Memorandum of Points in Opposition to File 7-G-10-UR; Use on Review Application of Excell Communications, Inc., for T-Mobile South LLC; Property on Southeast side of Tolson Lane, Southwest of Summerfield Drive and Oak Ridge Highway

Excell Communications, Inc. is listed as the Applicant on this agenda item, but the Applicant is acting as the representative of T-Mobile South LLC, as is obvious from the materials submitted with the application and from the May 24, 2010, letter from Excell Communications. The requested approval is for a multiple-user wireless facility at 4326A Tolson Lane. T-Mobile proposes to construct, maintain, and manage a 150' monopole telecommunications tower and supporting ground equipment within a fenced compound on property owned by Ms. Kathy Hobson.

If approved, the proposed tower would be located approximately one hundred seventy-five (175) feet from the Easterly's home.

Amy and Elliott Easterly own property immediately adjacent to the proposed site of this proposed 150' telecommunications tower, and they maintain their residence on the property they own. Their home is oriented on their property in such a way that this proposed 150' telecommunications tower will be approximately 175' from the front of their house. Immediately across Tolson Lane is the residence of Russell and Faye Porcella. The proposed 150' telecommunications tower will be across the street from the Porcella's front door, approximately 165' away from their home. Obviously, both the Easterly home and the Porcella home are located within 500' of the proposed 150' telecommunications tower.

Approval of a one hundred fifty (150) foot tower today in reality means that the Applicant could build a tower and antenna array one hundred ninety-nine (199) feet tall without further permission from the MPC.

The proposed construction of the 150' telecommunications tower is submitted for approval as a Use on Review as provided by the Zoning Ordinance. It is important to note that the Zoning Ordinance requires that any new commercial telecommunications tower that is more than 130' in height (as is the proposed tower) must accommodate at least three antenna arrays; however, the Tower Elevation & Antenna Schedule filed by T-Mobile in connection with the application shows that a total of four antenna arrays are planned for this tower. Although the Schedule shows that T-Mobile proposes to put its antenna arrays at the top of the tower, the Zoning Ordinance permits antennas that extend no more than 30 feet above the approved height of the structure. As a result, a 30' antenna could be installed at the top of this proposed 150' telecommunications tower without the requirement of approval by this body. Installing such an

antenna would result in both the Easterly home and the Porcella home being within the fall zone of the tower.

In addition, the Zoning Ordinance permits, without the need for additional setbacks or approval by this body, the extension of this proposed 150' telecommunications tower an additional 30'. Your approval of this application would permit a tower located at the proposed site that could be 180' and an antenna at the top that could be 19' above the top of the tower, without the need for the applicant to seek any further approval from this body. Only in the event an extension of the tower or an antenna mounted thereon exceeds 200' in height must further approval from this body be sought by the applicant. Both the Easterly and Porcella homes would be within the fall zone of a 199' tower and antenna array.

The proposed use is not reasonably necessary for the convenience and welfare of the community and will have a significant adverse impact on the character of the neighborhood.

Approval or denial of the proposal is governed by the standards and provisions for commercial telecommunications facilities and by the standards and provisions for Uses Permitted on Review, all of which are contained in the Zoning Ordinance.

In addition, in 2002, the Wireless Communication Facilities Plan was adopted by this body, Knoxville City Council, and Knox County. (This proposed site is located in Knox County, outside the city limits of Knoxville.)

In the Zoning Ordinance, Article 4, Section 4.92, and following, establishes the standards for telecommunications facilities and Article 6, Section 6.50 and Article 4, Section 2 establish the approval standards and procedure for Uses Permitted on Review. The proposed site for this 150' telecommunications tower is zoned Agricultural and commercial telecommunications towers are uses permitted on review under the Agricultural Zone. Thus, this use may be established **only** after review by and with the approval of this body. One of the purposes of this review and approval process is "…to integrate properly the uses permitted on review with other uses located in the district." (Article 6, Section 6.50(2) – Zoning Ordinance).

In Article 6, Section 6.50.06, the following basis is established for consideration of approval or denial:

> The planning commission may approve a development plan or use permitted on review where it can be shown that the proposed plan or use is in harmony with the general purpose and intent of the zoning ordinance and with the General Plan and sector plan **and** is **reasonably necessary for the convenience and welfare of the community**. (Emphasis supplied)
>
> The planning commission **may deny** a development plan or use permitted on review where the above cannot be shown or **where it can be shown that**

approval would have an adverse impact on the character of the neighborhood in which the site is located. (Emphasis supplied)

Likewise applicable to uses permitted on review are provisions of Article 4, Section 2 of the Zoning Ordinance. Such section states, "The Planning Commission in the exercise of its administrative judgment shall be guided by adopted plans and policies, including the General Plan and the following general standards."

4.10.11 The use is consistent with adopted plans and policies, including the General Plan and the Sector Plans.

4.10.12 The use is in harmony with the general purpose and intent of these zoning regulations.

4.10.13 **The use is compatible with the character of the neighborhood** where it is proposed and with the size and locations of buildings in the vicinity.

4.10.14 **The use will not significantly injure the value of adjacent property** by noise, lights, fumes, odors, vibration, traffic congestion or other impacts that may detract from the immediate environment.

(Emphasis supplied).

Included in the "adopted plans and policies" which must guide this body's administrative decision on this application is the Wireless Communication Facilities Plan ("the Plan"). The overarching goal of the Plan is to:

> Enable telecommunications providers to furnish comprehensive and efficient wireless communication services to the community, while **minimizing the adverse impacts their facilities may have on neighboring properties.** (Emphasis supplied)

In an effort to assure safety, the Plan requires separation of towers and residences "by a distance equal to at least 110 percent of the height of the tower." (Wireless Communication Facilities Plan, Objective 1, POLICIES). However, this provision fails to take into consideration regulations in the Zoning Ordinance that allow the installation of antenna arrays that exceed the height of the proposed tower and extensions of the height of the tower, neither of which require the approval of this body. The current application is a perfect example of how the regulations fail to meet the objective of the Plan to assure safety because the regulations allow acts that will place two residences squarely within the fall zone. Actually three residences will be in the fall zone if any change in the height of this proposed tower is increased, but Ms. Hobson has agreed to waive her right to protect her residence from the adverse effects of this tower. The Easterlys and the Porcellas have not waived that right and ask this body to protect them by denying this application.

The Plan requires an Applicant to obtain the approval of this body "when the design or location of telecommunications facilities would cause an unreasonable intrusion on other properties by way of appearance, noise, lighting, removal of vegetation or where such facilities could have an adverse impact on the future development pattern proposed by the General Plan and sector plans." These provisions are an attempt by the authors of the Plan to ensure that towers are compatible with adjacent land uses, but they will accomplish that objective only if this body wisely exercises its administrative judgment in reviewing proposed new telecommunications towers.

The tower being proposed for this site constitutes an unreasonable intrusion on the properties that will surround it by its appearance, and by its imposition in the middle of this residential area. Though many of the surrounding properties are zoned Agricultural, all are used for residential purposes. Indeed, there is a planned residential subdivision nearby and its residents will be able to look up the slope at this intrusion into the neighborhood in which they live.

It is not yet known whether construction of this proposed 150' telecommunications tower will involve removal of vegetation, but nothing in the Zoning Ordinance prohibits it, nor does any provision require that it be replaced.

Further, before "approving a telecommunications installation", the Plan requires the MPC to find that the proposed facility:

A. Is consistent with adopted plans and policies, including the General Plan and the sector plans.

B. Is in harmony with the general purpose and intent of these zoning regulations.

C. **Is compatible with the character of the neighborhood** where it is proposed, and with the size and locations of buildings in the vicinity.

D. **Will not significantly injure the value of adjacent property** by noise, lights, fumes, odors, vibration, traffic congestion or other impacts, which may detract from the immediate environment.

E. Is not of a nature or so located as to draw substantial additional traffic through residential streets.

F. Is reasonably necessary for the convenience and welfare of the community.

G. **Will not have an adverse impact on the character of the neighborhood** in which the site is located.

(Emphasis supplied)

In addition, the Plan requires:

The nature of development in the surrounding area is not such as to pose a potential hazard to the proposed use or to create an undesirable environment for the proposed use.

The Easterlys are joined in their opposition to this application by numerous neighbors who have signed a Petition. A copy of the text of the Petition is attached. (The original Petition and Signatures and the supporting information will be submitted for the record at the meeting of the Commission.) Items 2, 5 and 6 of the Petition and the supporting information address the issues of the adverse impact of siting this 150 foot telecommunications tower in this residential area, and the detrimental effect the construction of this tower will have on their community.

Item 4 and the supporting information address the lack of need for this tower. Courts have held federal law does not mandate continuous coverage for customers of cellular providers, certainly not in the event construction of a telecommunications tower in the middle of a residential area will have the significant adverse impact on the neighborhood that this proposed tower will have.

It should be clear that there is a no need for this tower and its impact on this neighborhood will be significant.

The proposed tower does not comply with the specific requirements for commercial telecommunications facilities contained in the Zoning Ordinance.

The Planning Commission must find that the facility complies with the specific requirements for commercial telecommunications facilities included in the Zoning Ordinance. Those requirements mirror provisions found in the Plan.

The following order of preference is included in the Plan and it is to be used in regulating and approving sites for telecommunications facilities. (While these approaches to tower siting are listed from most to least preferable, all of the approaches are encouraged by the Plan.)

A. **Co-location of facilities on existing towers**, buildings, or other structures.

B. Locations where natural topography, existing vegetation, building or other structures screen the facilities from public view

C. Locations where stealth towers or alternative tower structures may be used to hide antennas and related equipment

D. **Locations in undeveloped areas** or industrial **or general commercial areas** where the impacts on view sheds and residential areas are minimal.

E. Within residential areas, **non-residential sites** such as churches, large parking areas, golf courses and cemeteries where facilities can be installed with minimal impact on view sheds or residences.

F. Locations where low monopoles with low profile antenna arrays can blend in with comparably sized utility poles or similar structures.

(Emphasis supplied)

Under "OBJECTIVE 6: Discourage unnecessary proliferation of wireless facilities", the Plan states the following "POLICIES":

Construction of new communication towers should be an option of last resort. To the extent feasible, antennas should be co-located on existing towers or located on building rooftops and other suitable structures.

Regulation of wireless communication facilities **shall continue to encourage co-location** with expedited review procedures, "permitted use" status, and incentives.

Approval of new towers or structures, other than co-location, **shall require a demonstration of need and feasibility**, including a demonstration that good faith efforts have been made by the permit applicant to comply with the Co-location policy.

The Planning Commission will need to consider revisions to the Co-location policy for lower towers that may be necessary to supplement capacity of the network or avoid neighborhood impacts.

(Emphasis supplied)

Item 3 of the Petition and information supporting that item speak to the issue of whether the Applicant has considered co-location facilities or other sites that would not so severely impact a neighborhood. **It should be clear that the Applicant has failed in its duty to propose the construction of a new tower only as a last resort**.

The Registered Professional Engineer who reviewed the plans for the proposed tower application for the MPC stopped short of recommending approval of this tower.

Article 4, Section 4.92.02 1 f of the Zoning Ordinance provides:

The professional planning staff of the Metropolitan Planning Commission shall refer technical engineering aspects of the administration and enforcement of this section to a registered professional engineer qualified in the design and installation of wireless communications facilities to provide advice and assistance. Any use on review application for a new communications tower of sixty feet or more in height shall, at the

discretion of the professional planning staff of the Metropolitan Planning Commission, be referred to the engineering consultant for review and report. . . .

In compliance with this ordinance, the MPC had this application reviewed by Larry Perry, an engineer and a lawyer with considerable experience in this area. In the "Summary" of his report to the Metropolitan Planning Commission, Mr. Perry stated:

> In light of the analysis and review of documents, it is my professional opinion that the applicant has made a technical showing of justification for the site on Tolson Lane, but **there may be other alternative sites in the area that are of less concern to local residents who oppose the application.**

(Emphasis supplied)

In the "Consultant's Summary" portion of the report, under "Consultant's Recommendation", Mr. Perry stated:

> The applicant proves adequate justification for the site using a monopole type antenna support structure; however, **there may be other support structures within the immediate area that would provide the coverage needed** by the applicant that would not be as objectionable to the local residents.

(Emphasis supplied)

Nowhere in the Report or the Consultant's Summary does Mr. Perry recommend the approval of this tower.

Elsewhere in his report, at Item 10, "Facilities Plan Compliance", Mr. Perry stated:

> The proposed site is in an Agriculturally zoned area but there are residences located nearby. There is also a water tank several hundred feet and at a higher elevation about 300 feet to the west of the proposed site that the **adjacent land to the water tank would appear to be a better location and would require a shorter tower. The proposed site is located in a SENSITIVE area of the Wireless Facility Plan in that there are several residences within 500 feet of the proposed site . . . including 3 within 200 feet.**

(Emphasis supplied)

Mr. Perry explains this further in the DISCUSSION section of his report:

> **The area would be characterized as a Sensitive Area area based upon the Land Use / Wireless Facilities Matrix (Exhibit C) in that it is located within 500 feet of several residential homes.** . . .In speaking with the neighbors of the area, there is considerable opposition to the proposed site from the adjacent landowners.

(Emphasis supplied)

Mr. Perry goes on to explain at Item [4] of the SUMMARY section of his report:

> The proposed equipment housing facility will have **some impact on the aesthetics** of the adjacent land uses. **Due to the closeness to the residences** and the **fact that the proposed tower is 154 feet compared to the indigenous trees of about 65 feet in height**. . .

(Emphasis supplied)

Conclusion

In looking at the content and provisions of the adopted plans for the area where the proposed development is to be located, one finds compelling reasons for denial of this request. We ask that you do as provided by the Zoning Ordinance and exercise your judgment to deny this Use on Review. It is not reasonably necessary for the convenience and welfare of the community, and approval of this application will have an adverse impact on the character of the neighborhood in which the proposed site is located.

Submitted by:

John J. Britton,

John T. Buckingham,
Attorneys for Amy and Elliot Easterly

A Petition of Opposing Construction of Cell Tower on Tolson Lane

We, the undersigned residents and voters of Knox County, oppose Excell Communication and T-Mobile's application to construct a new cell tower at 4326A Tolson Lane. We are opposed for the following reasons and urge the Knoxville-Knox County Metropolitan Planning Commission (MPC) to deny Excell Communication and T-Mobile's request, for the protection and welfare of the families of this Knox County community.

(1) The proposed cell phone tower does not belong in such close proximity to residential homes. Excell Communications and T-Mobile have proposed a 154' tower that could be extended without further review to a height of 184' feet. According to the MPC's Land Use/Wireless Facilities Matrix, a tower of this height would classify as a "Tall Monopole" and **should be "discouraged"** within 500' of a residence. The proposed tower is sited within 500' of at least 5 residences, three of which are within a 200' radius.

(2) At 154' the proposed tower would be more than twice as high as the surrounding woods. If the proposed tower is then extended to 184', it would be nearly three times as high. Because of the enormous incongruity between the height of the tower and the natural setting of the area, it is impossible to adequately screen the tower from view of the surrounding residential community. The proposed tower would be **a conspicuous eyesore** to our neighborhood and would despoil a scenic portion of Black Oak Ridge, south of Western Avenue, where its beautiful forested slopes are still intact.

(3) **T-Mobile has failed to thoroughly assess possible alternative locations for a new tower.** There are other towers in the area which may fulfill T-Mobile's purposes, without contracting with Excell Communications to build a new tower. According to antennasearch.com there are currently 4 towers within a 1.5 mile radius of the proposed site, plus another 13 towers within 1.5 to 2 miles. In total, **there are 46 towers within 4 miles of the proposed site.** In addition, T-Mobile already has MPC approval for a telecommunication tower extension (150' to 195') and collocation with US Cellular at 3902 Schaad Road (file 8-J-08-UR), which would address their needs. Furthermore, there are more suitable, commercially zoned, properties in the area.

(4) Local residents who are **T-Mobile customers currently have adequate cell phone and data coverage** for nearly all of the area that T-Mobile claims lacks service, and do not need the proposed tower.

(5) **The tower will lower property values** of the single family homes in the community. Knox County will be at risk of losing tax revenue as impacted residents seek to have property tax assessments lowered. Appraiser journals and industry publications support the correlation between cell phone towers and reduced property values.

(6) Research into the health concerns associated with cell towers has produced results for and against increased risk. Regardless of the research itself, pervasive concerns on the internet, and even in the media, will cause some **potential home-buyers to avoid our area**. As long as there is growing public perception that health risks are associated with cell towers, it will make it increasingly difficult to sell residential property near a tower and will therefore decrease the value of this quiet, family community as a whole.

We thank the members of the Metropolitan Planning Commission for their time in considering our objections and urge them to deny Excell Communication and T-Mobile's application for a cell tower permit on Tolson Lane.

MPC Case 7-G-10-UR

Objection, Documentation and References

Submitted by Elliott and Amy Easterly

Tower Opposed By Residents

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We thank the members of the Metropolitan Planning Commission for their time in considering our objections and urge them to deny Excell Communication and T-Mobile's application for a cell tower permit on Tolson Lane.

- Over 30 local residents ***object to this tower***

Battery Safety Issues

- Consideration of battery safety is not prohibited under Section 704 of Title 7 of the FCC Telecommunications Act and therefore must be considered by the MPC.

  - Reference: FCC Telecommunications Act of 1996

- Families live in every direction of this tower. *Infants, children, and families would be put at risk.*

- This tower does not belong in such close proximity and elevation to surrounding *family* residential homes.

Battery Safety Issues

- **Hazardous Materials** are used in large telecom batteries which will be installed at the site
  - Lead
  - Lead Oxide
  - Sulfuric Acid

Note
Product contains **toxic chemicals** that are subject to the reporting requirements of Section 302 and 313 of the Emergency Planning and Community Right to Know Act of 1986. Reference: NorthStar Battery Company MSDS and Manuals

Battery Safety Issues

- **Explosion Hazard Warning** by the battery manufacturer
  - Reference: NorthStar Battery Company MSDS and Manuals

  - Batteries generate explosive gases during *normal* operation, which when released, *can explode and cause serious injury or death*. If a safety vent opens while the explosive gases are being generated (e.g., in the event of a charger malfunction), *these explosive gases will be released*.

  - When Lead Acid batteries are used indoors where temperature and humidity are controlled, they are safe. *However, if they are used in areas where conditions fluctuate, e.g. outdoors, they do pose risks, due mainly to their use of passive air ventilation.*

Battery Safety Issues

- **Warning** by Manufacturer - "Conditions to Avoid"
  - This site would be an *attractive nuisance* and easily accessible by neighboring children and teenagers *who have already set fire in another structure on the site owner's property*. Other neighborhood teens and residences regularly *set off fireworks* and *use firearms*.

"Conditions to Avoid"

- Sparks and other sources of ignition

-Reference: NorthStar Battery Company MSDS and Manuals

Battery Safety Issues

- **Warning** by Manufacturer – "Conditions to Avoid"
  - This area has experienced extreme temperature and heat in excess of 90° for weeks at a time.
  - It is even hotter in an enclosed metal box.

"Conditions to Avoid"

- High temperature

-Reference: NorthStar Battery Company MSDS and Manuals

Pre-existing MPC Approval

- T-Mobile already has MPC approval for a telecommunication tower extension (150’ to 195’) and collocation with US Cellular at 3902 Schaad Road (file 8-J-08-UR)
  - The Schaad site would provide *superior coverage* to the proposed Tolson site
    - Reference: Coverage Maps for MPC file 7-G-10-UR
    - Reference: Coverage Maps for MPC file 8-J-08-UR

"By approving the application a new T-Mobile wireless facility will not be needed in this area of Knox County." -Reference: MPC file 8-J-08-UR

MPC Consultant Report

- Not recommended
  - Despite staff recommendations, the MPC Consultant, Larry Perry, stops short of recommending this site

SUMMARY

In light of the analysis and review of documents, it is my professional opinion that the applicant **has made a technical showing of justification** for the site on Tolson Lane, but there may be alternative sites available in the area that [are] of less concern to the local residents who oppose the application. Reference: MPC's Consultant Report

MPC Consultant Report

- No third-party verification of coverage maps
  - Technical showing of justification was provided and verified *by the applicant*
    - Reference: MPC Consultant's Report
  - Local T-Mobile customers report adequate voice and data service for the proposed "*needed*" coverage area
    - Reference: Actual Coverage and Signal Strength Maps
  - Other major carriers presently have adequate service in the area
    - Reference: Major Carrier Coverage Maps

MPC Consultant Report

- Other locations
  - Applicant provided sparse evidence of self-directed effort to examine other support structures and sites in the area
    - According to Article 4 Section 4.92.01 Ordinance for the County of Knox, construction of new communications towers [should be] an ***option of last resort***.
      - Reference: Ordinance for County of Knox
      - Reference: Excell Communications/T-Mobile MPC application
  - Applicant provided unsubstantiated and deceptive claims attempting to dismiss alternative sites listed in the Local Resident Initial Objection Letter to the MPC
      - Reference: Local Resident Initial Objection Letter to MPC
      - Reference: Excell/T-Mobile Alt Site Correspondence
      - Reference: Local Resident Response to Alt Site Correspondence

CONSULTANT'S RECOMMENDATION:

The applicant proves adequate justification for the site using a monopole type antenna support structure, however, there may be other support structures within the immediate area that would provide the coverage needed by the applicant that would not be as objectionable to the local residents. The Commission in the past has discourage multiple towers within about a mile of each other and in this instance there area couple within that radius. Reference: MPC's Consultant Report

Tower should be Discouraged

- Proposed tower is 154 feet and could be extended *without further review* to a height of 184 feet.
  - Antenna could extend total structure height up to 199.99 feet *without further review*
- According to the MPC's Land Use/Wireless Facilities Matrix, a tower of this height would classify as a "Tall Monopole" and *should be discouraged* within 500 feet of a residence.
- The proposed tower is sited within 500 feet of *at least five* residences, three of which are *within a 200 foot radius.*

  - Reference: Ordinance for County of Knox
  - Reference: MPC Wireless Communication Facilities Plan
  - Reference: MPC Consultant's Report

Tower should be Discouraged

- This site is on Black Oak Ridge according to USGS quadrangle maps.
- At 154 feet the proposed tower would be more than twice as high as the surrounding woods. If the proposed tower is then extended to 184 feet, it would be nearly three times as high.

Siting on a Ridge

This principle applies to sites on ridges and mountains identified on the USGS quadrangle maps.

Ridge top tree line is defined as the height of the tallest tree within 100 feet either side of the tower.

-Reference: MPC Wireless Communication Facilities Plan

No Mandate for Seamless Coverage

- Courts have held that federal law *does not mandate* seamless coverage.
  - The T-Mobile network is well established in the area and there is no need for an additional tower at this site.
  - Neighborhood T-Mobile customers report adequate voice and data service for the proposed "*needed*" coverage area.
  - Denial of this permit is legal and does not constitute discrimination.

- Reference: FCC Telecommunications Act of 1996
- Reference: Actual Coverage and Signal Strength Maps

Poor Business Practices

- MPC recommends *the applicant* hold a neighborhood meeting *prior* to application submission. **This was never done.**

> Prior to submitting an application for use on review approval, applicants for new towers should hold a "pre-application meeting" with neighborhood groups, interested individuals and property owners within one-quarter mile of the proposed site to explain the proposed project.
>
> -Reference: MPC Wireless Communication Facilities Plan

Poor Business Practices

- MPC staff member, Tom Brechko, and MPC consultant, Larry Perry, recommended *the applicant* hold a neighborhood meeting.
  - No one in the recommended quarter-mile radius was notified or told of a "neighborhood meeting."
  - The Easterlys were notified of a meeting between counsel, but never heard the term "neighborhood meeting" until a few hours before the meeting.
    - Reference: Email exchange with MPC Consultant
    - Reference: Email exchange with Denise Vestuto representing T-Mobile

Poor Business Practices

- Excell/T-Mobile did not provide documentation with their application
  - Only a summary of 2 sites was submitted.
  - There are **46 towers** within 4 miles of the proposed site.
- Excell/T-Mobile did not provide written evidence of their research into the KUB or TVA sites

> The applicant shall also provide written evidence that location on an existing structure is not feasible due to at least one of the following reasons…
>
> -Reference: Ordinance for County of Knox

Poor Business Practices
Unlawful Trespassing and Deception

- Surveyors employed by Excell/T-Mobile trespassed on several neighboring properties and lied to neighbors by misrepresenting themselves
  - See SIM photos *submitted by applicant*
  - See Neighbor Statements Regarding Misrepresentation
  - See Neighbor Photos of Trespassing Events

Poor Business Practices

Unlawful Trespassing and Deception

Interaction with Surveyors
By Kim Venable
June 30, 2010, at about 1:25 p.m.

I received a call from Elliott Easterly, telling me that surveyors were in the woods behind my house. There were two of them, just on the other side of my fence. I (and my toddlers) went out to take pictures and to speak with them.

I asked them what they were doing; one man answered me that they were surveying.
I asked why; he said to mark the property lines.
I asked why; he said because my neighbor, Kathy Hobson, had hired them.
I asked why; he said they did not know why. And he suggested that maybe [Kathy] was going to sell part of the land for development.
I was surprised that surveyors would not know why they were working for someone, but decided to trust that he spoke the truth.
As I watched the surveyors tie a marker to my back fence, I clarified: You're working at my property line, because my line is her line?
The man said yes.

At that point, Elliott and his father came and I turned to talk to them briefly. Then I took my kids back inside to finish settling down for afternoon nap.
I am still wondering if development is really a possibility. Mostly, I worry that the actual plan for the proposed cell tower has changed. I am concerned that the tower and the access road could end up closer to my property (just beyond my fence?) than where Excell's application states it will be.

Interaction with Surveyors
By Amy Easterly
June 30, 2010, at about 3:45 p.m.

In May of 2010, after being out of town, our neighbors who were getting our mail told us that people were surveying on our property. No one on Tolson claimed to know why surveyors were here, even Dorothy Storey, Hobson's mother. It was not until we reached Hobson that we learned the nature of the trespassing. Hobson even informed us they had opened one of our gates (which has a "Keep Out" sign posted), parked on and inspected various portions of our property.

On my way home the afternoon of June 30, 2010, I noticed a work truck with the same logo as the survey documents in the MPC application in Hobson's driveway. I was surprised, as we had already received a report for the MPC Consultant, Larry Perry, with his analysis of the submission. I immediately called Tom Brechko (1:47 PM, 8 minutes long) to inquire why the applicant would be surveying again. I then notified my husband and father-in-law that the surveyors who had previously trespassed were somewhere near our property. They went to investigate and then informed me the surveyors were marking the property boundaries of Hobson's property. My husband left the property soon after the interaction.

Later, I walked into my living room and noticed the survey truck was parked on our property (not even on the gravel road). I told my father-in-law and went to confront the trespassers. I was told by one surveyor that they had been hired by Kathy Hobson. He continued on about working for Hobson and I let him know that I had documents on my dining room table that indicated they worked for T-Mobile. Another surveyor emerged from the brush and said "Oh, yes, T-Mobile signs our paychecks." I informed both that they were trespassing and they know it as part of their trade. They asked if they could finish their work and I responded that they needed to leave. They refused. My father-in-law told them to leave. They did not. We waited. My father-in-law sternly told them to leave again. We stayed and watched until they finally left our property. I phoned Tom Brechko at the MPC and left a message regarding the misrepresentation and trespassing of surveyors working on behalf of T-Mobile and Excell Communications (3:48 pm, 2 minutes long). I did not receive a response.

Poor Business Practices

Unlawful Trespassing and Deception

Poor Business Practices

Misleading Simulation 1

- The tower placement **<u>does not correspond to the survey marks and boundary lines</u>**. It is severely misaligned, and would fail to meet set-back requirements at the location.
- The photo is ***<u>prima facie</u>* <u>documentation of blatant trespassing.</u>**

•The "View From" is **<u>misleading</u>**. It's taken from a driveway SW of site.

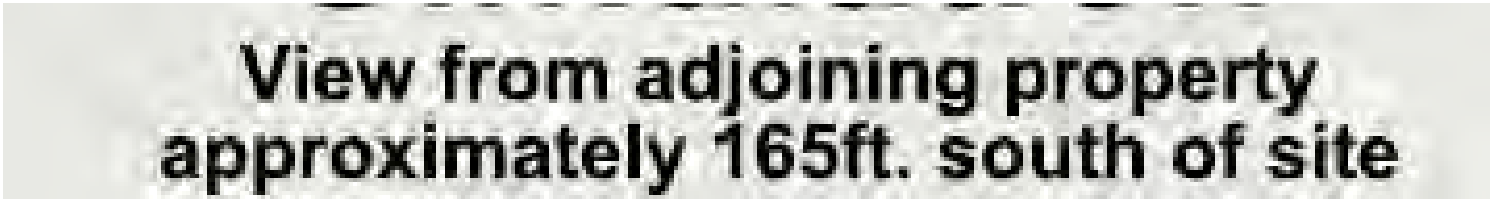
Poor Business Practices

Misleading Simulation 2

Poor Business Practices

Misleading Simulation 2

- Additional documentation of trespassing noted by T-Mobile on the simulation



- The angle is representative of the view at ground level (i.e. laying on the ground)
- Date on photos are false and misleading

Poor Business Practices

Misleading Simulations

- They *presumably* show a 150 foot monopole with a single rad center at the top of it rising above trees that are only 60 feet tall.
  - The engineering drawing in their permit application shows attachment points for FOUR rad centers.
  - Such a cluster of rad centers would be much more obtrusive, not to mention how it would look with another 30 feet and several additional rad centers at the higher elevations!
- Because there would be no further review required to extend the structure to 180 feet, **<u>an honest applicant would have provided illustrations of what the full build-out would look like</u>**, which the commissioners would, in fact, accept by approving this permit.

Poor Business Practices

Misleading Simulations

- It is not all that uncommon for parabolic antennas to be added to some rad centers on such towers for long-haul backbone transmission. Such **dishes will be much more obtrusive** than the relatively slim antennas shown in this montage!

- The applicant's submitted drawings show antennas that reach only 4 feet above the top of the monopole, but sometimes tall antennas for other than mobile-phone uses are put on top of cell towers. The zoning ordinance calls them telecommunications towers for good reasons, and makes no distinction among the particular uses they accommodate.

Poor Business Practices

Misleading Simulations

- According to the zoning ordinance, a permit allows antennas to be up to 30 feet taller than the tower proper, provided they meet FAA and FCC regulations. Thus, in essence, if the MPC grants this permit, it would be nothing less than tacit approval for a 199-foot structure!

- **We implore the commissioners to heed the spirit of the zoning ordinance where it says, "It is the expressed intent of this Section that the construction of new communications towers be an option of last resort."**

References

Included References

- MPC file 7-G-10-UR
- MPC's Consultant Report
- MPC file 8-J-08-UR
- MPC Wireless Communication Facilities Plan
- Actual Coverage and Signal Strength Maps
  - Coverage and Signal Maps 1-3
- Email exchange with Denise Vestuto representing T-Mobile
- Email exchange with MPC Consultant
- Local Resident Initial Objection Letter to MPC
- Major Carrier Coverage Maps
  - AT&T Coverage and Data Maps
  - Sprint Coverage and Data Maps
  - Verizon Coverage and Data Maps
- NorthStar Battery Company MSDS and Manual

References to be Submitted at Meeting

- Petition with signatures
- Court Upheld Cases
- Excell/T-Mobile Alt Site Correspondence
- Resident Response to Alt Site Correspondence

References Available Upon Request

- FCC Telecommunications Act of 1996
- Ordinance for County of Knox

KNOXVILLE/KNOX COUNTY METROPOLITAN PLANNING COMMISSION
USE ON REVIEW REPORT

FILE #: 7-G-10-UR **AGENDA ITEM # 40**

AGENDA DATE: 7/8/2010

APPLICANT: **EXCELL COMMUNICATIONS, INC.**

OWNER(S): KATHY HOBSON

TAX ID NUMBER: 79 86.04

JURISDICTION: County Commission District 3

LOCATION: **Southeast side of Tolson Ln., southwest of Summerfield Dr. and Oak Ridge Hwy.**

APPX. SIZE OF TRACT: **3.4 acres**

SECTOR PLAN: Northwest County

GROWTH POLICY PLAN: Urban Growth Area (Outside City Limits)

ACCESSIBILITY: Access is via Tolson Ln., a local street with a 13' pavement width within a 50' right-of-way.

UTILITIES: Water Source: Knoxville Utilities Board

Sewer Source: Knoxville Utilities Board

WATERSHED: Third Creek

ZONING: **A (Agricultural)**

EXISTING LAND USE: **Residence**

PROPOSED USE: **150' monopole telecommunications tower**

HISTORY OF ZONING: None noted

SURROUNDING LAND USE AND ZONING:
North: Residences / A (Agricultural)
South: Residences / PR (Planned Residential)
East: Residence / A (Agricultural)
West: Residence / A (Agricultural)

NEIGHBORHOOD CONTEXT: The site is located on a dead-end street with a few residences on large lots.

STAFF RECOMMENDATION:

POSTPONE until the August 12, 2010 MPC meeting as requested by the applicant.

COMMENTS:

This is a request for a new 150 foot monopole telecommunications tower to be located within a 3,600 square foot lease area located on a 3.4 acre tract on the south side of Tolson Ln., southwest of Oak Ridge Hwy. The subject property is zoned A (Agricultural) and telecommunication towers are considered as a use on review in this district.

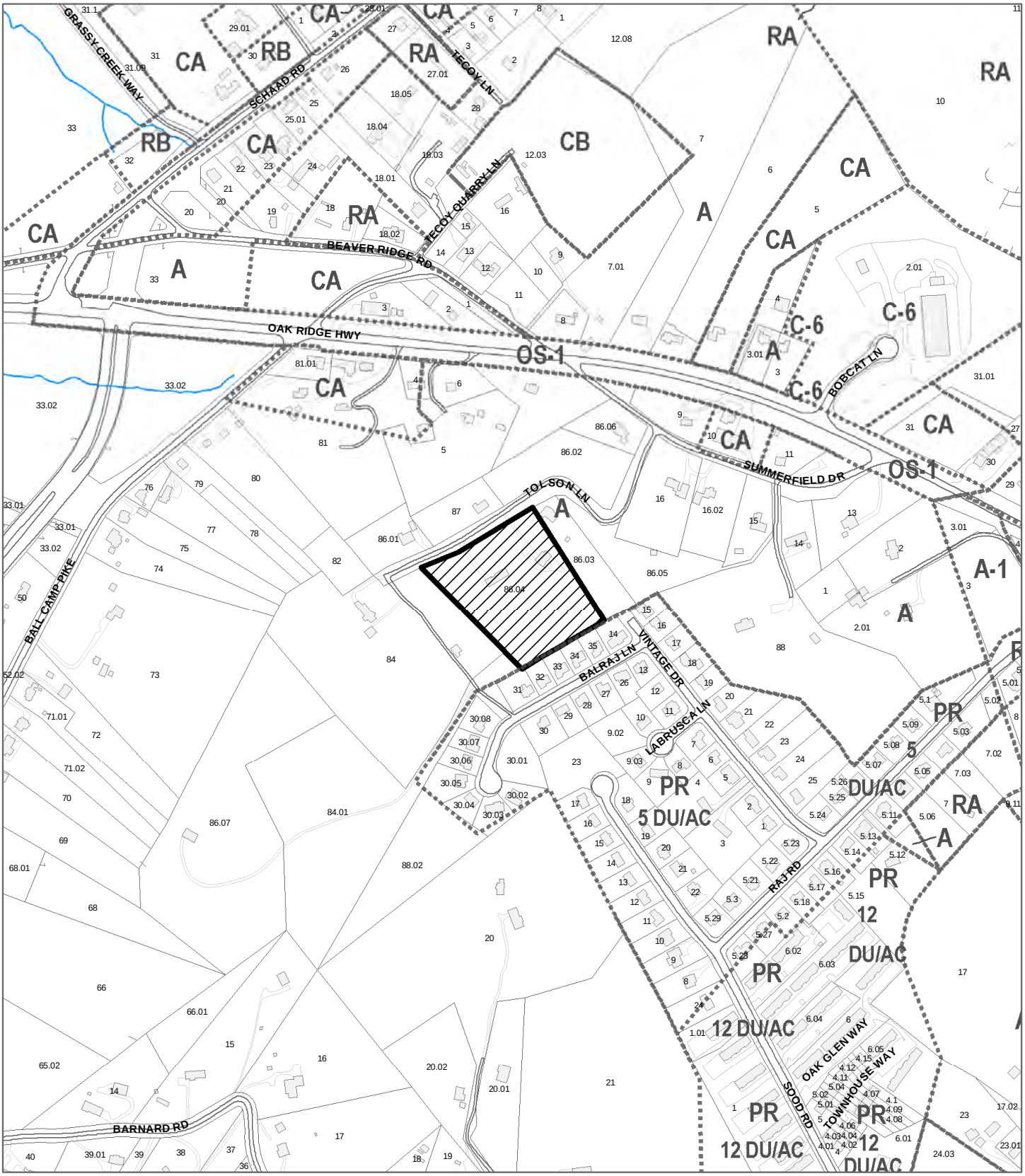
The applicant has requested a postponement until the August 12, 2010 meeting to allow time to address

concerns raised by area residents and Mr. Larry Perry, MPC's tower consultant.

ESTIMATED TRAFFIC IMPACT: Not calculated.

ESTIMATED STUDENT YIELD: Not applicable.

MPC's approval or denial of this request is final, unless the action is appealed to the Knox County Board of Zoning Appeals. The date of the Knox County Board of Zoning Appeals hearing will depend on when the appeal application is filed. Appellants have 30 days to appeal an MPC decision in the County.



7-G-10-UR
USE ON REVIEW

Petitioner: Excell Communications, Inc.

150' monopole telecommunications tower in A (Agricultural)

Map No: 79
Jurisdiction: County

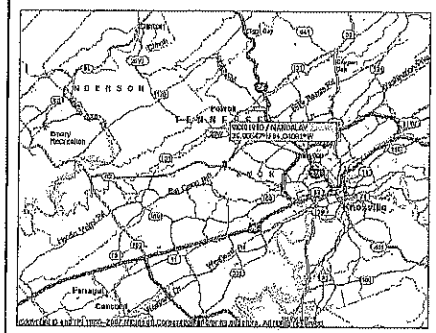
0 500
Feet

N

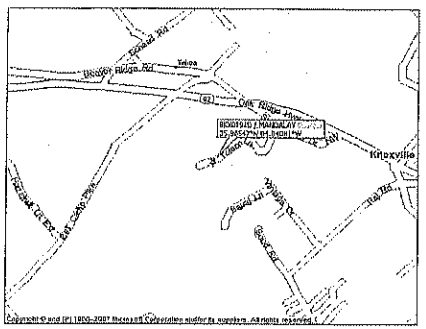
Original Print Date: 6/23/2010 Revised:

*Metropolitan Planning Commission * City / County Building * Knoxville, TN 37902*

LOCATION MAP



VICINITY MAP



DRIVE DIRECTIONS

FROM THE T-MOBILE NASHVILLE OFFICE: TAKE I-40 EAST TO KNOXVILLE. OUTSIDE OF KNOXVILLE, TAKE EXIT 374 AND TURN LEFT/NORTH ON SR131/LOVELL ROAD. FOLLOW TO THE INTERSECTION WITH BALL CAMP BYINGTON ROAD AND TURN RIGHT/NORTH. FOLLOW TO BYINGTON BEAVER RIDGE ROAD AND TURN LEFT/NORTH. FOLLOW TO SR62/OAK RIDGE HIGHWAY AND TURN RIGHT/EAST. FOLLOW TO TOLSON LANE AND TURN LEFT/SOUTH. SITE IS TOWARD THE END OF THE ROAD ON THE LEFT.

