SWITCH (SEE SHEET C4).**

KEY NOTES - CONDUIT, CONDUCTORS, & MISC.

1. **TWO (2) 4" PVC POWER CONDUITS FOR INCOMING SERVICE LATERALS FROM LOCAL UTILITY (SEE TRENCH DETAIL 2/E7).**
2. **2" PVC POWER CONDUIT FROM PROPOSED METER RACK TO EQUIPMENT RACK (SEE TRENCH DETAIL 2/E7).**
3. **TWO (2) 2" PVC TELCO CONDUITS, WITH TWO (2) PULL ROPES EACH (SEE TRENCH DETAIL 2/E7).**
4. **4" PVC BRIDGE FIBER CONDUIT. (IF NO EXISTING LIT FIBER HANDHOLE/PEDESTAL IS PRESENT CONTRACTOR TO PROVIDE A 5' LONG CAPPED STUB BRIDGE CONDUIT).**
5. **TWO (2) 2" PVC CONDUITS FROM RIGHT OF WAY W/ TWO (2) PULL ROPES (SEE TRENCH DETAIL 2/E7 AND SHEET E3).**
6. **3" PVC CONDUIT FOR ROUTING POWER CONDUCTOR TO THE GENERATOR (SEE TRENCH DETAIL 2/E7).**
7. **1" PVC CONDUIT FOR ROUTING GENERATOR CONTROL AND ALARM SIGNAL CABLES TO THE GENERATOR (SEE TRENCH DETAIL 2/E7).**
8. **1" PVC CONDUIT FOR ROUTING GENERATOR BATTERY CHARGERS AND THE GENERATOR BLOCK HEATER (SEE TRENCH DETAIL 2/E7).**

NOTES:

GENERAL CONTRACTOR IS TO CONFIRM WITH VERIZON CONSTRUCTION MANAGER WHETHER INSTALLATION OF THE TWO (2) 2" CONDUITS TO THE RIGHT OF WAY WILL BE PART OF THE INITIAL CONSTRUCTION.
### PANEL SCHEDULE - VERIZON INTEGRATED LOAD CENTER

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Sub-Total (kVA): 14.24 14.24

**LOAD SUMMARY**

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<th>B</th>
<th>Demand Factor</th>
<th>Demand Load (kVA) A</th>
<th>B</th>
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<td>RECTIFIERS/EQUIP</td>
<td>17.80</td>
<td>17.80</td>
<td>1.00</td>
<td>17.80</td>
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<tr>
<td>LARGEST MOTOR</td>
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<td>0.00</td>
<td>1.00</td>
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<tr>
<td>ALL OTHER MOTORS</td>
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<td>1.00</td>
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<tr>
<td>LIGHTING</td>
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<td>1.00</td>
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<tr>
<td>DUPLEX RECEPTACLES</td>
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<td>0.36</td>
<td>1.00</td>
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<tr>
<td>TOTAL MISCELLANEOUS</td>
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<td>0.30</td>
<td>1.00</td>
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Total Power per Phase: 18.96 18.96 kVA
Total Demand Current per Phase: 150.00 161.00 Amps
Total Demand Power: 38.28 kVA

**NOTE:** CIRCUIT LOAD AND DEMAND FACTOR PROVIDED BY VERIZON.

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1 PANEL SCHEDULE

**NOT TO SCALE**
DRIP LOOP DETAIL
E7
NOT TO SCALE

TYPICAL TRENCH DETAIL
E7
NOT TO SCALE

NOTES:
1. IF GROUND SURFACE IS OTHER THAN NEWMY GRAVED AREA, CONTRACTOR IS TO RESTORE TO ORIGINAL CONDITION.
2. PROVIDE PVC CONDUIT BELOW GRADE EXCEPT AS NOTED BELOW.
3. PROVIDE SCHEDULE 40 OR SCHEDULE 80 PVC CONDUIT & ELBOWS AT STUB UP LOCATIONS (I.E. POLES, EQUIMENT, ETC.)
4. PROVIDE SCHEDULE 80 PVC CONDUIT BELOW PARKING LOTS AND ROADWAYS.
GROUNDING NOTES

1. THE GROUND RING SHALL CONSIST OF #2 AWG BARE SOLID TINNED COPPER CONDUCTOR, UNLESS NOTED OTHERWISE. ALL CONNECTIONS SHALL BE MADE USING THE BARE CONDUCTOR EXCEPT WHERE NOTED OTHERWISE.

