

State of Texas

Telecommunications Site Review New Structure



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July 3, 2013

Mr. Stephen Cook
Senior Planner
City of Euless
201 North Ector Drive
Euless, Texas 76039

RE: Verizon Wireless Application
Site: Westpark Way
Airport Freeway at Dock McGinnis Drive

Dear Mr. Cook,

At your request on behalf of the City of Euless, Texas, CityScape Consultants, in its capacity as telecommunications consultant for the City, has considered the merits of an application submitted by Verizon Wireless Personal Communications LP ("Applicant"), to construct a new one hundred (100) foot concealed monopole type support structure with a lightning rod that appears to be four (4) feet for a total elevation of one hundred four (104) feet, see *figure 1*. The concealed monopole tower, commonly referred to as a "slick stick" is intended as an antenna support structure for Verizon Wireless, and is also intended to support the antennas of two (2) additional collocated wireless service providers. The ground area of the site is owned by Sterling Property Joint Venture and is located on Dock McGinnis Drive in Euless, Texas, see *figure 2*.

All personal wireless service providers ("Carriers") are in the process of upgrading their services. AT&T Mobility has released approximately 46,000 construction drawings for new construction and upgraded site; Verizon Wireless has stated they will be doing a substantial number of similar facilities; T-Mobile has said they will start their upgrade later this year; Nextel has begun rebranding their iDEN service to be more compatible with their sister provider Sprint and both Sprint/Nextel began their upgrades last year; the remaining service providers have not publically announce their changes. All Carriers are making changes that will morph personal wireless services into a broader capability. The goal is high speed wireless broadband service. Each carrier has their own name for the advanced wireless service (AWS). Currently all Carriers operate in spectrum of 800MHz, 850MHz, 1,700MHz and 1,900 MHz the expanded band will include frequencies between 700MHz-799MHz formally used in television broadcast and continuing developing spectrum between 2,100 and 2,300MHz. Carriers identify the changes by differing names. The most common is "LTE" for long term evolution which is exactly what it says; it will be a long term to evolve to the speed the public demands. Other Carriers reference the improved service as "Site Modernization" yet others don't place a name. The goal is to provide the download/upload speed equated to computers. Achieving this is more difficult because the majority of interconnectivity is via copper wires. To develop the necessary data transference speeds copper wire will not work; the system will require more modern methods for data "backhaul" which is limited to either fiber optic cable or microwave link.

All wireless communications systems depend on the concept of resource re-use to achieve their great capacities. With some technologies, the individual channel frequencies are reused every few cells, but not too closely, since interference would result. In other systems, power from one base station interferes with the users on another, impacting network capacity making it undesirable for the wireless phones to communicate with more than a few base stations simultaneously.

Cellular, PCS and EMSR wireless providers attain service coverage through ground equipment base stations and antennas mounted on towers or other elevated structures and buildings. The height and location of the elevated antenna platform is critical to two aspects of radio frequency (RF) engineering. The first of these is wireless network coverage.

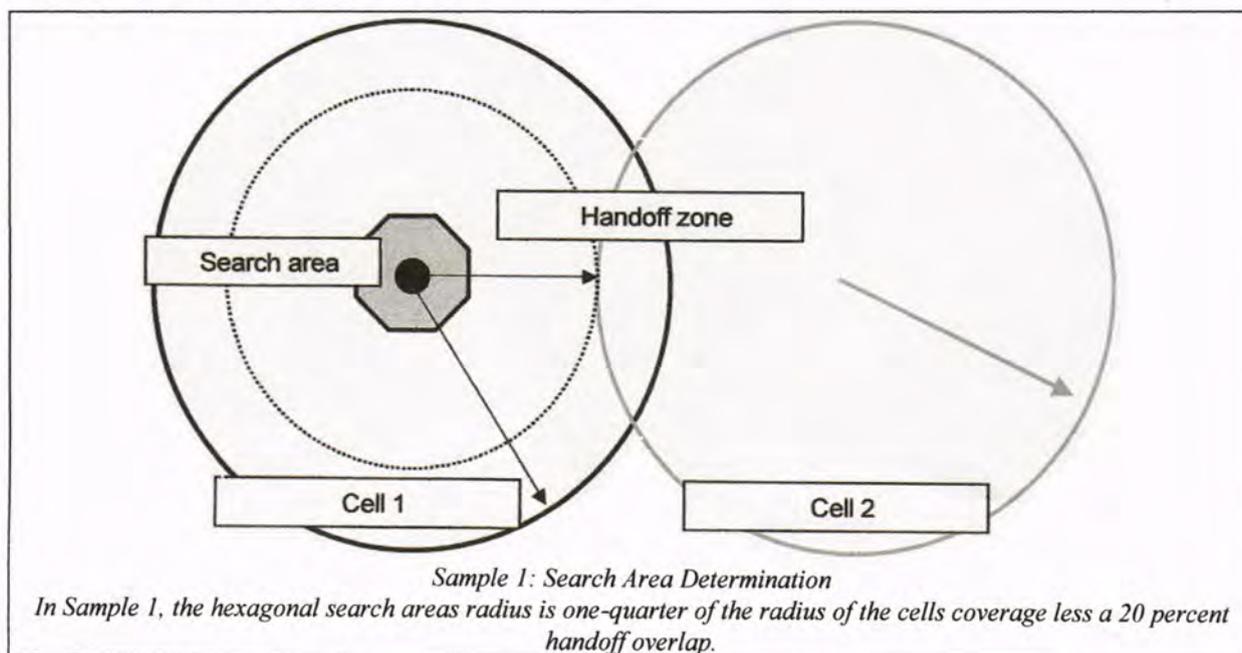
Generally, the higher the antenna is mounted on the support structure, the farther the wireless signal penetrates a defined geographic area. However, the ground equipment at the base station has capacity limitations. In areas where wireless subscribers are intense and airtime minutes are high, caller volume will exceed the designed network capacity, resulting in busy signals or "no service" messages. To help remedy this situation, the antenna heights are mounted at lower elevations than would be necessary for coverage.