DEPARTMENT	NAME / SIGNATURE	DATE
LAND OWNER / TOWER OWNER		
SITE ACQUISITION AGENT		
ZONING / PERMITTING AGENT		
PROGRAM MANAGER		
CONSTRUCTION MANAGER		
RF ENGINEER		

PREPARED FOR:

T-Mobile South LLC

3800 EZELL ROAD, SUITE 815
NASHVILLE, TN 37211
615-332-8006

SITE NUMBER:

9KX0191D

SITE NAME:

MANDALAY

4326A TOLSON LANE
KNOXVILLE, TN 37921

PROPOSED 150' RAWLAND MONOPOLE TOWER

TOWER OWNER:

T-MOBILE TOWERS
SITE NO. 9KX0191D

PREPARED BY:

PM&A
30 MANSELL CT
SUITE 103
ROSWELL, GA 30076
678-280-2325

PROJECT INFORMATION

911 ADDRESS:	4326A TOLSON LANE KNOXVILLE, TN 37921
PARCEL ID:	TAX MAP 079, PARCEL 86.04
LATITUDE: LONGITUDE: ELEVATION:	35° 54' 07.1" (NAD83) 84° 02' 26.8" (NAD83) 1241' AMSL (NAVD 88)
ZONING CLASS: JURISDICTION:	A KNOX COUNTY
PROPERTY OWNER:	KATHY HOBSON 4326 TOLSON LANE KNOXVILLE, TN 37921 865-212-4758
TOWER OWNER & APPLICANT:	T-MOBILE SOUTH LLC 3800 EZELL ROAD, SUITE 815 NASHVILLE, TN 37211 MATT CHASTAIN 615-332-8004
ENGINEER:	PM&A 30 MANSELL COURT, SUITE 103 ROSWELL, GA 30076 PATRICK W MARSHALL, P.E. 678-280-2325
POWER CONTACT:	KNOXVILLE UTILITIES BOARD 865-558-2555
TELCO CONTACT:	AT&T 800-351-1111

DRAWING INDEX

7-6-10-UR
REVISED
6-23-10

CALL BEFORE YOU DIG
TENNESSEE ONE-CALL
1-800-351-1111
www.tnonecall.com

GEORGIA REGISTERED No. 23000 PROFESSIONAL ENGINEER PATRICK W MARSHALL

PM&A
30 MANSELL CT
SUITE 103
ROSWELL, GA 30076
678-280-2325

T-Mobile South LLC
3800 EZELL ROAD, SUITE 815
NASHVILLE, TN 37211
615-332-8006

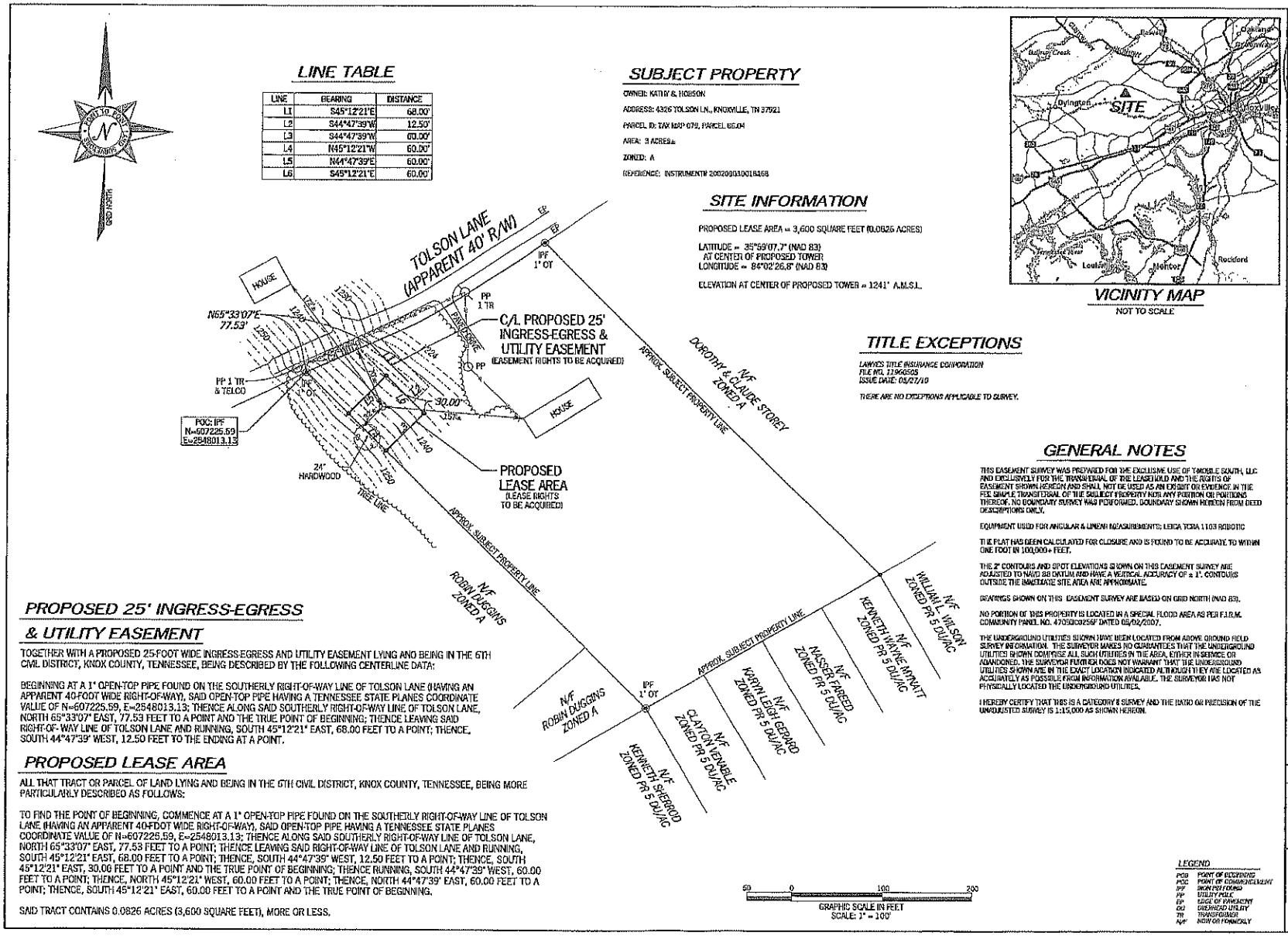
NUM	DATE	DESCRIPTION:
0	5/2/10	ISSUED FOR PRELIMINARY REVIEW
1	5/21/10	ISSUED FOR PERMITTING & CONSTRUCTION
2	6/1/10	REVISED PER COMMENTS
3	6/21/10	REVISED LEASE AREA AND ACCESS
4	6/22/10	ISSUED FOR ZONING SUBMITTAL

9KX0191D / MANDALAY

TITLE SHEET & PROJECT INFORMATION

DESIGNED: AJB
DRAWN: AJB
CHECKED: PWM
JOB #: TMT001

T-1


LINE TABLE
LINE | BEARING | DISTANCE
L1 | S45°12'21"E | 68.00'
L2 | S44°47'39"W | 12.50'
L3 | S44°47'39"W | 60.00'
L4 | N45°12'21"W | 60.00'
L5 | N44°47'39"E | 60.00'
L6 | S45°12'21"E | 60.00'
SUBJECT PROPERTY
OWNER: KATHY S. HOBSON
ADDRESS: 4326 TOLSON LN., KNOXVILLE, TN 37921
PARCEL ID: TAX MAP 079, PARCEL 66.04
AREA: 3 ACRES±
ZONED: A
REFERENCE: INSTRUMENT# 200209030018368
SITE INFORMATION
PROPOSED LEASE AREA = 3,600 SQUARE FEET (0.0826 ACRES)
LATITUDE = 35°59'07.7" (NAD 83)
AT CENTER OF PROPOSED TOWER
LONGITUDE = 84°02'26.8" (NAD 83)
ELEVATION AT CENTER OF PROPOSED TOWER = 1241' A.M.S.L.
VICINITY MAP
NOT TO SCALE
SITE
Dyington
Louisville
Mentor
Rockford
TITLE EXCEPTIONS
LAWYERS TITLE INSURANCE CORPORATION
FILE NO. 1196050S
ISSUE DATE: 05/27/10
THERE ARE NO EXCEPTIONS APPLICABLE TO SURVEY.
TOLSON LANE (APPARENT 40' R/W)
HOUSE
N65°33'07"E 77.53'
PP 1 TR
PP 1 TR & TELCO
IPF 1" OT
C/L PROPOSED 25' INGRESS-EGRESS & UTILITY EASEMENT
(EASEMENT RIGHTS TO BE ACQUIRED)
PROPOSED LEASE AREA
(LEASE RIGHTS TO BE ACQUIRED)
30.00'
POC: IPF N=607225.59 E=2548013.13
21" HARDWOOD
TREE LINE
APPROX. SUBJECT PROPERTY LINE
N/F DOROTHY & CLAUDE STOREY ZONED A
N/F ROBIN DUGGINS ZONED A
N/F WILLIAM L. WILSON ZONED PR 5 DU/AC
N/F KENNETH WAYNE NYMATT ZONED PR 5 DU/AC
N/F MASSER PAREED ZONED PR 5 DU/AC
N/F MARYN LEIGH GERARD ZONED PR 5 DU/AC
N/F CLAYTON VENABLE ZONED PR 5 DU/AC
N/F KENNETH SHERROD ZONED PR 5 DU/AC
PROPOSED 25' INGRESS-EGRESS & UTILITY EASEMENT
TOGETHER WITH A PROPOSED 25-FOOT WIDE INGRESS-EGRESS AND UTILITY EASEMENT LYING AND BEING IN THE 6TH CIVIL DISTRICT, KNOX COUNTY, TENNESSEE, BEING DESCRIBED BY THE FOLLOWING CENTERLINE DATA:
BEGINNING AT A 1" OPEN-TOP PIPE FOUND ON THE SOUTHERLY RIGHT-OF-WAY LINE OF TOLSON LANE (HAVING AN APPARENT 40-FOOT WIDE RIGHT-OF-WAY), SAID OPEN-TOP PIPE HAVING A TENNESSEE STATE PLANES COORDINATE VALUE OF N=607225.59, E=2548013.13; THENCE ALONG SAID SOUTHERLY RIGHT-OF-WAY LINE OF TOLSON LANE, NORTH 65°33'07" EAST, 77.53 FEET TO A POINT AND THE TRUE POINT OF BEGINNING; THENCE LEAVING SAID RIGHT-OF-WAY LINE OF TOLSON LANE AND RUNNING, SOUTH 45°12'21" EAST, 68.00 FEET TO A POINT; THENCE, SOUTH 44°47'39" WEST, 12.50 FEET TO THE ENDING AT A POINT.
PROPOSED LEASE AREA
ALL THAT TRACT OR PARCEL OF LAND LYING AND BEING IN THE 6TH CIVIL DISTRICT, KNOX COUNTY, TENNESSEE, BEING MORE PARTICULARLY DESCRIBED AS FOLLOWS:
TO FIND THE POINT OF BEGINNING, COMMENCE AT A 1" OPEN-TOP PIPE FOUND ON THE SOUTHERLY RIGHT-OF-WAY LINE OF TOLSON LANE (HAVING AN APPARENT 40-FOOT WIDE RIGHT-OF-WAY), SAID OPEN-TOP PIPE HAVING A TENNESSEE STATE PLANES COORDINATE VALUE OF N=607225.59, E=2548013.13; THENCE ALONG SAID SOUTHERLY RIGHT-OF-WAY LINE OF TOLSON LANE, NORTH 65°33'07" EAST, 77.53 FEET TO A POINT; THENCE LEAVING SAID RIGHT-OF-WAY LINE OF TOLSON LANE AND RUNNING, SOUTH 45°12'21" EAST, 68.00 FEET TO A POINT; THENCE, SOUTH 44°47'39" WEST, 12.50 FEET TO A POINT; THENCE, SOUTH 45°12'21" EAST, 30.00 FEET TO A POINT AND THE TRUE POINT OF BEGINNING; THENCE RUNNING, SOUTH 44°47'39" WEST, 60.00 FEET TO A POINT; THENCE, NORTH 45°12'21" WEST, 60.00 FEET TO A POINT; THENCE, NORTH 44°47'39" EAST, 60.00 FEET TO A POINT; THENCE, SOUTH 45°12'21" EAST, 60.00 FEET TO A POINT AND THE TRUE POINT OF BEGINNING.
SAID TRACT CONTAINS 0.0826 ACRES (3,600 SQUARE FEET), MORE OR LESS.
GENERAL NOTES
THIS EASEMENT SURVEY WAS PREPARED FOR THE EXCLUSIVE USE OF T-MOBILE SOUTH, LLC AND EXCLUSIVELY FOR THE TRANSFERAL OF THE LEASEHOLD AND THE RIGHTS OF EASEMENT SHOWN HEREON AND SHALL NOT BE USED AS AN EXHIBIT OR EVIDENCE IN THE FEE SIMPLE TRANSFERAL OF THE SUBJECT PROPERTY NOR ANY PORTION OR PORTIONS THEREOF. NO BOUNDARY SURVEY WAS PERFORMED. BOUNDARY SHOWN HEREON FROM DEED DESCRIPTIONS ONLY.
EQUIPMENT USED FOR ANGULAR & LINEAR MEASUREMENTS: LEICA TCRA 1103 ROBOTIC
THE PLAT HAS BEEN CALCULATED FOR CLOSURE AND IS FOUND TO BE ACCURATE TO WITHIN ONE FOOT IN 100,000+ FEET.
THE 2' CONTOURS AND SPOT ELEVATIONS SHOWN ON THIS EASEMENT SURVEY ARE ADJUSTED TO NAVD 88 DATUM AND HAVE A VERTICAL ACCURACY OF ± 1'. CONTOURS OUTSIDE THE IMMEDIATE SITE AREA ARE APPROXIMATE.
BEARINGS SHOWN ON THIS EASEMENT SURVEY ARE BASED ON GRID NORTH (NAD 83).
NO PORTION OF THIS PROPERTY IS LOCATED IN A SPECIAL FLOOD AREA AS PER F.I.R.M. COMMUNITY PANEL NO. 47093C0256F DATED 05/02/2007.
THE UNDERGROUND UTILITIES SHOWN HAVE BEEN LOCATED FROM ABOVE GROUND FIELD SURVEY INFORMATION. THE SURVEYOR MAKES NO GUARANTEES THAT THE UNDERGROUND UTILITIES SHOWN COMPRISE ALL SUCH UTILITIES IN THE AREA, EITHER IN SERVICE OR ABANDONED. THE SURVEYOR FURTHER DOES NOT WARRANT THAT THE UNDERGROUND UTILITIES SHOWN ARE IN THE EXACT LOCATION INDICATED ALTHOUGH THEY ARE LOCATED AS ACCURATELY AS POSSIBLE FROM INFORMATION AVAILABLE. THE SURVEYOR HAS NOT PHYSICALLY LOCATED THE UNDERGROUND UTILITIES.
I HEREBY CERTIFY THAT THIS IS A CATEGORY 1 SURVEY AND THE RATIO OR PRECISION OF THE UNADJUSTED SURVEY IS 1:15,000 AS SHOWN HEREON.
LEGEND
POB POINT OF BEGINNING
POC POINT OF COMMENCEMENT
IPF IRON PIPE FOUND
PP UTILITY POLE
EP EDGE OF PAVEMENT
OU OVERHEAD UTILITY
TR TRANSFORMER
N/F NOW OR FORMERLY
50 0 100 200
GRAPHIC SCALE IN FEET
SCALE: 1" = 100'
CHARLES LEE INER
REGISTERED LAND SURVEYOR
TENNESSEE NO. 2784
9/22/10
NO. | DATE | REVISION
1 | 06/03/2010 | ADDED TITLE - NRW
2 | 06/22/2010 | MOVED LEASE AREA -NRW
EASEMENT SURVEY PREPARED BY:
POINT TO POINT LAND SURVEYORS
810 Jackson Street
Locust Grove, Georgia 30248
(p) 678.565.4440 (f) 678.565.4497
(w) pointtopointsurvey.com
EASEMENT SURVEY PREPARED FOR:
T-Mobile
T-MOBILE SOUTH, LLC
FOUR CONCOURSE PARKWAY
SUITE 300
SANDY SPRINGS, GEORGIA 30328
Phone (770) 604-6980
Fax (770) 350-3049
"MANDALAY"
SITE NO.
9KX0191-D
6TH CIVIL DISTRICT
KNOX COUNTY, TENNESSEE
DRAWN BY: NRW
CHECKED BY: NW
APPROVED: C. INER
DATE: 20 MAY, 2010
P2P JOB #: 2010.273
SHEET: 1 OF 1

NO#	DATE	DESCRIPTION:
0	5/21/10	ISSUED FOR PRELIMINARY REVIEW
1	5/21/10	ISSUED FOR PERMITTING & CONSTRUCTION
2	6/1/10	REVISED PER COMMENTS
3	6/7/10	REVISED LEASE AREA AND ACCESS
4	6/22/10	ISSUED FOR ZONING SUBMITTAL

T-Mobile South LLC
3900 EZELL ROAD, SUITE 615
NASHVILLE, TN 37211
615-332-8008

PM&A
30 MANSELL CT
SUITE 100
ROSWELL, GA 30076
678-280-2225

DESIGNER:	A.J.B
DRAWN:	A.J.B
CHECKED:	P.W.M
JOB #:	TMT001

OVERALL SITE PLAN

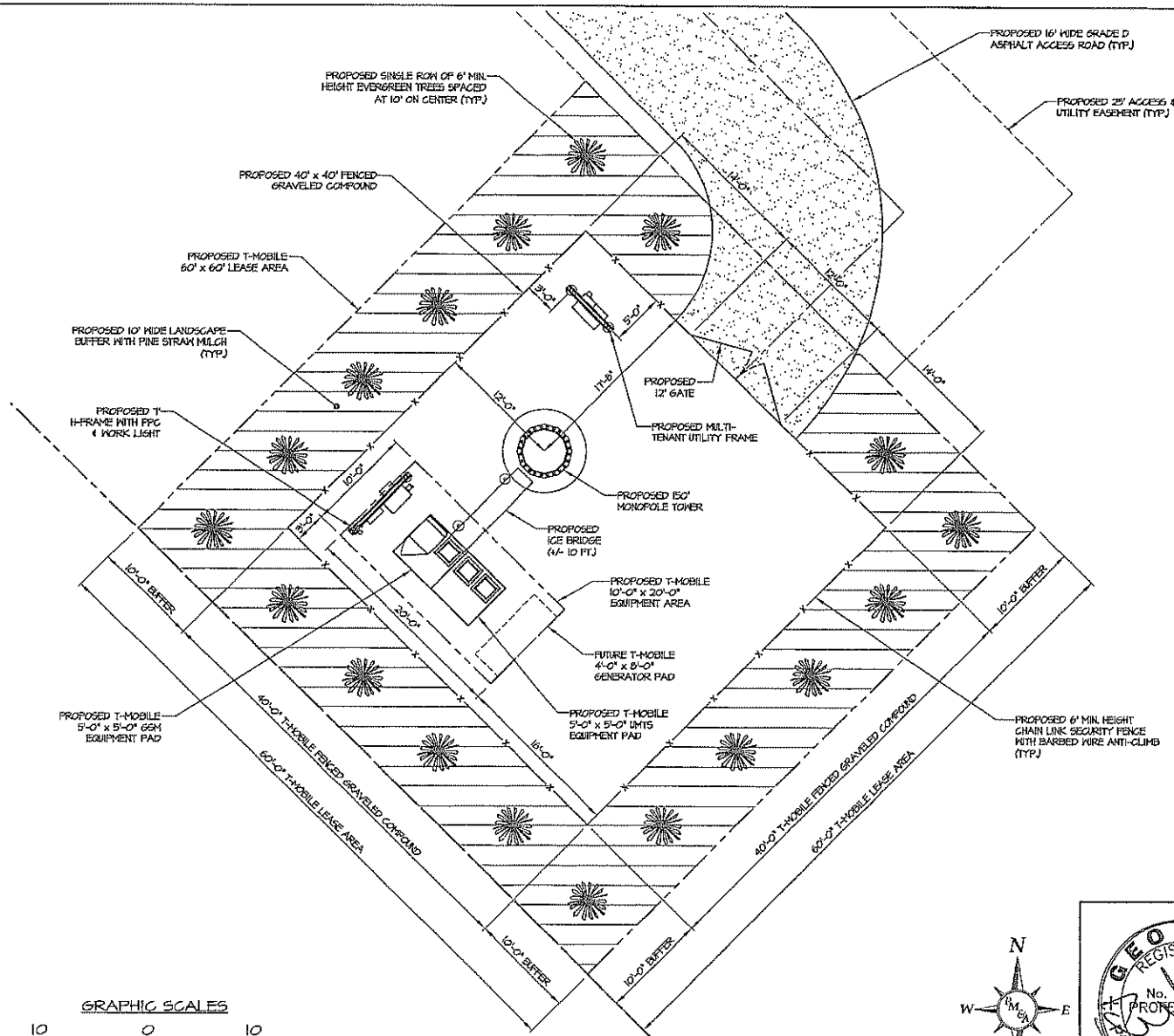
4KXO1AID / MANDALAY

SHT

Z-1

GENERAL CONSTRUCTION NOTES

1. DAMAGE TO ALL UTILITIES, LAND, ACCESS AREAS, AND PROPERTY OF OTHERS DISTURBED DURING CONSTRUCTION SHALL BE RETURNED TO THE ORIGINAL CONDITION AT THE COMPLETION OF THE WORK.
2. THE CONTRACTOR SHALL COORDINATE WITH THE LOCAL POWER AND TELEPHONE UTILITIES AND THE CONSTRUCTION MANAGER TO CONFIRM THE SOURCE OF SERVICE, PRIOR TO THE INSTALLATION OF ANY CONDUITS.
3. REMOVE ANY EXISTING VEGETATION AND ORGANIC MATERIALS FROM THE T-MOBILE GRAVELED LEASE AREA.
4. REGRADE AROUND THE EQUIPMENT PAD AS REQUIRED TO ALLOW A MAXIMUM 4" OF PAD THICKNESS EXTENDING ABOVE THE FINISHED GRADE. REPLACE FILL AROUND SLAB AT THE COMPLETION OF INSTALLATION.
5. THE CONTRACTOR SHALL INSTALL THE POWER AND TELEPHONE SERVICE UNDERGROUND TO THE EQUIPMENT AS SHOWN ON THE ELECTRICAL PLAN.
6. ALL WORK SHALL BE DONE IN A SATISFACTORY AND PROFESSIONAL WORKMANLIKE MANNER. ALL WORK SHALL BE SUBJECT TO INSPECTION DURING CONSTRUCTION AND FINAL APPROVAL BY THE CONSTRUCTION MANAGER.
7. ANY SUBSTITUTIONS OF MATERIALS, EQUIPMENT, OR DEVIATIONS FROM THE DESIGN PLANS OR SPECIFICATIONS SHALL BE COORDINATED AND APPROVED BY THE CONSTRUCTION MANAGER.
8. COLOR SELECTION FOR PAINTED ITEMS SHALL BE MADE BY THE CONSTRUCTION MANAGER.
9. THE CONTRACTOR SHALL FIELD VERIFY ALL EXISTING DIMENSIONS AND CONDITIONS SHOWN PRIOR TO BID SUBMITTAL. ANY CONFLICTS, DISCREPANCIES, ERRORS, AND/OR OMISSIONS SHALL BE BROUGHT TO THE ATTENTION OF THE CONSTRUCTION MANAGER.
10. CONTRACTOR SHALL CONTACT A SUBSURFACE UTILITY LOCATOR FOR EXACT LOCATIONS OF ALL EXISTING UTILITIES WITHIN DISTURBED AREAS, PRIOR TO THE COMMENCEMENT OF CONSTRUCTION ACTIVITIES. CONTRACTOR SHALL VERIFY THE LOCATIONS OF EXISTING UTILITIES BY DIGGING A TEST PIT, AS NECESSARY. THE LOCATIONS OF EXISTING UTILITIES SHOWN ON THESE PLANS ARE APPROXIMATE AND ARE FOR PLANNING PURPOSES ONLY.
11. THE CONTRACTOR SHALL PROVIDE ANY NECESSARY PROTECTION FOR EXISTING UTILITIES DURING CONSTRUCTION.
12. THE CONTRACTOR SHALL MAINTAIN A CLEAN SET OF CONSTRUCTION DRAWINGS AT THE SITE FOR THE PURPOSE OF DOCUMENTING "AS-BUILT" CONDITIONS AND DEVIATIONS FROM THE ORIGINAL DESIGN. THE REDLINED DRAWINGS SHALL BE TURNED OVER TO THE CONSTRUCTION MANAGER AT THE COMPLETION OF THE PROJECT.
13. THE CONTRACTOR SHALL PROTECT ALL SURVEY STATIONS AND CONTROL POINTS DURING CONSTRUCTION AND SHALL REESTABLISH ANY DISTURBED CONTROL POINTS.
14. ALL WORK SHALL BE DONE IN ACCORDANCE WITH THE GOVERNING LOCAL BUILDING CODE AND ALL APPLICABLE AMENDMENTS. THE CONTRACTOR SHALL COORDINATE WITH THE LOCAL GOVERNING OFFICIAL FOR LOCAL BUILDING CODE REQUIREMENTS.
15. TOWER AND TOWER FOUNDATIONS ARE SHOWN FOR ILLUSTRATIVE PURPOSES ONLY. BEFORE THE ANTENNAS, MOUNTS, OR CABLES ARE PLACED, THE TOWER MUST BE ANALYZED FOR THE PROPOSED LOADS BY A LICENSED STRUCTURAL ENGINEER (BY OTHERS). INSTALL ALL ANTENNAS AND OTHER TOWER-MOUNTED EQUIPMENT IN ACCORDANCE WITH THE TOWER ANALYSIS REPORT.
16. THE CONTRACTOR SHALL VISIT THE PROJECT SITE AND FAMILIARIZE HIMSELF WITH ALL EXISTING CONDITIONS INCLUDING SITE ACCESS PRIOR TO BID SUBMITTAL. ANY CHANGES DURING CONSTRUCTION DUE TO AN EXISTING CONDITION WHICH IS VISUALLY ASCERTAINABLE PRIOR TO BID SUBMITTAL, CANNOT BE USED AS THE BASIS FOR A CHANGE ORDER.
17. THE CONTRACTOR SHALL BE RESPONSIBLE FOR REMOVING ALL WASTE DEBRIS AND VEGETATION FROM THE SITE. BURIAL AND/OR BURNING OF WASTE MATERIALS IS NOT ACCEPTABLE.



GRAPHIC SCALES

10 0 10

SCALE: 1" = 10'

DETAILED SITE PLAN

SCALE: 1" = 10'

N W E S

GEORGIA REGISTERED No. 23080 PROFESSIONAL ENGINEER PATRICK W MARSHALL 6/21/10

PM&A
30 MANSELL CT
SUITE 103
ROSWELL, GA 30076
678-260-2325

T-Mobile-South LLC
3000 EZELL ROAD, SUITE 815
NASHVILLE, TN 37211
615-324-6008

NUM	DATE	DESCRIPTION:
0	9/2/09	ISSUED FOR PRELIMINARY REVIEW
1	5/24/10	ISSUED FOR PERMITTING & CONSTRUCTION
2	6/1/10	REVISED PER COMMENTS
3	6/21/10	REVISED LEASE AREA AND ACCESS
4	6/22/10	ISSUED FOR ZONING SUBMITTAL

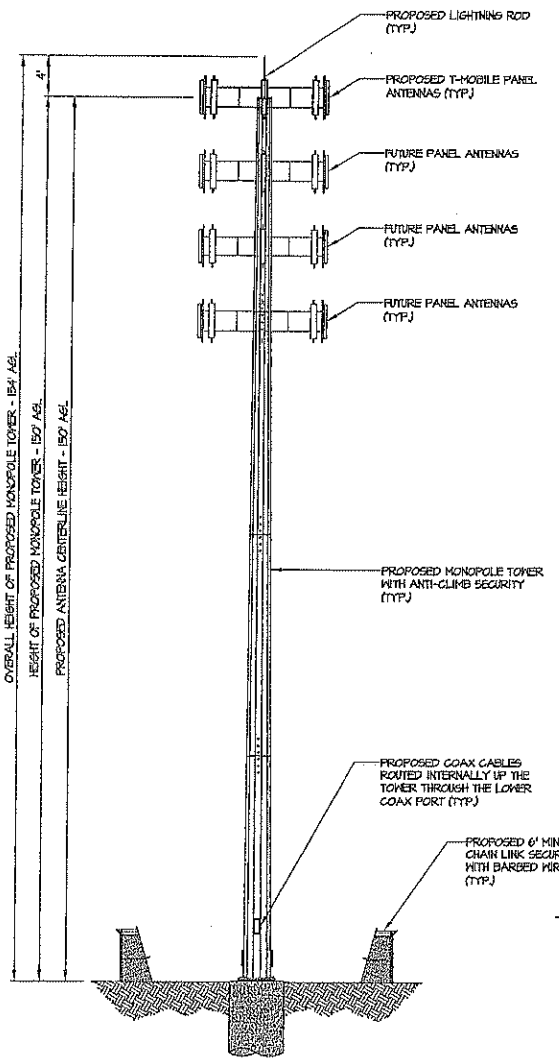
SITE ID: 9KX0191D / MANDALAY

DETAILED SITE PLAN

DESIGNED: AJB
DRAWN: AJB
CHECKED: PWM

JOB #: TMT001

Z-2



TOWER ELEVATION
NOT TO SCALE

ANTENNA AND COAXIAL CABLE SCHEDULE

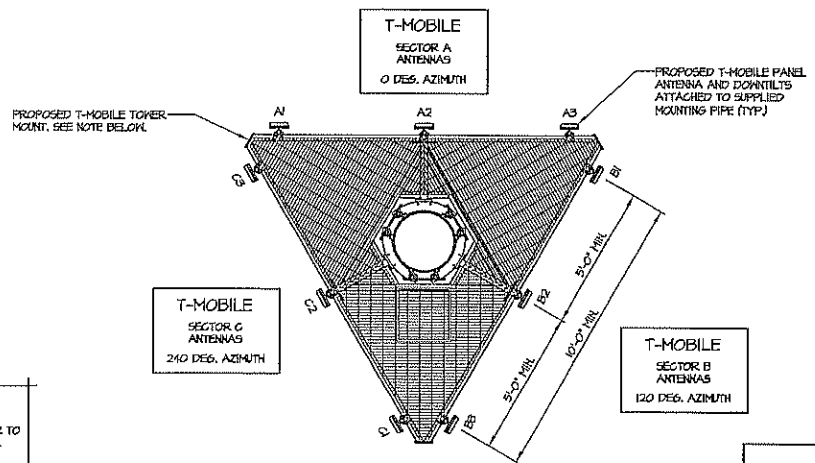
ANTENNA MARK	TYPE	ANTENNA MODEL #	COAX FEED LOCATION	AZIMUTH (0°=NORTH)	COAX COLOR CODE	TECHNOLOGY CONFIGURATION	COAX CABLE NUM-SIZE-LENGTH	TMA MODEL AND QUANTITY	DOWN TILT ANGLE MECH.	DOWN TILT ANGLE ELEC.	CCI EQUIPMENT
A1	65M	TMBX65-17-R2M	BOTTOM	0°	RED	Tx / Rx	(4) 1-5/8" x 185'	T.B.D. PER RF	0°	4°	N/A
A2	UMTS	TMBX65-17-R2M	BOTTOM	0°	RED - RED	Tx / Rx		N/A	0°	4°	
A3	65M	TMBX65-17-R2M	BOTTOM	0°	RED - ORANGE RED - RED - ORANGE	Tx / Rx		T.B.D. PER RF	0°	4°	
B1	65M	TMBX65-17-R2M	BOTTOM	120°	BLUE	Tx / Rx	(4) 1-5/8" x 185'	T.B.D. PER RF	0°	4°	N/A
B2	UMTS	TMBX65-17-R2M	BOTTOM	120°	BLUE - BLUE	Tx / Rx		N/A	0°	4°	
B3	65M	TMBX65-17-R2M	BOTTOM	120°	BLUE - ORANGE BLUE - BLUE - ORANGE	Tx / Rx		T.B.D. PER RF	0°	4°	
C1	65M	TMBX65-17-R2M	BOTTOM	240°	GREEN	Tx / Rx	(4) 1-5/8" x 185'	T.B.D. PER RF	0°	4°	N/A
C2	UMTS	TMBX65-17-R2M	BOTTOM	240°	GREEN - GREEN	Tx / Rx		N/A	0°	4°	
C3	65M	TMBX65-17-R2M	BOTTOM	240°	GREEN - ORANGE GREEN - GREEN - ORANGE	Tx / Rx		T.B.D. PER RF	0°	4°	

NOTE: THE INITIAL T-MOBILE INSTALLATION REQUIRES (4) ANTENNAS, (6) TMAs AND (12) 1-5/8" COAX CABLES. T-MOBILE'S RESERVE CAPACITY IS (8) ANTENNAS AND (18) LINES.

ANTENNA & COAXIAL CABLE SCHEDULE
NOT TO SCALE

TOWER NOTE:
FAA LIGHTING IS NOT REQUIRED BASED ON THE OVERALL HEIGHT OF THE PROPOSED TOWER. PRIOR TO PERMITTING AND CONSTRUCTION THE TOWER OWNER SHALL CONDUCT AN FAA STUDY TO DETERMINE IF TOWER LIGHTING IS REQUIRED BASED ON THE PROXIMITY TO NEARBY AIRPORTS.

TOWER MATERIAL - STEEL
TOWER COLOR - GALVANIZED
MOUNT MATERIAL - STEEL
MOUNT COLOR - GALVANIZED
ANTENNA COLOR - BEIGE
COAX COLOR - BLACK
EQUIPMENT FRAME - GALVANIZED
EQUIPMENT CABINET - TAN
ICE BRIDGE MATERIAL - STEEL
ICE BRIDGE COLOR - GALVANIZED



NOTE: PROPOSED TOWER MOUNT SUPPLIED BY T-MOBILE AND INSTALLED BY CONTRACTOR. ANTENNAS SUPPLIED BY T-MOBILE AND INSTALLED BY CONTRACTOR. CONTRACTOR TO PROVIDE ANTENNA CENTERLINE HEIGHT VERIFICATION TO T-MOBILE.

ANTENNA ORIENTATION
NOT TO SCALE

GEORGIA REGISTERED No. 23080 PROFESSIONAL ENGINEER PATRICK W MARSHALL 6/22/10

PM&A
30 MANSELL CT
SUITE 100
ROSWELL, GA 30076
678-280-2325

T-Mobile South LLC
3800 EZELL ROAD, SUITE 815
NASHVILLE, TN 37211
615-302-8008

NUM	DATE	DESCRIPTION:
0	5/26/10	ISSUED FOR PRELIMINARY REVIEW
1	5/28/10	ISSUED FOR PERMITTING & CONSTRUCTION
2	6/1/10	REVISED PER COMMENTS
3	6/22/10	REVISED LEASE AREA AND ACCESS
4	6/22/10	ISSUED FOR ZONING SUBMITTAL

SITE ID: GKXO1GID / MANDALAY

TOWER ELEVATION & ANTENNA SCHEDULE

DESIGNED: AJB
DRAWN: AJB
CHECKED: PWM

JOB #: TMT001

Z-3

EXCELL COMMUNICATIONS, INC.

May 20, 2010

Knoxville-Knox County
Metropolitan Planning Commission
400 Main Street, Suite 403
City County Building
Knoxville, TN 37902

Re: Statement of Intent, Proposed Wireless Telecommunications Facility
4326A Tolson Lane, Knoxville, TN 37921

Dear Sirs and Madams:

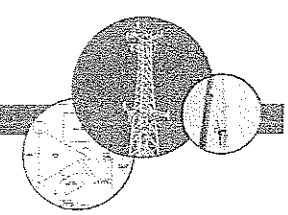
T-Mobile South LLC ("T-Mobile") respectfully submits this statement in support of its application to the Metropolitan Planning Commission for a permit to construct, maintain, and mange a multiple user wireless facility at 4326A Tolson Lane, Knoxville, TN 37921. This property is owned by Ms. Kathy S. Hobson. The property owner and T-Mobile respectfully request that the Metropolitan Planning Commission approve this application.

Proposal
The proposed facility will consist of a 150' monopole within a fenced compound, also including supporting ground equipment. T-Mobile will lease antenna space on the structure and the necessary ground space for supporting equipment to other wireless providers. The facility will be fenced and locked. T-Mobile will construct and maintain the facility in compliance with all federal, state, and local building codes and standards.

Site Selection
This particular site was selected because of its location in proximity to other T-Mobile antennas in the area. T-Mobile operates a digital system, providing the latest in wireless communications throughout the southeastern United States.

The proposed site is critical for complete coverage along Schaad Road, Oak Ridge Highway, and the surrounding areas. Each cell site holds the equipment that provides the air interface to the subscriber units, and must be precisely located relative to other cells creating a grid system. This grid system must reflect the topography and traffic (user population and building density) of the cells as well as the radius of the respective antenna's reliable transmission area.

The Technology
The proposed communications facility will not interfere with either television or radio reception, as T-Mobile is licensed by the Federal Communications Commission (FCC) to operate in a very specific frequency at a different location on the spectrum.



EXCELL COMMUNICATIONS, INC.

Because digital technology uses weaker signals than radio, TV, or cellular technology, the antennas must be closer together than cellular antennas. T-Mobile is acutely aware of citizen concerns regarding the antenna devices and is committed to minimizing the visual impact of transmission structures in local communities. As a result, T-Mobile has attempted to place as many of its antennas as possible on existing towers, water tanks, and other structures to avoid the need for new tower sites. There are several existing facilities around this proposed tower on which T-Mobile is located.

Communities must develop the necessary communication infrastructure as they do with sewers, roads, and other public utilities. Poorly designed or insufficient communication infrastructure will result in companies not being able to provide adequate information and safety devices. A direct result and obvious benefit of T-Mobile's proposal is the alleviation of the proliferation of unnecessary multiple towers within a community, because T-Mobile cooperates with all other wireless carriers interested in locating on their facilities.

The Land Use/Wireless Facilities Matrix

The Land Use/Wireless Facilities Matrix indicates that the proposed location is in within a Sensitive Area because it is located within an Agricultural zone, but surrounded by residential areas, and there are residences located within 500' of the tower. The property owner does have a residence on her property that meets the tower setback requirement of 165' (110% of the proposed height of the tower). This residence is located 168.4' from the centerline of the tower. In case the tower location needs to be shifted, included with this application you will find a notarized statement, signed by both the property owner and T-Mobile, agreeing to allow the minimum setback requirement to be reduced to the principal use setback in the zoning district in which the tower is located, if approved by the Metropolitan Planning Commission.

Conclusion

A communication facility at the proposed location will benefit the public, as the tower will provide wireless service to a portion of Knoxville County currently void of these services. In addition, the facility will reduce the proliferation of new structures in the area by providing other carriers with a facility that meets general structural and coverage requirements. Included with the application package are the following items:

- 10 sets of site plans
- RF Justification statement with search radius map and propagation maps of before and after coverage
- Letter of Intent to allow future collocation on proposed tower
- Notarized statement from T-Mobile and Property Owner allowing reduced setback

T-Mobile appreciates your consideration, and respectfully requests approval of this application for Use on Review. Please feel free to contact me with any questions or concerns.

Sincerely,

Amy Stark

Amy Stark
Excell Communications, Inc.
Representative of T-Mobile
(205) 907-8150

T-Mobile

T-Mobile Central LLC
Kevin Blewitt
11509 Commonwealth Drive
Suite 9
Louisville KY 40299

May 21, 2010

Metropolitan Planning Commission
City County Building
Suite 403
400 Main Street
Knoxville TN 37902

RE: T-Mobile Site #9KX0191D/Kathy Hobson
Site Address: 4326 Tolson Lane, Knoxville, TN 37921

To Whom It May Concern:

T-Mobile South LLC ("T-Mobile") respectfully submits this letter in efforts to site a new telecommunications monopole at 4326 Tolson Lane, Knoxville, TN ("Kathy Hobson"). The proposed new monopole is required to improve coverage and provide adequate RF signal strength for the T-Mobile network in Knoxville.

T-Mobile initially pursued collocating on a tower owned by US Cellular. The highest available position on the US Cellular tower did not meet T-Mobile's coverage needs. T-Mobile worked with US Cellular to pursue the possibility of extending the height of the existing tower to meet T-Mobile's requirement. However, the height increase required a variance request with the jurisdiction and the signature and consent of the underlying property owner. Due to ongoing issues between the US Cellular and the property owner, US Cellular was unable to get consent for an extension. T-Mobile was then forced to explore other candidates. T-Mobile considered a nearby TVA tower that was ultimately deemed not suitable for collocation by TVA engineering. Having exhausted all viable collocation opportunities, T-Mobile looked for raw land options in the search ring. The Kathy Hobson raw land candidate, our proposed primary option, is currently being pursued as it meets T-Mobile objectives while meeting all the jurisdiction's requirements.

If you have any further technical questions related to this application, you may contact me at 502-297-6207.

Sincerely,

Kevin Blewitt
Senior Engineer, RF Deployment

stick together

Mr. Matt Chastain
Real Estate Manager
T-Mobile South, LLC
3800 Ezell Road - Suite 815
Nashville, TN 37211

May 20, 2010

Metropolitan Planning Commission
City County Building
Suite 403
400 Main Street
Knoxville, TN 37902

Re: Letter of Intent to Allow Collocation
Address: 4326 #A Tolson Lane Knoxville, TN 37921
Site Name: 9KX0191D Mandalay

To Whom It May Concern:

Pursuant to the Knox County Zoning Ordinance, Article 4, Section 4.92.1 (b), T-Mobile South LLC ("T-Mobile") hereby submits this letter of intent. T-Mobile, and its successors and assigns, agrees to allow shared use of the proposed wireless communications tower to be located at 4326 #A Tolson Lane Knoxville, TN 37921, if an additional user agrees in writing to meet reasonable terms and conditions for said shared use as determined by T-Mobile.

Sincerely,

Matt Chastain

NOTARIZED STATEMENT
OF
MATT CHASTAIN AND CHARLES S. MCMILLAN
For construction of a Telecommunications Facility by
T-Mobile South, LLC
to be located at 4326 #A Tolson Lane Knoxville, TN 37921

Pursuant to the Knox County Zoning Ordinance, Article 4, Section 4.92.2 (c), Matt Chastain, Real Estate Manager for T-Mobile South, LLC and Kathy S. Hobson, "Property Owner", mutually agree, upon approval by the Metropolitan Planning Commission, to allow the minimum tower setback requirement to be reduced to the principal use setback in the zoning district in which the tower is located (Agricultural).