2. INSTALL GROUND RODS AS SHOWN AND AS REQUIRED. GROUND RODS TO BE COPPER CLAD STEEL, 5/8" DIAMETER AND 10 FT IN LENGTH. SPACING BETWEEN GROUND RODS SHALL BE 10 FT MINIMUM AND 15 FT MAXIMUM. TOP OF GROUND ROD TO BE 30" MINIMUM ABOVE GRADE (OR ABOVE FROST LINE). BOND TOP OF GROUND ROD TO GROUND WIRE WITH EXOTHERMIC WELD. DO NOT EXOTHERMICALLY WELD ANYTHING TO GROUND ROD EXCEPT GROUND WIRE WHICH PASSES OVER TOP OF GROUND ROD (CLAMPED CONNECTIONS TO GROUND ROD FOR TOWER MANUFACTURER DETAILS ARE ACCEPTABLE).

3. EARTH GROUND RING SHALL HAVE A MINIMUM OF 4 GROUND RODS, INSTALLED AT THE CORNERS OF THE GROUND RING PLUS ADDITIONAL RODS AS REQUIRED TO COMPLY WITH THE SPAWING REQUIREMENTS. TOWER GROUND RING SHALL HAVE A MINIMUM OF 3 GROUND RODS, EXCEPT USE 4 RODS AT A MONOPOLE TOWER WHERE SPREAD TOWER FOOTING WOULD PREVENT GROUND RODS FROM BEING DRIVEN INTO SOIL ADJACENT TO TOWER. PROVIDE VERTICAL 1-1/2" DIAMETER PVC SLEEVE ENCASED IN FIBERGLASS TO ALLOW INSTALLATION OF GROUND RODS.

4. EARTH GROUND RING AND TOWER GROUND RING SHALL BE BONDED TOGETHER WITH TWO #2 STC GROUND LEADS, ONE ON EACH SIDE OF ICE BRIDGE.

5. BOND TOWER TO TOWER GROUND RING AT THREE LOCATIONS WITH #2 AWG GROUND LEAD. SELF SUSTAINING SUPPORTS SHALL HAVE EACH LEG BONDED TO GROUND RING. WINDROUS AND GUYED TOWERS SHALL HAVE GROUND LEADS (SQUARED SPACED AROUND TOWER) BONDED TO TOWER AND EXOTHERMICALLY WELD GROUND LEADS TO TOP OF GROUND PLATE OR ATTACH TO TOWER USING BONDED CONDUIT AS SHOWN IN DETAIL.

6. BOND #2 STC RADIALS FROM THE TOWER GROUND RING TO EACH FENCING POST OR RADIALS SHALL HAVE GROUND RODS AS PER THE REQUIRED SPAWING. THE GROUND ROD AT THE END OF BOND RADIAL SHALL BE 24" MINIMUM FROM FENCE/ CORNER POST.

7. MINIMUM BEND RADIUS FOR #2 AWG GROUND WIRE IS 12", EXCEPT USE 36" BEND RADIUS FOR TOWER GROUND RINGS AND EQUIPMENT PAD GROUND RINGS.

8. GROUND ALL EXTERNAL EXPOSED METAL OBJECTS, USE TWO HOLE LUGS FOR CONNECTION TO FLAT METAL SURFACES. USE NON-STAINLESS STEEL HARDWARE ON ALL MECHANICAL CONNECTIONS. CLEAN ALL SURFACES (STRIP PAINT AND FLUSHED) TO BARE BRIGHT METAL PRIOR TO MAKING GROUND CONNECTIONS. APPLY ANTI-OXIDE CONDUCTIVE TO ALL BARE METAL SURFACES. USE NON-METALLIC PAINT (SOLVENT BASED) TO ALL EXOTHERMIC WELDS, AND TO ANY METAL EXPOSED BY CLEANING, STRIPPING, GRINDING, CUTTING OR DRILLING.

9. ALL GROUNDING CONDUCTORS ABOVE GRADE SHALL BE RUN IN 3/4" FLEXIBLE PVC CONDUIT, CONDUIT SHALL BEGIN WITHIN 3/4" OF ABOVE GROUND CONNECTION POINT. SHALL EXTEND 24" EXCEPT GROUND ROD MINIMUM AND SHALL BE FILED WITH SEALANT AT ABOVE GROUND CONNECTION POINT. SECURE CONDUIT EVERY 24" ON VERTICAL RUNS AND EVERY 30' ELSEWHERE WITH NON-METALLIC TIES.