In the standard wireless system evolution, a Carrier will initially provide service with a few coverage base stations with relatively tall antenna elevations to maximize the "footprint" for a minimal cost. As subscriber totals grow, and network capacity for that base station is maximized, antennas must be lowered and the areas in between the former "tall" base stations fill in with lower-antenna "coverage" base stations.

Such a stipulation is not difficult to achieve in a new system. In most cities and in all rural areas, wireless providers seek to maximize height in new systems in order to provide continuous coverage at the least expense to the provider. However, in urban-to-suburban areas and demand increases, as is happening in Euless and the Greater Metroplex area, each base station becomes less capable of meeting network objectives. Thus, wireless providers seek to deploy antennas mounted at lower elevations.

An important part of any wireless communication facility application is the verification of the provider's proposed height requirements with generally accepted engineering. To accomplish the proposed location is the controlling factor and the Applicant did submit their "search ring" see *figure 3*. All Carriers utilizes assigned 700MHz through 2,300MHz spectrum within Tarrant County. The proposed facility is anticipated to operate in spectrum close to state, county and local public safety communications, but this should *not* have a concern for the public safety communications within the area.

Cellular search areas are usually circles of approximately one-quarter the radius of the proposed cell. In practice it is fairly simple to determine whether the search area radius is reasonable. The distance from the closest existing site is determined, halved, and a handoff "overlap" of about 20 percent is added. One fourth of this distance is the search area radius. Sample 1 illustrates this graphically.



A reasonable search area location is a key element in assuring that a site is justified. Generally, new wireless communication facilities are equally spaced with respect to existing sites. However, terrain, network capacity and other issues may necessitate a facility that it is *not* equally spaced with respect to existing sites. Typically the wireless provider is asked to provide a frequency grid or coverage predictions to indicate that a site is properly located.

In order to verify that the site is technologically suitable for Verizon's stated needs; the Applicant supplied their "Search Ring" indicating the desired area for the proposed facility. Upon detailed investigation CityScape confirmed there was no other support structure that could support the Applicant's needs see *figure 4*; therefore the Applicant has proposed to construct a new support structure.

Verizon has determined, and CityScape confirms the antenna height of 97 feet is required to provide sufficient service for existing and future Verizon Wireless subscribers, and to comply with federal guidelines for personal communications deployment. CityScape is concerned that the height will limit potential future collocations and believes that will create the need for additional towers in the same area in the near future.

There are options such as to require the tower to have capability of an extension to be added at a later date. That would not be an option if this support structure is designed and constructed as a concealed tower. To add an extension would require the tower to be of a standard or low profile monopole structure, otherwise there is insufficient internal pole size to accommodate feed lines and the overall structure would not have the strength to support an addition. The City will need to understand that the height and design limitations will directly result in the need for additional support structures of similar design in the same general location.

Specifically, the undersigned has evaluated Verizon's proposal from the following perspectives:
That,

- The proposed antenna additions are required due to technological reasons and is essential for the Applicant to provide its telecommunications service, and,
- The proposed facility will have the capacity to add additional collocations; and,
- The Applicant is required by federal mandate to provide wireless communications services for emergency needs; and,
- The Applicant has shown need to construct facilities for high speed wireless broadband service; and,
- The proposed new site is reasonably within the proximity of the Applicant's Search Ring or the Applicant has followed the guidelines of the Telecommunications Act of 1996, the State of Texas statutes and the Euless City Ordinance.

All designs and plans for the proposed new facilities were developed according to accepted practices of RF propagation engineering and the persons completing all work are sufficiently qualified within their disciplines.

Figure 5 represents the existing service for Verizon and clearly shows a need for the addition of a new support structure. CityScape anticipates this plan, if built as designed, should be sufficient to allow an improvement of service to Verizon customers within this area into the foreseeable future and justify the proposed construction of a new support structure. *Figure 6* indicates the Applicant's predicted service which shows the improvement in the general area, and therefore further justifies the needed improvements.

CityScape recognizes this is a rapid growth area and this addition will help relieve existing service concerns within the present Verizon operating system. It is anticipated that other Carriers will soon be requiring new and upgraded facilities in Tarrant County and the entire Metroplex sector.

The Applicant supplied a letter of compliance with all FCC standards regarding human exposure to Radio Frequency energy, and the Applicant will comply with all aspects of FCC rules regarding interference. CityScape knows that this facility will operate in the 700 MHz through the 2,300 MHz spectrum. Area Public Safety communications operate on frequencies in the 800 MHz range but there is not any anticipated interference concerns. The Applicant did not provide compliance statements.