T-Mobile South, LLC

By: _____

Name: Matt Chastain

Title: Real Estate Manager

Date: 05/21/10

Property Owner

By: _____

Name: Kathy S. Hobson

Title: Individual

Date: 5/19/10

STATE OF TENNESSEE)
COUNTY OF _____)

I, the undersigned authority, a Notary Public, in and for said County, in said State, hereby certify that, **Kathy S. Hobson**, whose name as **Property Owner** is signed to the foregoing instrument and who is known to me, acknowledged before me on this day that, being informed of the contents of the foregoing instrument, he in his capacity as such officer and with full authority, executed the same voluntarily for and as the act of said corporation on the day the same bears date.

GIVEN under my hand and seal this 19 day of May, 2010.

[NOTARIAL SEAL]

Notary Public: Jonna M. Green

Print Name: Jonna M Green

My Commission Expires: 11-10-13

STATE OF TENNESSEE)
COUNTY OF Davidson)

I, the undersigned authority, a Notary Public, in and for said County, in said State, hereby certify that, **Matt Chastain**, whose name as **Manager of Real for T-Mobile South, LLC** is signed to the foregoing instrument and who is known to me, acknowledged before me on this day that, being informed of the contents of the foregoing instrument, he in his capacity as such officer and with full authority, executed the same voluntarily for and as the act of said corporation on the day the same bears date.

GIVEN under my hand and seal this 21 day of [illegible], 200__.

[NOTARIAL SEAL]

Notary Public: [illegible]

Print Name: [illegible]

My Commission Expires: My Commission Expires November 7, 2012

Coverage without KX0191
Layer Order
Legend
Data Types
Best Server
UL
Very Good
Good

Coverage with KX0191
Layer Order
Legend
Data Types
Best Server
UL
Very Good
Good

From: Sarah Powell
To: Betty Jo Mahan
Date: 6/26/2010 10:47:40 PM
Subject: Fwd: Case # 7-G-10-UR Excell Communications/T-Mobile cell tower objection

>>> Amy Easterly <amy.easterly@gmail.com> 6/26/2010 6:51 PM >>>
Dear Knoxville Metropolitan Planning Commission:

Please accept this email as an official community complaint and objection to the proposed cell tower T-Mobile via Excell Communications is attempting to place on Tolson Lane (case # 7-G-10-UR).

The proposed tower is not wanted by the residents of the neighborhood. A tower piercing the sky twice as tall as the surrounding trees would be quite visually obtrusive.
Their need for additional coverage may not be as great as T-Mobile states. On the "Signal Strength at Mobile Phone" map, signal strength was measured using a bottom-of-the-line cell phone with T-Mobile service. It should be noted that for all but the valley south of Banard Road, signal was available in each of the areas tested. Data service was available in all areas but the aforementioned area. Because it appears that there is indeed T-Mobile data and voice service in the areas used in the permit application for the cell tower, the rationale for the current tower location should be more closely examined. The proximity of the proposed tower is adjacent to three residential driveways, which will effectively decrease property values more substantially than if a tower were located in an commercial or industrial location. The tower would be directly out the front windows of two of the properties. Additionally, the two most affected properties are already bearing some civic responsibility by being located next to a municipal water tower. The additional eyesore of a 150' - 180' cell tower is unthinkable. Every other ridge in this area already has one or more cell towers on it. There is no reason to add more insult to injury.
There are several co-location opportunities that have not been examined. The two closest towers are both US Cellular towers, one off of Schaad Road and the other off of McKamey. The permit application stated that T-Mobile has tried to colocate on one US Cellular tower without success. Considering there are several towers which may be sufficient for colocation, T-Mobile has not performed an exhaustive search for alternative locations.
3902A Schaad Road (US Cellular)
4739 McKamey Road (US Cellular)
Presley Lake Road (American Towers) 6305 Vance Lane (#9196, American Towers) It should be noted that according to the "Viewshed Analysis" figure (generated using ZVI, Zone of Visual Influence calculations), colocation on the Schaad Road tower would provide coverage over all of the areas where T-Mobile desires additional coverage. Hence, there would be no need to build a new tower because using an existing one would meet the desired outcome for the carrier. The same may be true for other existing cell tower locations.
Moreover, the abandoned Tecoy Quarry is already zoned CB, has a similar elevation to the existing Schaad Road tower, and is significantly farther away from existing residences than the proposed tower. The proposed location joins 10 residential lots and will be an eyesore for the hundreds of people living in the proximate neighborhoods.

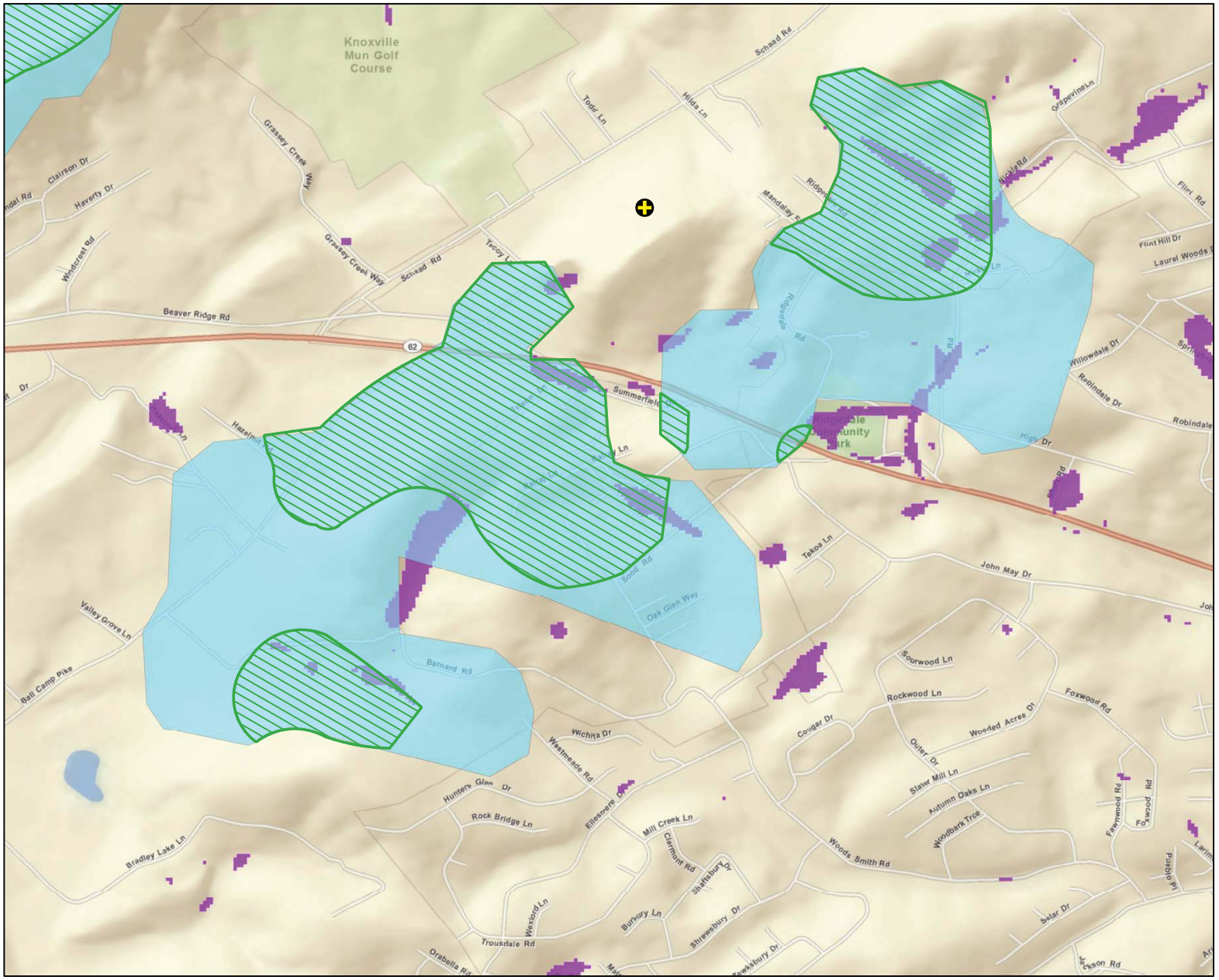
Please address our concerns with the commissioners on the MPC and urge them to vote against allowing T-Mobile/Excell Communications to place their obtrusive and unnecessary tower in our neighborhood and out our front windows.

We appreciate your time, input, and support on this matter.

Sincerely, Amy and Elliott Easterly 4340 Tolson Lane Knoxville, TN 37921 (865) 551-9269

MPC July 8, 2010

Agenda Item # 40



VICINITY MAP

LEGEND

- Tower Location
- No T-Mobile Data Coverage
- No T-Mobile Voice Coverage
- Towers Not Visible
- Towers Visible

Notes:
1. Viewshed based on 10 meter USGS DEM data.

N

0 1,000 2,000
Feet

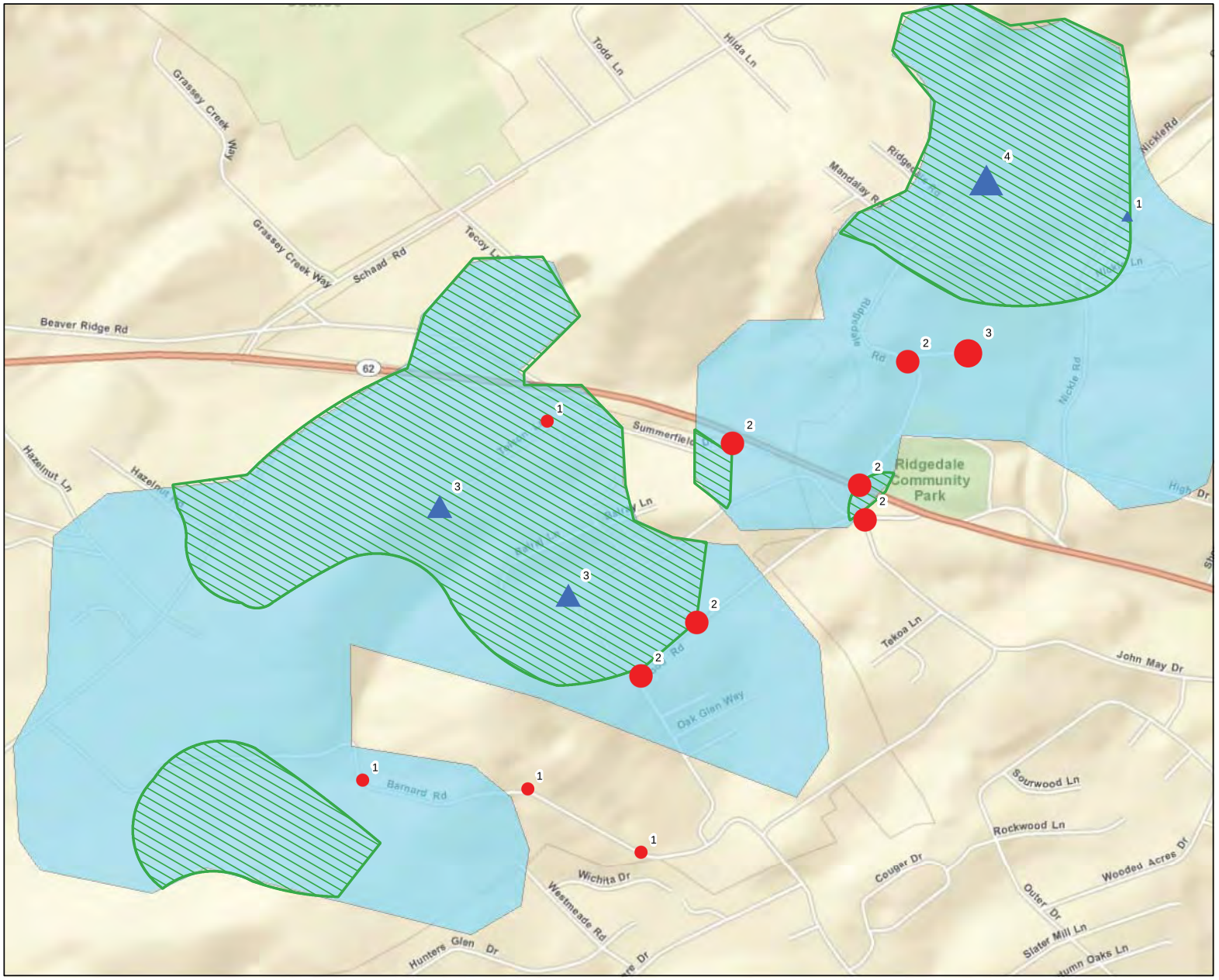
Viewshed Analysis

Knoxville Vicinity
June 2010

\\MNBAOLXP322331\PROJECTS\ELLIOTT_TOWERZVI\MAPFILES\ZVI_JUNE2010.MXD CARCHER 6/22/2010 16:21:05

MPC July 8, 2010

Agenda Item # 40



VICINITY MAP

LEGEND

Signal Levels

- 1 Voice
- 2 Voice
- 3 Voice
- 1 Voice and data
- 3 Voice and data
- 4 Voice and data
- No T-Mobile Data Coverage
- No T-Mobile Voice Coverage

Notes:
Signal strength measured 6/23/2010

N

0 1,000 2,000
Feet

Signal Strength at Mobile Phone
Knoxville Vicinity
June 2010

\\MNBTRLXP322561\DOCUMENTS AND SETTINGS\GBOQUIN\DESKTOP\TOWERZVI\ELLIOTT_TOWERZVI\MAPFILES\SIGNAL_STRENGTH.MXD GBOQUIN 6/24/2010 13:20:19

Larry D. Perry

11464 Saga Lane • Knoxville, TN 37931-2819
Telephone (865) 927-8474 Fax (865) 927-4912 Email: larryperry@worldnet.att.net

June 30, 2010

Mr. Tom Brechko, AICP
Metropolitan Planning Commission
4th Floor
City County Building
400 Main Street
Knoxville, TN 37902-2476

RE: T MOBILE TOWER APPLICATION-- 7-G-01-UR

Dear Tom:

Attached please find my report for the MPC on the application by Excell Communications for a T Mobile tower to be located at 4326A Tolson Lane in west Knox County.

I have enclosed all of the materials you forwarded along with several new documents that I requested from the applicant and which they supplied.

Should you have any questions in this matter, please advise.

Sincerely yours,

Larry Perry,

LP/eb

enclosure

T MOBILE

USE ON REVIEW APPLICATION #7-G-10-UR

CONSULTANT'S SUMMARY

TOLSON LANE SITE REQUEST

Location: Tolson Lane near Western Ave (County of Knox)

Proposed Tower Height: 154 feet

Address: 4326 Tolson Lane
Knoxville, Tennessee

District: 3rd County Commission Dist **Tax Map#**: 79 **Tract** 086.04

Use: Telecommunications antenna support structure

Zoning: A (Agricultural), but is immediately adjacent to a PR zoned area.

Variances and waivers: None required.

Need: The applicant is a communications carrier that provides communication service to area citizens. The applicant in this case is T Mobile, a licensed PCS carrier by the Federal Communications Commission. The carrier has justified a need for service in the area.

Instant Proposal: Construct a 154 foot (maximum) monopole type support structure. Lighting not required.

Consultant's Recommendation: The applicant proves adequate justification for the site using a monopole type antenna support structure, however, there may be other support structures within the immediate area that would provide the coverage needed by the applicant that would not be as objectionable to the local residents. The Commission in the past has discouraged multiple towers within about a mile of each other and in this instance there are a couple within that radius. Because of the terrain and shadowing problems associated with the terrain, sometimes it is necessary to have more than one tower within that radius and that appears to be the case here.

6-30-10

REPORT TO

METROPOLITAN PLANNING COMMISSION

for

Proposed Telecommunications Tower Site
located on Tolson Lane
Knoxville, TN

T-MOBILE SOUTH LLC

UOR 7-G-10-UR

COMPLIANCE WITH

THE MPC TELECOMMUNICATIONS FACILITY ORDINANCE

6/30/2010

The proposed site for the applicant is an apparent replacement site for the site originally approved by the MPC in November, 2008 in file 8-J-08-UR at 13902 Shaad Road and that would fill in the area of low or no signal coverage as proposed by the instant application. Apparently that site was not used for whatever reason. The supporting material from applicant has been reviewed for technical and Federal/State legal compliance.

REQUESTED

1. **Location.** The location is within the **County** of Knox limits in **Commission Dist 3** and is located on **Tax Map 79, Parcel 86.04** and **ID# 079-8604**

2. **Zoning.** A---Agricultural (Growth Pattern---Urban)

3. **Tower height.** The requested overall height is 154 feet above ground level. Lighting will not be required on this structure.

4. **Variances**. The set back requirements in Article 4 Section 4.92.02(2)(a) of the Ordinance for the County of Knox are met with this structure. The setback required is 170 feet from the nearest residential house and the propose site is exactly 170 from two residences, one is the landowner and the other is a residence directly across the street from the proposed site.

5. **Site**. This application is for the construction of a new 154 foot monopole on a partially wooded site in an Agricultural zoned area.

6. **Use**. This antenna support structure will be used for telecommunications with the present state of the art communications technology using PCS and cellular communication sources.

7. **Setbacks**. The setback requirements in Article 4 .92 section .02. 2(a) requires that the setback be 110% of the height of the tower from any dwelling unit or in this case 170 feet. The set back is met as proposed in that the tower is exactly 170 feet to residences, one the land owner and the other across the street from the site.

8. **Height**. The proposed structure will be up to 154 feet (maximum) overall height. It will not require any lighting as the other existing towers are taller and already have lighting to meet FAA requirements.

9. **Alternatives:** There are two other antenna support structures located within a mile of the site: (1) a US Cellular Tower located at 3902 Shaad Road to the north of the proposed site; and (2) a site on McKamey Road to the South East. Either of these towers may provide the coverage needed and should be considered by the applicant, if not already.

10. **Facilities Plan Compliance:** The proposed site is in an Agriculturally zoned are but there are residences located nearby. There is also a water tank several hundred feet and at a higher elevation about 300 feet to the west of the proposed site that the adjacent land to the water tank would appear to be a better location and would require a shorter tower. The proposed site is located in a SENSITIVE are of the Wireless Facility Plan in that there are several residences within 500 feet of the proposed site...including 3 within 200 feet.

EVALUATION

The following is a list of items reviewed:

Zoning Ordinance for Knox Tennessee by Metropolitan Planning Commission---Telecommunication Facilities Section (as amended thru July 1, 2006)

The MPC Wireless Facilities Plan dated 2004.

Check for other existing towers capable of supporting the load and elevation clearance requested by the applicant herein and within 1 mile radius of site.

Review support structure drawings and specifications with applicant

Review FAA lighting and marking requirements and proposals

Review FCC requirements regarding signal coverage, towers and lighting

Review applicant's justification for site in compliance with the FCC's requirements for telecommunication company providers compliance

with required coverage for the use of the general public.

Review Site plan by applicant

Check Zoning

Check setbacks for building and antenna support structure

Check landscape plan

Check proximity to other structures and district boundaries

Check nature of surrounding land uses

Check surrounding foliage and tree coverage

Check design of tower for esthetic changes

Check height requirements necessary for coverage

Check separation from other towers

Check frequencies proposed for possible interference to TV and radio reception in the immediate vicinity of the structure.

DISCUSSION

I visited the proposed tower site that is a part of this review and met with several neighbors around the proposed site. Further, I reviewed the applicant's specifications and requirements.

The applicant has proposed a site that is located in an Agricultural zoned are, but there are residences located nearby. There is a KUB water tank located to the west of the proposed site and closer to the top of the hill. There is wooded land surrounding the water tank. In addition there are other support structures located within a half mile or so of the proposed site that may provide the coverage needed by the applicant provided they can work out arrangement with the owners for a joint use.

The area would be characterized as a Sensitive Area area based upon the Land Use/Wireless Facilities Matrix. (Exhibit C) in that it is located within 500 feet of several residential homes. Lighting for the structure will not be required.

In speaking with the neighbors of the area, there is considerable opposition to the proposed site from the adjacent landowners.

There is a need for the added signal coverage as proposed by the carrier, T Mobile based on the signal contour maps provided and verified by the applicant.

SUMMARY

(1) The proposed antenna support structure is a 154 foot (maximum) monopole including antennas. There are no lighting required by the FAA.

(2) The structure design meets or exceeds FCC and EIA requirements.

(3) The area of the proposed site is zoned Agricultural. There is are other residences within about 500 feet. The landowner has filed a notarized statement accepting the setback variance for her property.

(4) The proposed equipment housing facility will have some impact on the aesthetics of the adjacent land uses. due to the closeness to the residences and the fact that the proposed tower is 154 feet compared to indigenous trees of about 65 feet in height. The landscape plan indicates that the fenced area will be surrounded by vegetation as coverage for the location. The access road to the site from Tolson Lane can be designed in such a way so as to minimize the view from the residence across Tolson Lane.

(5) The applicant has received authorization from the various governmental agencies, including the Federal Communications Commission, to provide communication service to the citizens of Knoxville, Tennessee.

(6) There are no variances required for setbacks for the proposed site.

(7) The proposed site and structure will have no environmental impact within the federal guidelines.

(8) The proposed frequencies to be used by the various applicants who plan to use the site should present no problem nor any interference to area reception of commercial television or radio signals.

(9) There is a need for the structure in the area to provide signal coverage for the surrounding area by the applicant, but it would appear that there may be other alternative support facilities available.

SUMMARY

In light of the analysis and review of documents, it is my professional opinion that the applicant **has made a technical showing of justification** for the site on Tolson Lane, but there may be other alternative sites available in the area that be of less concern to the local residents who oppose the application.

Respectfully submitted,

Larry Perry
Consultant to MPC

Exhibit A
Tolson Road Site
MPC 7-G-10-UR

Exhibit B

MPC 7-G-10-UR

T MOBILE 7-6-10-UR

EXHIBIT 7.
LAND USE/WIRELESS FACILITIES MATRIX

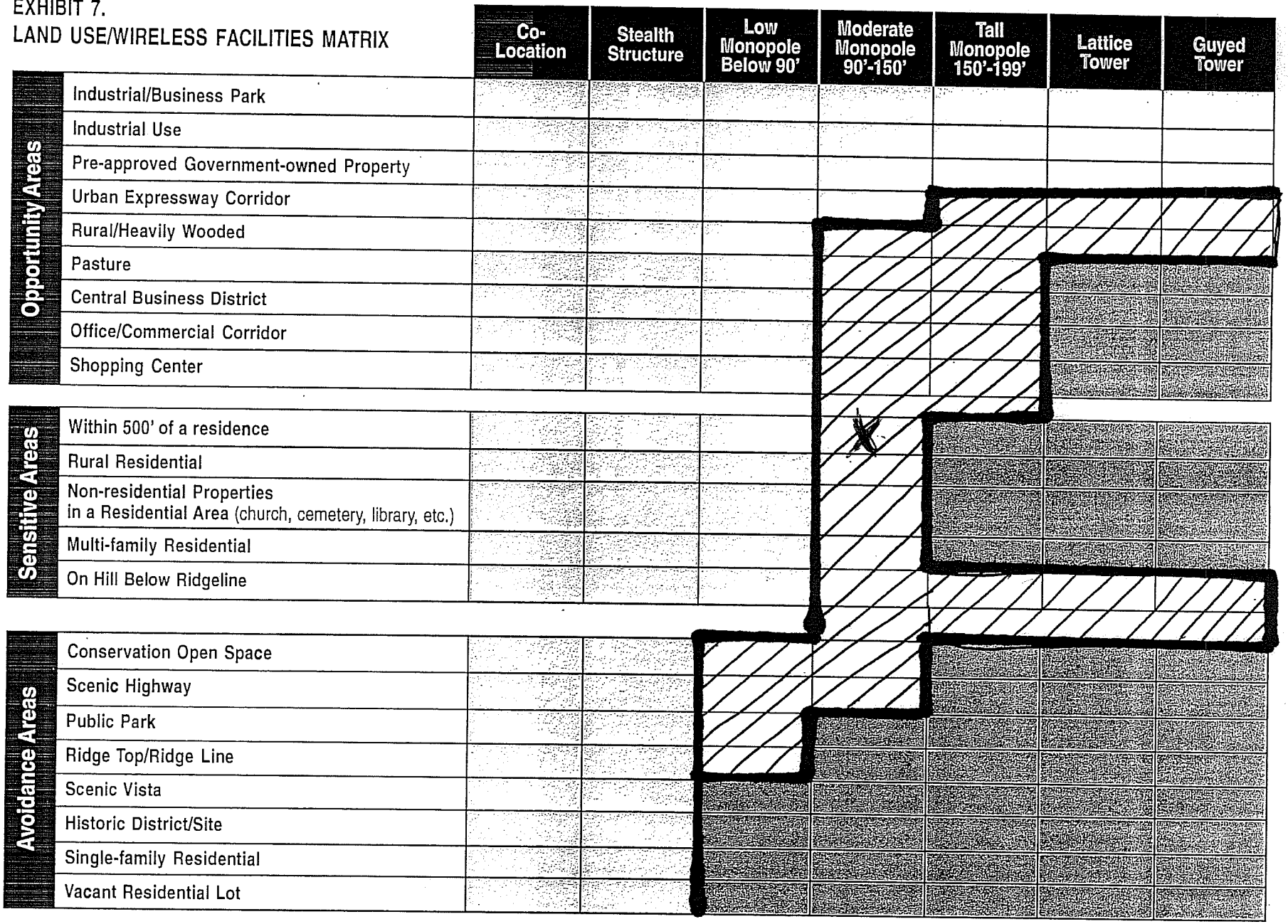
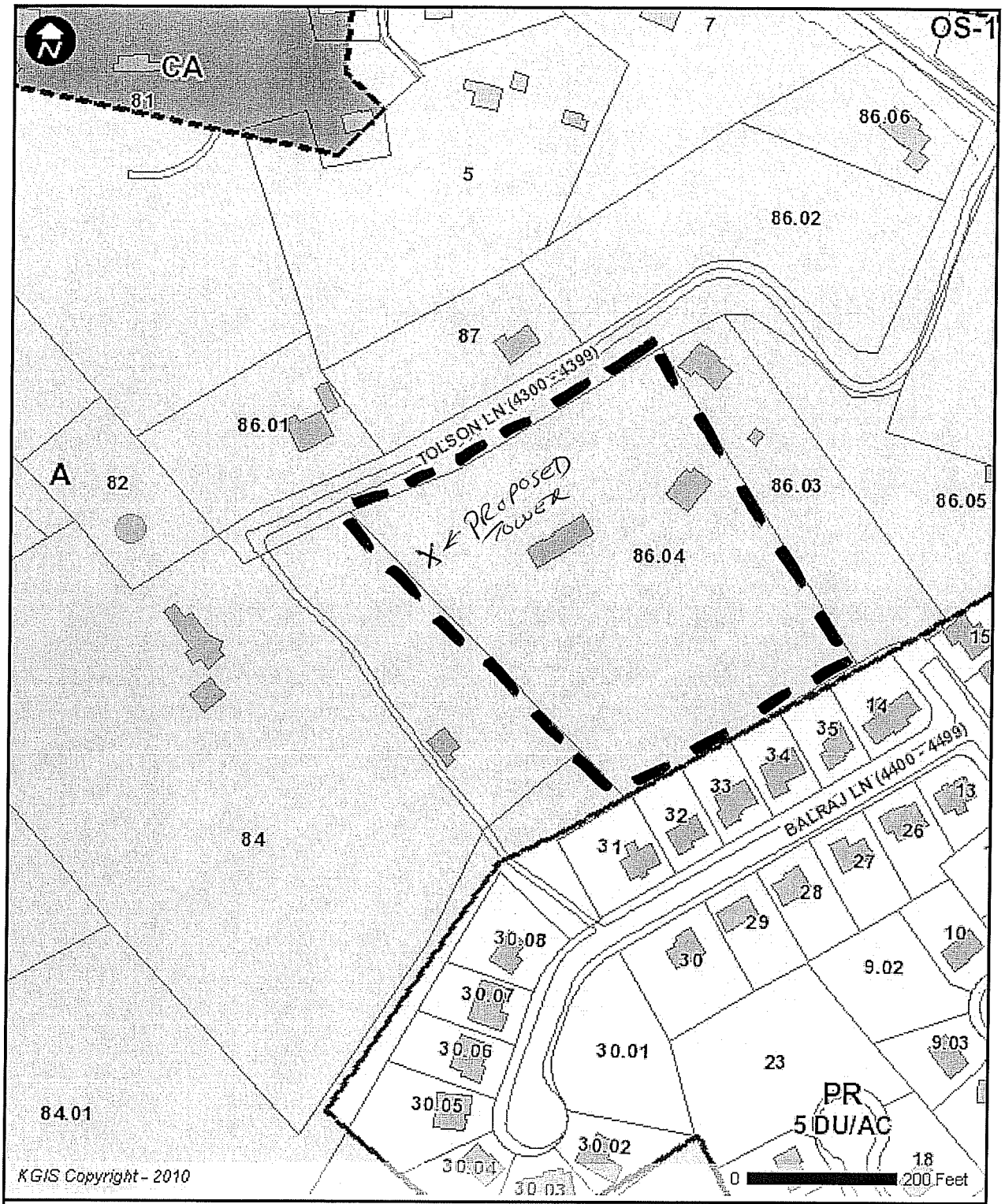


EXHIBIT C



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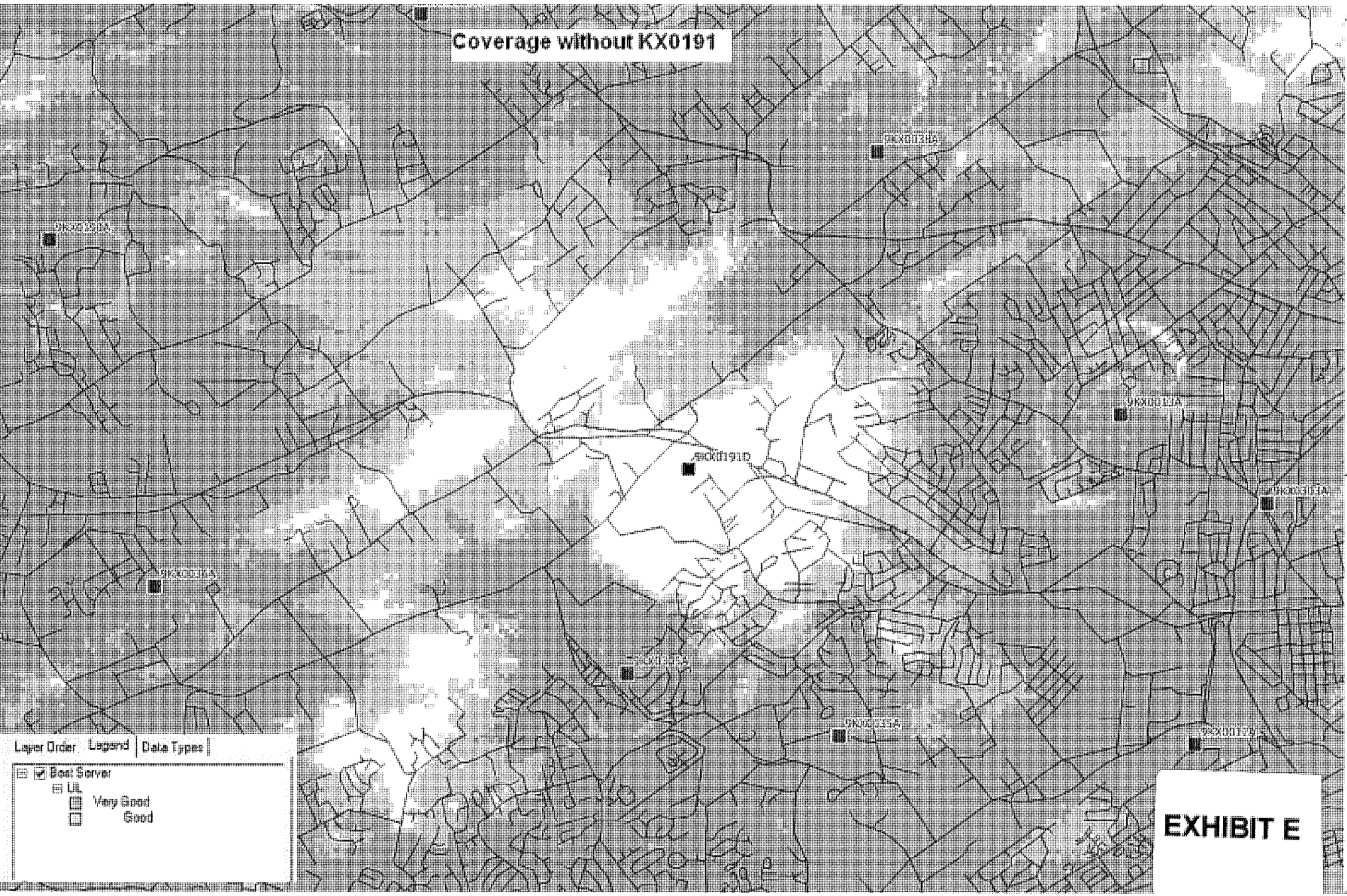
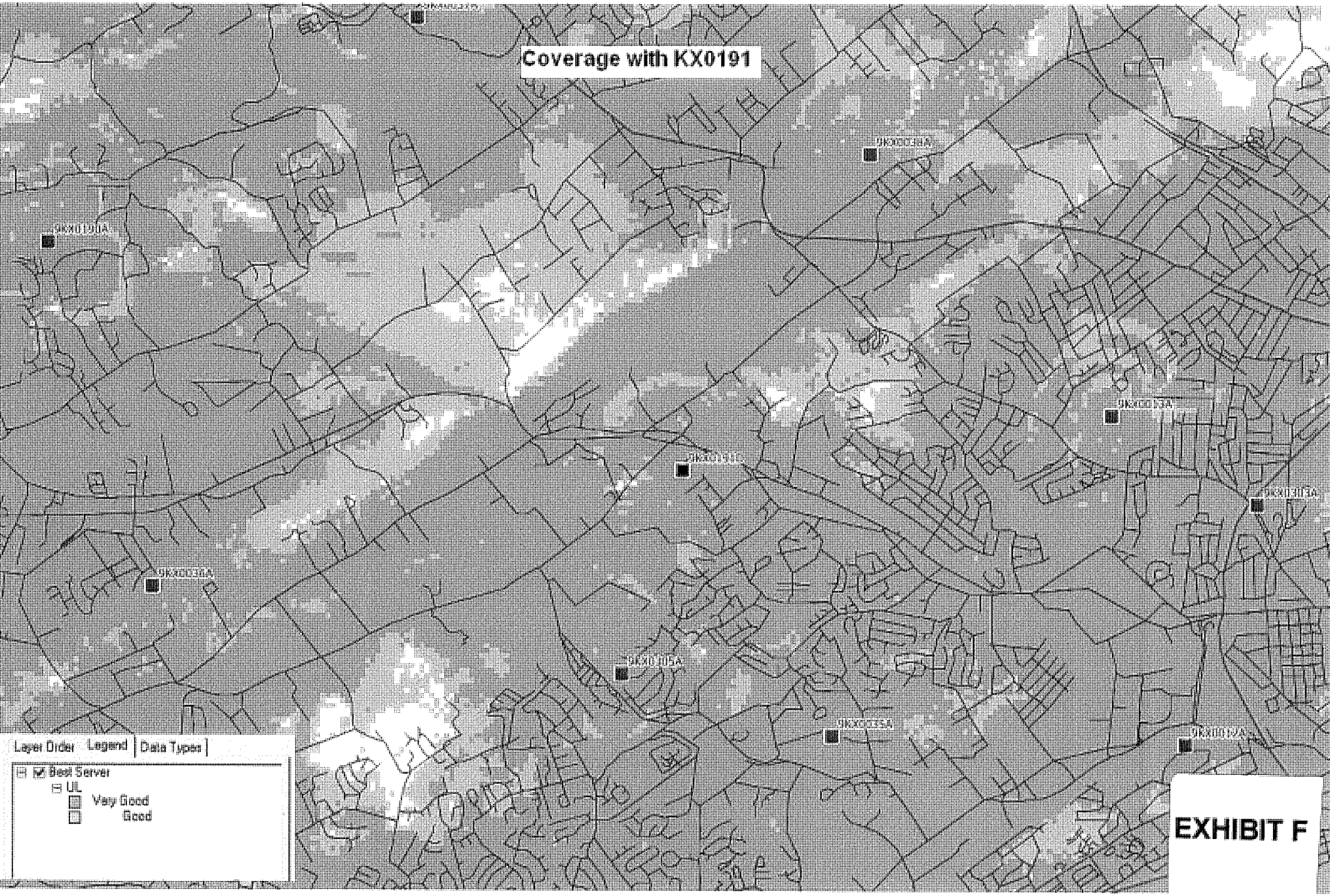
KGIS - 606 Main St - Suite 150 - Knoxville, TN 37772 - www.kgis.org

Printed: 5/24/2010 at 2:18 PM

EXHIBIT D


Coverage without KX0191
9KX00191A
9KX00191D
Layer Order
Legend
Data Types
Best Server
UL
Very Good
Good
EXHIBIT E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KX0191A
KX0193A
KX0195A
KX0197A
KX0199A
KX0201A
KX0203A
KX0205A
KX0207A
Layer Order
Legend
Data Types
Best Server
UL
Very Good
Good
EXHIBIT F

STATEMENT OF QUALIFICATIONS OF CONSULTANT

I, Larry Perry, do hereby state:

1. That I have degrees in Law and Engineering with extensive experience in towers and communications related activities;

2. That I have prepared numerous communications applications resulting in grants by the Federal Communications Commission and other federal agencies;

3. That I have been responsible for the design and construction of more than 3785 towers in 21 countries around the world;

4. That I have prepared Ordinances and other statutes for cities and states concerning tower usage within municipal boundaries, including many in Tennessee.

5. That my credentials are a matter of record with the FAA and the FCC;

6. That I am a licensed attorney and Registered Professional Engineer in several states;

7. That I have testified before Congress on several occasions on communications related matters;

8. That I have served as an advisor to three FCC Chairmen and the US Department of State on International communications matters;

9. That I have more than 40 years experience in tower design, evaluation and construction;

10. That I have and presently do teach courses in communications and radiation at the college level at major universities and for private industry.

Larry Perry

KNOXVILLE/KNOX COUNTY METROPOLITAN PLANNING COMMISSION
USE ON REVIEW REPORT

FILE #: 8-J-08-UR **AGENDA ITEM #: 81**

AGENDA DATE: 8/14/2008

APPLICANT: **T-MOBILE SOUTH / US CELLULAR**

OWNER(S): US CELLULAR

TAX ID NUMBER: 79 G B 012.04

JURISDICTION: County Commission District 6

LOCATION: **Southeast side of Schaad Rd., northeast of Tecoy Ln.**

APPX. SIZE OF TRACT: **6.12 acres**

SECTOR PLAN: Northwest City

GROWTH POLICY PLAN: Urban Growth Area

ACCESSIBILITY: Access is via Schaad Rd., a minor arterial street with a 19' pavement width within a 50' right-of-way.

UTILITIES: Water Source: Knoxville Utilities Board

Sewer Source: Knoxville Utilities Board

WATERSHED: Grassy Creek

ZONING: **A (Agricultural)**

EXISTING LAND USE: **Residence and vacant**

PROPOSED USE: **Telecommunication tower extension (150' to 195')**

HISTORY OF ZONING: In 2003, US Cellular was approved for a 150' telecommunications tower on this site (6-I-03-UR).

SURROUNDING LAND USE AND ZONING:

North: Low density residential, Schaad Rd. & vacant land / A (Agricultural), RA (Low Density Residential) & RB (General Residential)

South: Low density residential & vacant land / RA (Low Density Residential)

East: Low density residential & vacant land / A (Agricultural)

West: Low density residential & vacant land / A (Agricultural)

NEIGHBORHOOD CONTEXT: The site is located in an area with a mix of rural to medium density residential development.

STAFF RECOMMENDATION:

APPROVE the development plan for a 45' extension on an existing 150' foot monopole telecommunications tower at this location, subject to 7 conditions:

1. Maintaining the existing landscaping as shown on the previously approved landscape plan within six months of the tower becoming operational.
2. Since the FAA does not require any lighting for this facility, there shall be no lighting on the tower.
3. Installing a 6' high security fence around the tower and equipment area prior to the tower becoming operational.
4. At the time of the request for a building permit, posting a bond or other approved financial surety that would ensure the removal of the tower if it is abandoned.

CONFORMITY OF THE PROPOSAL TO ADOPTED PLANS

1. The Northwest City Sector Plan proposes low density residential uses and slope protection on this property. The proposed development is consistent with the Sector Plan.
2. The Wireless Communication Facilities Plan identifies the existing 150' and the proposed 195' monopole as "tall" monopoles. Under the guidelines for tower placement section of the Facility Plan, the proposed tower extension falls within the "Sensitive Area" category since it is proposed within 500' of a residence. However, the Plan takes a neutral position on tall monopoles located in rural/heavily wooded areas (see attached matrix). As previously stated, the tower will be setback approximately 207' from the nearest residential structure.