10. AT GUYED AND SELF SUPPORT TOWERS MOUNT TSGSA-PA14 TOWERS TO GROUND RING WITH #2 AWG COPPER CONDUCTOR BONDED TO BARE CONDUCTOR WITH BARE CONDUCTOR LEADS CONNECTED TO GROUND RODS. BARE COPPER CONDUCTOR CABLE COVERS OFF GROUND POST, TOP OF POST TO 3.5" OD BLACK STEEL BUSHING. MAXIMUM FLANGE PLATE MATERIAL FROM TOWER FOUNDATION. ALL CONNECTIONS SHALL BE MADE USING A BARE CONDUCTOR WITH EXOTHERMIC WELD, OR AS NOTED OTHERWISE.

11. AT TWIN TOWERS CLAMP TSGSA-RC14 TOWER BOTTOM BOND GROUND BAR DIAMETER TO TOWER FRAME. IF RUNNING COAX INSIDE MONOPOLE, CLAMP COPPER BOND TO Bottom UP END OF FLEX PORT. IF BANDING COAX TO OUTSIDE OF TOWER, CLAMP COPPER BOND TO STEEL ANGLE WHICH IS BONDED TO TERMINAL SIO-PA14 TO TOWER GROUND RING WITH #2 STC LEADS BONDED TO GROUND BAR AND EXOTHERMICALLY WELD TO GROUND RING.

12. AT EQUIPMENT AREA, INSTALL TSGSA-PA14 EXTERIOR GROUND BAR (THRU-BOLTED STYLE) AT BASE OF (#2) INTERIOR H-FRAME POSTS AND AT TOP OF ICE BRIDGE POST WHICH IS NEAREST TO (BUT CLOSER TO TOWER) THAN THE COAX CABLE TERMINATION. MOUNT GROUND BAR TO H-FRAME POSTS AT 6" ABOVE GRAVEL AND TO ICE BRIDGE POST AT 6FT ABOVE GRAVEL.

13. ALL ICE BRIDGE SECTIONS ARE TO BE JUMPERED TOGETHER WITH #2 WIRE, EITHER BARE TINNED COPPER OR GREEN INSULATED STRANDED ICE BRIDGE SHALL BE GROUNDED AT EACH END WITH #2 STC WIRE BONDED TO ICE BRIDGE AND EXOTHERMICALLY WELDED TO UPPER PORTION OF NEAREST ICE BRIDGE POST. ICE BRIDGE SECTIONS ABOVE H-FRAME SHALL BE BONDED TO EACH OTHER WITH JUMPS AT EACH END. THIS ASSEMBLY WILL BE CONSIDERED AS ONE SINGLE ICE BRIDGE SECTION FOR GROUNDING PURPOSES.

14. BOND EACH ICE BRIDGE POST, H-FRAME POST OR DEVICES GROUNDING POST TO BARE GROUND WIRE SYSTEM WITH #2 STC LEADS BONDED TO GROUND BAR AND EXOTHERMICALLY WELD TO GROUND BAR. EACH POST TO HAVE BONDED AND SECURED TO GROUND BARE GROUND WIRE - DO NOT USE CHAIN ORething WELDS TOGETHER.

15. BOND EACH RF CABINET TO EQUIPMENT GROUND RING WITH #2 AND TAPPED SOLID BARE COPPER CONDUCTOR BONDED TO CABINET BODY AND EXOTHERMICALLY WELD TO GROUND RING. LUG TO CABINET BODY USING LOCATION "A" WHICH STICKS ON CABINET CHASSIS HAVE DIRECT GROUND WIRE CONNECTION TO CABINET INTERNAL GROUND BAR. RUN CONDUCTOR ACROSS BACK OF CABINET (DO NOT RUN TOWARDS NEAREST CORNER OF CABINET) AND THEN BOND GROUND WIRE ACROSS CONDUCTOR PAD BELOW CABINET LACER, THEN DOWN INTO GRAVEL AREA.

16. BOND EACH BATTERY CABINET TO GROUND RING WITH #2 AWG TAPPED SOLID BARE COPPER CONDUCTOR BONDED TO CABINET BODY AND EXOTHERMICALLY WELD TO GROUND ROD. GROUND LEAD IN FLEX CONDUIT ALONG BACK OF BATTERY CABINET, ACROSS CABINET PAD BELOW CABINET LACER, THEN DOWN INTO GRAVEL AREA. CONNECT TWO HOLE LUGS TO EACH OF CABINET AT FACTORY PROCOVING GROUNDING STRAPS.