There are certain provisions within the City ordinance that will require variances. CityScape's technical opinion on each variance request:

1. Property Fall Setback: Generally speaking in populated areas in most urban and most suburban areas locating property to allow of 100% or more can be difficult to locate, more difficult for support structures of greater heights.
 - There are provisions which have been developed by the tower industry that will provide fall zones of a defined distance which is less than the structure height and will meet the intentions of the fall zone requirements. This is called breakpoint technology and a tower can be designed to be limited to overturn within a set distance; the City may want to require this option.
 2. The tower separation requirements of 5,000 feet between all communications towers as specified within the City ordinance:
 - This may be in conflict with general practices of wireless network design and could be successfully defended under the Telecommunications Act of 1996.
 3. NEPA/SHPO:
 - Generally this requirement is concluded following zoning approvals to save expense should the application be denied. But should be required prior to issuance of any permits.
 4. Capability to support space for additional collocations:
 - All new structures should be capable of providing antenna space for collocations. Generally the number of additional carriers is computed based on the tower height and the type of design. Monopole towers allow multiple sets of antennas at each aperture while concealed towers usually only allow for a single set of antennas at each aperture. Current network designs require a standard voice/text (CDMA/GSM) antenna set and an 4G (LTE/Site Modernization) antenna set which means a single carrier requires six (6) antennas and in this situation tow (2) antenna slots. Remaining is only a single antenna slot. Antenna arrays should be separated by ten (10) feet. In this situation the antennas heights are 97 feet, 87 feet and 77 feet. There is additional consideration due to the physical size and strength of the tower and the ability to install the necessary feed lines internally, see *figure 7*.
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For the reasons listed below, it is our opinion that:

- The proposed facility is required because of generally accepted and adequately demonstrated technological reasons and is essential in order for Verizon to provide satisfactory existing communications service, to alleviate a signal coverage issue and to provide new fourth generation (4G) services; and,
- Verizon's submissions indicate there is a substantial service void in the general area surrounding the subject site and that the addition of new service at a height of 97-feet will help relieve much of these concerns; and,
- The tower elevation and design as a concealed structure will likely result in the need for additional support structures of similar design in the general surrounding area
- The site will be designed and constructed by professionals with expertise in telecommunications site design and construction on behalf of the Applicant, see *figure 8*.

Accordingly the Applicant, Verizon Wireless, has met the technical requirements of the City of Euless ordinance. If the City finds in favor of the variance requests, CityScape Consultants, as the wireless expert for the City of Euless Texas confirms the application as submitted meets the requirements of wireless facility network design according to the guidelines of the federal government and recommends the application as described in the Construction Drawings submitted by Verizon Wireless and dated January 16, 2013. Telecommunications Act of 1996 should be approved with the following conditions:

1. The Applicant under Section 25.002 of Title 3. Aviation of the Texas Transportation Code shall submit a Notice of Construction to DFW and the Texas Agricultural Aviation Association; and,
2. The Applicant redesign the tower to add one additional collocation opportunity at the 67 foot level with all feed lines to be internally installed; and,
3. Upon completion and prior to occupancy the Applicant provide the City with a structural analysis from a Texas Registered Professional Engineer that the tower will support up to four (4) similar antenna systems in accordance with ANSI/TIA-222G for Tarrant County, Texas; and,
4. The Applicant shall submit a statement of compliance that the tower will be erected and operated in compliance with current FCC and FAA rules and other applicable federal standards; and,
5. All access ports shall be sufficiently sealed to prevent access by birds and other wildlife.

Respectfully submitted,



Richard L. Edwards
FCC Licensed
PCIA Certified
CityScape Consultants, Inc.