ESTIMATED TRAFFIC IMPACT: Not calculated.

ESTIMATED STUDENT YIELD: Not applicable.

MPC's approval or denial of this request is final, unless the action is appealed to the Knox County Board of Zoning Appeals. The date of the Knox County Board of Zoning Appeals hearing will depend on when the appeal application is filed. Appellants have 30 days to appeal an MPC decision in the County.

5. Meeting all applicable requirements of the Knox County Department of Engineering and Public Works.
6. Meeting all applicable requirements of the Knox County Zoning Ordinance.
7. Obtaining a setback variance from the Knox County Board of Zoning Appeals prior to development plan approval (215' to 207').

With the conditions noted above, this request meets all requirements for approval of a use on review.

COMMENTS:

This is a request for a 45' extension on an existing 50' monopole telecommunications tower to be located on a wooded, 15 acre tract located on the south side of Schaad Rd., approximately 0.5 miles northeast of Oak Ridge Highway. Access to the property is via Schaad Rd. The property is zoned A (Agricultural), and telecommunication towers are considered as a use on review in this district. According the Knox County Zoning Ordinance as it relates to the modification of existing towers, it states that a tower may be modified or rebuilt to a taller height and not require an additional use-on-review as long as it does not exceed 30' over the tower's existing height (Art. 4 Sec. 4.92, 3). Since the applicant's are proposing to extend the tower 45', they are required to obtain an additional use on review.

The current proposal provides for a 207' setback between the existing tower and the nearest residence, which is located on the 15 acre tract. According to the setback requirements of the Knox County Zoning Ordinance, the tower must be setback from the nearest residence by 110% of the height of the tower which is 165' for a 150' tower and 215' for the 195' tower. Since the tower encroaches into the required setback, the applicant will be required to obtain a variance from the Knox County Board of Zoning Appeals prior to development plan approval. It should be noted that the impact on this residence will be minimal since this is an existing tower and the owner of the residence leased this area to U.S. Cellular/T-Mobile.

The visual impact on nearby residences will be minimal due to the fact that the site is heavily wooded and it has been in operation since 2003. The existing vegetation will provide a natural buffer between the tower and adjacent residences. The applicant will be required to reinstall a 6' high security fence and any landscaping that may be compromised during reconstruction. FAA does not require any lighting for the tower. The tower will support four telecommunications carrier antenna arrays. T-Mobile and U.S. Cellular will be the principal clients for the tower.

According to a statement submitted by the applicant, there are no other existing or acceptable structures within this area and that the proposed extension will improve cellular service in the area for both T-Mobile and U.S. Cellular customers (see attached letter from Lannie Greene).

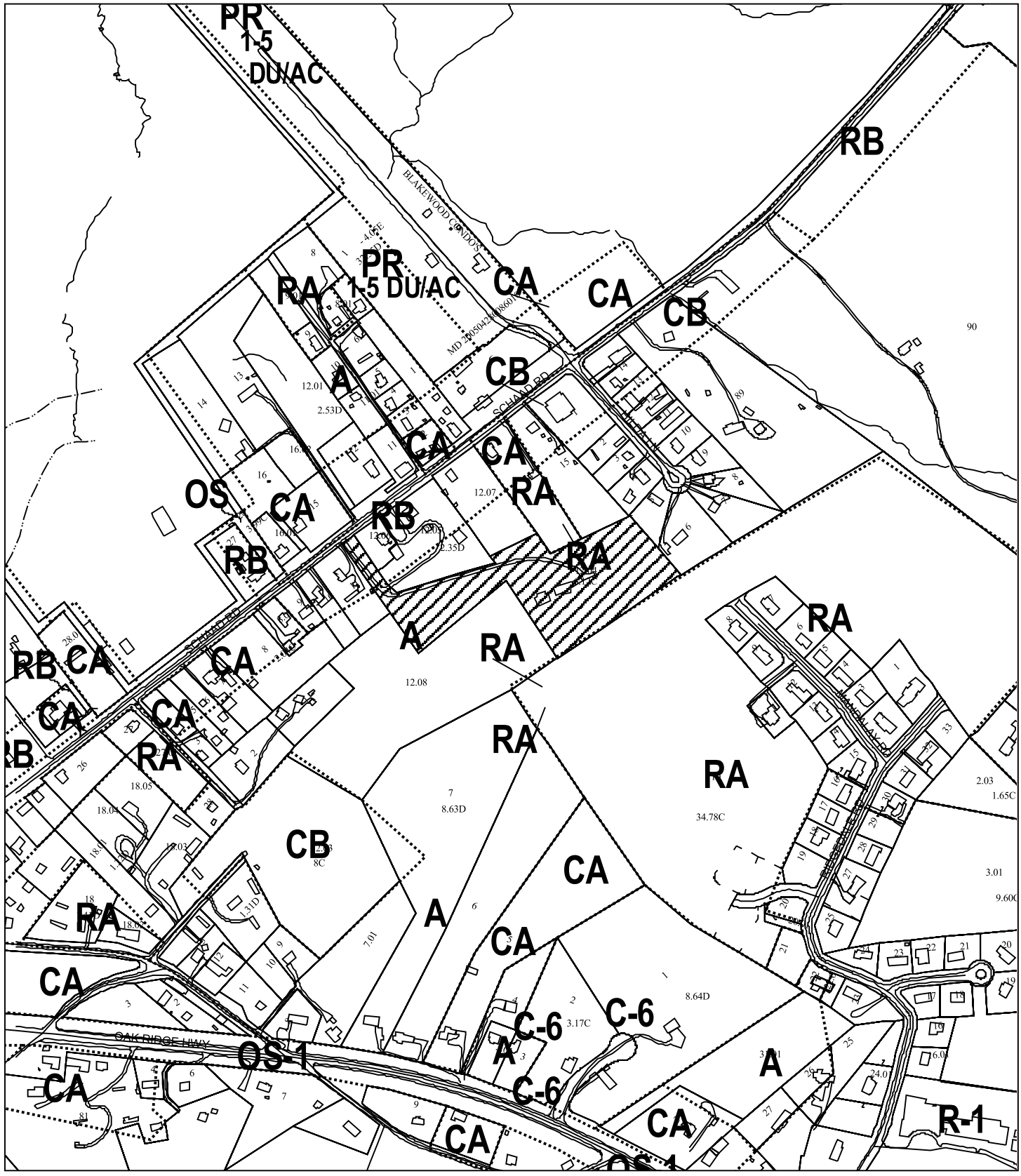
Attached to the staff report are several support documents, including a report from MPC's tower consultant, Mr. Larry E. Perry. Mr. Perry's report describes T-Mobile / U. S. Cellular Corporation's tower proposal and highlights his findings. Mr. Perry concludes that the 45' extension is technically justified by the materials submitted by the applicant (see attached report).

EFFECT OF THE PROPOSAL ON THE SUBJECT PROPERTY, SURROUNDING PROPERTY AND THE COMMUNITY AS A WHOLE

1. The proposed development will have minimal impact on local services since all utilities are in place to serve this development.
2. The tower, being located within a low density residential area, is required to be heavily screened. Since this 15 acre parcel is heavily wooded and provides a natural vegetative buffer between the existing lease area and nearby properties, the impact on nearby residences will be minimal. The impact on nearby properties will also be minimal since this is an existing telecommunication tower site and neighboring property owners are accustomed to a tower at this location.

CONFORMITY OF THE PROPOSAL TO CRITERIA ESTABLISHED BY THE KNOXVILLE ZONING ORDINANCE

1. With exception to the required setback variance, the proposed commercial telecommunications tower at this location meets the standards required in the A (Agricultural) zoning district.
2. The proposed commercial telecommunications tower is consistent with the general standards for uses permitted on review: The proposed development is consistent with the adopted plans and policies of the General Plan and Sector Plan. The use is in harmony with the general purpose and intent of the Zoning Ordinance. The use is compatible with the character of the neighborhood where it is proposed. Since this is a proposed extension on an existing tower, the use will not significantly injure the value of adjacent property. The use will not draw additional traffic through residential areas.



8-J-08-UR
USE ON REVIEW

Telecommunication tower extension (150' to 195') in A (Agricultural)

Original Print Date: 07/21/08 Revised:
Metropolitan Planning Commission * City / County Building * Knoxville, TN 37902

Petitioner: T-Mobile South / US Cellular

Map No: 79

Jurisdiction: County

0' 500'

N

MPC August 14, 2008 **Agenda Item # 81**

SITE DEVELOPMENT PLANS FOR T-MOBILE SOUTH, LLC

SITE #: 9KX0191A

SITE NAME: MANDALY

SITE ADDRESS: 13902 SCHADD RD

KNOXVILLE, TENNESSEE 37914

US CELLULAR SITE #: 223378

0796B012.04

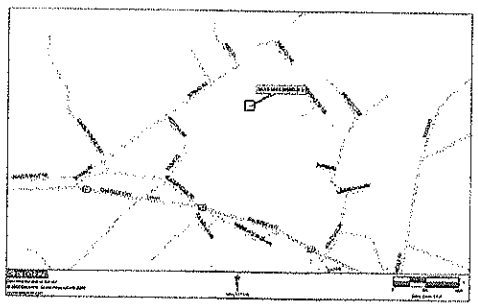
GENERAL NOTES:

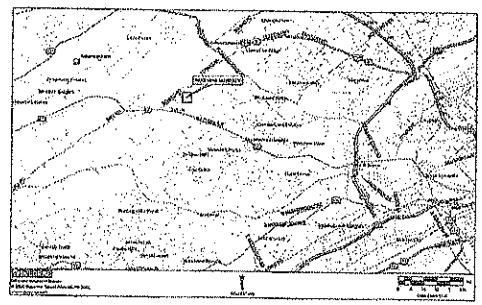
1. ALL CONSTRUCTION TO BE IN ACCORDANCE WITH THE KNOX COUNTY REGULATIONS.
2. CONTRACTOR SHALL NOTIFY TENNESSEE ONE CALL LEAST 3 BUSINESS DAYS PRIOR TO START OF CONSTRUCTION TO VERIFY LOCATION OF ALL UTILITIES SHOWN OR NOT SHOWN.
3. ALL UTILITIES WITHIN ROADWAY SHALL BE BACKFILLED WITH STONE.
4. CONTRACTOR SHALL REPAIR AT HIS EXPENSE DAMAGE TO ANY EXISTING IMPROVEMENTS DURING CONSTRUCTION, SUCH AS, BUT NOT LIMITED TO DRAINAGE, UTILITIES, PAVEMENT, STRIPPING, CURBS, ETC.. REPAIRS SHALL BE EQUAL TO OR BETTER THAN EXISTING CONDITIONS.
5. CONTRACTOR SHALL BE RESPONSIBLE FOR REMOVING ALL UNUSABLE MATERIALS FROM THE SITE.
6. CONTRACTOR SHALL COORDINATE WITH POWER COMPANY PROVIDING TEMPORARY SERVICE FOR CONSTRUCTION FACILITIES DURING CONSTRUCTION.
7. THE CONTRACTOR IS SPECIFICALLY CAUTIONED ABOUT THE LOCATION AND/OR ELEVATIONS OF EXISTING UTILITIES SHOWN ON THIS DRAWING. THEY ARE BASED UPON RECORDS FROM VARIOUS UTILITY COMPANIES, DEEDS, AND PLATS OF RECORD, AND WHERE POSSIBLE ACTUAL FIELD MEASUREMENTS. THIS INFORMATION IS NOT TO BE TAKEN EXACT OR COMPLETE.
8. IT SHALL BE THE CONTRACTOR'S RESPONSIBILITY TO FIELD VERIFY THE EXACT LOCATION OF EXISTING UTILITIES WHICH MAY CONFLICT WITH PROPOSED IMPROVEMENTS.
9. THIS PROJECT WILL NOT REQUIRE WATER OR SEWER SERVICE.
10. CONTRACTOR SHALL REMOVE ANY DIRT OR MUD FROM TIRES OF ANY CONSTRUCTION VEHICLES PRIOR TO LEAVING SITE.
11. REFER TO BUILDING/TOWER PLANS FOR PROPOSED DIMENSIONS AND OTHER SPECIFICS WHICH ARE NOT SHOWN.
12. CONTRACTOR IS RESPONSIBLE FOR MAINTAINING A PROPER TRAFFIC CONTROL PLAN FOR PUBLIC SAFETY ADJACENT TO CONSTRUCTION SITE. THE TRAFFIC CONTROL PLAN MUST BE IN ACCORDANCE WITH LATEST MUTCD EDITION.

Tennessee One Call System, Inc.
1-800-351-1111

NOTICE TO CONTRACTORS

SHOULD ARTIFACTS, ARCHAEOLOGICAL FEATURES OR HUMAN SKELETAL REMAINS BE ENCOUNTERED DURING PROJECT ACTIVITIES: STOP WORK IMMEDIATELY AND CONTACT THE T-MOBILE FIELD CONSTRUCTION MANAGER FOR INSTRUCTIONS.





VICINITY MAP
(NOT TO SCALE)

DIRECTIONS:
FROM KNOXVILLE, GO I-40 EAST TO I-640 NORTH THE EXIT 1. GO LEFT FROM THE OFF RAMP ONTO WESTERN AVE FOR 4 MILES TO SCHADD RD AND TURN RIGHT. GO 0.5 MILES TO THE SITE ON THE RIGHT.

SIGNATURE AUTHORIZATIONS:

RF ENGINEER APPROVAL:
SIGNATURE _____ DATE: _____

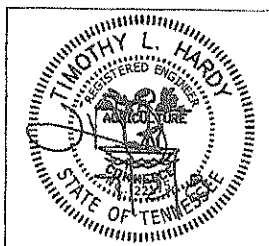
CONSTRUCTION MANAGER APPROVAL:
SIGNATURE _____ DATE: _____

SITE ACQUISITION AGENT APPROVAL:
SIGNATURE _____ DATE: _____

LAND OWNER APPROVAL:
SIGNATURE _____ DATE: _____

OPS APPROVAL:
SIGNATURE _____ DATE: _____

ZONING/PERMITTING APPROVAL:
SIGNATURE _____ DATE: _____



REGISTERED PROFESSIONAL ENGINEER SEAL

TELEPHONE CO.:
BELLSOUTH
PHONE: (800) 238-5501

ELECTRIC CO.:
KNOXVILLE UTILITIES
P.O. BOX 59017
KNOXVILLE, TN 37950-9017
CONTACT: CUSTOMER SERVICE
PHONE: (865) 524-2911

COORDINATES:
LATITUDE: 35° 59' 30.6" N
LONGITUDE: 84° 02' 12.0" W
GROUND ELEV: 1357 FT. AMSL

PROPERTY ZONING.:

BUILDING PERMIT:
KNOX COUNTY

LANDLORD INFO:
US CELLULAR
707 CONCORD RD
KNOXVILLE, TN 37922
CONTACT: GERRY O'BRIEN
PHONE: (773) 399-4283

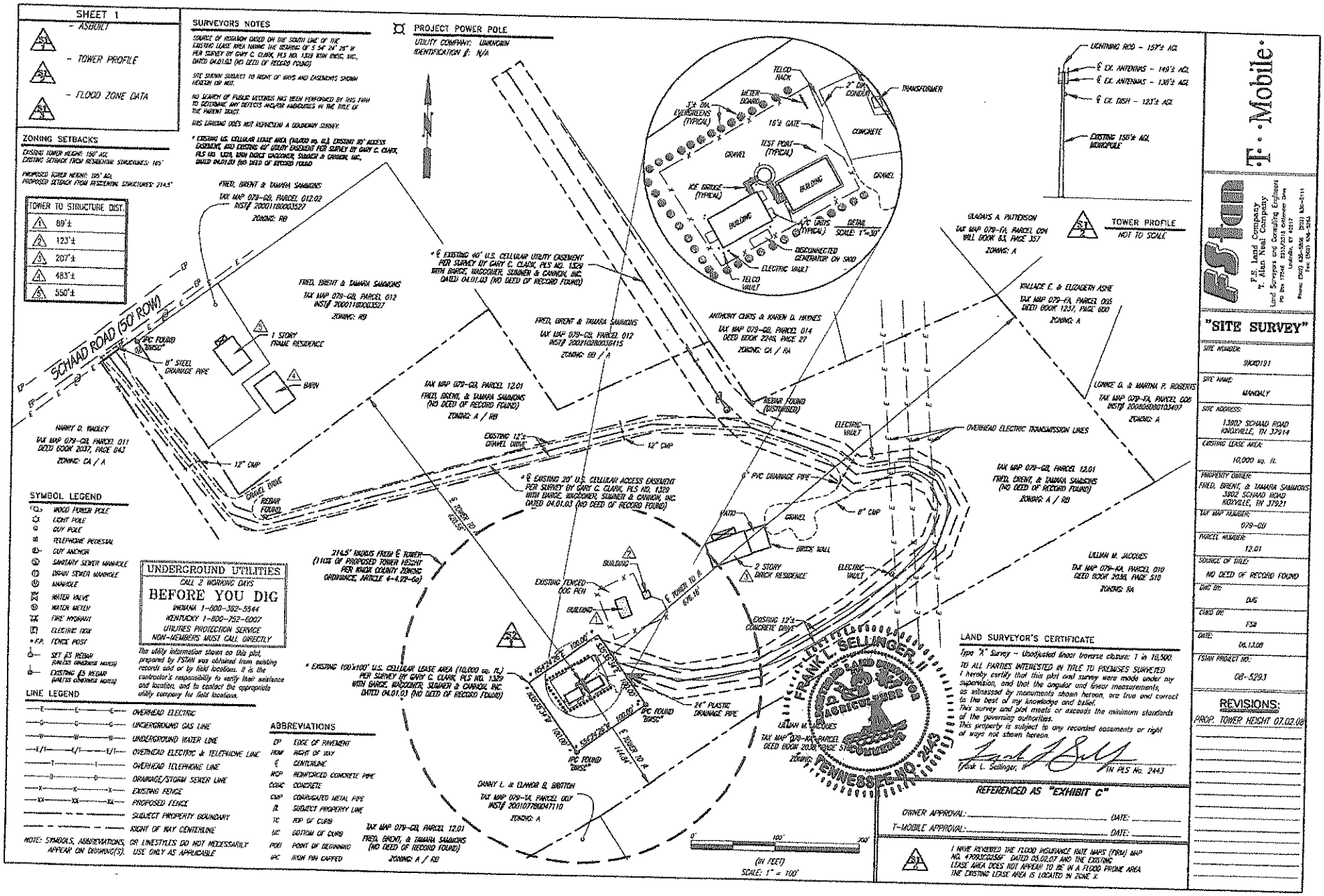
LESSEE:
T-Mobile
T-MOBILE - NASHVILLE MARKET
3800 EZELL ROAD, SUITE 815
NASHVILLE, TENNESSEE 37211
CONTACT: REAL ESTATE DEPARTMENT

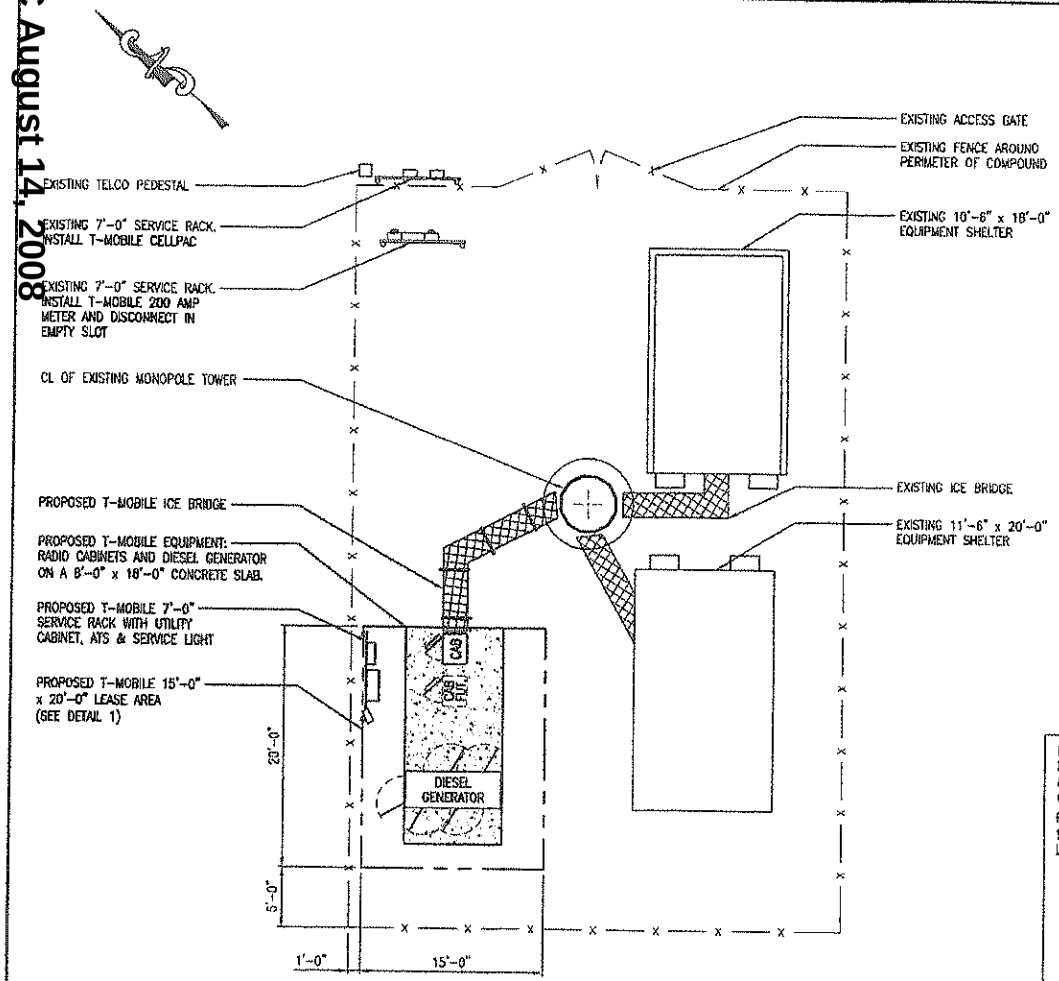
ENGINEER:
HARDY ENGINEERING, INC.
209 LINDEN STREET
TRUSSVILLE, ALABAMA 35173
CONTACT: TIM HARDY
PHONE: (205) 655-1427
MOBILE: (205) 222-7563

INDEX:

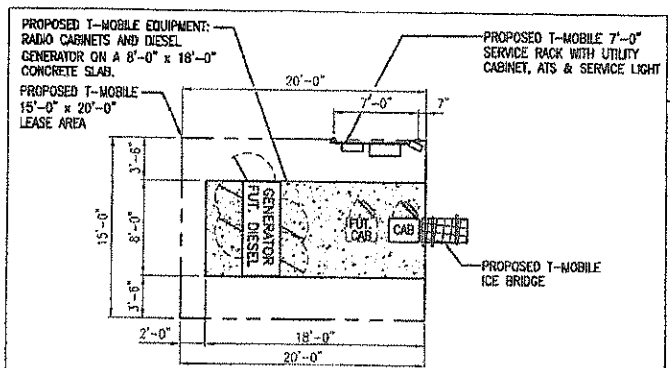
		REV.:	DATE:
T1	TITLE SHEET	1	7-02-08
	SURVEY	1	7-02-08
C1	COMPOUND LAYOUT		
C2	TOWER ELEVATION	1	7-02-08
C3	ANTENNA & COAX GROUNDING DETAILS		
C3.1	COAX GROUNDING DETAIL		
C3.2	GROUND RISER DIAGRAM		
C4	EQUIPMENT ELEVATION		
C5	ELECTRICAL DETAILS		
C6	GROUNDING LAYOUT		
C7	ELECTRICAL LAYOUT		
C7.1	PANEL BOARD CALCULATIONS		
C8	EQUIPMENT & GENERATOR PAD DETAILS		
C9	WIRING DIAGRAM		
C10	UTILITY TRENCH DETAILS		

8-J-08-UR


SHEET 1
- ASBUILT
- TOWER PROFILE
- FLOOD ZONE DATA
SURVEYORS NOTES
PROJECT POWER POLE
UTILITY COMPANY: UNKNOWN
IDENTIFICATION #: N/A
ZONING SETBACKS
TOWER TO STRUCTURE DIST.
1 89'±
2 123'±
3 207'±
4 483'±
5 550'±
SCHAAD ROAD (50' ROW)
FRED, BRENT & TAMARA SAMMONS
TAX MAP 079-GB, PARCEL 012.02
INST# 200011180003527
ZONING: RB
1 STORY FRAME RESIDENCE
BARN
HARRY D. WADLEY
TAX MAP 079-GB, PARCEL 011
DEED BOOK 2037, PAGE 643
ZONING: CA / A
FRED, BRENT & TAMARA SAMMONS
TAX MAP 079-GB, PARCEL 012
INST# 200011180003527
ZONING: RB
FRED, BRENT & TAMARA SAMMONS
TAX MAP 079-GB, PARCEL 012
INST# 200011280038415
ZONING: RB / A
TAX MAP 079-GB, PARCEL 12.01
FRED, BRENT, & TAMARA SAMMONS
(NO DEED OF RECORD FOUND)
ZONING: A / RB
EXISTING 12'± GRAVEL DRIVE
12" CMP
GRAVEL RIDGE
REBAR FOUND
SYMBOL LEGEND
WOOD POWER POLE
LIGHT POLE
GUY POLE
TELEPHONE PEDESTAL
GUY ANCHOR
SANITARY SEWER MANHOLE
STORM SEWER MANHOLE
MANHOLE
WATER VALVE
WATER METER
FIRE HYDRANT
ELECTRIC BOX
F.P. FENCE POST
SET #5 REBAR (UNLESS OTHERWISE NOTED)
EXISTING #5 REBAR (UNLESS OTHERWISE NOTED)
UNDERGROUND UTILITIES
CALL 2 WORKING DAYS
BEFORE YOU DIG
INDIANA 1-800-382-5544
KENTUCKY 1-800-752-6007
UTILITIES PROTECTION SERVICE
NON-MEMBERS MUST CALL DIRECTLY
The utility information shown on this plat prepared by FSTAN was obtained from existing records and or by field locations. It is the contractor's responsibility to verify their existence and location, and to contact the appropriate utility company for field locations.
LINE LEGEND
OVERHEAD ELECTRIC
UNDERGROUND GAS LINE
UNDERGROUND WATER LINE
OVERHEAD ELECTRIC & TELEPHONE LINE
OVERHEAD TELEPHONE LINE
DRAINAGE/STORM SEWER LINE
EXISTING FENCE
PROPOSED FENCE
SUBJECT PROPERTY BOUNDARY
RIGHT OF WAY CENTERLINE
NOTE: SYMBOLS, ABBREVIATIONS, OR LINESTYLES DO NOT NECESSARILY APPEAR ON DRAWING(S). USE ONLY AS APPLICABLE
ABBREVIATIONS
EP EDGE OF PAVEMENT
ROW RIGHT OF WAY
℄ CENTERLINE
RCP REINFORCED CONCRETE PIPE
CONC CONCRETE
CMP CORRUGATED METAL PIPE
PL SUBJECT PROPERTY LINE
TC TOP OF CURB
BC BOTTOM OF CURB
POB POINT OF BEGINNING
IPC IRON PIN CAPPED
* ℄ EXISTING 40' U.S. CELLULAR UTILITY EASEMENT PER SURVEY BY GARY C. CLARK, PLS NO. 1329 WITH BARGE, WAGGONER, SUMNER & CANNON, INC. DATED 04.01.03 (NO DEED OF RECORD FOUND)
* ℄ EXISTING 20' U.S. CELLULAR ACCESS EASEMENT PER SURVEY BY GARY C. CLARK, PLS NO. 1329 WITH BARGE, WAGGONER, SUMNER & CANNON, INC. DATED 04.01.03 (NO DEED OF RECORD FOUND)
214.5' RADIUS FROM ℄ TOWER (110% OF PROPOSED TOWER HEIGHT PER KNOX COUNTY ZONING ORDINANCE, ARTICLE 4-4.9B-4a)
* EXISTING 100'x100' U.S. CELLULAR LEASE AREA (10,000 sq. ft.) PER SURVEY BY GARY C. CLARK, PLS NO. 1329 WITH BARGE, WAGGONER, SUMNER & CANNON, INC. DATED 04.01.03 (NO DEED OF RECORD FOUND)
N54°42'26"E 100.00'
S35°29'26"E 100.00'
N54°42'26"E 100.00'
N35°29'26"W 100.00'
PROPOSED 12' ACCESS EASEMENT
PROPOSED 30' ACCESS EASEMENT
℄ TOWER TO E 676.16'
℄ TOWER TO A 100.00'
℄ TOWER TO A 141.42'
EXISTING TENCED DOG PEN
BUILDING
2 STORY BRICK RESIDENCE
EXISTING 13'± CONCRETE DRIVE
24" PLASTIC DRAINAGE PIPE
IPC FOUND "BROKE"
TAX MAP 079-GB, PARCEL 12.01
FRED, BRENT, & TAMARA SAMMONS
(NO DEED OF RECORD FOUND)
ZONING: A / RB
DANNY L. & ELANOR B. BRITTON
TAX MAP 079-1A, PARCEL 001
INST# 200107180047110
ZONING: A
TELCO RACK
METER BOARD
3'± DIA. EVERGREENS (TYPICAL)
16'± GATE
2" CPC CONDUIT
TRANSFORMER
CONCRETE
GRAVEL
TEST PORT (TYPICAL)
ICE BRIDGE (TYPICAL)
BUILDING
4'± GATES (TYPICAL)
DETAIL SCALE: 1"=30'
DISCONNECTED GENERATOR ON SKID
ELECTRIC VAULT
TELCO VAULT
LIGHTNING ROD - 157'± AGL
℄ EX. ANTENNAS - 149'± AGL
℄ EX. ANTENNAS - 130'± AGL
℄ EX. DISH - 123'± AGL
EXISTING 150'± AGL MONOPOLE
TOWER PROFILE
NOT TO SCALE
GLADYS A. PATTERSON
TAX MAP 079-FA, PARCEL 004
WILL BOOK 63, PAGE 357
ZONING: A
WALLACE E. & ELIZABETH ASHE
TAX MAP 079-FA, PARCEL 005
DEED BOOK 1237, PAGE 600
ZONING: A
ANTHONY CURTS & KAREN D. HAYNES
TAX MAP 079-GB, PARCEL 014
DEED BOOK 2141, PAGE 27
ZONING: CA / RA
REBAR FOUND (DISTURBED)
LONNIE O. & MARTHA P. ROBERTS
TAX MAP 079-FA, PARCEL 006
INST# 200605180103407
ZONING: A
OVERHEAD ELECTRIC TRANSMISSION LINES
ELECTRIC VAULT
6" PVC DRAINAGE PIPE
TAX MAP 079-GB, PARCEL 12.01
FRED, BRENT, & TAMARA SAMMONS
(NO DEED OF RECORD FOUND)
ZONING: A / RB
PATIO
GRAVEL
8" CMP
BRICK WALL
ELECTRIC VAULT
LILLIAN M. JACQUES
TAX MAP 079-KA, PARCEL 019
DEED BOOK 3038, PAGE 518
ZONING: RA
LILLIAN M. JACQUES
TAX MAP 079-KA, PARCEL 018
DEED BOOK 2038, PAGE 518
ZONING: RA
FRANK L. SELLINGER II
REGISTERED LAND SURVEYOR
AGRICULTURE
TENNESSEE NO. 2443
0' 100' 200'
(IN FEET)
SCALE: 1" = 100'
LAND SURVEYOR'S CERTIFICATE
Type "A" Survey - Unadjusted linear traverse closure: 1 in 10,500.
TO ALL PARTIES INTERESTED IN TITLE TO PREMISES SURVEYED
I hereby certify that this plat and survey were made under my supervision, and that the angular and linear measurements, as witnessed by monuments shown hereon, are true and correct to the best of my knowledge and belief. This survey and plat meets or exceeds the minimum standards of the governing authorities. This property is subject to any recorded easements or right of ways not shown hereon.
Frank L. Sellinger, II
TN PLS No. 2443
REFERENCED AS "EXHIBIT C"
OWNER APPROVAL: DATE:
T-MOBILE APPROVAL: DATE:
I HAVE REVIEWED THE FLOOD INSURANCE RATE MAPS (FIRM) MAP NO. 47093C0256F DATED 05.02.07 AND THE EXISTING LEASE AREA DOES NOT APPEAR TO BE IN A FLOOD PRONE AREA. THE EXISTING LEASE AREA IS LOCATED IN ZONE X.
T-Mobile
F.S. Land Company
T. Allen Real Company
Land Surveyors and Consulting Engineers
"SITE SURVEY"
SITE NUMBER: 91X0191
SITE NAME: MANDALY
SITE ADDRESS: 1.3802 SCHAAD ROAD KNOXVILLE, TN 37914
EXISTING LEASE AREA: 10,000 sq. ft.
PROPERTY OWNER: FRED, BRENT, & TAMARA SAMMONS 3802 SCHAAD ROAD KNOXVILLE, TN 37921
TAX MAP NUMBER: 079-GB
PARCEL NUMBER: 12.01
SOURCE OF TITLE: NO DEED OF RECORD FOUND
DRC BY: DVG
CHKD BY: FSII
DATE: 06.13.08
FSTAN PROJECT NO: 08-529.1
REVISIONS:
PROP. TOWER HEIGHT 07.02.08



SITE LAYOUT
(SCALE: 1" = 10'-0")



DETAIL 1

NOTES:

1. BOUNDARY AND EXISTING SITE FEATURES ARE BASED ON THE SURVEY. CONTRACTOR SHALL IMMEDIATELY NOTIFY THE ENGINEER OF ANY DISCREPANCIES BETWEEN ACTUAL FIELD CONDITIONS AND THIS DRAWING.
2. CONTRACTOR SHALL FURNISH ALL MATERIALS FOR 200 AMP SERVICE.
3. GROUNDING OF ANTENNAS MOUNTS, COAX, AND EQUIPMENT SHALL BE IN ACCORDANCE WITH T-MOBILE'S SPECIFICATIONS. COAX SHALL BE GROUNDED JUST BELOW ANTENNAS, AT MID-ELEVATION, AND AT BOTTOM OF TOWER.
4. SITE TO BE RESTORED BACK TO LESSOR'S ORIGINAL SPECS.
5. ANY MATERIALS STORED ON SITE SHALL BE STORED IN CLOSED OR COVERED CONTAINERS AND ALL EXCESS WASTE MATERIALS WILL BE PROPERLY DISPOSED OF DAILY AND ALL SOILS REMOVED FROM SITE.

TIMOTHY L. HARDY
REGISTERED ENGINEER
AGRICULTURE
STATE OF TENNESSEE

REGISTERED PROFESSIONAL ENGINEER SEAL

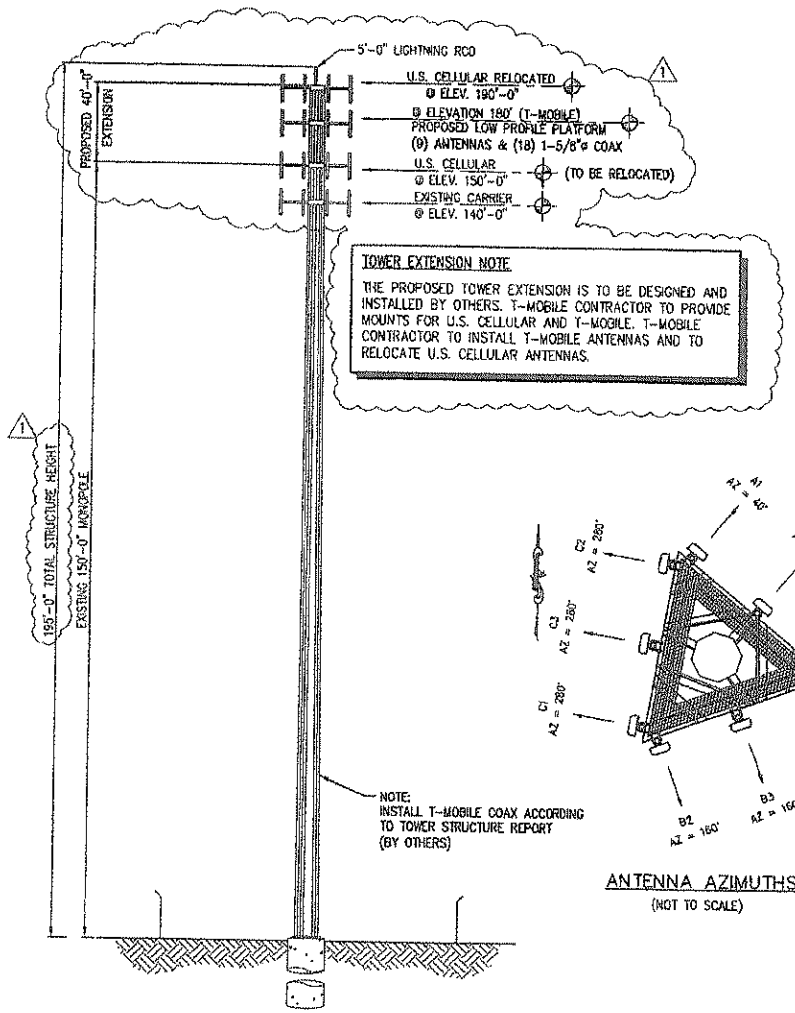
NO.	REVISIONS	BY	CHK. BY	DATE

DRAWN BY: S.E. WOMACK DATE: 4-16-08
CHECKED BY: T.L. HARDY DATE: 4-16-08
APPROVED BY: DATE:

HARDY ENGINEERING, INC.
ENGINEERING AND CONSULTING
209 LINDEN STREET, P.O. BOX 708
TRUSSVILLE, AL 35173
PHONE: (205) 655-1427 FAX: (205) 661-9027

DWG. NAME: SITE LAYOUT
9KX0191A SITE: MANDALY
KNOXVILLE, TENNESSEE
FOR
T-MOBILE SOUTH LLC
NASHVILLE, TENNESSEE

JOB NO: KX0191_C1 SCALE: AS SHOWN DWG. NO: C1



EXISTING STEEL MONOPOLE ELEVATION
W/ PROPOSED 40'-0" EXTENSION
(SCALE: N.T.S.)

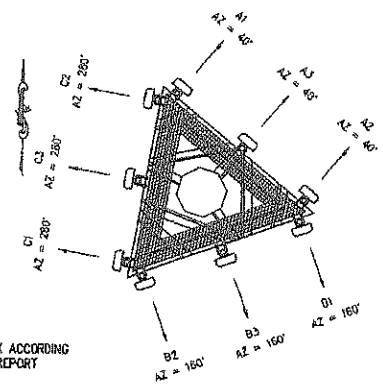
TOWER EXTENSION NOTE

THE PROPOSED TOWER EXTENSION IS TO BE DESIGNED AND INSTALLED BY OTHERS. T-MOBILE CONTRACTOR TO PROVIDE MOUNTS FOR U.S. CELLULAR AND T-MOBILE. T-MOBILE CONTRACTOR TO INSTALL T-MOBILE ANTENNAS AND TO RELOCATE U.S. CELLULAR ANTENNAS.

ANTENNA AND COAX SCHEDULE

ANTENNA MARK	SECTOR	ANTENNA (1)	COAX FEED LOCATION	AZIMUTH (0° = NORTH)	COAX COLOR CODE	COAX CABLE SIZE	MECHANICAL DOWN TILT (2)	ELECTRICAL DOWN TILT	RADIATION CENTER
A1	A	TMBX-6517-R2M	BOTTOM	40°	TX/RX - RED TX/RX - RED-GRAY	(6) 1 5/8"ø	0°	2°	180'
A2	A	TMBX-6517-R2M	BOTTOM	40°	TX/RX - RED-RED-GRAY TX/RX - RED-RED		0°	2°	180'
A3	A	TMBX-6517-R2M	BOTTOM	40°	TX/RX - RED-RED-RED TX/RX - RED-RED-RED-GRAY		0°	2°	180'
B1	B	TMBX-6517-R2M	BOTTOM	160°	TX/RX - BLUE TX/RX - BLUE-GRAY	(6) 1 5/8"ø	0°	2°	180'
B2	B	TMBX-6517-R2M	BOTTOM	160°	TX/RX - BLUE-BLUE-GRAY TX/RX - BLUE-BLUE		0°	2°	180'
B3	B	TMBX-6517-R2M	BOTTOM	160°	TX/RX - BLUE-BLUE-BLUE TX/RX - BLUE-BLUE-BLUE-GRAY		0°	2°	180'
C1	C	TMBX-6517-R2M	BOTTOM	280°	TX/RX - GREEN TX/RX - GREEN-GRAY	(6) 1 5/8"ø	0°	2°	180'
C2	C	TMBX-6517-R2M	BOTTOM	280°	TX/RX - GREEN-GREEN-GRAY TX/RX - GREEN-GREEN		0°	2°	180'
C3	C	TMBX-6517-R2M	BOTTOM	280°	TX/RX - GREEN-GREEN-GREEN TX/RX - GREEN-GREEN-GREEN-GRAY		0°	2°	180'

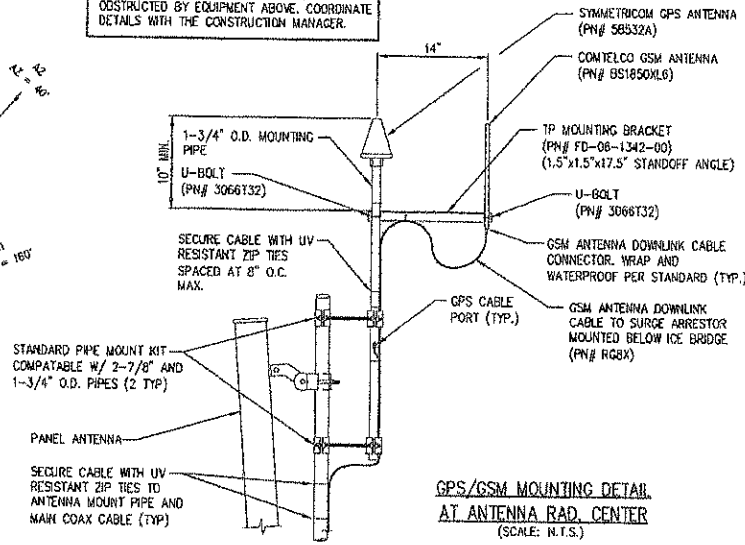
(1) FINAL ANTENNA TYPE TO BE DETERMINED BY T-MOBILE, ANTENNAS TO BE PROVIDED BY T-MOBILE AND INSTALLED BY CONTRACTOR.
(2) ALL ANTENNAS TO BE INSTALLED WITH DOWNTILT BRACKETS.