17. WHERE PROPANE TANK IS INSTALLED TO FUEL GENERATOR, BOND PROPANE TANK TO GROUND RING WITH A SINGLE #2 STC CLAMPED TO TILLER PIPE OF PROPANE TANK AND EXOTHERMICALLY WELD TO GROUND RING. GROUND LEAD SHOULD RUN TO TANK SUPPORT AND TAKE SHORTEST PATH ACROSS CONCRETE PAD TO GRAVEL AREA, THEN CONTINUE TO GROUND RING. IF PROPANE TANK FEED LINE IS METAL, INSTALL BARE COPPER BONDING WIRE TO CONCRETE GROUNDING RING. BOND FUEL LINE TO EQUIPMENT GROUND RING WHERE THE TWO LINES CROSS. SMALL #2 STC CLAMP TO FUEL LINE AND EXOTHERMICALLY WELD TO GROUND RING.

18. BOND GPS ANTENNA AND GPS ANTENNA MOUNT TO TGDGA GROUND BAR AT BOTTOM OF H-FRAME POST WITH #2 GREEN INSULATED STRANDED GROUND WIRE.

19. PROVIDE TWO GROUND ROSES OUTSIDE GATES OF COMPOUND. DISTANCE BETWEEN GROUND ROSES SHALL MATCH WIDTH OF GATE OPENING AND DISTANCE FROM GATE SHALL MATCH LENGTH OF LONGEST INDIVIDUAL GATE LEAF. GATE LEAF SPLIT POSTS TOGETHER WITH #2 STC LEAD WHICH RUNS PAST AND CONNECTS TO GROUND ROSES OUTSIDE GATES.

20. BOND EACH GATE POST WITH #2 STC TO NEARLIEST PORTION OF GROUNDING SYSTEM INSIDE COMPOUND.

21. BOND EACH GATE TO GATE POST WITH FLEXIBLE INSULATED OR BRAZED #4/0 COPPER STRAP (EXOTHERMICALLY WELD) STRAP TO BOTH GATE AND GATE POSTS.

22. ANY METAL FENCE POST WITHIN 6FT OF A GROUNDED METAL OBJECT SHALL BE BONDED TO THE NEAREST GROUND RING. ANY METAL FENCE WITHIN 2FT OF A GROUND RING SHALL HAVE THE LINE POSTS BONDED TO THE GROUND RING AT 2FT MAXIMUM INTERVALS AS MEASURED ALONG THE LENGTH OF THE FENCE.

23. WHERE GROUND BARE BUS, RAYCAP DOVS OR DIPLOCERS ARE INSTALLED AT THE EQUIPMENT AREA, BOND EACH COMPONENT TO NEAREST TGDGA GROUND BAR WITH THE COMPONENT TO #2 GREEN INSULATED STRANDED GROUND WIRE. SINGLE HOLE LUG OR RING TYPE CONNECTOR IS SUITABLE FOR CONNECTION TO GROUNDING SYSTEM.vider I

24. NOTIFY ORANGE TO INSPECT GROUND RING BEFORE BOLTING. CONDUCTS USING LOCATION "A" TO ALL THREE PARTIES TO INSPECT FOR FALL OF POTENTIAL METAL GROUND TEST MAXIMUM ALLOWABLE INFLUENCE OF GROUND IS 12 TIMES PROPER ADDITION GROUND SYSTEM COMPONENTS AS REQUIRED TO ACHIEVE THIS VALUE.

25. REFER TO TOWER GROUNDING DIAGRAM AND THE LIST GROUND SYSTEM REQUIREMENTS FOR THE TOWER.

26. GROUNDING OF ALL ELECTRICAL EQUIPMENT SHOULD BE AS PER NEC, MUNICIPAL, AND UTILITY COMPANY REQUIREMENTS.
KEY NOTES - GROUNDING EQUIPMENT