Figure 1. Tower Elevation

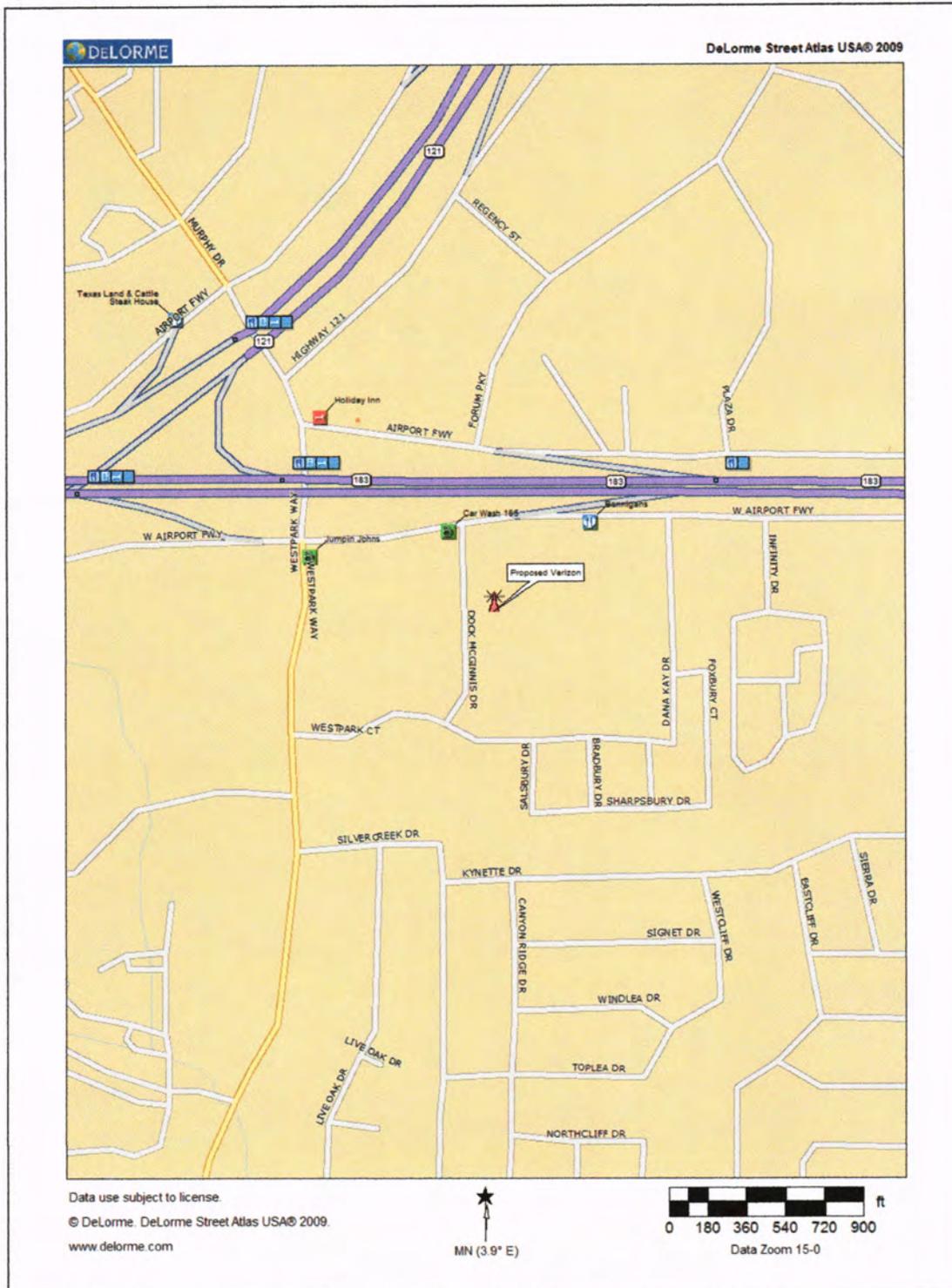


Figure 2. Site Location