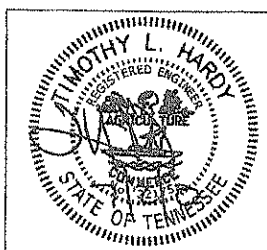
ANTENNA AZIMUTHS
(NOT TO SCALE)

GPS POSITIONING NOTE

THE CONTRACTOR SHALL FIELD VERIFY THE GPS LINE OF SIGHT TO THE SKY AND RELOCATE THE GPS ANTENNA ACCORDINGLY AS REQUIRED IF OBSTRUCTED BY EQUIPMENT ABOVE. COORDINATE DETAILS WITH THE CONSTRUCTION MANAGER.



GPS/GSM MOUNTING DETAIL
AT ANTENNA RAD. CENTER
(SCALE: N.T.S.)



REGISTERED PROFESSIONAL ENGINEER SEAL

ITEM	REVISIONS	BY	CHK. BY	DATE
1	REVISED TOWER ELEVATION, RAD CENTER AND TOWER EXTENSION NOTE	JS	TH	7-02-08

DRAWN BY: S.E. WOMACK	DATE: 4-16-08	HARDY ENGINEERING, INC.
CHECKED BY: T.L. HARDY	DATE: 4-16-08	ENGINEERING AND CONSULTING 209 LINDEN STREET, P.O. BOX 708 TRUSSVILLE, AL 35173 PHONE: (205) 655-1427 FAX: (205) 661-9027
APPROVED BY:	DATE:	

DWG NAME: MONOPOLE ELEVATION
9KX0191A SITE: MANDALY
KNOXVILLE, TENNESSEE
for
T-MOBILE SOUTH, LLC
NASHVILLE, TENNESSEE

JOB NO.: KX0191_C1 | SCALE: AS SHOWN | DWG NO.: C2

MITTRIX
REACH BEYOND

July 7, 2008

Knoxville-Knox County
Metropolitan Planning Commission
400 Main Street, Suite 403
City County Building
Knoxville, TN 37902

RE: Proposed 45' Monopole Tower Extension @ 3902 Schaad Road
(Tax Map 079 Parcel ~~12.01~~ 12.04 GB) 079GB-012.04

Dear Honorable Commission Members:

On behalf of T-Mobile and US Cellular, I respectfully submit this application for a Use on Review application to extend and existing 150 feet monopole tower to 195 feet. The structure will be extended forty feet and there will be a five foot lightening rod that will bring the overall height to 195 feet.

T-Mobile is a building a new wireless network for the metropolitan Knoxville area. This new network will provide a new choice for wireless users in the Knoxville area and in northeast Tennessee. T-Mobile has already co-located or in the process of co-locating on several sites in Knox County and the City of Knoxville. In some cases T-Mobile has gone through the added expense of making significant modifications to make existing structures work. By approving this application a new T-Mobile wireless facility will not be needed in this area of Knox County.

The proposed extension will allow T-Mobile to co-locate and US Cellular to improve its existing coverage. The Knox County Standards for Telecommunications Facilities allows an extension of thirty feet with only an administrative review, however, in order to meet the coverage requirements a total of forty five is needed. Currently the existing monopole has a rad center of a 130 feet available for T-Mobile.

One hundred and thirty feet will not provide the coverage needed by T-Mobile and its customers. T-Mobile requires a rad center of 180 feet. US Cellular will add antennas to the 190 foot rad center to improve its coverage in this area of Knox County. Included with this application are coverage maps which show T-Mobile's before and after coverage with a rad center of 130 feet and a rad center at 180 feet. Additionally I have included with this application, the design certified by a Professional Engineer for the extension. The extension will not require lighting since it is still below 200 feet.

With the extension the tower setback is required to be 209 feet from a dwelling unit. The tower currently is setback 207 feet from a dwelling unit located northeast of the existing facility. Therefore a setback reduction of two feet is required.

With the exception of being within 207 feet of a dwelling unit, the proposed site meets the intent of the Knox County Ordinance and will meet all local, state, and federal requirements in its design, construction, and operation.

1580 Boggs Rd, Suite 100
Duluth, GA 30096
770-717-9120 (Main)
770 -717-9123 (Fax)

I submit the following Pursuant to the Facilities Plan adopted by the Metropolitan Planning Commission in 2002:

(1) View Protection – The tower extension is proposed to be at a maximum height of 195' and will be a monopole design and will therefore have a minimal impact on surrounding properties. Due to the proposed height of 195' there will be no lighting on the structure.

(2) Land Use Compatibility - The subject property is zoned A, Agricultural Zone, which allows for more intense uses than this proposed facility. This facility will be unmanned and will have no substantial increase of noise, air pollution, or traffic. Furthermore the proposed facility will not burden any county services.

Adjacent and surrounding properties are zoned A Agricultural Zone, RA, Low Density Residential Zone and CB, Business and Manufacturing. The existing facility is within a Sensitive Area and is discouraged because it is within 500 feet of a residence, however, this is an existing facility and T-Mobile can co-locate with the approval of the extension which is encouraged.

(3) Design Compatibility –The facility design is a monopole tower and will not impact the existing uses of surrounding properties. These properties could be developed with more intense uses than this proposal. The existing structure is considered a Tall Monopole according to the Land Use/Wireless Facilities; the extension will not change this status. Monopoles are often considered the lease obtrusive type of structure.

Included with this application package are the following items:

10 sets of site plans
Coverage maps depicting before and after the proposed co-location

I appreciate your time in reviewing this application. If you require additional documentation or information please feel free to give me a call at (678) 920 – 1262.

Sincerely:

Lannie Greene
Mittrix, Inc. for T-Mobile South

1580 Boggs Rd, Suite 100
Duluth, GA 30096
770-717-9120 (Main)
770 -717-9123 (Fax)

WALKER ENGINEERING, INC.
8451 DUNWOODY PLACE
NORTHRIDGE 400, BLDG. 8
DUNWOODY, GA 30350
(770) 641-7306 FAX (770) 587-2196

CIVIL • STRUCTURAL
N 33° 59' 13.6" W 84° 20' 26.8"

Mr. Hamlet Hope
Mittrix, Inc.
3800 Ezell Rd., Suite 815
Nashville, TN 37211

07/03/08
Site ID: 9KX0191A
Site: Mandalay

Sub: Structural Analysis of 190[1]-ft Sabre Monopole
13902 Schadd Rd. Knoxville, TN 37914

Dear Mr. Hope:

Walker Engineering has performed a Level-Two finite element, P-Δ structural analysis of the above subject monopole in accordance with your Authorization for Services for the addition of the ***T-Mobile*** proposed antennas outlined below. This analysis consists of determining the forces on the monopole caused by the existing, proposed, and reserved loads. The existing, proposed, and reserved loads were provided by your office.

The subject monopole is a 150-foot, three-section, eighteen sided, tapered monopole, designed and manufactured by Sabre Communications, Inc. in 2003. The monopole manufacturer's drawing No.: 04-08200 Rev. A, dated 10/07/03, was provided by your office. The monopole geometry, section sizes, and foundation design loads were obtained from these data and are assumed to be accurate. The monopole has also been assumed to be in good condition and capable of supporting its full original design capacity.

This analysis is based on reinforcing and extending the existing monopole to an elevation of 190-ft AGL, per Walker Engineering Inc. Job No.: 0806-0327Ext, Drawing No's.: S1 to S5, dated 07/03/08. If the monopole extension and reinforcing is not installed as designed, then this analysis is void and Walker Engineering should be contacted for resolution of any issues.

Our analysis was performed in accordance with TIA/EIA-222-F for a 70 mph[2] base windload, and ASCE-7 windload with 3/4" radial ice, as specified by Mittrix, Inc.

[1] The original monopole design height is 150-ft. This structural analysis is based on an extension of the monopole to an elevation of 190-ft.

Scope of Work:

1 Reinforce the existing monopole base connection per Walker Engineering Job No.: 0806-0327Ext drawings S-1 to S-5 dated 07/03/08.

2 Extend the existing monopole per Walker Engineering Job No.: 0806-0327Ext drawings S-1 to S-5 dated 07/03/08.

3 Contractor shall verify overall condition and all dimensions of the monopole prior to fabrication.

4 Contractor to provide all labor and materials necessary to reinforce monopole.

5 All work shall be in accordance with federal, state and local requirements, including OSHA.

Existing, reserved, and proposed loads include the following:

at 190 ft — US Cellular: Three Panel Antennas on three T-Arm mounts, fed by three 1-5/8"∅ coax cables.

at 180 ft — ***T-Mobile (Proposed)***: Nine Andrew TMBX-6516-R2M panel antennas with six TMA's on three T-Arm mounts, fed by eighteen 1-5/8"∅ coax cables.

at 134 ft — Existing: Three Panel Antennas with six TMA's on three T-Arm mounts, fed by six 1-5/8"∅ coax cables.

at 124 ft — Existing: One 2-ft MW dish antenna on a dish mount, fed by one 1-5/8"∅ coax cable.

Note: This analysis ***is based on*** the existing, reserved, and proposed coax cables installed on the monopole per the *Cable Plan Drawing Sheet S-1, Walker Engineering analysis Job No. 0806-0327Ext, dated 07/03/08. Please notify the undersigned prior to altering the cable routing configuration or if the coax configuration is different than the above assumptions.* Placement of small cables for beacons, ground rods, etc. are not critical.

Monopole Summary:

This analysis shows that the stresses in the subject monopole are less than or equal to the allowable stresses with the existing, reserved, and proposed loads. Therefore; the analysis results show that the subject monopole ***is in***

[2] The minimum windspeed specified by EIA-222-F for Knox County, TN is 70 mph.

conformance with the requirements of the relevant standards for the existing, reserved, and proposed loading.
A copy of the analysis is enclosed. A summary of the controlling load cases is provided below:

Monopole Section	Elevation	CSI[3]
Section 4 (Extension)	149 ft to 190 ft	0.74
Section 3 (Top)	96 ft to 149 ft	0.49
Section 2	47 ft to 96 ft	0.51
Section 1 (Bottom)	0 ft to 47 ft	0.49

Monopole Base Connection Summary:

This analysis shows that the monopole base plate is overstressed under existing and proposed loads without modification. Walker Engineering, Inc. has performed a ***reinforcement design*** for the base plate and is attached as Walker Job No.: 0806-0327Ext, Dwg. No.: S-1 to S-5, dated 07/03/08. After the monopole has been reinforced, the subject monopole is capable of supporting the existing, reserved, and proposed loads.

Base Plate	Bending Stress	0.98 *Reinf*
Anchor Bolts	Tension	0.74

Foundation Summary:

The existing + proposed foundation reactions at the base of the monopole are greater than the original foundation design loads. Walker Engineering, Inc. has performed an existing foundation evaluation according to the original foundation design drawings by Sabre Drawing No.: 04-08200, dated 10/07/03 and the Geotechnical Site Soils report by Terracon project No.: 18037311, dated 08/14/03. The results indicated that the existing monopole foundation ***is considered adequate*** to support the existing, reserved, and proposed loads.

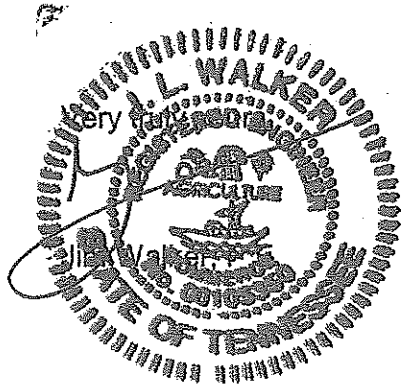
As future loads are installed, the monopole should be re-evaluated on a case-by-case basis.

The analysis is based, in part, on the information provided to this office by Mittrix, Inc. If the existing conditions are different than the information in this report, Walker Engineering Inc. should be contacted for resolution of any issues.

[3] **"Combined Stress Index"** Ratio of calculated loads verses total allowable loads; should be less than, or equal to, 1.05.

Walker Engineering Inc. appreciates the opportunity to be of service in this matter. Please do not hesitate to give me a call if you have any questions or comments.

Very truly yours,



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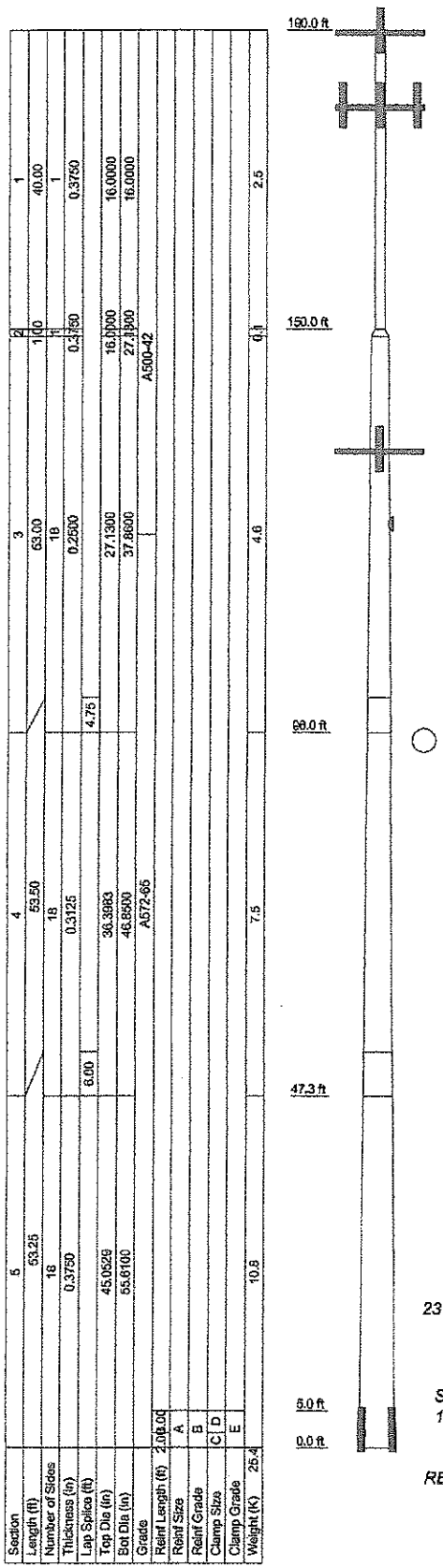
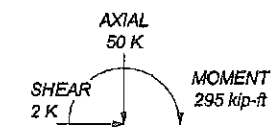
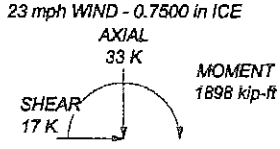




TORQUE 0 kip-ft
23 mph WIND - 0.7500 in ICE



TORQUE 0 kip-ft
REACTIONS - 70 mph WIND

DESIGNED APPURTENANCE LOADING

TYPE	ELEVATION	TYPE	ELEVATION
Panel Antenna (US Cellular)	190	(2) Proposed - TMA's (T-Mobile)	180
Panel Antenna (US Cellular)	190	(2) Proposed - TMA's (T-Mobile)	180
Panel Antenna (US Cellular)	190	Proposed - T-Arm (T-Mobile)	180
T-Arm (US Cellular)	190	Proposed - T-Arm (T-Mobile)	180
T-Arm (US Cellular)	190	Proposed - T-Arm (T-Mobile)	180
T-Arm (US Cellular)	190	Panel Antenna (Existing)	134
(3) Proposed - Andrew TMBX-6516-R2M panel antennas (T-Mobile)	180	Panel Antenna (Existing)	134
		Panel Antenna (Existing)	134
(3) Proposed - Andrew TMBX-6516-R2M panel antennas (T-Mobile)	180	(2) TMA's (Existing)	134
		(2) TMA's (Existing)	134
		(2) TMA's (Existing)	134
(3) Proposed - Andrew TMBX-6516-R2M panel antennas (T-Mobile)	180	T-Arm (Existing)	134
		T-Arm (Existing)	134
		T-Arm (Existing)	134
(2) Proposed - TMA's (T-Mobile)	180	2-ft MW Dish (Existing)	124

SYMBOL LIST

MARK	SIZE	MARK	SIZE
A	SR 1.75" Williams 6-Rod	D	12x1/2
B	A722-98 (Gr 150)	E	A572-50
C	6x1/2		

MATERIAL STRENGTH

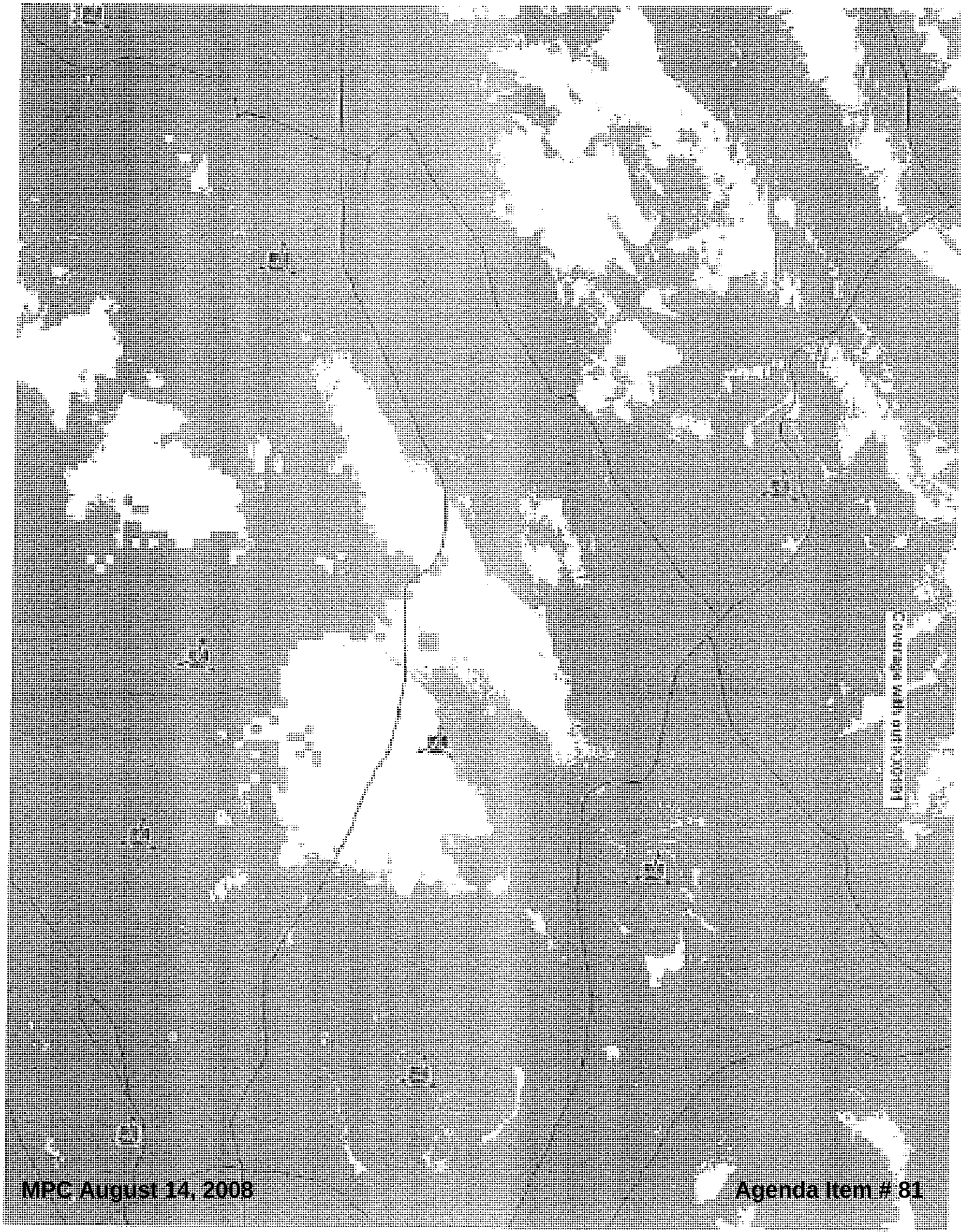
GRADE	Fy	Fu	GRADE	Fy	Fu
A500-42	42 ksi	58 ksi	A722-98 (Gr 150)	90 ksi	150 ksi
A572-65	65 ksi	80 ksi	A572-50	50 ksi	65 ksi

TOWER DESIGN NOTES

1. Tower is located in Knox County, Tennessee.
2. Tower designed for a 70 mph basic wind in accordance with the TIA/EIA-222-F Standard.
3. Tower is also designed for a 23 mph basic wind with 0.75 in ice.
4. Deflections are based upon a 50 mph wind.
5. Design of pole reinforcing is proprietary to Walker Engineering.

WE INC Tower Engineers
Walker Engineering
8451 Dunwoody Place, Bldg 8
Sandy Springs, Georgia
Phone: (770)-641-7306
FAX: (770)-587-2196

Job: *Mittrix279Ext 0806-327Ext*		
Project: *Mandalay; 9KX0191A*		
Client: Mittrix	Drawn by: cmm	App'd:
Code: TIA/EIA-222-F	Date: 07/03/08	Scale: NTS
Path: S:\Projects\Towers\Mittrix\Sites\Mittrix 279Ext 0806-327Ext Mandalay\MP.eri		Dwg No. E-1



MPC August 14, 2008 Agenda Item # 81

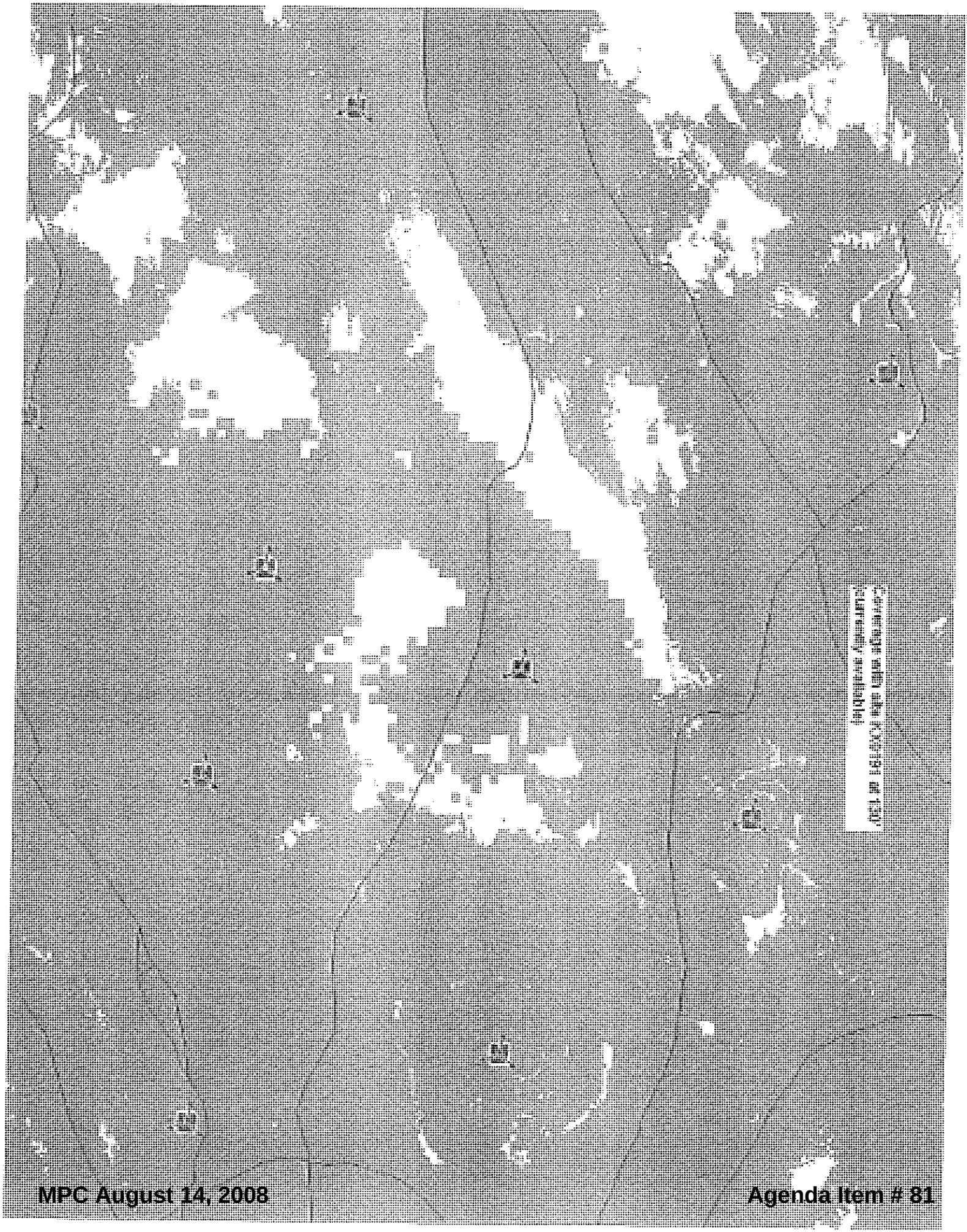


EXHIBIT 7.
LAND USE/WIRELESS FACILITIES MATRIX

		Co-Location	Stealth Structure	Low Monopole Below 90'	Moderate Monopole 90'-150'	Tall Monopole 150'-199'	Lattice Tower	Guyed Tower
Opportunity Areas	Industrial/Business Park							
	Industrial Use							
	Pre-approved Government-owned Property							
	Urban Expressway Corridor							
	Rural/Heavily Wooded							
	Pasture							
	Central Business District							
	Office/Commercial Corridor							
	Shopping Center							
Sensitive Areas	Within 500' of a residence							
	Rural Residential							
	Non-residential Properties in a Residential Area (church, cemetery, library, etc.)							
	Multi-family Residential							
	On Hill Below Ridgeline							
Avoidance Areas	Conservation Open Space							
	Scenic Highway							
	Public Park							
	Ridge Top/Ridge Line							
	Scenic Vista							
	Historic District/Site							
	Single-family Residential							
	Vacant Residential Lot							

Encouraged Neutral Discouraged

8-J-08-UR

7/29/08

T MOBILE

Telecommunications Tower Site Modification Review

USE ON REVIEW APPLICATION # 08-J-08-UR

CONSULTANT'S SUMMARY

Mandaly Site

Knox County

Location: 13902 Shaad Road (North West Knox County)

Proposed Tower Height: 195 foot Monopole overall after 45 foot modification requested herein

Address: 13902 Shaad Road
Knoxville, Tennessee

District: # 6th County **Tax ID: 079GB01204**

Use: Telecommunications antenna support structure

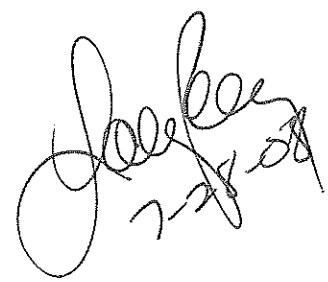
Zoning: A (Agricultural/Urban Growth)

Variances and waivers: A variance of 7 feet is required for this extension modification from the nearest residence.

Need: The applicant is T Mobile, a licensed PCS carrier by the Federal Communications Commission and possibly other users.

Instant Proposal: Construct a 45 foot extension to a preexisting monopole type support structure.

Consultant's Recommendation: The site and application meets the technical of the FCC, the requirements of the Ordinance and the spirit of the Facilities Plan. It is better to extend a preexisting structure than to add a new tower in the same vicinity.



REPORT TO

METROPOLITAN PLANNING COMMISSION

for

Proposed Telecommunications Tower Site Extension
Located at 13902 Shaad Road
Knoxville, TN known as

MANDALY SITE

T-MOBILE

UOR 8-J-08-UR

COMPLIANCE WITH

THE MPC TELECOMMUNICATIONS FACILITY ORDINANCE
07/29/2008

The proposed site for the applicant is an extension of an existing US Cellular monopole on Shaad Road. The supporting material from applicant has been reviewed for technical and Federal/State legal compliance As well as with the Knox County Wireless Communication Facilities Plan from 2002. This is an extension request of a previously approved tower site for the benefit of T Mobile in lieu of requesting a new tower.

REQUESTED

1. **Location.** The location is within the **County** of Knox limits in **District 6** and is located on **Tax Identification # 079GB01204.**

2. **Zoning.** A (Agricultural/Urban Growth)

3. **Tower height.** The requested height extension is 195 feet above ground level will support up to 2 additional telecommunications carrier antennas for a total of 4 users. Lighting will not be required on this structure.

4. **Variances.** The set back requirements in Article 4 of the Ordinance for Knox County for "A" sites are slightly short with the instant proposal. Section 4.92.02(2)(a) of the Knox County Zoning Ordinance requires a proposed tower to be more than 110% of the tower height (214 feet in this case) from a residential home. In the instant case the extension brings the tower site to within 207 feet of the nearest dwelling and thus a variance of 7 feet is required to meet the ordinance. The use of the land at this proposed site is permitted under section 5-5.22.03S.

5. **Site.** This application is for the construction of an extension of a preexisting 150 foot monopole type antenna support structure to located just off Shaad Road in Northwest Knox County.

6. **Use.** This antenna support structure will be used for telecommunications with the present state of the art communications technology using PCS and cellular communication sources. The applicant is T - Mobile Communications and there are 2 possible additional telecommunications users for the facility.

7. **Setbacks.** The setback requirements are that the facility must be 110% height of the tower from any dwelling unit or 214 feet in this case. *(Art. 4 Section 4.92.02(2)(a).* With the extension, the nearest residential house is 207 feet from the base of the structure and thus a variance is required for the additional 7 feet of setback.

8. **Height.** The proposed structure is for 195 feet.

EVALUATION

The following is a list of items reviewed:

Zoning Ordinance for Knoxville Tennessee by Metropolitan Planning Commission---Telecommunication Facilities Section (as amended thru October 1, 2004)

Knox County Wireless Communications Facilities Plan dated 2002.

Check for other existing towers capable of supporting the load and elevation clearance requested by the applicant herein and within 1 mile radius of site.

Check for Antenna Support Structure stress analysis for co-location users' equipment support

Review support structure drawings and specifications with applicant

Review FAA lighting and marking requirements and proposals

Review FCC requirements regarding signal coverage, towers and lighting

Review applicant's justification for site in compliance with the FCC's requirements for telecommunication company providers compliance with required coverage for the use of the general public.

Review Site plan by applicant

Check Zoning

Check setbacks for building and antenna support structure

Check for compliance with Wireless Communication Facility Plan

Check proximity to other structures and district boundaries

Check nature of surrounding land uses

Check surrounding foliage and tree coverage

Check design of tower for esthetic changes

Check height requirements necessary for coverage

Check separation from other towers

Check frequencies proposed for possible interference to TV and radio reception in the immediate vicinity of the structure.

Check engineering analysis of existing structure to check integrity of structure.

DISCUSSION

I visited the proposed tower site that is a part of this review and discussed the area with the applicant.

The request is for a 45 foot extension of a US Cellular tower for a total height above the ground of 195 feet of which US Celluar will use the top 25 feet and the additional usable lower 20 feet is for the use of T Mobile. US Cellular is relocating their antennas from 150 feet to 190 fet.

The proposed structure should not affect adjacent property as it is very wooded and does not constitute a safety hazard.

The proposed extensions a preferred way of allowing a new carrier, T Mobile, in to the area without the necessity of constructing a new tower in the same vicinity.

DISCUSSION RE FACILITIES PLAN

The Facilities plan is a guideline adopted by the MPC in 2002 for the placement and appearance of wireless communications facilities. The

following discussion is based on this application and how it relates to the Plan. The plan is an advisory plan and not a legal requirement.

(1) **View Protection**--The structure (195 feet) coupled with no lighting requirements and located in a fairly isolated wooded area should present no problems as to view.

(2) **Land Use Compatibility**---The site is on a slightly wooded parcel of land on a ridge in North West Knox county. The structure and associated building/facilities would be compatible with the local land use and the surrounding area is wooded. The site will be unmanned and will have no impact on noise, traffic or air pollution. Adjacent land zoning is RA (low Density Residential) and the site is in a Sensitive Area with the existing tower within 500 feet of a residence. However, this issue was addressed in the original application several years ago for US Cellular who built the tower.

(3) **Design Compatibility**---The proposed landscaping and facility design would blend in with surrounding agricultural land usage and design. The modified structure will be a monopole type structure which are the least obtrusive type antenna support structures.

(A) **Opportunity Areas**---This proposed site is in an area zoned Agricultural/Urban Growth and is wooded and meets the requirements of an opportunity area although in a sensitive area due to the location of a residence in the area. It is unlikely to become a blighting influence on the surrounding area.

(B) **Sensitive Areas**---This site is in a sensitive area as it is isolated and surrounded by woods but is within 500 feet of a residence. However, this is a preexisting facility and will have no additional impact.

(C) **Avoidance Areas**---This location is not in an avoidance area.

SUMMARY

(1) The proposed modified antenna support structure is a 195 foot monopole including antennas. There are no lighting requests for this structure nor are any required by the FAA.

(2) A review of the structure stress analysis on the proposed structure and specifications support the use of the monopole by two other potential users.

(3) The structure design meets or exceeds FCC and EIA requirements.

(4) The area surrounding the site is wooded and zoned Agricultural.

(5) There is no general use technology (such as satellite communications) that is available at the present time nor in the immediate future that would negate the need for the structure. However, should such a technology become available and the structure of no further use, the Ordinance at Article 4.92.03 requires it to be removed.

(6) The proposed equipment housing facility is an outdoor cabinet and will have no impact on the aesthetics of the adjacent land uses. The landscape plan indicates that the fenced area will be surrounded by wooded vegetation that is presently existing.

(7) The applicant has received authorization from the various governmental agencies, including the Federal Communications Commission, to provide communication service to the citizens of Knoxville, Tennessee.

(8) There are no other antenna support structures within 1 mile of the proposed site that are usable for the coverage required.

(9) The is an additional setback requirement for the modification site, but that is only 7 feet and should be granted as a variance waiver.

(10) The proposed site and structure will have no environmental impact within the federal guidelines.

(11) A variance to the Knox County Ordinance is required for this site for 7 feet from the distance to the nearest residential home.

(12) The nature of the development in the surrounding area is not such as to pose a potential hazard to the proposed tower or to create an undesirable environment for the proposed structure. However, the access road as proposed could pose possible safety issues for the construction of the site and possible access by emergency personnel should that be necessary.

(13) Assuming that there are 4 carriers operating cellular or PCS transmitters/receivers at this site and all are operating at the same time, the radiation produced by the combination of all the users at the same time using the standards and protocols proposed and used by the carriers today, will be considerably below that established by the Federal Communications Commission and the EPA as creating any danger to humans or animals.

(14) There is a need for the structure in this area to provide for the wide spectrum wireless internet service and for other wireless voice and data services to be provided under government regulation by the various proposed carriers who plan to use the site.

RECOMMENDATION

In light of the analysis and review of documents, it is my professional opinion that the applicant meets all the technical and federal requirements and the Ordinance and the spirit of the Facilities Plan as discussed above and is required for the applicant to meet their coverage requirements for the County of Knox.

Respectfully submitted,

Larry Perry
Consultant to MPC

WIRELESS COMMUNICATION FACILITIES PLAN

Adopted by:

Knoxville Knox County Metropolitan Planning Commission
on September 12, 2002

Knoxville City Council
on October 15, 2002

Knox County Commission
on November 18, 2002

Knoxville-Knox County Metropolitan Planning Commission
September 2002

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Acknowledgements

MPC would like to thank the interested citizens and business and industrial corporations who have contributed their time and provided vital input toward the development of this plan. Their contributions were most appreciated.

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- Rusty Baksa (MPC Commissioner)
- Trey Benefield (MPC Commissioner)
- Julie Bess (SunCom)
- Jim Bletner (Sequoyah Hills)
- Michael Brown (MPC Commissioner)
- John Bynon (West Hill)
- Ken Cookson (SunCom)
- Jeff Currey (Big Bend Towers)
- Melissa Hanson-Petrik (Town Hall East)
- Gene & Beverly Hoffman
- Joe Hultquist (City Councilman)
- Mark Jendrek
- Wayne Kline (Hodges Doughty & Carson)
- Jackson Kramer (Kramer Rayson)
- Linda Lichtenberger (Crown Castle)
- David Markey (SunCom)
- David Markum (Crown Castle)
- Diana Marsh (SunCom)
- Donna McWhirter (Nextel)
- Sue Mauer (Crestwood Hills)
- Mary Miller (Miller & Associates)
- Steve Nash (Town Hall East)
- Steve Robbins (US Cellular)
- Jim Robinson (Council of Involved Neighborhoods)
- Martin Seamon (Center for Neighborhood Development)
- Ron Siedentopf
- Jean Teague (MPC Commissioner)
- Carol & Sam Weaver
- David Webb (Cingular Wireless)

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- Jo Ella Washburn, Graphic Designer

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Introduction

At their December 13, 2001 public hearing, the Planning Commission directed MPC staff to develop a plan to be used as a guide in making decisions on applications for approval of new telecommunications towers. Commissioners noted a number of concerns arising out of a period of several months when disputes between neighborhood groups and tower applicants seemed to dominate the public hearing agenda. Some of the commissioners' concerns were:

- Lack of technical guidance in sorting out conflicting, complicated opinions on the necessity for tall towers near residences
- Lack of standards for making subjective, but necessary judgments concerning the impact of towers on the landscape and residential neighborhoods
- Absence of a plan for telecommunications towers; we have plans and policies for other types of development reviewed by the commission, but there is no plan for telecommunications towers
- A piecemeal approach to approving one tower at a time, without understanding how many more towers are "in the pipeline"
- A perception that the tower applicants could get by with lower towers than they are asking for
- A desire to know what alternatives are available
- Frustration at being presented with proposals for new towers without any explanation of how the towers relate to provider's long range plans for additional towers
- Frustration with the time involved in tower debates, which severely cut into the time available for discussion of other development issues

MPC staff presented a proposal for a plan and recommended that action on telecommunications towers be postponed until June 2002, with exceptions for towers that met the following criteria:

- Towers located in industrial or commercial zones
- Stealth towers (towers disguised as church steeples, trees, silos, etc.) less than 125 feet in height
- Towers less than 90 feet in height

During the postponement period, the commission approved four towers that met the above criteria.

The Planning Process

MPC staff publicized and conducted six public workshops, which were attended by members of the wireless telecommunications industry and neighborhood activists. Information used in developing the plan was also posted on MPC's website. The staff researched the wireless facility planning experiences of other communities and received advice from a radio frequency engineering consultant and an attorney specializing in wireless facility planning and regulation.

How the plan will be used

The plan has four purposes:

1. Provide a policy framework for the Planning Commission's decisions on telecommunications facilities under the use on review provisions of the Knoxville and Knox County Zoning Ordinances.
2. Provide standards and visual guidelines for construction and siting of telecommunications facilities, particularly towers or alternative tower structures.
3. Make recommendations for future improvements to the zoning regulations and review process for telecommunications facilities.
4. Provide a greater degree of predictability for the telecommunications industry and community residents and business owners who may be concerned about the placement of these structures.

The plan will be adopted as an element of the Knoxville-Knox County General Plan and will be the basis for other planning proposals included in the sector plans and the City of Knoxville Development Plan (the "One Year Plan"). When telecommunications towers are submitted to MPC as "uses on review", the Planning Commission is required to review the towers under specific standards for commercial telecommunications towers and general standards for all uses on review.

Among the requirements of the City and County Zoning Ordinances for approval of a use on review are findings by the Planning Commission that any proposed towers are "in harmony with" adopted comprehensive plans. The stated intent of the use on review process is "to integrate properly the uses permitted on review with other uses located in the district." To accomplish this, the Planning Commission routinely attaches design or appearance related conditions to approval of uses on review. Additionally, the section of the ordinances containing specific standards for approval of telecommunications towers state that the intent of the regulations is "to enable telecommunications providers to furnish comprehensive and efficient wireless communication services to the community, while minimizing the adverse impacts their facilities may have on neighboring properties." The ordinances also emphasize protection of the local landscape and avoiding unnecessary proliferation of towers. The policies and guidelines in this plan will provide the Planning Commission with a basis to make the findings necessary for approval of applications and will provide the designers of telecommunications installations with a tool kit of design principles to help ensure that approved towers comply with the intent of the zoning ordinances.