1. GROUND ROOD TEST WELL (SEE DETAIL 1/11).
2. GROUND ROOD, TYPICAL (SEE DETAIL 2/11 AND NOTES 2 AND 3 ON E8).
3. TOWER AND EQUIPMENT GROUND RING (SEE NOTES 1, 2, 3, 4, 5, 6 AND 7 ON E8).
4. TOSA-PA14 OR TOSA-BC14 WHERE APPLICABLE (SEE NOTES 10 AND 11 ON E8).
5. GENERATOR GROUNDING (SEE NOTE 16 ON E8).
6. GPS ANTENNA GROUNDING (SEE NOTE 18 ON E8).
7. RF CABINET GROUNDING (SEE NOTE 14 ON E8).
8. RRUS'S AND OVP'S GROUNDING (SEE NOTE 23 ON E8).
9. ICE BRIDGE POST BOND TO GROUND RING, TYPICAL (SEE NOTES 12 AND 13 ON E8).
10. FENCE POST GROUNDING, TYPICAL (SEE NOTE 22 ON E8).
11. GATE GROUNDING, TYPICAL (SEE NOTES 18, 19, 20, 21 ON E8).
12. TOWER GROUNDING, TYPICAL (SEE SHEET E3 AND NOTE 13 ON E9).
13. GROUND RADIALS, TYPICAL (SEE NOTE 6 ON E9).
14. REFER TO SHEETS E8, E10, E11 AND E12 FOR GROUNDING NOTES, DETAILS AND SPECIFICATIONS.

LEGEND:

- GROUND RING
- GROUND ROD EXOTHERMICALLY WELDED TO GROUND RING
- EXOTHERMIC MOLD
- GROUND ROD TEST WELL (SEE DETAIL 1/11)
- MECHANICAL CONNECTION
1  GROUND ROD TEST WELL DETAIL
E11  NOT TO SCALE

2  GROUND ROD INSTALLATION DETAIL
E11  NOT TO SCALE

FINISHED GRADE

CRUSHED AGGREGATE, SEE CIVL DRAWINGS FOR DETAILS.

LOOP GROUND RING INTO TEST WELL.

COMPACTED BACKFILL

8" DIAMETER SCHEDULE 40 PVC PIPE
WITH VERTICAL SLOT TO ALLOW PIPE PLACEMENT THRU GROUND RING.

#2 ANG BARE SOLID TINNED COPPER GROUND RING, EXOTHERMIC WELD TO GROUND ROD.

#6 x 10' COPPER CLAD GROUND ROD.
6" OF CRUSHED AGGREGATE.

EXOTHERMIC WELD, SEAL WITH TWO (2) COATS OF COLD GALVANIZED PAINT.

#2 BARE SOLID TINNED COPPER GROUND RING, EXOTHERMIC WELD TO GROUND ROD.

3/8" x 1 1/2 COPPER CLAD GROUND ROD.

PLACEMENT OF GROUND ROD SHALL NOT EXCEED 30 DEGREES FROM VERTICAL.
1. BAR NONE GROUND BEAM CLAMP (TDSGA-BC14)
   
   TINNED COPPER LONG-BARREL DOUBLE-LUG CONNECTOR, TYPICAL.
   STAINLESS STEEL SPACER, TYPICAL.
   STAINLESS STEEL BEAM CLAMP, TYPICAL.
   STAINLESS STEEL HARDWARE, TYPICAL.

   #8 AWG GROUNDING CONDUCTOR RUN FROM CDE TO TOWER USING CLAMP.
   OR RUN #2 ANG INSULATED GROUNDING CONDUCTOR TO NEXT LOWER CDE.

2. BAR NONE POST MOUNTED (TDSGA-PA14)
   
   TINNED COPPER LONG-BARREL DOUBLE-LUG CONNECTOR, TYPICAL.
   STAINLESS STEEL HARDWARE, TYPICAL.
   STAINLESS STEEL SPACER, TYPICAL.

3. ANTENNA GROUND WIRE INSTALLATION DETAIL
   
   NOT TO SCALE
   
   NOTES:
   1. ALL CDE GROUND BARS ON TOWER ARE TO BE ERICO TOSGA.
      TYPICALLY USE TOSGA-WB17 ISOLATED FROM UNDISTRICTED BRACKETS.
   2. IF CDE CANNOT BE CONNECTED TO TOWER WITH #2 ANG.
      GROUNDING CONDUCTOR VIA CLAMP ON EXOTHERMIC WELD, THEN RUN
      #2 ANG BLACK GROUND LEAD FROM CDE CORN TO NEXT LOWER
      CDE. Secure ground lead with non-metallic tie at same
      spacing as coax supports.

4. BAR NONE INSULATED (TDSGA-WB17)
   
   TINNED COPPER LONG-BARREL DOUBLE-LUG CONNECTOR, TYPICAL.
   STAINLESS STEEL HARDWARE, TYPICAL.
   STAINLESS STEEL SPACER, TYPICAL.
Proposed Verizon Wireless 195' monopole tower
(199' top of lightning rod)
Proposed Verizon Wireless 195’ monopole tower
(199’ top of lightning rod)
*Not visible in this view*