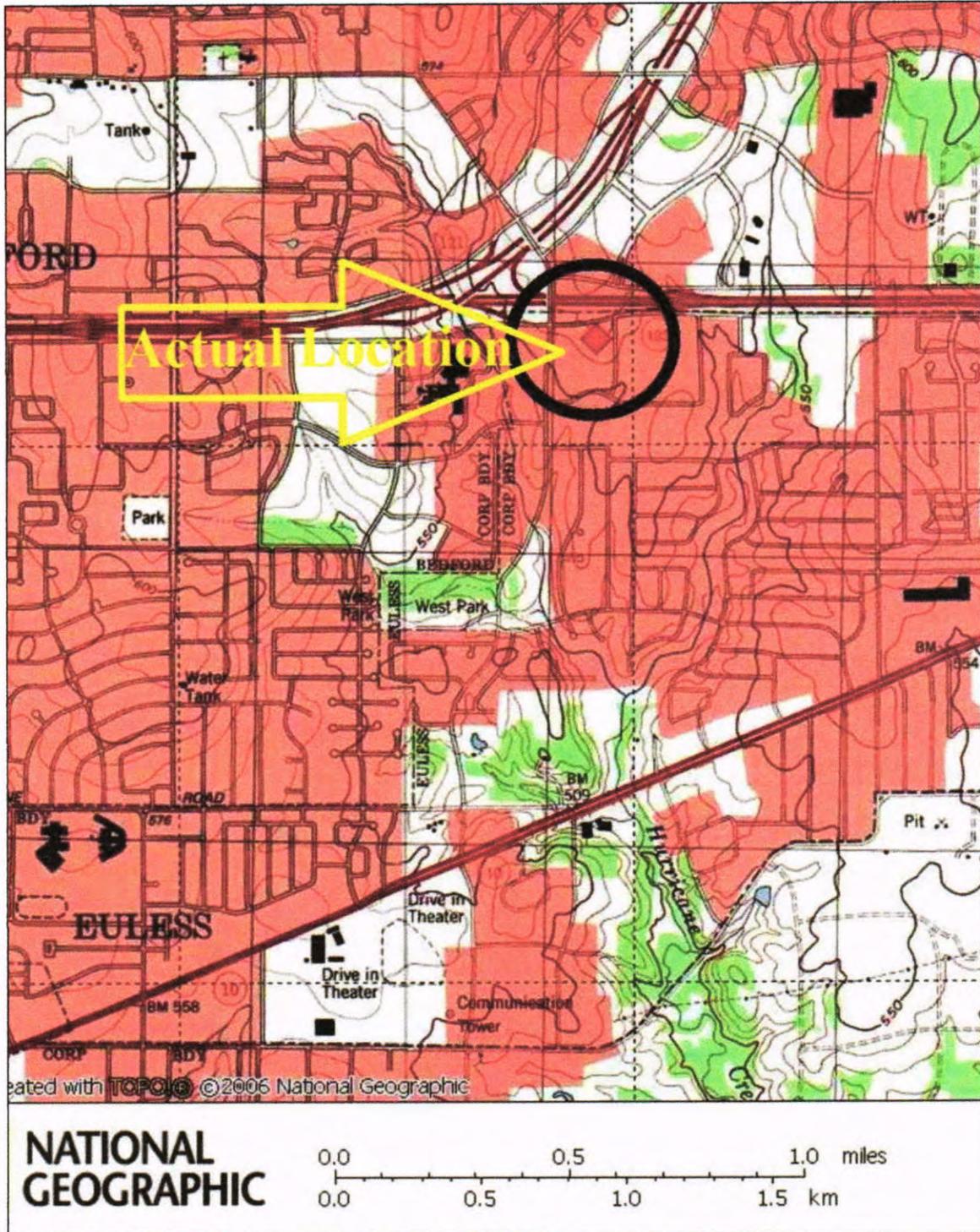


Figure 3. Verizon Search Ring

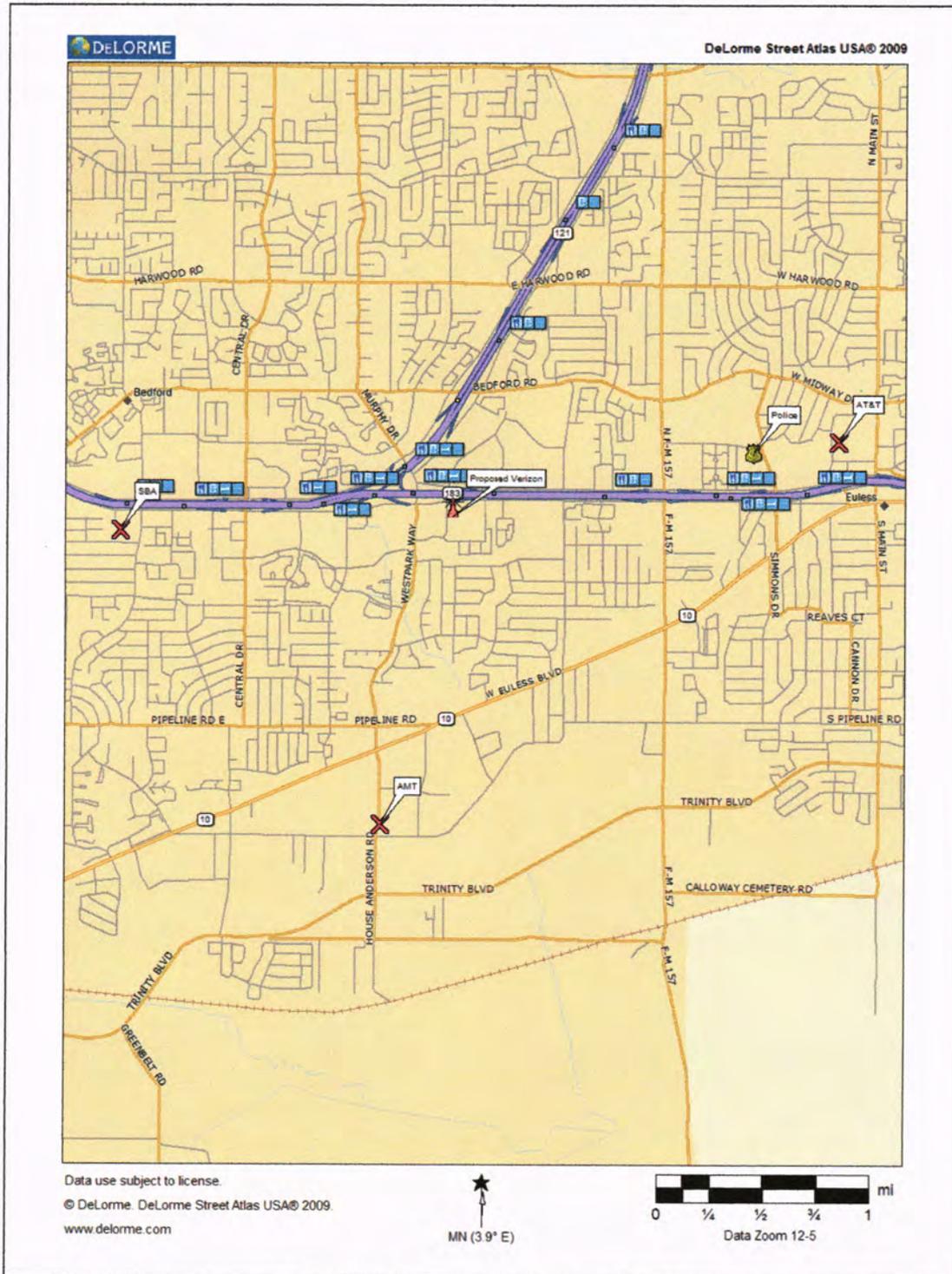


Figure 4. Adjacent Facilities