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Definitions

Alternative Tower Structure
A structure designed for another purpose (for example, buildings, water tanks, utility poles, light poles, billboards, signs and electric transmission towers) on which one or more antennas may be mounted.

Avoidance Areas
Areas where wireless communication towers should not be located

Co-location
The placement of antennas for two or more carriers on the same tower or structure

FAA
Federal Aviation Administration

FCC
Federal Communications Commission

Guyed Tower
A communication tower anchored with guy wires

Lattice Tower
A self-supporting communication tower with three or more sides of open-framed support

Low Profile Antennas
Antennas, such as the 'dual-polarized' design, or mounted in a 'cylindrical unicell' arrangement close to the tower shaft, that is less visible than the traditional 'top hat' design.


Dual-polarized Antenna


Cylindrical Unicell

Monopole
A cylindrical self-supporting communication tower constructed as a single spire

Opportunity Areas
Areas where placement of wireless communications facilities is encouraged

Sensitive Areas
Areas where placement of wireless communication facilities will most likely raise issues related

to safety, property values, visibility, or land use compatibility

Skylining
Locating a wireless communication facility in such a way that the backdrop of the facility is the sky

Stealth Structure
A self-supporting communication tower designed to closely resemble a commonplace object that blends with its surroundings. Some examples of stealth structures are tree poles in wooded areas, silos in agricultural areas, church steeples, a clock tower on a parking lot of the shopping center, and a flag pole in an office park.

Standing Wireless Communication Committee
A committee with representatives from the wireless communication industry and citizens appointed by the Planning Commission to review changes in technology that may lead to changes in governmental policies and regulations

Use On Review
Use On Review is a special procedure under zoning regulations that allows applicants to request specific uses of property as outlined within each zoning district. A use can only be established and maintained with the approval of the Metropolitan Planning Commission

Viewsheds
An area which may be viewed and mapped from one or more viewpoints that has inherent scenic qualities or aesthetic values as determined by those who view it.

Wireless Communication Facilities
Any combination of one or more antennas, towers and/or structures or equipment used for the transmission of wireless communication

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Inventory of Telecommunications Facilities

- Exhibit 1: Wireless Communication Facility Locations *(Map)*

MPC uses two telecommunications facilities databases for inventory purposes. According to the first, which originated from MPC's addressing department, there are 439 telecommunications facilities located in Knox County as of May 2002. This figure includes antennas that are individually mounted or co-located on existing structures, buildings and telecommunications towers. It also includes telecommunications facilities that are used for television broadcasting, radio broadcasting and wireless communication services. This database lacks information such as tower height, types or whether the identified record is an antenna mounted on a tower or a building. Map 1, shows the locations of all telecommunications facilities in Knox County. An assumption of a one-mile radius coverage area for each facility shows that about 52% of the county is covered under wireless communication services.

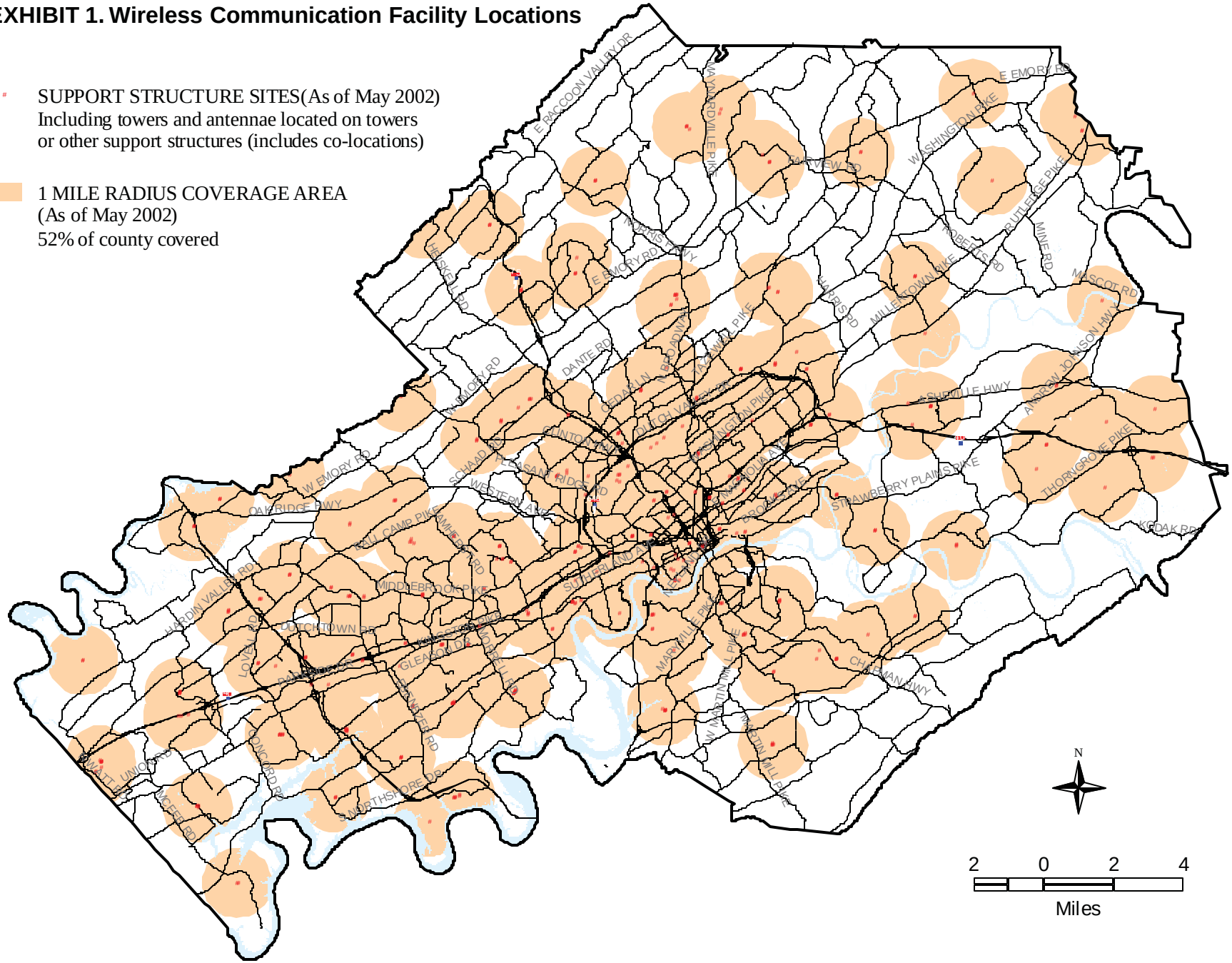
According to database from the FCC, Knox County has 163 telecommunications towers registered under FCC requirements. This includes towers for television broadcasting, radio broadcasting and wireless communication services. This database does not include antennas attached on buildings or other structures, nor does it include towers not requiring FCC registration (For example, towers less than 200 feet in height).

Neither database provides sufficient information for analyzing the current situation in Knox County. It is recommended that a more thorough database is needed for assessing existing facilities and reviewing proposed facilities. Information such as site location, tower type, tower height, co-location and its availability are essential data that can be provided by wireless service providers. Currently, there are eight carriers identified as active service providers to Knox County businesses and residents. They are US Cellular, Verizon, Sprint PCS, SunCom, Cricket, Cingular Wireless, Nextel, and VoiceStream/Powertel.

EXHIBIT 1. Wireless Communication Facility Locations

SUPPORT STRUCTURE SITES(As of May 2002)
Including towers and antennae located on towers
or other support structures (includes co-locations)

1 MILE RADIUS COVERAGE AREA
(As of May 2002)
52% of county covered



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Analysis of Future Needs

- Exhibit 2: Three Phases of Wireless Network Development *(Illustration)*

The wireless communication industry grew rapidly in the early 1990s when the Federal Communications Commission (FCC) conducted an auction of licenses for electromagnetic spectrum in the 1900 MHz band. The auction allowed numerous wireless service providers to enter the market, bringing a proliferation of cell sites as each carrier began construction of its own wireless network in subscriber communities.

Development of a wireless network typically occurs in three phases. The first stage is labeled the coverage phase, a period characterized by construction of antennas mounted on tall towers designed to achieve broad service coverage. When most areas are generally serviced and the number of subscribers continues to increase, the network moves into a second stage, the capacity phase, during which new shorter and lower-power cell towers are added to the system. Once the second-round development sites reach capacity, the system proceeds to a third stage, known as the residential phase. In this period of network development, short towers and very low power micro cells are installed in residential neighborhoods. (see Exhibit 2: Three Phases)

In Knox County, industry experts estimate that wireless network development is still in the coverage phase, with taller towers in greatest demand. This phase is expected to continue for three to five years before the network will reach the capacity phase, and another five to ten years are needed for residential phase development .

Third Generation Technology (3G), with its voice and image transmission capabilities, may be ready for local deployment by 2004, consistent with the anticipated arrival of the capacity phase of network development. As the number of local subscribers continues to grow, more cell sites will be needed in the coverage area. Co-location, the sharing of a single tower by multiple carriers, is expected to be the preferred structure choice. As tower construction continues, however, carriers will need to consider innovative design alternatives to provide service coverage without relying solely on taller towers. Antennas can also be co-located on existing tall structures, such as buildings, signs and water towers. Stealth towers are an option in residential areas and in other dense urban developments. Stealth structures are towers designed to look like flagpoles, silos, trees or other commonplace landscape features. Carriers, tower builders, neighborhoods, and local government officials must work together to resolve issues of network infrastructure development in or adjacent to residential communities.

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Goals, Objectives and Policies

GOAL: Enable telecommunications providers to furnish comprehensive and efficient wireless communication services to the community, while minimizing the adverse impacts their facilities may have on neighboring properties.

OBJECTIVE 1: Assure safety

POLICIES:

1. Require building plans to show that the proposed facility meets all local and federal safety and health requirements.
2. Require separation of towers and residences by a distance equal to at least 110 percent of the height of the tower.
3. Require removal of abandoned towers or other wireless communication facilities.
4. Support the use of wireless communications in the Emergency 911 Communication System.
5. Comply with any future Federal standards for use of wireless facilities in the Homeland Security effort.

OBJECTIVE 2: Promote comprehensive and efficient wireless communication services.

POLICIES:

1. Licensed wireless telecommunications shall be allowed to locate in all zoning districts, subject to complying with the policies of this plan and the requirements of the Zoning Ordinance.
2. Regulation and review of telecommunications facilities shall comply with the Telecommunications Act of 1996.
3. A standing wireless communications committee shall be formed and shall meet at least twice a year to review changes in technology that may require further review of policies and regulation.
4. The range of incentives for unobtrusive telecommunications installations shall be expanded. (See Objective 7).
5. A database of wireless communication facilities shall be established and maintained.

OBJECTIVE 3: Ensure compatibility with adjacent land uses

POLICIES:

1. Require use on review approval when the design or location of telecommunications facilities would cause an unreasonable intrusion on other properties by way of appearance, noise, lighting, removal of vegetation or where such facilities could have an adverse impact on the future development pattern proposed by the General Plan and sector plans.
2. In approving a telecommunications installation, MPC must make the following findings in accordance with the Zoning Ordinance.

   The proposed facility:

   - A. Is consistent with adopted plans and policies, including the General Plan and the sector plans.
   - B. Is in harmony with the general purpose and intent of these zoning regulations.
   - C. Is compatible with the character of the neighborhood where it is proposed, and with the size and locations of buildings in the vicinity.
   - D. Will not significantly injure the value of adjacent property by noise, lights, fumes, odors, vibration, traffic congestion or other impacts, which may detract from the immediate environment.
   - E. Is not of a nature or so located as to draw substantial additional traffic through residential streets.
   - F. Is reasonably necessary for the convenience and welfare of the community.
   - G. Will not have an adverse impact on the character of the neighborhood in which the site is located.

3. The nature of development in the surrounding area is not such as to pose a potential hazard to the proposed use or to create an undesirable environment for the proposed use.
4. Additionally, the Planning Commission must find that the facility complies with the specific requirements for commercial telecommunications facilities included in the Zoning Ordinance.
5. Section 6, Guidelines for Tower Placement and Appearance, provides a variety of suggested standards and techniques for avoiding adverse visual impacts and promoting compatibility with adjacent neighborhoods. Use on review applicants

should use these or similar techniques to the extent possible to reduce the impacts of telecommunications installations on neighboring properties and the landscape. The Planning Commission should accept compliance with the guidelines as compliance with the ordinance requirements regarding visual impacts.

6. Require photo-simulation of the appearance of the proposed facility as viewed from the street right-of-way in front of a sampling of affected dwellings.

OBJECTIVE 4: Protect revitalization and redevelopment areas, historic districts and other like areas of considerable public investment

POLICIES:

Require compliance with Section 106 of the National Environmental Policy Act, which requires review of licensed telecommunications facilities to prevent degradation of historic or architectural resources.

OBJECTIVE 5: Avoid adverse visual impacts to the city/county landscape

POLICIES:

1. Where new tower construction is found absolutely necessary, compatible design measures, such as monopole towers at reduced heights, camouflaging techniques, and screening should be instituted to minimize detrimental effects to the community.
2. The following order of preference will be used in regulating and approving sites for telecommunications facilities. (While these approaches to tower siting are listed from most to least preferable, all of the approaches are encouraged by this plan.)

    A. Co-location of facilities on existing towers, buildings, or other structures.

    B. Locations where natural topography, existing vegetation, building or other structures screen the facilities from public view

    C. Locations where stealth towers or alternative tower structures may be used to hide antennas and related equipment

    D. Locations in undeveloped areas or industrial or general commercial areas where the impacts on view sheds and residential areas are minimal.

    E. Within residential areas, non-residential sites such as churches, large parking areas,

golf courses and cemeteries where facilities can be installed with minimal impact on view sheds or residences.

F. Locations where low monopoles with low profile antenna arrays can blend in with comparably sized utility poles or similar structures.

3. Section 6, Guidelines for Tower Placement and Appearance, provides a variety of suggested standards and techniques for avoiding adverse visual impacts and promoting compatibility with adjacent neighborhoods.

OBJECTIVE 6: Discourage unnecessary proliferation of wireless facilities.

POLICIES:

1. Construction of new communication towers should be an option of last resort. To the extent feasible, antennas should be co-located on existing towers or located on building rooftops and other suitable structures.
2. Regulation of wireless communication facilities shall continue to encourage Co-location with expedited review procedures, "permitted use" status, and incentives.
3. Approval of new towers or structures, other than Co-location, shall require a demonstration of need and feasibility, including a demonstration that good faith efforts have been made by the permit applicant to comply with the Co-location policy.
4. The Planning Commission will need to consider revisions to the Co-location policy for lower towers that may be necessary to supplement capacity of the network or avoid neighborhood impacts.

OBJECTIVE 7: Provide incentives for antenna support structures that are visually unobtrusive and that are compatible with their surroundings.

POLICIES:

1. 1. The following telecommunications uses are administratively approvable by the chief building official when all applicable development standards are met:

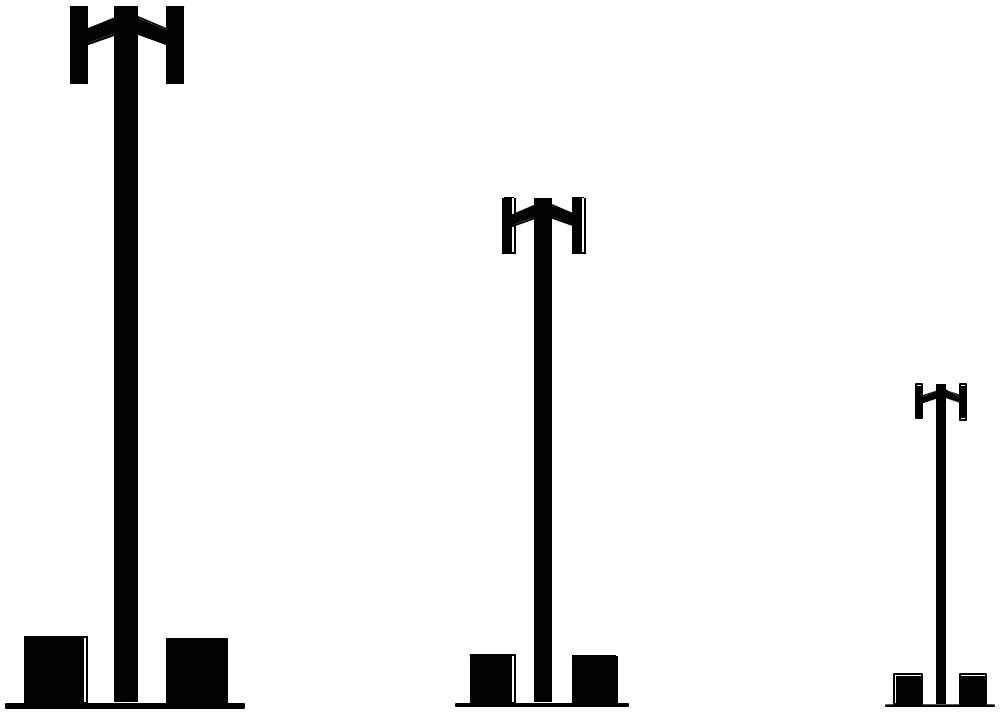
A. Antennas located on existing structures, including existing telecommunications towers, so long as the antenna:

- Complies with applicable FCC and FAA regulations and does not extend more than 30 feet above the highest point of

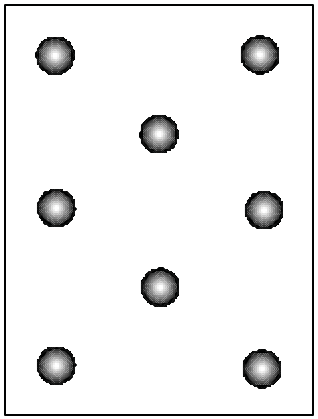
the structure.

- (In the county only) is placed on towers in commercial or industrial zones over 500 feet away from any residential zoning district or dwelling structure.
- Consideration should be given to extending this list to include the licensed wireless telecommunications facilities as suggested in Section 7, Recommendations for Incentives.

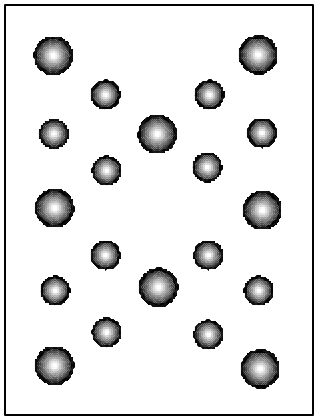
EXHIBIT 2: THREE PHASES OF WIRELESS NETWORK DEVELOPMENT



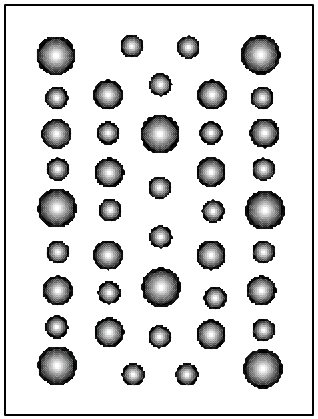
Tower heights will come down with each succeeding phase.



Coverage Phase



Capacity Phase



Residential Phase

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Guidelines for Tower Placement and Appearance

This chapter presents design guidelines for the placement and appearance of wireless communications facilities. The guidelines will be used by the MPC staff in evaluating use on review applications for telecommunications towers. They also provide the designers of telecommunications facility networks with suggested siting techniques.

The guidelines are advisory and adherence to them is not a legal requirement.

Knox County is an area with challenging topography and landscapes ranging from intensely urban to isolated and rural. Not all wireless facility siting issues can be anticipated, and network designers are encouraged to use creativity in proposing design solutions that are not included as illustrations in this document. Proposals that are in substantial compliance with the principles outlined below should be approved. Failure to comply with the design guidelines does not necessarily mean that the applicant has not met the legal requirements of the zoning ordinance regarding visual impacts. The Planning Commission reserves the right to approve proposals that differ from the guidelines but provide a superior design solution which meets the intent of this plan and the zoning ordinance. Furthermore, the Planning Commission may

approve proposals that represent the most practical design for the situation.

Principles:

VIEW PROTECTION
The proposed facility should not burden other properties with adverse visual impacts, nor should the facility detract from the character of the Knoxville-Knox County landscape.

LAND USE COMPATIBILITY
The proposed facility should not interfere with the use and enjoyment of other properties and should be consistent with the character of land use and development of the area around its location.

DESIGN COMPATIBILITY
The proposed facility design, including its form, height and color, should be compatible with the surrounding area.

OPPORTUNITY AREAS, SENSITIVE AREAS & AVOIDANCE AREAS
Three types of areas are described in the guidelines, based on their potential suitability for wireless facilities: opportunity areas, sensitive areas, and avoidance areas. (It should be noted that co-location of antennae on existing towers or alternate tower structures is encouraged in all areas, including avoidance areas.)

> **Opportunity areas** are the most likely to provide good sites for the widest range of telecommunications installations, including towers. Exhibit 3 shows examples of opportunity areas, including interstate highway corridors, industrial parks, shopping centers, large agricultural tracts, and other locations where properly designed facilities could fit into the landscape reasonably well and would be unlikely to become a blighting influence on the surrounding neighborhood.
>
> **Sensitive Areas**, such as high density housing districts, sites within 500 feet of low density residential areas, and community facilities such as churches, cemeteries, playing fields and recreation centers, require more care in site selection, facility design and screening. Issues such as safety, visibility, property values or land use compatibility are more likely to arise in these areas than in opportunity areas. Exhibits 4 and 5 show examples.
>
> **Avoidance Areas** are the least preferred locations for wireless telecommunications towers. Low-density residential districts, ridge tops, historic sites, scenic highways, and most public parks are included in this category. Exhibit 6 shows examples.

LAND USE/WIRELESS FACILITIES MATRIX

The Land Use/Wireless Facilities Matrix (Exhibit 7) uses a three-tiered classification system, based on site characteristics and the type of telecommunications facility being considered. The three classifications are "encouraged", "neutral" and "discouraged". Site/facility combinations classified as ***encouraged*** will have the least impact on existing or future development patterns and landscapes. Installations that fall into the ***neutral*** category may be very acceptable, or may raise issues related to safety, property values, visibility, or land use compatibility, depending on the development pattern, topography, and the specific plans for the wireless facilities. Care in site selection, facility design, and screening are needed to ensure compliance with the zoning ordinance. Installations classified as ***discouraged*** are the least likely to comply with the intent of the zoning ordinance and this plan, unless the facilities are disguised or effectively screened.

As shown by the matrix, some type of wireless communications facility may be approved in all three site classifications. Though the matrix is designed as a general guide to siting decisions, there will be instances where new towers will be acceptable in a sensitive area or avoidance area with proper siting,

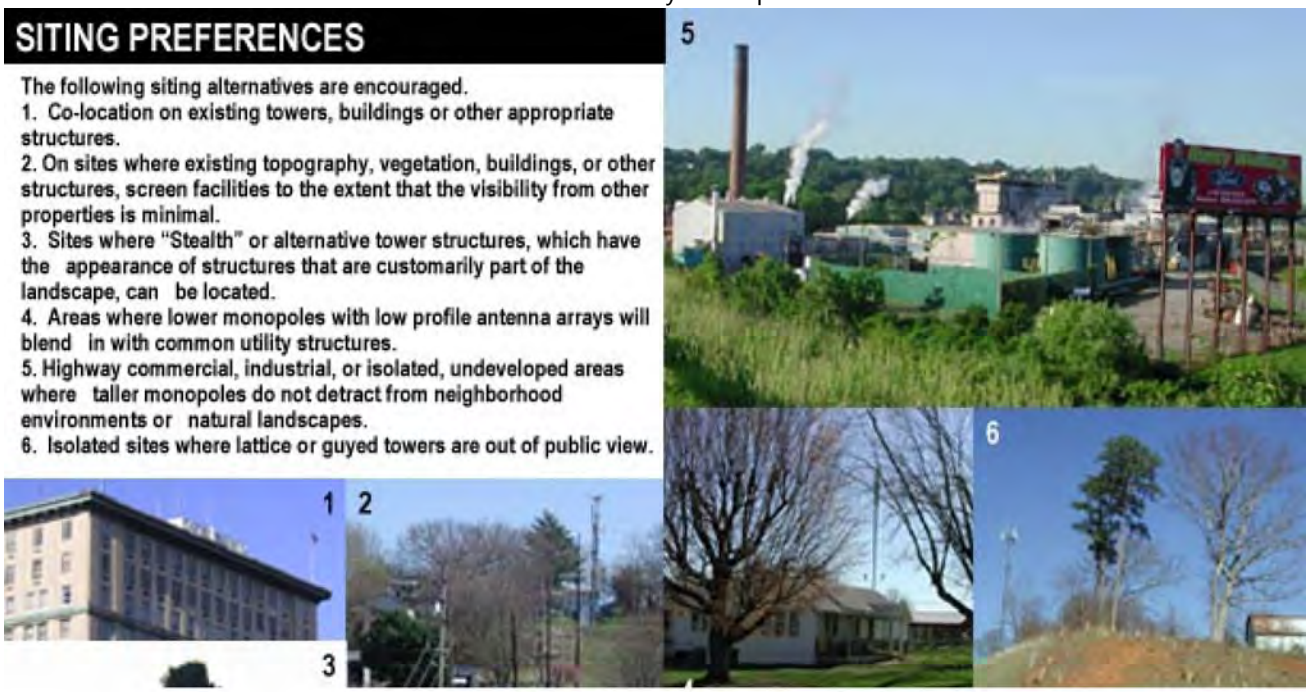
appropriate design or effective screening.

The matrix is advisory. The Planning Commission may approve installations that are inconsistent with the matrix; however, the Commission should be satisfied that the intent of the ordinance is met and that the applicant is in substantial compliance with the spirit of the guidelines.

SITING PREFERENCES

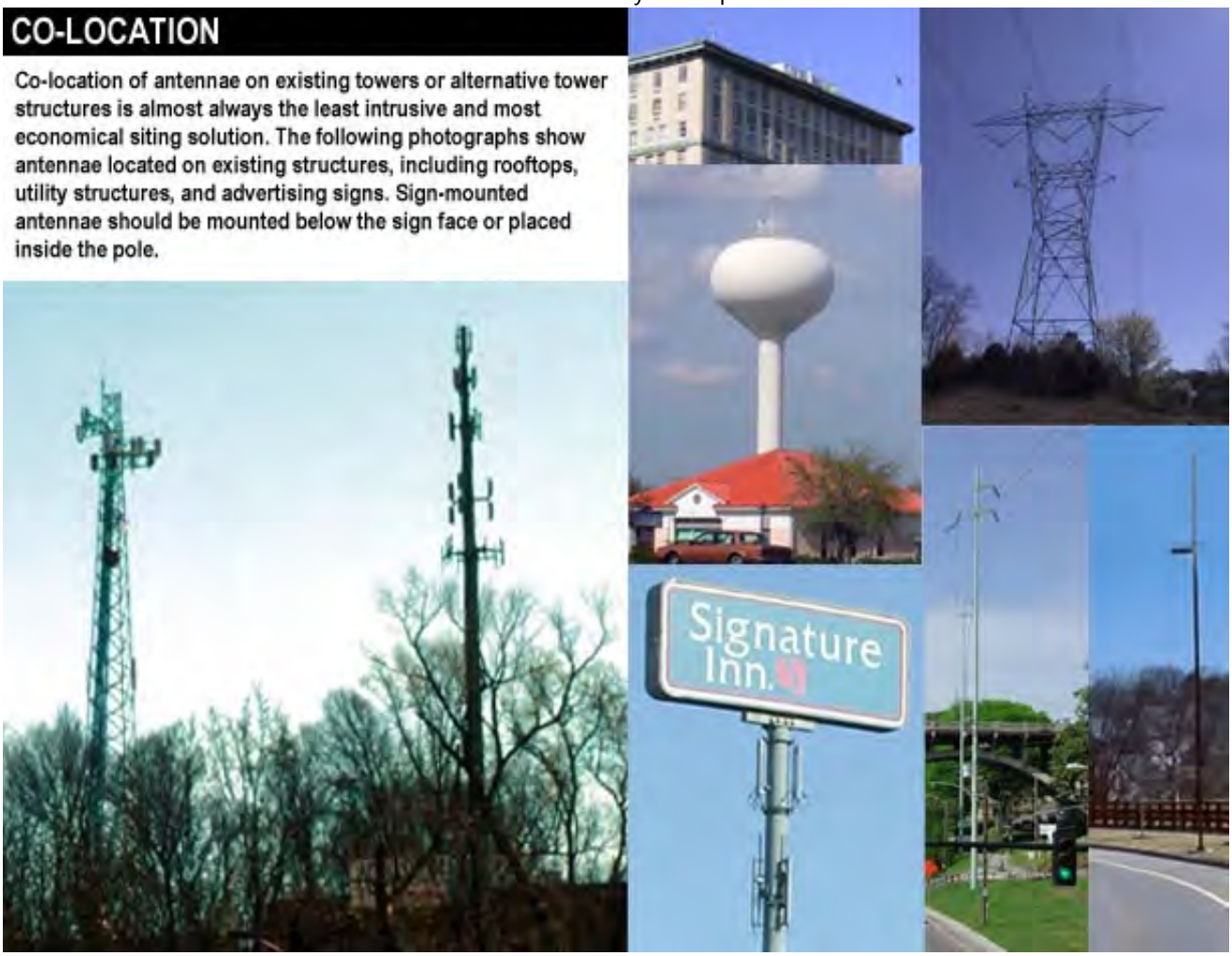
The following siting alternatives are encouraged.

1. CO-location on existing towers, buildings or other appropriate structures.
2. On sites where existing topography, vegetation, buildings, or other structures, screen facilities to the extent that the visibility from other properties is minimal.
3. Sites where "Stealth" or alternative tower structures, which have the appearance of structures that are customarily part of the landscape, can be located.
4. Areas where lower monopoles with low profile antenna arrays will blend in with common utility structures.
5. Highway commercial, industrial, or isolated, undeveloped areas where taller monopoles do not detract from neighborhood environments or natural landscapes.
6. Isolated sites where lattice or guyed towers are out of public view.



CO-LOCATION

CO-location of antennae on existing towers or alternative tower structures is almost always the least intrusive and most economical siting solution. The following photographs show antennae located on existing structures, including rooftops, utility structures, and advertising signs. Sign-mounted antennae should be mounted below the sign face or placed inside the pole.



SCREENING

One of the most effective screening techniques involves locating towers among stands of mature trees so that the base and a large part of the tower will be hidden from view. Careful analysis of wooded sites is needed to determine the best screening strategy. Distance, perspective, topography and the height and extent of tree cover between the tower and sensitive views or land uses determine the effectiveness of screening. Planting new trees to screen anything but the equipment cabinet and perimeter fencing has very limited effectiveness. In some cases, however, planting Leland Cypress or other fast growing, tall trees at the edge of a larger property hosting a tower will create some screening. Buildings or topographic features can also provide screening.

SITING ON A RIDGE

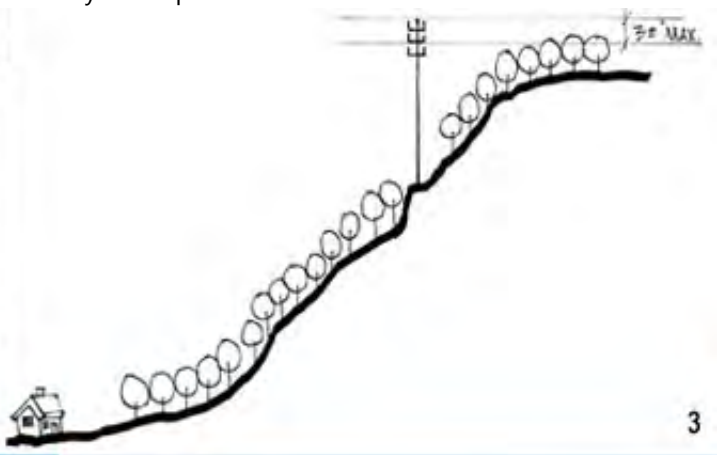
This principle applies to sites on ridges and mountains identified on the United States Geological Survey (USGS) quadrangle maps.

1. Avoid skylining towers
2. Use a backdrop to reduce visibility
3. Locate towers below the ridgeline, not exceeding 30 feet above the ridge top tree line. Ridge top tree line is defined as the height of the tallest tree within 100 feet either side of the place where the tower exceeds the height of the ridgeline.

SITING ON A RIDGE

This principle applies to sites on ridges and mountains identified on the United States Geological Survey (USGS) quadrangle maps.

1. Avoid skylining towers
2. Use a backdrop to reduce visibility
3. Locate towers below the ridgeline, not exceeding 30 feet above the ridge top tree line. Ridge top tree line is defined as the height of the tallest tree within 100 feet either side of the place where the tower exceeds the height of the ridgeline.



SEPARATION

Locating multiple towers on the same site may create an unattractive "tower farm" appearance. This may be less of a concern in areas that are out of the public view or are already impacted by other forms of visual clutter, and it may be necessary to locate towers in multiples if no acceptable alternative exists. Spacing towers far enough apart to help achieve more complete coverage is preferable. However, towers may need to be located or clustered together to allow carriers to provide coverage.

COLOR

Use galvanized coating, gray, light blue or similar colors for towers with a sky backdrop, and brown or forest green if they are in a wooded area.

COLOR

Use galvanized coating, gray, light blue or similar colors for towers with a sky backdrop, and brown or forest green if they are in a wooded area.

EQUIPMENT HOUSING

Screen the equipment housing with fences, vegetation or other techniques.

SITING STEALTH STRUCTURES

The proposed stealth structure should be appropriate for the context of its surroundings. For example, a silo structure appropriate in a farming area would be inappropriate in a more urban setting. The equipment housing should be integrated into the structure, or buried underground.

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The proposed stealth structure should be appropriate for the context of its surroundings. For example, a silo structure appropriate in a farming area would be inappropriate in a more urban setting. The equipment housing should be integrated into the structure, or buried underground.

EXHIBIT 7.
LAND USE/WIRELESS FACILITIES MATRIX

		Co-Location	Stealth Structure	Low Monopole Below 90'	Moderate Monopole 90'-150'	Tall Monopole 150'-199'	Lattice Tower	Guyed Tower
Opportunity Areas	Industrial/Business Park							
	Industrial Use							
	Pre-approved Government-owned Property							
	Urban Expressway Corridor							
	Rural/Heavily Wooded							
	Pasture							
	Central Business District							
	Office/Commercial Corridor							
	Shopping Center							
Sensitive Areas	Within 500' of a residence							
	Rural Residential							
	Non-residential Properties in a Residential Area (church, cemetery, library, etc.)							
	Multi-family Residential							
	On Hill Below Ridgeline							
Avoidance Areas	Conservation Open Space							
	Scenic Highway							
	Public Park							
	Ridge Top/Ridge Line							
	Scenic Vista							
	Historic District/Site							
	Single-family Residential							
	Vacant Residential Lot							

Encouraged Neutral Discouraged

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Recommendations for Incentives

The current City and County zoning regulations include limited incentives for preferred siting techniques. Both ordinances require use on review approval for commercial telecommunications towers in all zoning districts. As an incentive to co-location, however, locating a wireless antenna on an existing tower, utility pole, tall building, or other structure is a "permitted use by right", requiring no use on review. In the County, as an incentive to locate long distances from residences, no use on review is required for a commercial telecommunications tower in an industrial or commercial zone if the tower will be 500 feet from a residential zone or a residence.

MPC staff recommends consideration of "permitted use by right" status for the following additional tower design and siting practices:

A. Antennas or antenna support structures approved as part of a use on review development plan for another development

Examples:

- A low monopole on a site reserved in an approved shopping center development plan;
- A stealth tower approved in a recreation area of a multi-family residential development;
- A system of low monopoles, similar in appearance to street light poles, located in street rights-of-way and approved as a feature of a single family residential development.

B. Antenna or antenna support structures on pre-approved sites owned by city, county,

state or federal governments and utility districts

C. Monopoles less than 100 feet in height with low profile antennas that are no closer than 250 % of the tower height to any residence

D. "Stealth" towers or alternative tower structures less than 125 feet high and no closer than 250 % of the tower height to any residence

E. Monopoles less than 150 feet high and no closer than 500% of the tower height to any residence or residential zoning district

F. Towers and sites already specifically approved by the Planning Commission as part of a network plan submitted by a provider

Wireless Communication Facilities Plan

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Recommendations for Improving the Review Process

The use on review hearings for wireless communication facilities at the MPC public meetings often resulted in lengthy discussions that led to delays of other hearings on the agenda. The following recommendations are designed to expedite or improve the review process for wireless communication facilities applications.

A. Reduce the potential public hearing "case load" by utilizing the recommended incentives discussed in the previous chapter.

B. Prior to submitting an application for use on review approval, applicants for new towers should hold a "pre-application meeting" with neighborhood groups, interested individuals and property owners within one-quarter mile of the proposed site to explain the proposed project. The purpose of the meeting is to inform the public and to solicit any suggestion for impact mitigation, which will then be described in the application. At these meetings, applicant should discuss safety, technical necessity, visual impacts, and alternative sites and designs. Whether or not a consensus between the applicants and the attendants can be reached, the applicants should submit a report detailing the result of these meeting along with the submission of applications for use on review approval. This could be an optional requirement, or could be required for all use on review towers.

C. Create a Standing Wireless Communication Committee, with an equal number of representatives from the wireless communication industry and citizens, to review changes in technology that may lead to changes in policies and regulations.

D. Expand the information to be provided to the Planning Commission by the third-party engineering review procedure. The engineer's analysis should include an explanation of other feasible alternative designs and locations. The analysis should also address the implications of approval of a tower with regards to other towers that will be needed to complete the network.

Wireless Communication Facilities Plan

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A Proposed Requirement for Network Planning

As mentioned in the introductory chapter, Planning Commission members have expressed frustration at being presented with proposals for new towers without any explanation of how the towers relate to the provider's long-range plans for additional towers. Some industry representatives have stated that their planning is driven more by the need to respond to service commitments than by any system of network planning principles, and that it is not possible for them to produce a schematic plan of their proposed network because of

1) uncertainty about where they will locate antennae in the future and

2) concerns about disclosing proprietary information to their competitors.

Staff has reviewed wireless facilities plans from other communities, and a common approach seems to be to produce a policy plan similar to the first seven chapters of this document. If a more specific schematic plan is to be developed, it will have to be produced largely by the telecommunications industry. Staff offers the following concept for consideration:

Each carrier would be required to submit a plan containing the following elements to MPC, and update the plan on an annualized basis. In the event that a carrier does not submit any application during any calendar year, such carrier's plan would be due upon the submission of its next succeeding application. In any event, a carrier shall not be required to submit such information more often than once during a calendar year:

a. Map of service area

b. Description of services provided

c. A narrative or chart explaining where the carrier is in the process of developing their system

d. An explanation of the carrier's general approach to co-location, siting towers, working with neighborhood groups on determining the type of facilities to install

e. A map or maps showing facilities, including towers and any co-located antennas, erected in the previous year

f. A narrative describing the carrier's projected growth in sites with regard to which a Use on Review Application is reasonably expected to be filed within the next succeeding 12 months and identifying the growth plan sector where such sites are anticipated

g. The carrier may submit a plan for a network of specific towers and sites and have this network plan approved as a use on review application, thereby avoiding multiple future use on review applications. (This provision would require a zoning ordinance amendment).

Other network planning requirement alternatives from earlier drafts of this plan are shown in Appendix B.

Wireless Communication Facilities Plan

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Appendix A: Survey Results and Comments

MPC held a workshop on April 3 and asked workshop participants to fill out a survey. There were thirteen participants who returned the surveys at the end of the meeting. Most were employed by the wireless communications industry.

A = Agree N = Neutral D = Disagree

INCENTIVES

The following uses would not require a use on review application:

- Locate new towers on pre-approved sites on government-owned property.
  (A - 73%, N - 9%, D - 18%)
- Locate new towers within 50 feet of an expressway.
  (A - 45%, N - 18%, D - 36%)
- Locate new towers at least 150' below ridgelines.
  (A - 18%, N - 9%, D - 77%)
- Hide antennas inside a "stealth" structure.
  (A - 9%, N - 9%, D - 82%)
- Limit new towers to no more than 90 feet in height in some zones.
  (A - 36%, N - 0%, D - 64%)

  Other suggested incentives:

  - Limit new towers to no more than 150 feet in height in some zones.
  - Locate a monopole that is less than 150 feet in specific areas.
  - Locate new towers in an industrial, commercial, or office zones (all areas within the city and county).
  - Locate new towers on existing utility substation.
  - Any tower that is 150 feet or less.
  - Reduce setback requirements for locating towers in an industrial or commercial zone.

HEIGHT

1. MPC should impose a maximum height for new towers in different land use or zoning categories:

- Agricultural

(A - 29%, N - 14%, D - 57%)

- Single family residential
  (A - 65%, N - 35%, D - 0%)
- Multi-family
  (A - 65%, N - 35%, D - 0%)
- Office
  (A - 29%, N - 43%, D - 29%)
- Commercial
  (A - 17%, N - 17%, D - 67%)
- Industrial
  (A - 14%, N - 29%, D - 57%)
- Parks and open spaces
  (A - 29%, N- 43%, D - 29%)

Other comments:

- Agricultural, commercial, industrial and office - No maximum height
- Single family residential - (90 - 120 feet)
- Multi-family residential - 150 feet
- Parks and Open Space - 180 feet
- Maximum height is not realistic. Maximum height will be required only in an approval process with tower in excess of that height requirement.
- Height is dictated by radio frequency.
- Tall towers allow for more co-location.

2. A large number of short towers may achieve the same coverage as some tall towers:

- MPC should limit tall towers and encourage a large number of short towers instead.
  (A- 25%, N - 13%, D - 62%)
- MPC should encourage tall towers to avoid a large number of short towers.
  (A - 62%, N - 0%, D - 38%)

REVIEW PROCESS

- MPC should hold a "pre-application hearing" for new tower applications. This would allow time for more extensive testimony and would give the applicant an idea of issues that need to be addressed.
  (A - 44%, N - 12%, D - 44%)
- This could be prior to preparation of detailed engineering studies required for the MPC public hearing.
  (A - 56%, N - 11%, D - 33%)
- MPC should allow a tower design to be incorporated as a standard feature of new developments (office parks, subdivisions, churches, shopping centers, etc.? For example, pre-approve a stealth tower in a shopping center or business park as part of the development plan.
  (A - 44%, N - 44%, D - 12%)
- MPC should fast track or pre-approve sites on government properties and right-of-way?

(A - 67%, N - 22%, D - 11%)

Other suggestions:

- The 110% setback requirements shall also apply to location on a commercial property.
- Strictly adhere to zoning ordinance.
- As technology changes, allow carriers to modify equipment as needed.
- Listen to staff recommendations.

OTHER CONCERNS AND COMMENTS

- Enhanced 911 requirements will affect the design and types of new antennas.
- Limitation of height.
- Using visibility to determine tower type.
- Restrict additional towers to be placed on the same property.
- Color requirements for the towers.
- Requirements for improving existing sites.
- We are still in coverage phase - tall towers for CO-location is still needed.
- Industries need to work closely with homeowners.
- Advance notice to homeowners or participants is needed (12 days notice is too short).
- Will a number of "spec sites" be able to identify? Will it be possible to incorporate them into our land use plan?
- Need to incorporate tower planning with the land use plan.
- If a long range plan cannot be provided, can it be a schematic plan?

Wireless Communication Facilities Plan

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Appendix B: Other Network Planning Requirement Alternatives Discussed at Workshops

1. Require each wireless telecommunications provider to submit a plan for their anticipated system and update it annually. The plan should show the area to be served, identify all existing towers and alternative tower structures in the service area, and identify potential sites for new towers that may be required. Two well-publicized public meetings should be conducted by the provider within the service area, and citizen comments should be solicited and given consideration in developing a final plan; or
2. Expand the current third- party engineering review process to show the network of existing and planned facilities within three miles of any proposed new facility that requires use on review approval; or
3. Create an incentive whereby the use on review procedure will be waived for towers consistent with a network plan approved by MPC; or
4. Each carrier would be required to submit a plan that identifies anticipated service areas for new facilities in the next twelve months. If MPC finds that there are the same or similar anticipated service areas identified by two or more carriers, those carriers should hold a joint pre-application meeting and follow the procedures stated in Chapter 8, recommendation B. All carriers are encouraged to share information about co-location availability to other carriers.

Wireless Communication Facilities Plan

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Appendix C: References.

Aesthetics, Community Character, and the Law, PAS Report No. 489/490, 1999

Bristol, Virginia Zoning Ordinance, Division 14. Communications Towers and Antenna

Business Briefing: Wireless Technology 2002, EMS Wireless, 2002

Comprehensive Plan for Wireless Communication Facilities, Pinelands Commission, New Jersey, January 2000

Ordinance for Telecommunication Towers, Haywood County, NC, February 1998

Personal Wireless Service Facility Policy, Albemarle County Department of Planning and Community Development, Kreines & Kreines, Inc., December 2000

Siting Criteria for Personal Wireless Service Facilities, Kreines & Kreines, Inc. in cooperation with the Cape Cod Commission, June 1997

Telecommunication Act of 1996, FCC

Wireless Communication Facilities Ordinance, Yavapai County Government, Arizona

Wireless Communication Facilities Plan, City of Liberty, Missouri, February 1997

Wireless Communication Facilities Regulations, Section 18, Birmingham, Alabama, January 2002

Some photographs used in this publication are courtesy of TeleStructures and Stealth Technologies.

EXHIBIT 1. Wireless Communication Facility Locations

SUPPORT STRUCTURE SITES(As of May 2002)
Including towers and antennae located on towers
or other support structures (includes co-locations)

1 MILE RADIUS COVERAGE AREA
(As of May 2002)
52% of county covered

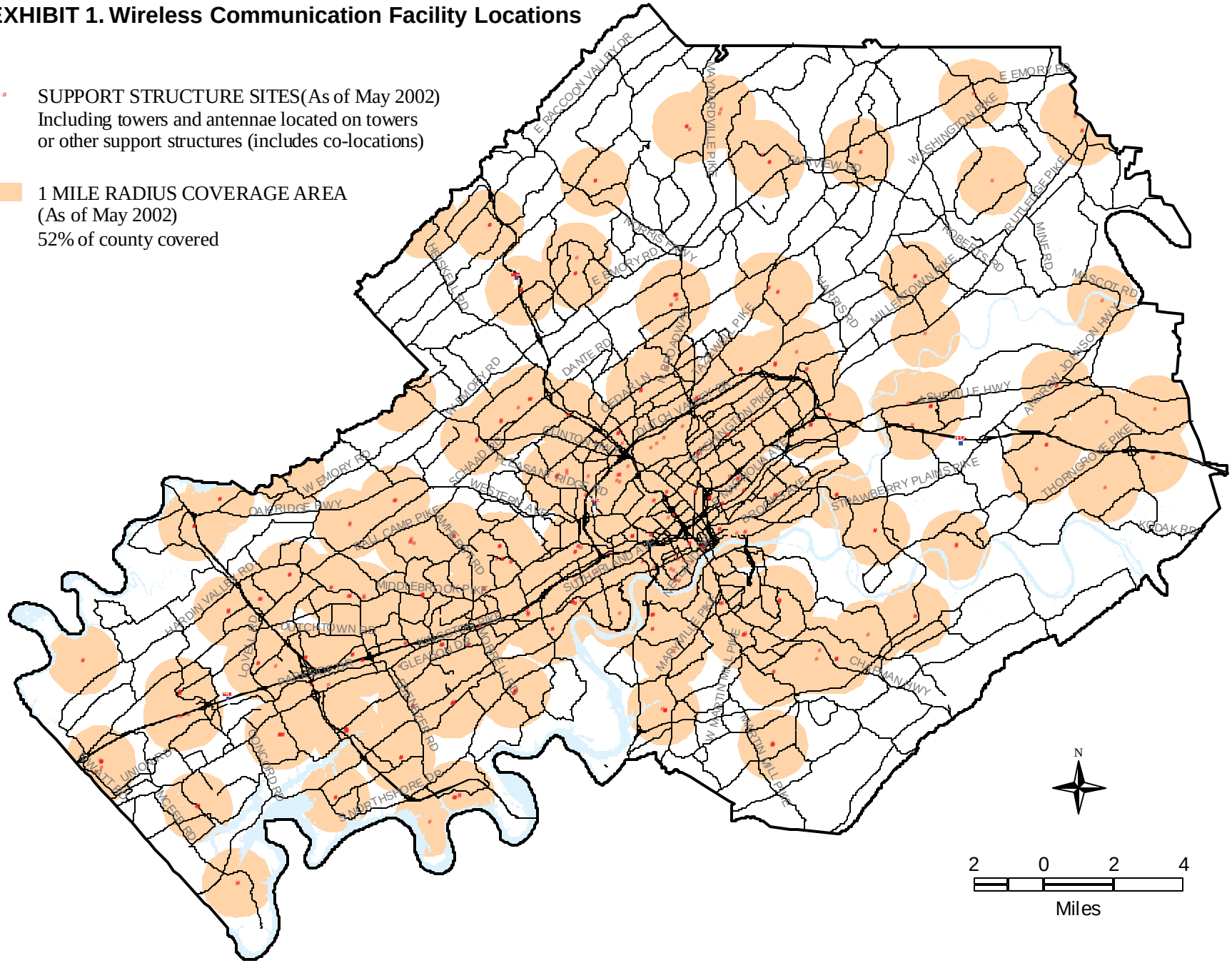
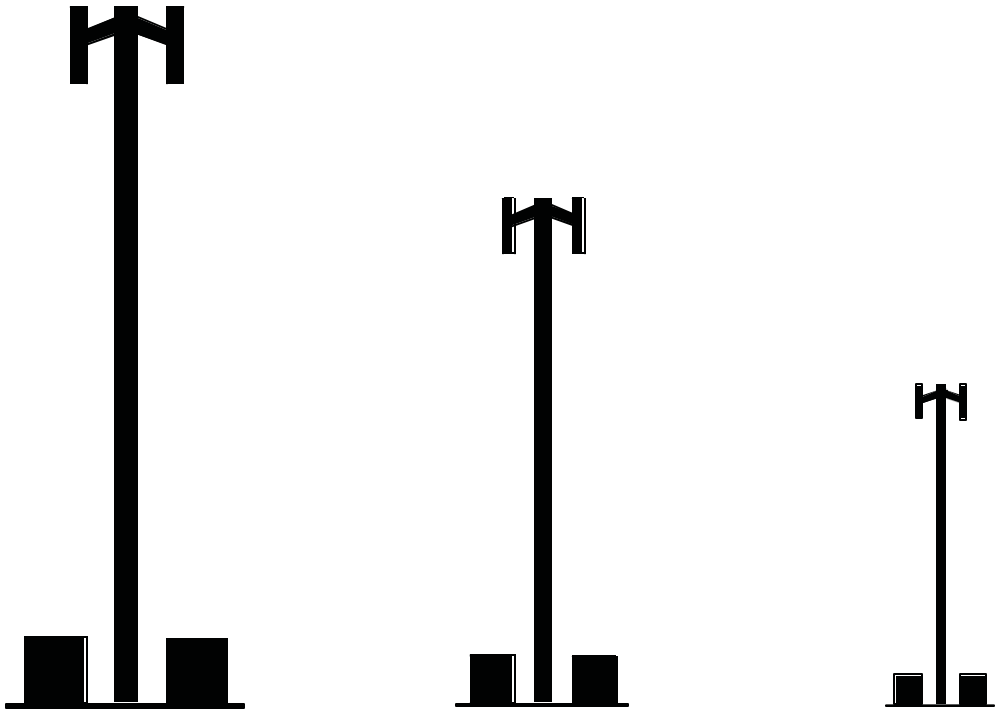
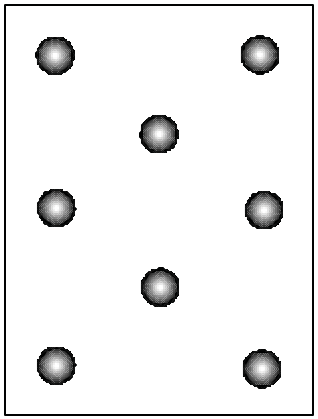


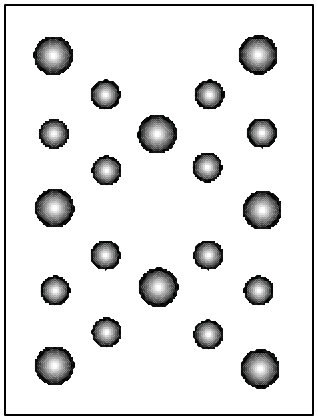
EXHIBIT 2: THREE PHASES OF WIRELESS NETWORK DEVELOPMENT



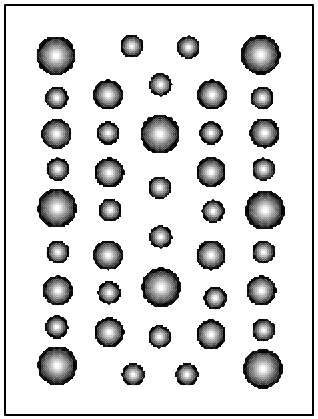
Tower heights will come down with each succeeding phase.



Coverage Phase



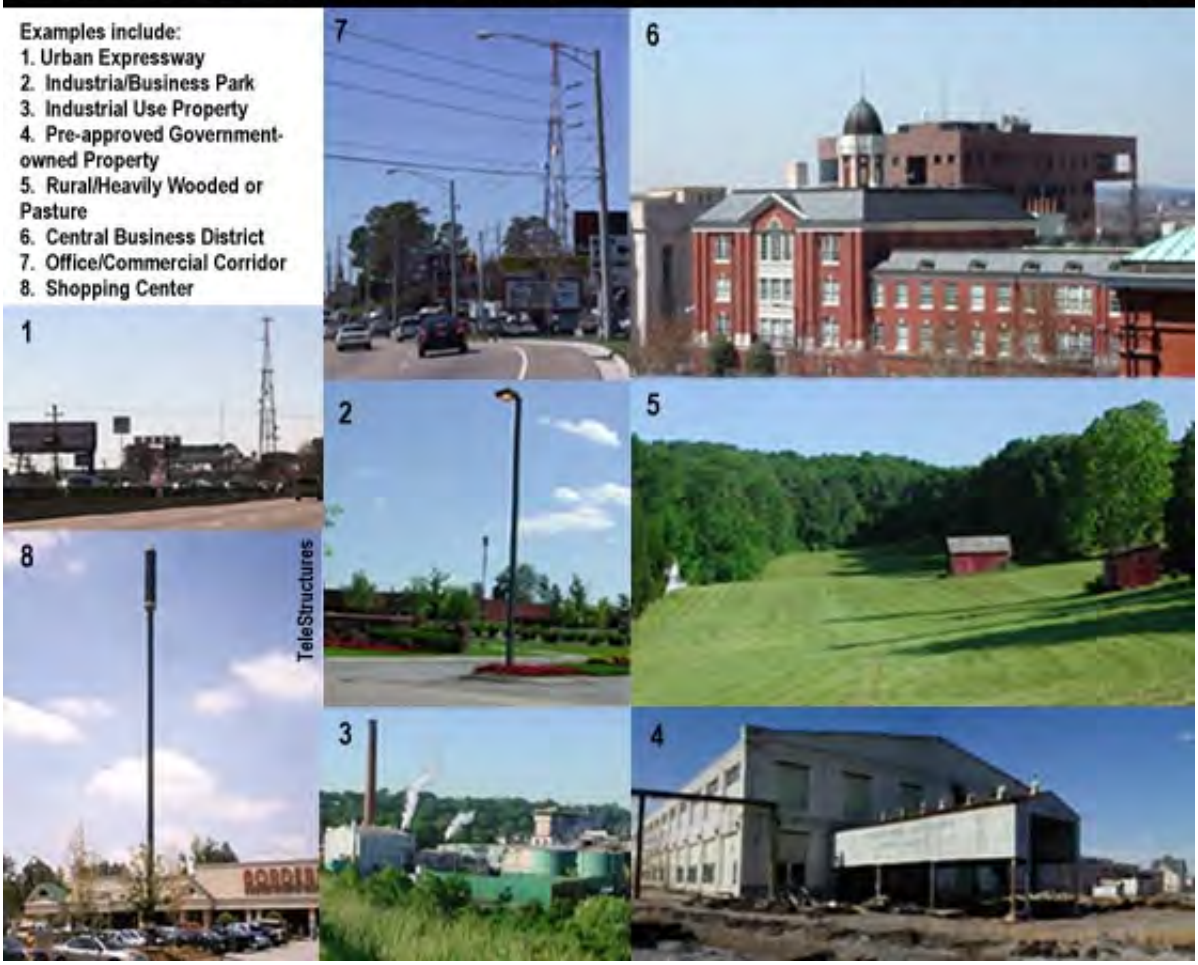
Capacity Phase



Residential Phase

Wireless Communication Facilities Plan

EXHIBIT 3. OPPORTUNITY AREAS: Areas where placement of wireless communication facilities is encouraged.



Wireless Communication Facilities Plan

EXHIBIT 4. SENSITIVE AREAS: Areas where placement of wireless communication facilities will most likely raise issues related to safety, property values, visibility, or land use compatibility. Care in site selection , facility design, and screening are needed.

Examples include: 1. Multi-family Housing, 2. Within 500' of a residence, and 3. Community facilities in a residential area (e.g. library)

Wireless Communication Facilities Plan

EXHIBIT 5. SENSITIVE AREAS: COMMUNITY FACILITY SITES IN RESIDENTIAL NEIGHBORHOODS:
These areas within residential neighborhoods could provide wireless facility sites if care is taken with design, location, and screening.

Examples include:
1. Golf course
2. Cemetary
3. Parking lot of a church
4. Utility station

Wireless Communication Facilities Plan

EXHIBIT 6. AVOIDANCE AREAS: Areas where wireless communication towers should not be located. Co-location on existing structures is encouraged. Special review requirements may be in effect in historic districts and scencic highway corridors.

Examples include:

1. Conservation open space
2. Public park
3. Ridge top/ridge line
4. Scenic highway
5. Single-family residential
6. Historic district/site
7. Scenic vista
8. Vacant residential lot

EXHIBIT 7.
LAND USE/WIRELESS FACILITIES MATRIX

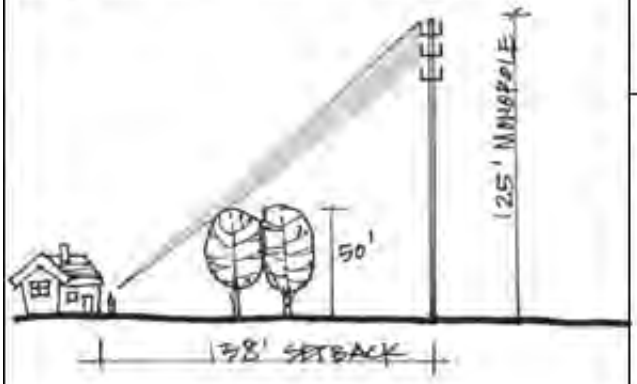
		Co-Location	Stealth Structure	Low Monopole Below 90'	Moderate Monopole 90'-150'	Tall Monopole 150'-199'	Lattice Tower	Guyed Tower
Opportunity Areas	Industrial/Business Park							
	Industrial Use							
	Pre-approved Government-owned Property							
	Urban Expressway Corridor							
	Rural/Heavily Wooded							
	Pasture							
	Central Business District							
	Office/Commercial Corridor							
	Shopping Center							
Sensitive Areas	Within 500' of a residence							
	Rural Residential							
	Non-residential Properties in a Residential Area (church, cemetery, library, etc.)							
	Multi-family Residential							
	On Hill Below Ridgeline							
Avoidance Areas	Conservation Open Space							
	Scenic Highway							
	Public Park							
	Ridge Top/Ridge Line							
	Scenic Vista							
	Historic District/Site							
	Single-family Residential							
	Vacant Residential Lot							

Encouraged Neutral Discouraged

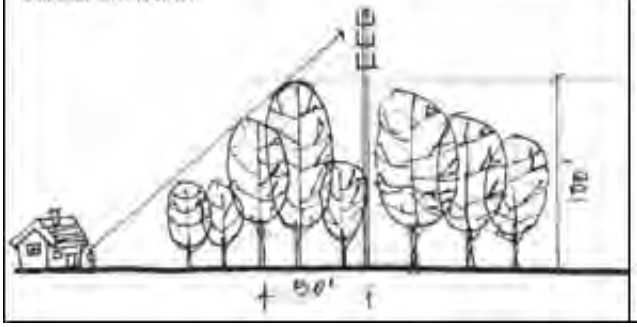
Wireless Communication Facilities Plan

EXHIBIT 8. EXAMPLES OF APPLICATION OF DESIGN PRINCIPLES

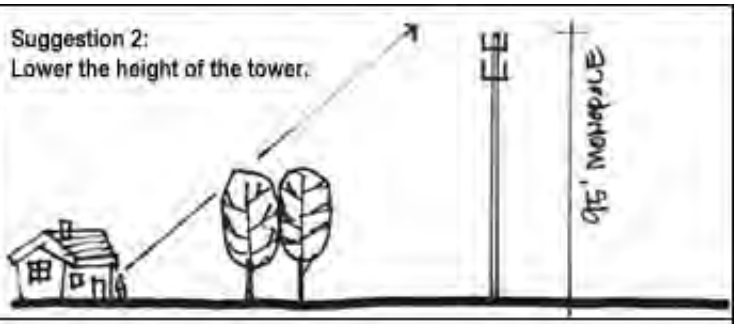
SCENARIO 1:
Siting a moderately tall tower (125') near a residence



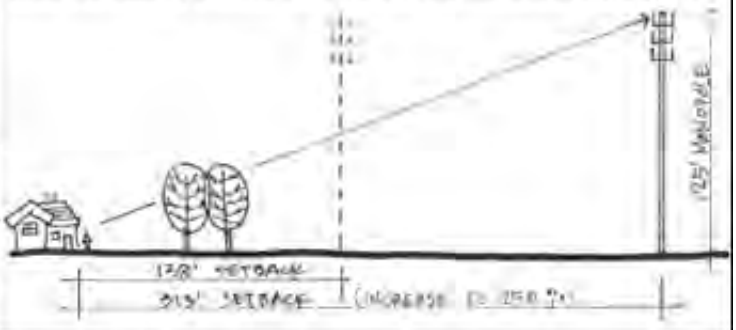
Suggestion 1:
Locate tower in an area where tall trees can be used to screen the tower.



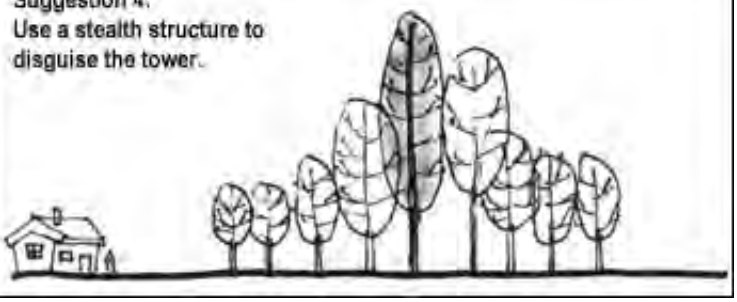
Suggestion 2:
Lower the height of the tower.



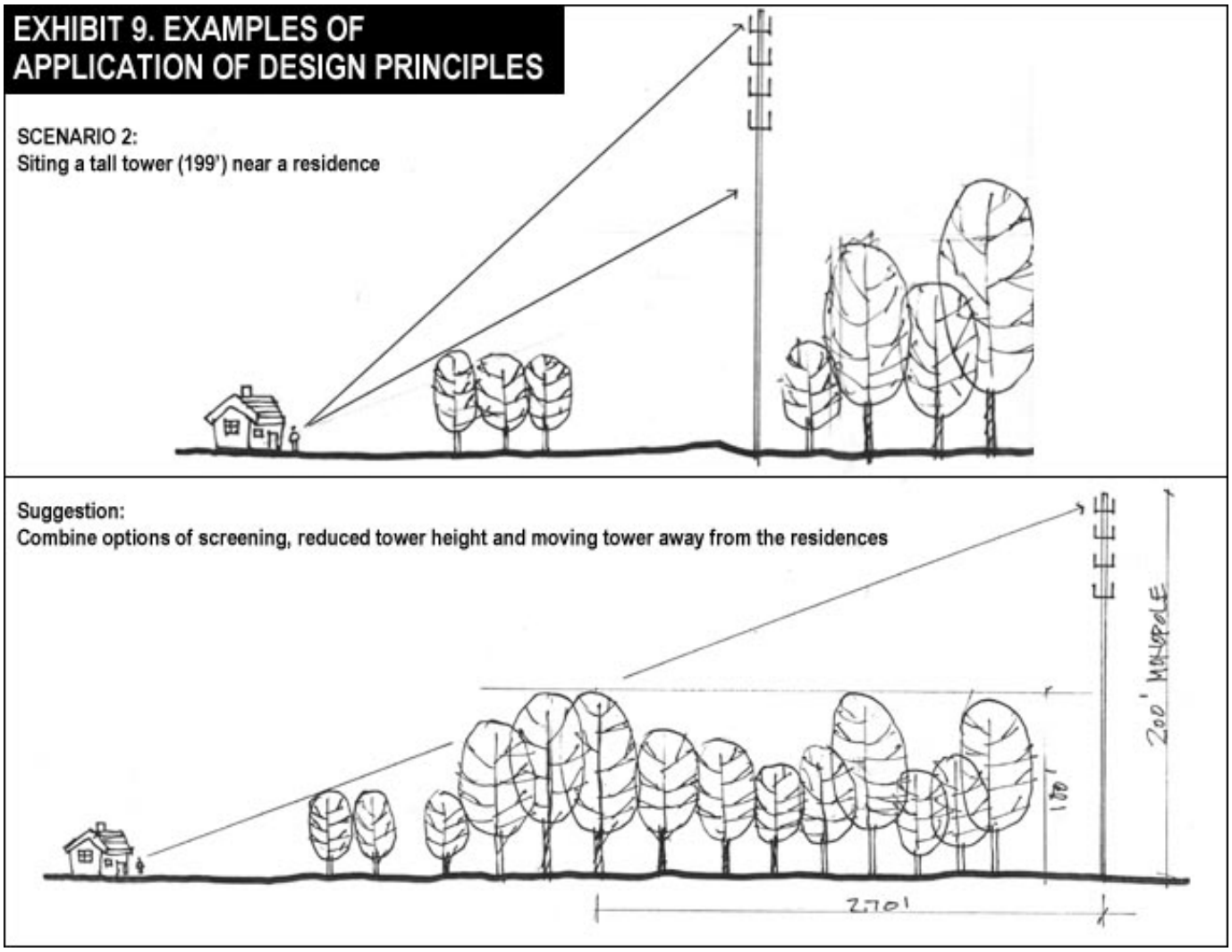
Suggestion 3:
Move the tower to a farther distance from the residential property line.

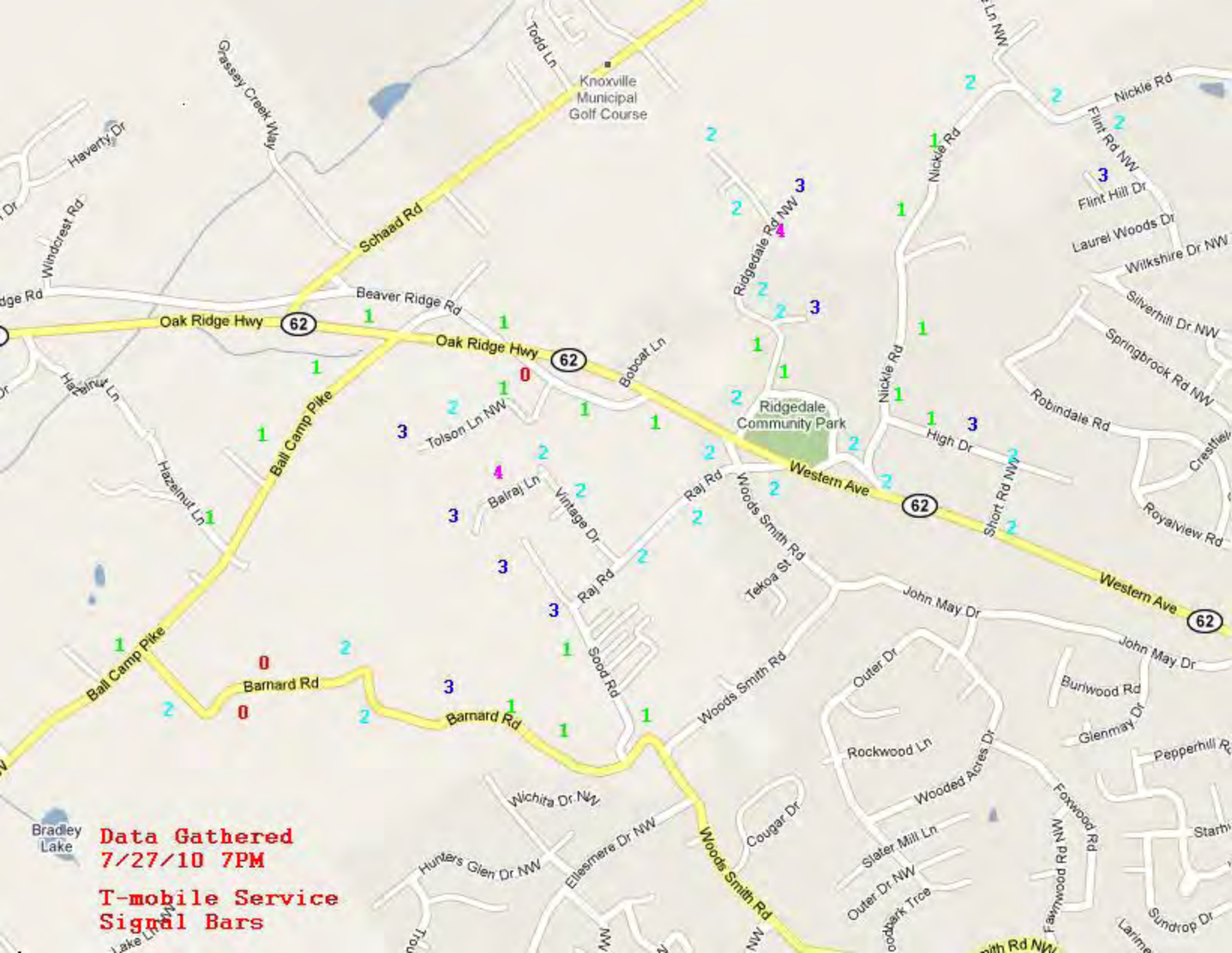


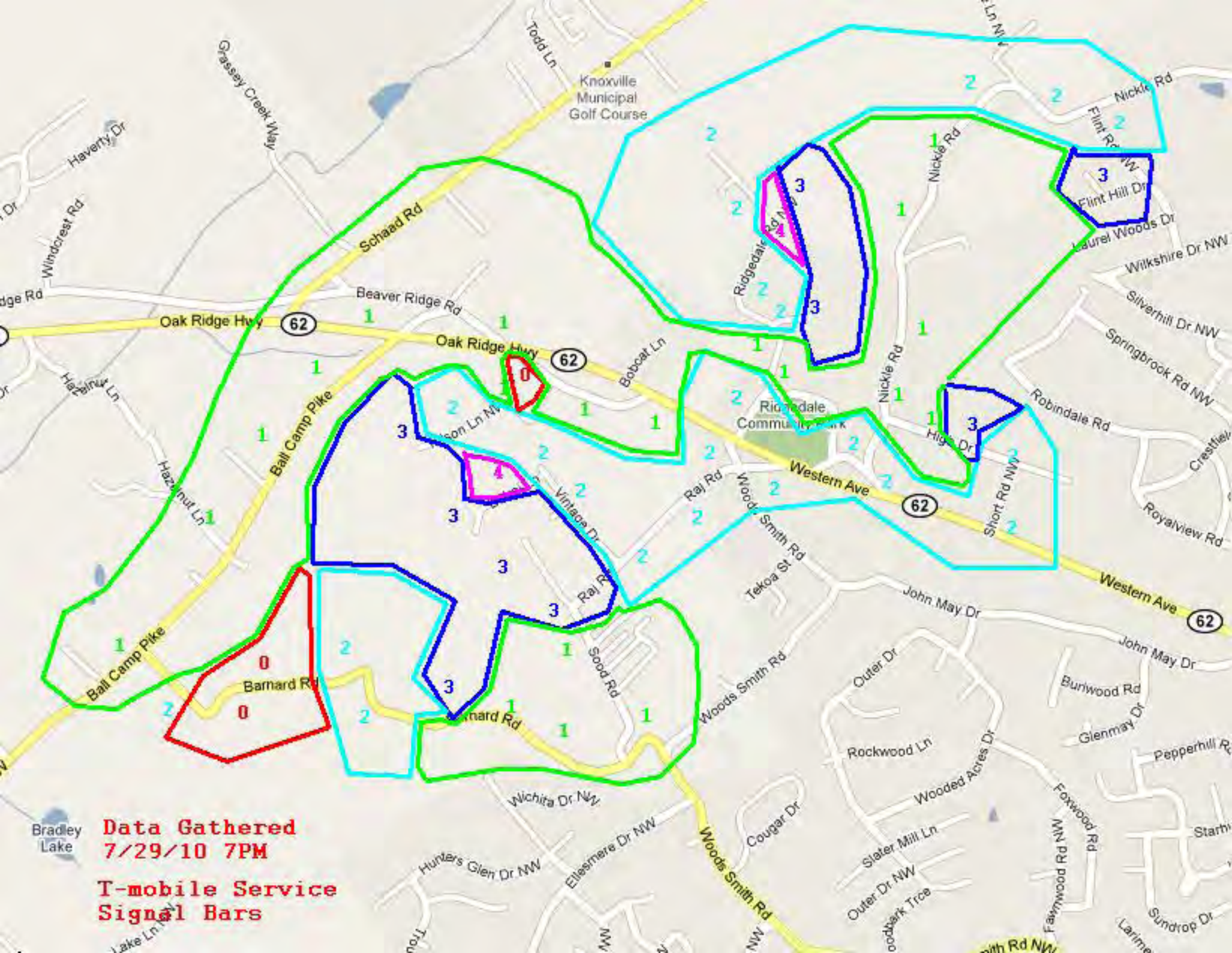
Suggestion 4:
Use a stealth structure to disguise the tower.



Wireless Communication Facilities Plan




Data Gathered
7/27/10 7PM
T-mobile Service
Signal Bars
Knoxville
Municipal
Golf Course
Ridgedale
Community Park
Bradley
Lake
Oak Ridge Hwy
62
Western Ave
Schaad Rd
Ball Camp Pike
Barnard Rd
Woods Smith Rd
Nickle Rd
Ridgedale Rd NW
Beaver Ridge Rd
Bobcat Ln
Tolson Ln NW
Bairaj Ln
Vintage Dr
Raj Rd
Sood Rd
Tekoa St
John May Dr
Outer Dr
Rockwood Ln
Wooded Acres Dr
Slater Mill Ln
Outer Dr NW
Cougar Dr
Wichita Dr NW
Ellesmere Dr NW
Hunters Glen Dr NW
Flint Rd NW
Flint Hill Dr
Laurel Woods Dr
Wilkshire Dr NW
Silverhill Dr NW
Springbrook Rd NW
Robindale Rd
High Dr
Short Rd NW
Royalview Rd
Burlwood Rd
Glenmary Dr
Foxwood Rd
Fawnwood Rd NW
Sundrop Dr
Grassey Creek Way
Todd Ln
Haverty Dr
Windcrest Rd
Hazelnut Ln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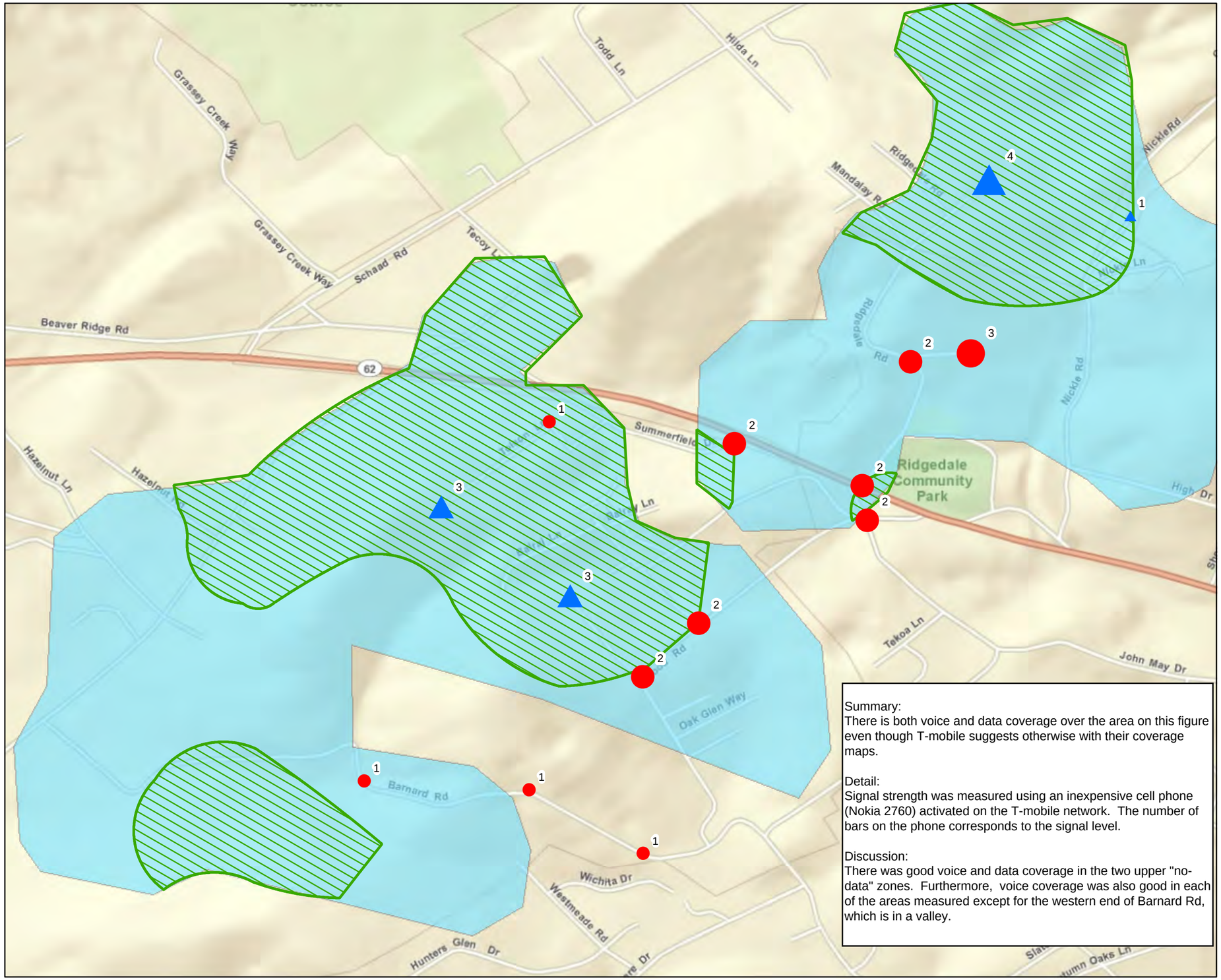
Laurel Woods Dr
Wilkshire Dr NW
Silverhill Dr NW
Springbrook Rd NW
Robindale Rd
Ridgedale
Community Park
Bobcat Ln
Raj Rd
Vintage Dr
Woods Smith Rd
Tekoa St
John May Dr
Outer Dr
Burlwood Rd
Glenmay Dr
Rockwood Ln
Wooded Acres Dr
Foxwood Rd
Slater Mill Ln
Outer Dr NW
Cougar Dr
Wichita Dr NW
Ellesmere Dr NW
Hunters Glen Dr NW
Barnard Rd
Sood Rd
Bradley
Lake
Grassey Creek Way
Haverty Dr
Windcrest Rd
Todd Ln
Hazelnut Ln
Shiort Rd NW
Royalview Rd
Sundrop Dr



VICINITY MAP

LEGEND

Signal Levels

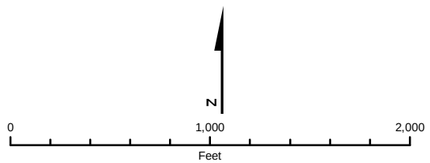
- 1 Voice
- 2 Voice
- 3 Voice
- 1 Voice and data
- 3 Voice and data
- 4 Voice and data
- No T-Mobile Data Coverage
- No T-Mobile Voice Coverage

Notes:
Signal strength measured 6/23/2010

Summary:
There is both voice and data coverage over the area on this figure even though T-mobile suggests otherwise with their coverage maps.

Detail:
Signal strength was measured using an inexpensive cell phone (Nokia 2760) activated on the T-mobile network. The number of bars on the phone corresponds to the signal level.

Discussion:
There was good voice and data coverage in the two upper "no-data" zones. Furthermore, voice coverage was also good in each of the areas measured except for the western end of Barnard Rd, which is in a valley.



Signal Strength at Mobile Phone

Knoxville Vicinity
June 2010

Amy Easterly <amy.easterly@gmail.com>

FW: Neighborhood Meeting - Location change for meeting

Britton, John J. <JBritton@lewisking.com> **Wed, Aug 4, 2010 at 1:36 PM**
To: amy.easterly@gmail.com
Cc: "Buckingham, John T." <JBuckingham@lewisking.com>

FYI Please call me at your convenience about linking up this evening. Thanks

John J. Britton, Attorney at Law
Lewis, King, Krieg & Waldrop, P.C.
Post Office Box 2425 | Knoxville, TN 37901
Tel: 865-546-4646 | Fax: 865-523-6529
Web Page | My Bio

From: Vestuto, Denise [mailto:Denise.Vestuto@T-Mobile.com]
Sent: Wednesday, August 04, 2010 12:19 PM
To: Britton, John J.
Cc: Amy Stark
Subject: Neighborhood Meeting - Location change for meeting
Importance: High

John,

We were just informed this morning that the Karn's Library closes at 6:00PM. In order to make sure that we have enough time for our meeting, I scheduled it at the Karn's Old Library building located at 7708 Oakridge Hwy, Knoxville, TN.