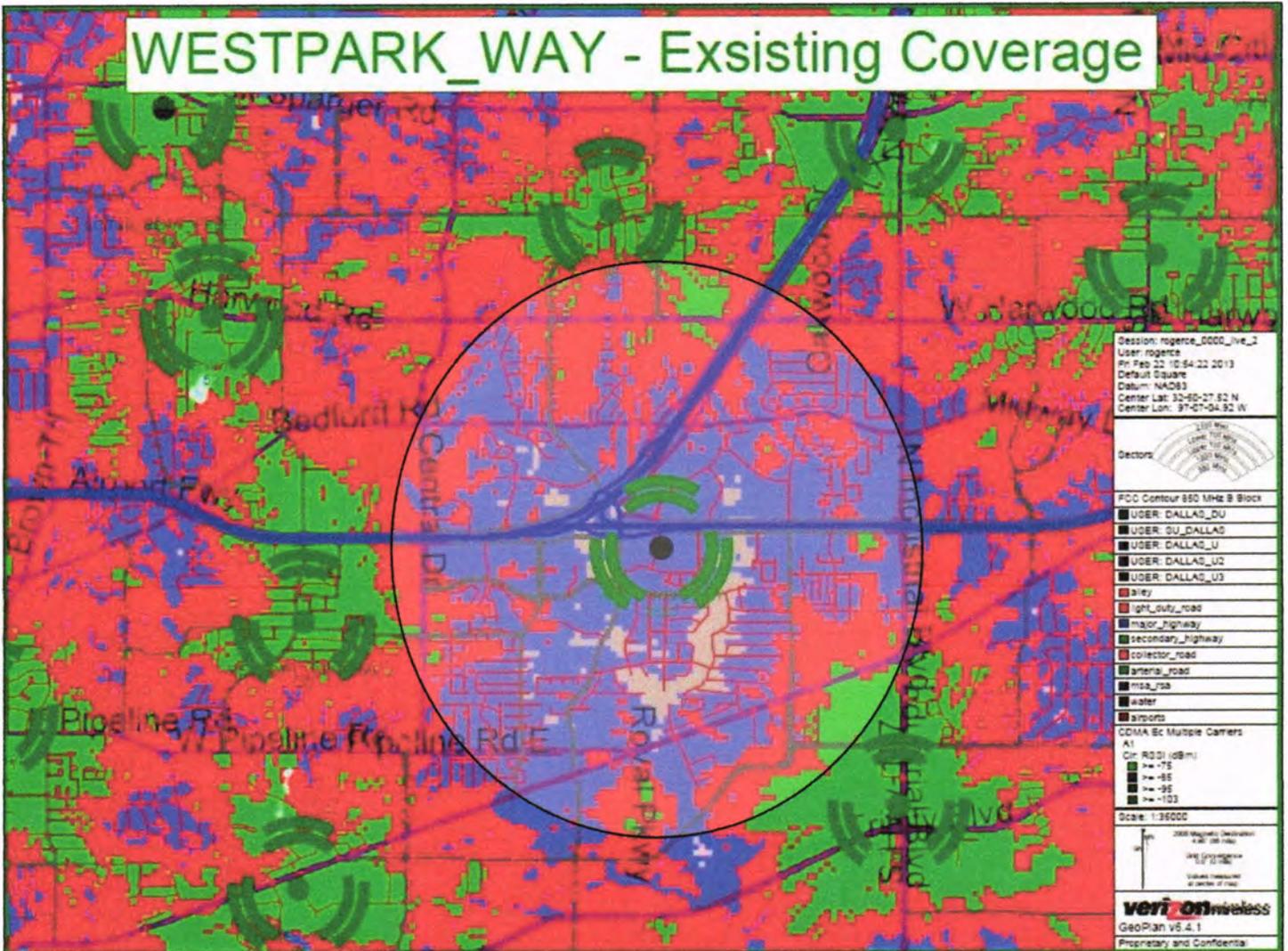


Figure 5. Existing Service (Gray Indicates Target Area)

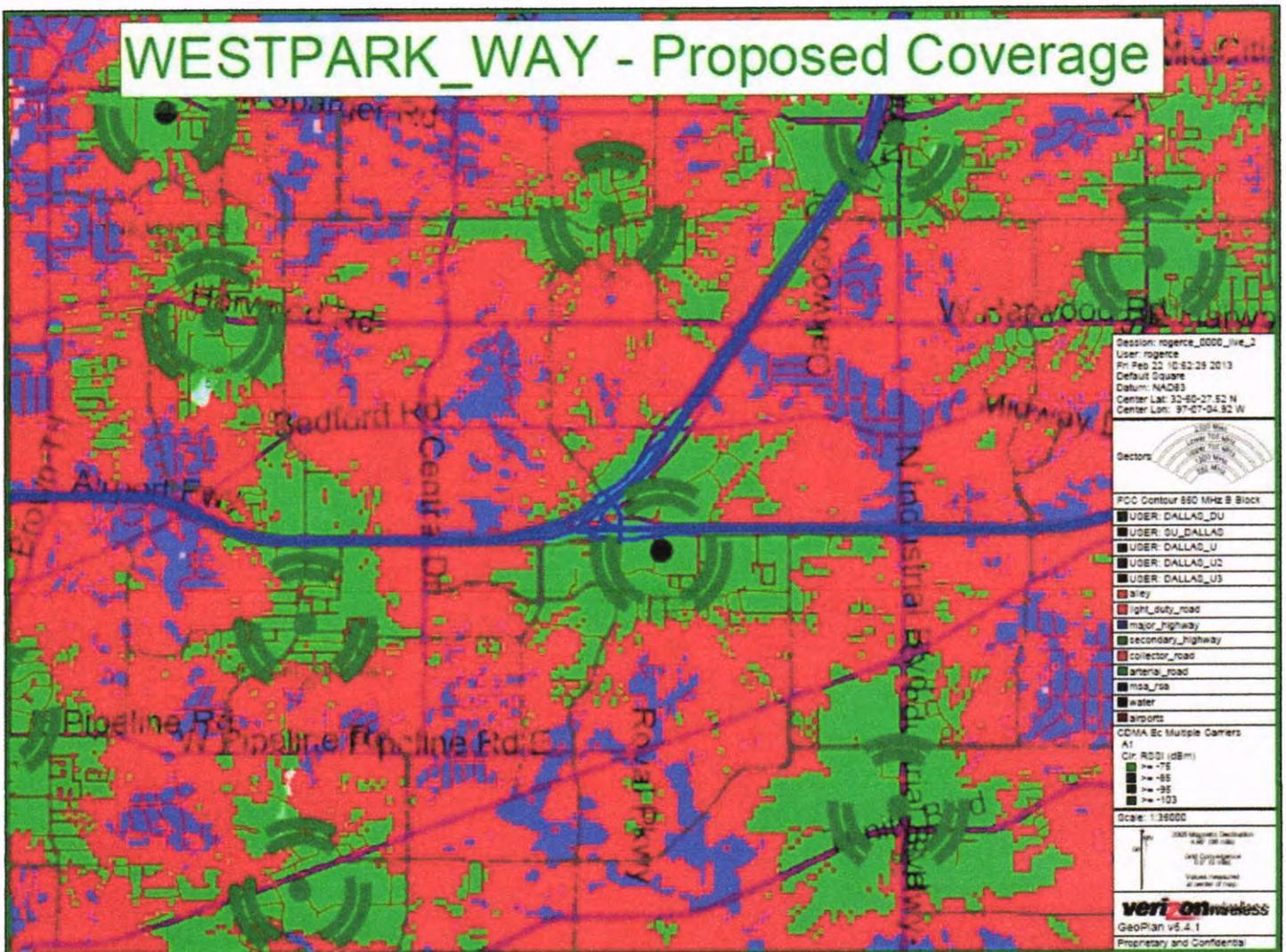


Figure 6. Applicant's Proposed Service

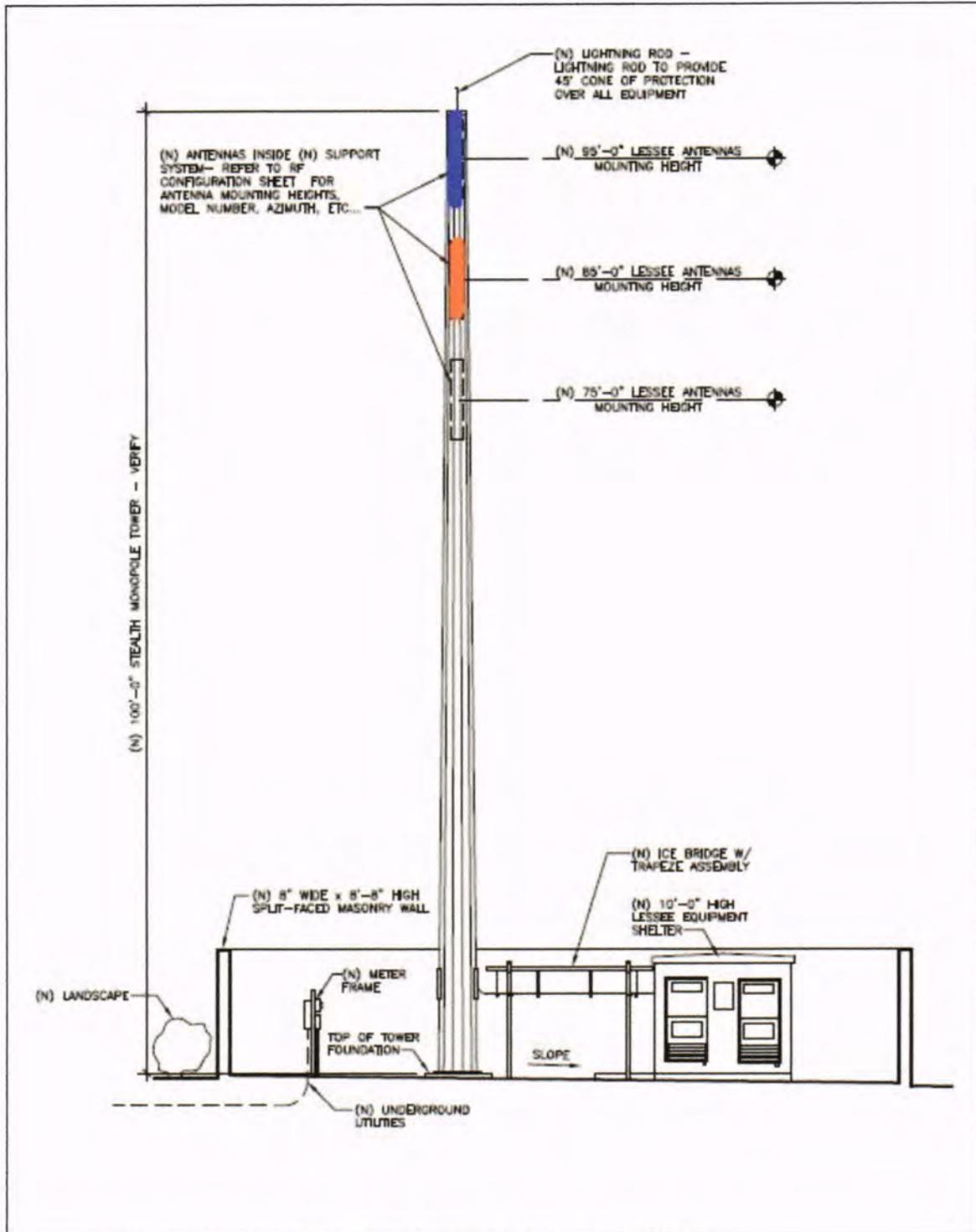


Figure 7. Antenna Configuration

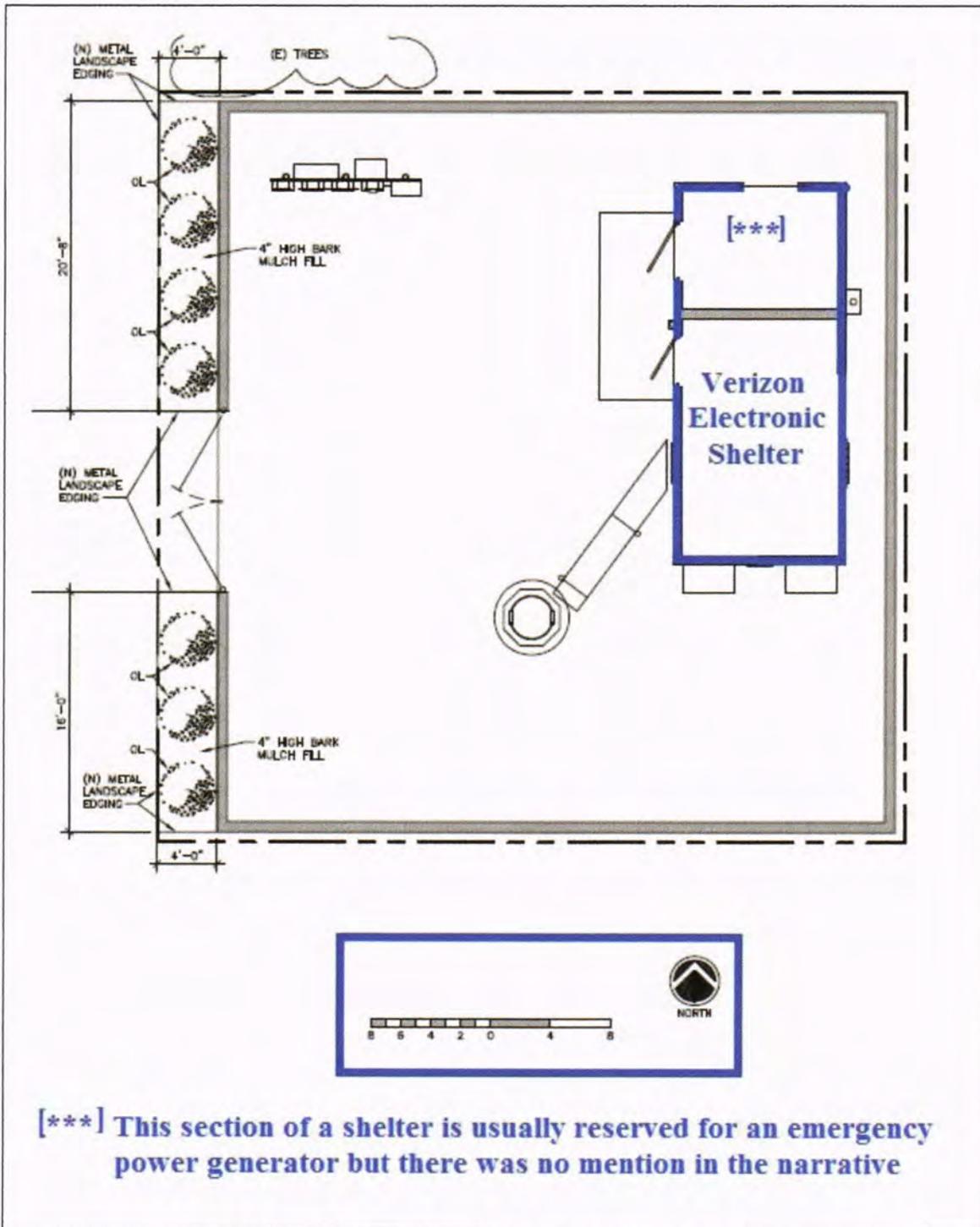


Figure 8. Proposed Ground Compound