I attached the location of the meeting place below. We still plan on meeting at 5:30PM. Please let me know if this new location is a problem.

http://www.mapquest.com/maps?address=7708%2BOak%2BRidge%2BHwy&city=Knoxville&state=TN&country=US

Thank you,

Denise Vestuto
T-Mobile
8550 W. Bryn Mawr
Suite 100
Chicago IL 60631

Desk #: 773-444-5517
Cell #: 630-667-8743

Amy Easterly <amy.easterly@gmail.com>

Re: MPC # 7-G-10-UR Excell Communications/T-Mobile cell tower report

Larry Perry <larryperry@att.net> **Mon, Jul 26, 2010 at 5:39 PM**
To: Amy Easterly <amy.easterly@gmail.com>
Cc: Tom Brechko <smokymtns@comcast.net>

Good Afternoon Amy:

I do not plan on any other report filing with the MPC than you already have.

I just hope that your group has had an opportunity to meet with the homeowners in the area to discuss and hear their concerns and listen to any possible remedies they may have.

If you decide to change site locations, that will entail another report and study, but there is no need for an additional study for this same site.

Larry

--- On **Fri, 7/23/10, Amy Easterly <*amy.easterly@gmail.com*>** wrote:

> From: Amy Easterly <amy.easterly@gmail.com>
> Subject: Re: MPC # 7-G-10-UR Excell Communications/T-Mobile cell tower report
> To: "Larry Perry" <larryperry@att.net>
> Date: Friday, July 23, 2010, 1:53 PM
>
> Hi Mr. Perry:
>
> I understand that you will create a final report for the new meeting in August. Will you please send that as well?
>
> Thank you,
> Amy Easterly

Gmail by Google

Amy Easterly <amy.easterly@gmail.com>

Case # 7-G-10-UR Excell Communications/T-Mobile cell tower objection

Amy Easterly <amy.easterly@gmail.com> **Sat, Jun 26, 2010 at 6:51 PM**
To: contact@knoxmpc.org

Dear Knoxville Metropolitan Planning Commission:

Please accept this email as an official community complaint and objection to the proposed cell tower T-Mobile via Excell Communications is attempting to place on Tolson Lane (case # 7-G-10-UR).

- The proposed tower is not wanted by the residents of the neighborhood. A tower piercing the sky twice as tall as the surrounding trees would be quite visually obtrusive.
- Their need for additional coverage may not be as great as T-Mobile states. On the "Signal Strength at Mobile Phone" map, signal strength was measured using a bottom-of-the-line cell phone with T-Mobile service. It should be noted that for all but the valley south of Banard Road, signal was available in each of the areas tested. Data service was available in all areas but the aforementioned area. Because it appears that there is indeed T-Mobile data and voice service in the areas used in the permit application for the cell tower, the rationale for the current tower location should be more closely examined.
- The proximity of the proposed tower is adjacent to three residential driveways, which will effectively decrease property values more substantially than if a tower were located in an commercial or industrial location. The tower would be directly out the front windows of two of the properties. Additionally, the two most affected properties are already bearing some civic responsibility by being located next to a municipal water tower. The additional eyesore of a 150' - 180' cell tower is unthinkable. Every other ridge in this area already has one or more cell towers on it. There is no reason to add more insult to injury.
- There are several co-location opportunities that have not been examined. The two closest towers are both US Cellular towers, one off of Schaad Road and the other off of McKamey. The permit application stated that T-Mobile has tried to colocate on one US Cellular tower without success. Considering there are several towers which may be sufficient for colocation, T-Mobile has not performed an exhaustive search for alternative locations.
    1. 3902A Schaad Road (US Cellular)
    2. 4739 McKamey Road (US Cellular)
    3. Presley Lake Road (American Towers)
    4. 6305 Vance Lane (#9196, American Towers)
- It should be noted that according to the "Viewshed Analysis" figure (generated using ZVI, Zone of Visual Influence calculations), colocation on the Schaad Road tower would provide coverage over all of the areas where T-Mobile desires additional coverage. Hence, there would be no need to build a new tower because using an existing one would meet the desired outcome for the carrier. The same may be true for other existing cell tower locations.
- Moreover, the abandoned Tecoy Quarry is already zoned CB, has a similar elevation to the existing Schaad Road tower, and is significantly farther away from existing residences than the proposed tower. The proposed location joins 10 residential lots and will be an eyesore for the hundreds of people living in the proximate neighborhoods.

Please address our concerns with the commissioners on the MPC and urge them to vote against allowing T-Mobile/Excell Communications to place their obtrusive and unnecessary tower in our neighborhood and out our front windows.

We appreciate your time, input, and support on this matter.

Sincerely,
Amy and Elliott Easterly

4340 Tolson Lane
Knoxville, TN 37921
(865) 551-9269

2 attachments

ZVI_June2010Smap.pdf
246K

Signal_Strength.pdf
134K

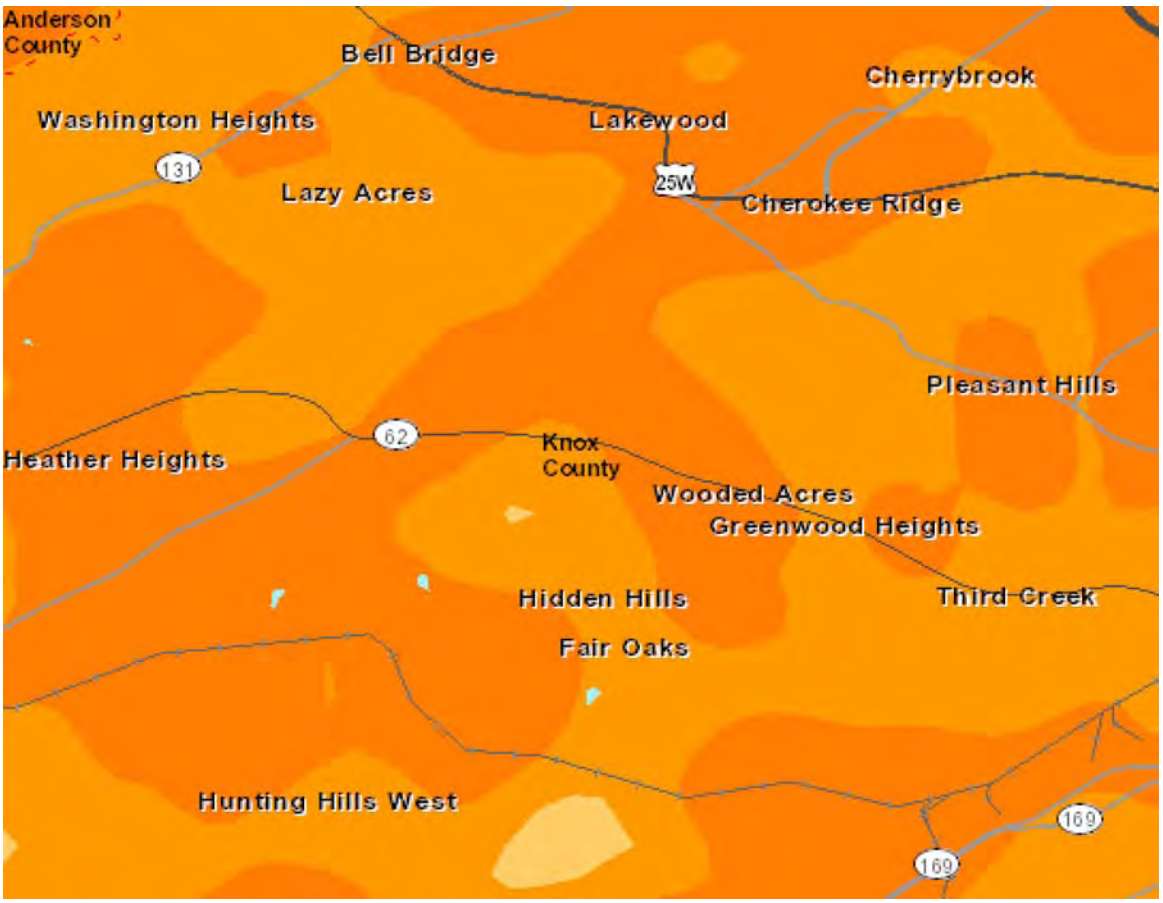
Data Coverage Legend

- 3G/Mobile Broadband * Video Share ⁑
- EDGE/GPRS *
- Partner EDGE ^
- Partner GPRS ^
- No Service Available

- *Supports optional features such as AT&T Media, including Cellular Video.
- ^Supports optional features AT&T Media, excluding Cellular Video.
- ⁑Capable handsets required.

Important Information About the Coverage Map

Map may include areas served by unaffiliated carriers, and may depict their licensed area rather than an approximation of the coverage there. Actual coverage area may differ substantially from map graphics, and coverage may be affected by such things as terrain, weather, foliage, buildings and other construction, signal strength, customer equipment and other factors. AT&T does not guarantee coverage. Charges will be based on the location of the site receiving and transmitting the call, not the location of the subscriber.



Voice Coverage Legend

- Best
- Good
- Moderate
- Partner
- No Service Available

3G/Mobile Broadband Coverage

Show 3G Coverage

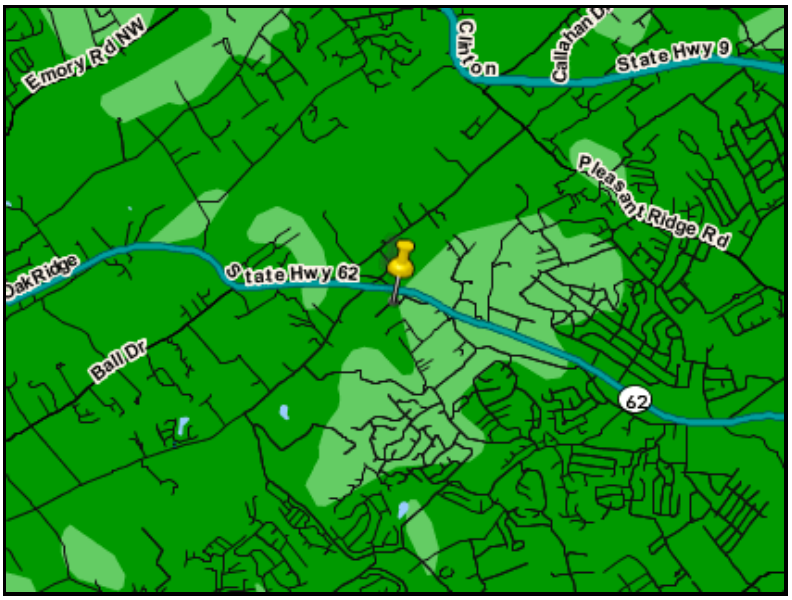
Important Information About the Coverage Map

Map may include areas served by unaffiliated carriers, and may depict their licensed area rather than an approximation of the coverage there. Actual coverage area may differ substantially from map graphics, and coverage may be affected by such things as terrain, weather, foliage, buildings and other construction, signal strength, customer equipment and other factors. AT&T does not guarantee coverage. Charges will be based on the location of the site receiving and transmitting the call, not the location of the subscriber.

Your Sprint Coverage Map

Print map

Voice Coverage - Sprint Devices



0 1 mi.

Recent towers Future towers

Coverage updated on: 6/4/10

Coverage details for:

4340 TOLSON LN
KNOXVILLE, TN 37921

Voice coverage:

Best Good Fair

Sprint coverage - signal strength varies

Roaming

No Coverage

The Sprint all-digital wireless network gives you voice coverage and access to innovative services like Sprint TV®, text messaging and Web browsing. Please note that certain data services, such as Sprint Music Store, are not available throughout the entire Nationwide Sprint® Network. Need help? Contact us at 888-211-4727.

Best: You should generally receive a signal strength sufficient to make calls outdoors, in a car and in many buildings.
Good: You should generally receive a signal strength sufficient to make calls outdoors, in a car and in some buildings.
Fair: You should generally receive a signal strength sufficient to make calls outdoors, but typically not for calls in a car or in buildings.

Our coverage maps provide high-level estimates of our coverage areas when using your device outdoors under optimal conditions. Coverage isn't available everywhere. Estimating wireless coverage and signal strength is not an exact science.

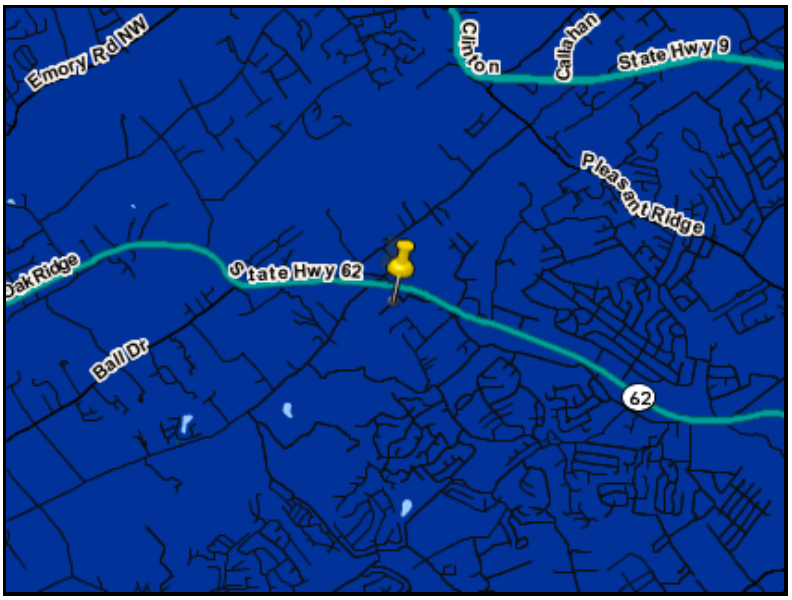
There are gaps in coverage within our estimated coverage areas that, along with other factors both within and beyond our control (network problems, software, signal strength, your wireless device, structures, buildings, weather, geography, topography, etc.), will result in dropped and blocked connections, slower data speeds, or otherwise impact the quality of services.

Services that rely on location information, such as E911 and GPS navigation, depend on your device's ability to acquire satellite signals (typically not available indoors) and network coverage. E911 services also depend on local emergency service provider systems/support. Estimated future coverage subject to change.

Your Sprint Coverage Map

Print map

Data Coverage - 3G, 4G and more - Nextel Devices



0 1 mi.

Recent towers Future towers

Coverage updated on: 6/4/10

Coverage details for:

TOLSON LN
KNOXVILLE, TN 37921

Data coverage:
Data Services

- Nextel National Network
- No Coverage

The Sprint all-digital wireless network gives you voice coverage and access to innovative services like Sprint TV®, text messaging and Web browsing. Please note that certain data services, such as Sprint Music Store, are not available throughout the entire Nationwide Sprint® Network. Need help? Contact us at 888-211-4727.

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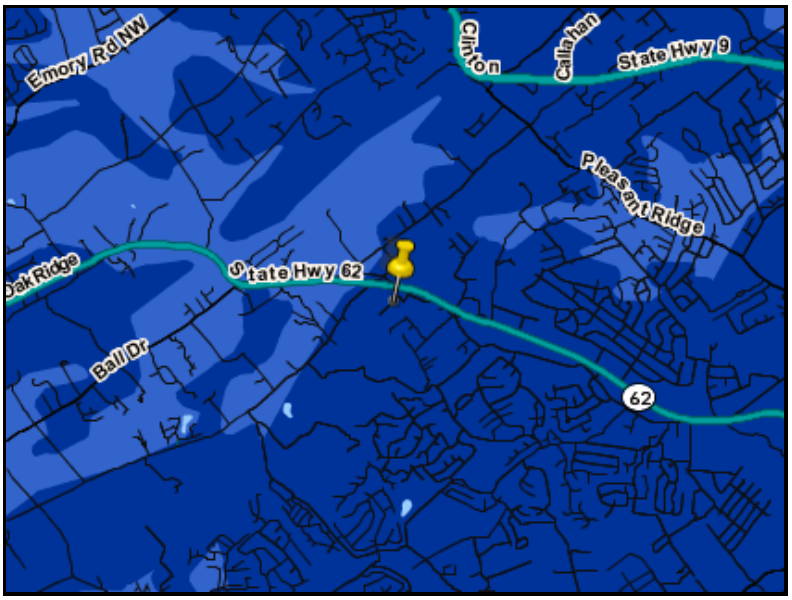
Services that rely on location information, such as E911 and GPS navigation, depend on your device's ability to acquire satellite signals (typically not available indoors) and network coverage. E911 services also depend on local emergency service provider systems/support. Estimated future coverage subject to change.

Your Sprint Coverage Map

Print map

Voice Coverage - Nextel Devices



0 1 mi.

Recent towers Future towers

Coverage updated on: 6/4/10

Coverage details for:

TOLSON LN
KNOXVILLE, TN 37921

Voice coverage:

Best Good Fair

No Coverage

The Sprint all-digital wireless network gives you voice coverage and access to innovative services like Sprint TV®, text messaging and Web browsing. Please note that certain data services, such as Sprint Music Store, are not available throughout the entire Nationwide Sprint® Network. Need help? Contact us at 888-211-4727.

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Good: You should generally receive a signal strength sufficient to make calls outdoors, in a car and in some buildings.
Fair: You should generally receive a signal strength sufficient to make calls outdoors, but typically not for calls in a car or in buildings.

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There are gaps in coverage within our estimated coverage areas that, along with other factors both within and beyond our control (network problems, software, signal strength, your wireless device, structures, buildings, weather, geography, topography, etc.), will result in dropped and blocked connections, slower data speeds, or otherwise impact the quality of services.

Services that rely on location information, such as E911 and GPS navigation, depend on your device's ability to acquire satellite signals (typically not available indoors) and network coverage. E911 services also depend on local emergency service provider systems/support. Estimated future coverage subject to change.

Verizon Wireless Printer Friendly Coverage Map

N

Mapped Coverage
Enhanced Services

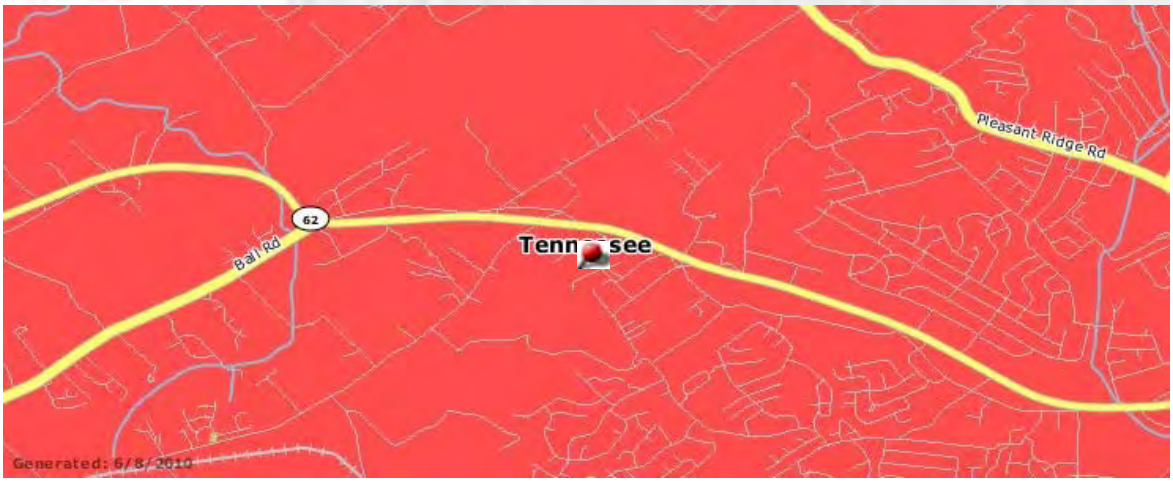
Mapped Location
4340 Tolson Ln
Knoxville, TN
37921

Map Legend
- Enhanced Services
- Extended Enhanced Services
- Canadian Enhanced Services Roaming
- No Coverage
- VZW Store

These Coverage Locator depictions apply to the following calling plans:
Nationwide Calling Plans, America's Choice initiated (activated) on or after 2/21/2005, Mobile Broadband and INpulse.
Roaming charges apply in Canada Broadband and Canada Enhanced Services areas.
If you have a Nationwide Calling Plan: Picture/Video Messaging, Mobile Web and Mobile Email works in both the Enhanced Services and Extended Enhanced Services coverage area; Push to Talk, VZ Navigator and Family Locator work in only the Enhanced Services coverage area.
If you have an America's Choice Calling Plan: Picture/Video Messaging, Mobile Web, Mobile Email, Push to Talk, VZ Navigator and Family Locator work in only the Enhanced Services coverage area.
These Coverage Locator maps are not a guarantee of coverage and may contain areas with no service. The maps reflect a depiction of predicted and approximate wireless coverage. The coverage areas shown do not guarantee service availability, and may include locations with limited or no coverage. Even within a coverage area, there are many factors, including customer's equipment, terrain, proximity to buildings, foliage, and weather that may impact service. An all-digital device will not operate or be able to make 911 calls when digital service is not available. The Extended Enhanced Services Coverage Areas include networks run by other carriers; some of the coverage depicted is based on their information and public sources, and we cannot ensure its accuracy.
Handset Banner Information
When your banner displays "Extended Network" or "Roaming", Included Features and Optional Services may not be available; standard

Text/Picture/Video Messaging rates apply when available. When your banner displays "Verizon Wireless". Optional Services, including Unlimited

Verizon Wireless Printer Friendly Coverage Map



N

Mapped Coverage
Voice and Messaging

Mapped Location
4340 Tolson Ln
Knoxville, TN
37921

Map Legend
- Digital Coverage
- Analog Coverage
- No Coverage
- VZW Store

These Coverage Locator depictions apply to the following calling plans:
Nationwide Calling Plans, America's Choice initiated (activated) on or after 2/21/2005, Mobile Broadband and INpulse.
Roaming charges will apply in the Canada Coverage area unless you subscribe to the Nationwide Plus Canada Plan.
Roaming charges will apply in the Mexico Coverage area unless you subscribe to the Nationwide Plus Mexico Plan.
These Coverage Locator maps are not a guarantee of coverage and may contain areas with no service. These maps reflect a depiction of predicted and approximate wireless coverage of the Verizon Wireless Network and the network of other carriers. The coverage areas shown do not guarantee service availability, and may include locations with limited or no coverage. Even within a coverage area, there are many factors, including a customer's equipment, terrain, and proximity to buildings, foliage, and weather that may impact service. An all-digital device will not operate or be able to make 911 calls when digital service is not available. Some of the coverage area includes networks run by other carriers; some of the coverage depicted is based on their information and public sources and we cannot ensure its accuracy.

MATERIAL SAFETY DATA SHEET

LEAD ACID BATTERY

Springfield, Missouri

I. PRODUCT IDENTIFICATION:

A. Chemical/Trade Name (per on label): Lead Acid Battery

B. Chemical Family/Classification: Electrical Storage Battery

C. Manufacturer's Name & Address:

NorthStar Battery Co. LLC
4000 Continental Way
Springfield, MO 65803

D. Contact:

U.S. - NSB Safety and Health Department
Phone: (417) 575-8219
Fax: (417) 575-8250

Aust. NorthStar Battery Pty Ltd
Phone: 02 9888 1998

E. Emergency Information:

Chemtrec (US, Canada & Mexico)
Phone: (800) 424-9300

Chemtrec (Outside US, Canada & Mexico)
Phone: +1 (703) 527-3887 (call collect)

F. Non-Hazardous Classification

Per US DOT, Northstar Battery Company products, submitted and tested by Wyle Labs, have been deemed to meet all requirements as specified in 49CFR§ 173.159 (d) for **exception** as hazardous material classification.

II. HAZARDOUS INGREDIENTS/IDENTITY INFORMATION:

NORTH AMERICAN INFORMATION:

			Air Exposure Limits (ug/m^3)		
Materials	**Approx % by Wt.***	**CAS Number**	**OSHA**	**AGGIH (TLV)**	**NIOSH**
Lead	50	7439-92-1	50	150	100
Lead Oxide	20	1309-60-0	50	150	100
Electrolyte (Sulfuric Acid) 1.400 sg	17	7664-93-9	1	1	1

*Please reference **Appendix I** for detailed product data.

AUSTRALIAN INFORMATION

Chemical or Material	Australian Dangerous Goods Classification	Hazardous Substance Classification as per NOHSC Australia	Australian Poison Schedule Classification
Non-Spillable Lead Acid Battery	Exempt under A67 (NATA Identification Guide) and Clause 238 of the Australian Dangerous Goods Code, Appendix 3	R34/R41	Schedule 6 Agricultural, Domestic and Industrial Substances

Note: Product contains toxic chemicals that are subject to the reporting requirements of Section 302 and 313 of the Emergency Planning and Community Right-to-Know Act of 1986.

III. PHYSICAL DATA:

Material is solid at normal temperatures.

A. Electrolyte:

1.	Specific Gravity:	
	(a) Standard Product	1.320 +/- 0.01 kg/dm^3
	(b) BLUE Product	1.290 +/- 0.01 kg/dm^3
2.	Boiling Point:	110°C (230°F)
3.	% Volatiles By Weight:	Not Applicable
4.	Solubility in Water:	100%
5.	Melting Point Lead:	327°C (621°F)
6.	Vapor Density	Not Determined

B. Appearance and Odor

1. Electrolyte is a clear liquid with an acidic odor.

IV. HEALTH HAZARD INFORMATION:

Under normal operating conditions, because the battery is “non-spillable”, the internal material will not be hazardous to your health. Only internally exposed material during production or case breakage or extreme heat (fire) may be hazardous to your health.

A. Routes of Entry:

1. Inhalation: Acid mist from formation process may cause respiratory irritation.
2. Skin Contact: Acid may cause irritation, burns and/or ulceration.
3. Skin Absorption Not a significant route of entry.
4. Eye Contact: Acid may cause sever irritation, burns, cornea damage and/or blindness.
5. Ingestion: Acid may cause irritation of mouth, throat, esophagus and stomach.

B. Signs and Symptoms of Over Exposure:

1. Acute Effects: Over exposure to lead may lead to loss of appetite, constipation, sleeplessness and fatigue. Over exposure to acid may lead to skin irritation, corneal damage of the eyes and upper respiratory system.
2. Chronic Effects: Lead and its components may cause damage to kidneys and nervous system. Acid and its components may cause lung damage and pulmonary conditions.
3. Potential to Cause Cancer: The International Agency for Research on Cancer has classified "strong inorganic acid mist containing sulfuric acid" as a Category 1 carcinogen, a substance that is carcinogenic to humans. This classification does not apply to liquid forms of sulfuric acid or sulfuric acid solutions contained within a battery. Inorganic acid mist is not generated under normal use of this product. Misuse of the product, such as overcharging, may however result in the generation of sulfuric acid mist.

C. Emergency and First Aid Procedures:

1. Inhalation: Remove from exposure, move to fresh air, and apply oxygen if breathing is difficult. Consult physician immediately.
2. Skin: Wash with plenty of soap and water for at least 15 minutes. Remove any contaminated clothing. Consult physician if skin irritation appears.
3. Eyes: Flush with plenty of water immediately for at least 15 minutes, lifting lower and upper eyelids occasionally. Consult a physician immediately.
4. Ingestion: Do not induce vomiting. Give large quantities of water. Never give anything by mouth to an unconscious person. Consult a physician immediately.

D. HANDLING AND STORAGE

1. Safe Storage: Store in a cool, dry place in closed containers. Keep away from ignition sources and high temperatures.
    1. Contact NorthStar Battery Company (417-575-8200) for shelf life information.
2. Handling: Avoid skin or eye contact. Avoid breathing vapors. Do not use near sources of ignition

V. CARCINOGENICITY: See section IV, Part B "Signs and Symptoms of Over Exposure"
MEDICAL CONDITIONS AGGRAVATED BY EXPOSURE: See section IV, Part B "Signs and Symptoms of Over Exposure"

VI. FIRE AND EXPLOSION HAZARD DATA:

A. Flash Point: Hydrogen = 259°C

B. Auto ignition Temperature: Hydrogen = 580°C

C. Extinguishing Media: Dry chemical, foam, CO_2

D. Unusual Fire and Explosion Hazards: Hydrogen and oxygen gases are produced in the cells during normal battery operation (hydrogen is flammable and oxygen supports combustion). These gases enter the air through the vent caps. To avoid the chance of a fire or explosion, keep sparks and other sources of ignition away from the battery.

E. Firefighting PPE: Full protective clothing and

NIOSH-approved self-contained breathing apparatus with full facepiece

VII. REACTIVITY DATA:

A. Stability: Stable

B. Conditions to Avoid: Sparks and other sources of ignition.

C. Incompatibility: (materials to avoid)

1. Lead/lead compounds: Potassium, carbides, sulfides, peroxides, phosphorus, sulfur.

2. Battery electrolyte (acid): Combustible materials, strong reducing agents, most metals, carbides, organic materials, chlorates, nitrates, picrates, and fulminates.

D. Hazardous Decomposition Products:

1. Lead/lead compounds: Oxides of lead and sulfur.

2. Battery electrolyte (acid): Hydrogen, sulfur dioxide, and sulfur trioxide.

E. Conditions to Avoid:

High temperature. Battery electrolyte (acid) will react with water to produce heat. Can react with oxidizing or reducing agents.

VIII. CONTROL MEASURES:

A. Engineering Controls:

Store lead/acid batteries with adequate ventilation. Room ventilation is required for batteries utilized for standby power generation. Never recharge batteries in an unventilated, enclosed space.

B. Work Practices:

Do not remove vent covers. Follow shipping and handling instructions which are applicable to the battery type. To avoid damage to terminals and seals, do not double-stack industrial batteries.

C. Personal Protective Equipment:

1. Respiratory Protection: None required under normal handling conditions. During battery formation (high-rate charge condition), acid mist can be generated which may cause respiratory irritation. Also, if acid spillage occurs in a confined space, exposure may occur. If irritation occurs, wear a respirator suitable for protection against acid mist.

2. Eyes and Face: Chemical splash goggles are preferred. Also acceptable are "visor-gogs" or a chemical face shield worn over safety glasses.

3. Hands, Arms, Body: Vinyl coated, VC, gauntlet type gloves with rough finish are preferred.

4. Other Special Clothing and Equipment: Safety shoes are recommended when handling batteries. All footwear must meet requirements of ANSI Z41.1 -Rev. 1972.

IX. ACCIDENTAL RELEASE MEASURES:

A. Not applicable under normal conditions.

B. In case of damage resulting in breakage of the battery container, see VIII, Sec. C Personal Protective Equipment.

X. PRECAUTIONS FOR SAFE HANDLING AND USE:

A. Hygiene Practices: Following contact with internal battery components, wash hands thoroughly before eating, drinking, or smoking.

B. Respiratory Protection: Wear safety glasses. Do not permit flames or sparks in the vicinity of battery(s). If battery electrolyte (acid) comes in contact with clothing, discard clothing.

C. Protective Measures:

1. Remove combustible materials and all sources of ignition. Cover spills with soda ash (sodium carbonate) or quicklime (calcium oxide). Mix well. Make certain mixture is neutral, then collect residue and place in a drum or other suitable container. Dispose of as hazardous waste.

2. Wear acid-resistant boots, chemical face shield, chemical splash goggles, and acid-resistant gloves. Do not release unneutralized acid.

D. Waste Disposal Method (*):

1. Battery electrolyte (acid): Neutralize as above for a spill, collect residue, and place in a drum or suitable container. Dispose of as hazardous waste.

2. Do not flush lead contaminated acid to sewer.

3. In case of accidental spill, utilize personal protective equipment, i.e., face shield, rubber apron, rubber safety shoes.

4. Batteries: Send to lead smelter for reclamation following applicable Federal, State and local regulations. Product can be recycled along with automotive (SLI) lead acid batteries.

5. Battery may be returned, shipping pre-paid, to the manufacturer or any distributor for recycling. See 1.C for manufacturer's address or visit our web site @ www.northstarbattery.com.

*In accordance to Local, State and Federal regulations and laws.

E. Other Handling and Storage Precautions: None Required.

XI. ECOLOGICAL INFORMATION:

Lead and its compounds can pose a threat if released to the environment.
See Waste Disposal Method in Section X, Part D.

XII. NFPA HAZARD RATING: SULFURIC ACID:

Flammability (Red)	=	0
Health (Blue)	=	3
Reactivity (Yellow)	=	1

XIII. DEPARTMENT OF TRANSPORTATION AND INTERNATIONAL SHIPPING REGULATIONS:

Proper Shipping Name	UN2800 - Battery, wet, non-spillable (electric storage)
IATA	Batteries must be packed to protect against short circuits and firmly secured to skids or pallets. Packaging instruction 806 Not restricted per special provision A67.
US DOT	Northstar Battery Company products, submitted and tested by Wyle Labs, have been deemed to meet all requirements as specified in 49CFR§ 173.159 (d) for exception as hazardous material classification.
IMDG	Northstar Battery Company products, submitted and tested by Wyle Labs, have been deemed to meet all requirements as specified in special provision 238 for determination of “Non-Spillable” and are not subject to the provision of this Code.

XIV. SPECIAL REQUIREMENTS:

TLV

- Sulfuric Acid - Occupation Exposure Limit - AUSTRALIA TWA 1mg/m3,JAN1993
- Lead - Occupation Exposure Limit - AUSTRALIA TWA 0.15 mg/m3, 2002

NorthStar Battery Lead and Acid Weights per 12-Volt Module

Battery Type			NSB13	NSB40	NSB70	NSB75	NSB90	NSB125	NSB40FT	NSB60FT	NSB90FT	NSB100FT	NSB100BT NSB100 BLUE	NSB110FT	NSB130FT	NSB155FT	NSB170FT	NSB170BT NSB170 BLUE
Electrolyte	Weight	/kg	0.8	2.7	4.5	4.5	6.2	8.5	2.4	3.8	5.3	6.1	6.1	6.8	8.1	9.9	10.5	10.5
		/lbs	1.8	5.9	9.9	9.9	13.8	18.6	5.3	8.3	11.6	13.4	13.4	14.9	17.8	21.8	23.2	23.2
	Volume	/litres	0.6	2.0	3.4	3.4	4.7	6.3	1.8	2.8	3.9	4.5	4.5	5.0	6.0	7.4	7.8	7.8
		/gallons	0.2	0.5	0.9	0.9	1.2	1.7	0.5	0.7	1.0	1.2	1.2	1.3	1.6	2.0	2.08	2.08
Acid	Weight	/kg	0.4	1.2	2.0	2.0	2.8	3.8	1.1	1.7	2.4	2.8	2.8	3.0	3.6	4.4	4.8	4.8
		/lbs	0.8	2.6	4.3	4.4	6.2	8.4	2.4	3.7	5.2	6.1	6.1	6.7	8.0	9.7	10.5	10.5
	Volume	/litres	0.2	0.6	1.1	1.1	1.5	2.1	0.6	0.9	1.3	1.5	1.5	1.7	2.0	2.4	2.6	2.6
		/gallons	0.1	0.2	0.3	0.3	0.4	0.6	0.2	0.2	0.3	0.4	0.4	0.4	0.5	0.6	0.7	0.7
	% Acid Weight to Total Weight		7%	7%	7%	7%	8%	8%	8%	8%	8%	8%	8%	8%	8%	8%	8%	8%
Lead	Weight	/kg	2.3	8.9	14.9	14.6	19.7	22.0	7.2	9.8	13.6	15.6	15.6	18.4	20.5	23.2	26.6	26.6
		/lbs	6.4	19.7	32.9	32.2	43.5	48.4	15.8	21.7	30.0	34.5	34.5	40.6	45.1	51.1	58.7	58.7
Lead Oxide	Weight	/kg	1.7	3.2	4.7	5.3	7.5	10.4	3.0	4.7	6.3	8.0	8.0	8.4	10.1	11.4	13.6	13.6
		/lbs	2.3	7.0	10.4	11.7	16.5	23.0	6.5	10.3	13.9	17.7	17.7	18.6	22.2	25.2	29.9	29.9
Cells	# of Cells		6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6
Total Weight	Weight	/kg	5.7	16.3	26.8	26.7	35.4	44.3	14.1	21.6	30.5	33.5	33.5	38.7	43.4	51.9	58.2	58.2
		/lbs	11.7	36.0	59.0	59.0	78.0	98.0	31.0	48.0	67.0	74.0	74.0	85.0	96.0	114.0	128.0	128.0

NorthStar UPS Battery Lead and Acid Weights per 12-Volt Module

Battery Type			NSB 12-180	NSB 12-330	NSB 12-270	NSB 12-370	NSB 12-475	NSB 12-150FT	NSB 12-330FT	NSB 12-380FT	NSB 12-450FT	NSB 12-600FT
Electrolyte	Weight	/kg	2.7	4.5	4.5	6.2	8.5	2.4	5.3	6.1	6.8	10.5
		/lbs	5.9	9.9	9.9	13.8	18.6	5.3	11.6	13.4	14.9	23.2
	Volume	/litres	2.0	3.4	3.4	4.7	6.3	1.8	3.9	4.5	5.0	7.8
		/gallons	0.5	0.9	0.9	1.2	1.7	0.5	1.0	1.2	1.3	2.08
Acid	Weight	/kg	1.2	2.0	2.0	2.8	3.8	1.1	2.4	2.8	3.0	4.8
		/lbs	2.6	4.3	4.4	6.2	8.4	2.4	5.2	6.1	6.7	10.5
	Volume	/litres	0.6	1.1	1.1	1.5	2.1	0.6	1.3	1.5	1.7	2.6
		/gallons	0.2	0.3	0.3	0.4	0.6	0.2	0.3	0.4	0.4	0.7
	% Acid Weight to Total Weight		7%	7%	7%	8%	8%	8%	8%	8%	8%	8%
Lead	Weight	/kg	8.9	14.9	14.6	19.7	22.0	7.2	13.6	15.6	18.4	26.6
		/lbs	19.7	32.9	32.2	43.5	48.4	15.8	30.0	34.5	40.6	58.7
Lead Oxide	Weight	/kg	3.2	4.7	5.3	7.5	10.4	3.0	6.3	8.0	8.4	13.6
		/lbs	7.0	10.4	11.7	16.5	23.0	6.5	13.9	17.7	18.6	29.9
Cells	# of Cells		6	6	6	6	6	6	6	6	6	6
Total Weight	Weight	/kg	16.3	26.8	26.7	35.4	44.3	14.1	30.5	33.5	38.7	58.2
		/lbs	36.0	59.0	59.0	78.0	98.0	31.0	67.0	74.0	85.0	128.0

NorthStar Marine Battery Lead and Acid Weights per 12-Volt Module

Battery Type			NSBM 12-70	NSBM 12-100	NSBM 12-115	NSBM 12-130	NSBM 12-210
Electrolyte	Weight	/kg	3.8	5.3	6.1	6.8	10.5
		/lbs	8.3	11.6	13.4	14.9	23.2
	Volume	/litres	2.8	3.9	4.5	5.0	7.8
		/gallons	0.7	1.0	1.2	1.3	2.08
Acid	Weight	/kg	1.7	2.4	2.8	3.0	4.8
		/lbs	3.7	5.2	6.1	6.7	10.5
	Volume	/litres	0.9	1.3	1.5	1.7	2.6
		/gallons	0.2	0.3	0.4	0.4	0.7
	% Acid Weight to Total Weight		8%	8%	8%	8%	8%
Lead	Weight	/kg	9.8	13.6	15.6	18.4	26.6
		/lbs	21.7	30.0	34.5	40.6	58.7
Lead Oxide	Weight	/kg	4.7	6.3	8.0	8.4	13.6
		/lbs	10.3	13.9	17.7	18.6	29.9
Cells	# of Cells		6	6	6	6	6
Total Weight	Weight	/kg	21.6	30.5	33.5	38.7	58.2
		/lbs	48.0	67.0	74.0	85.0	128.0

NorthStar Engine Start Battery Lead and Acid Weights per 12-Volt Module

Battery Type			NSBG-2200	NSBG-2700	NSBG-2400	NSBG-3100
Electrolyte	Weight	/kg	2.7	4.5	4.5	6.2
		/lbs	5.9	9.9	9.9	13.8
	Volume	/litres	2.0	3.4	3.4	4.7
		/gallons	0.5	0.9	0.9	1.2
Acid	Weight	/kg	1.2	2.0	2.0	2.8
		/lbs	2.6	4.3	4.4	6.2
	Volume	/litres	0.6	1.1	1.1	1.5
		/gallons	0.2	0.3	0.3	0.4
	% Acid Weight to Total Weight		7%	7%	7%	8%
Lead	Weight	/kg	8.9	14.9	14.6	19.7
		/lbs	19.7	32.9	32.2	43.5
Lead Oxide	Weight	/kg	3.2	4.7	5.3	7.5
		/lbs	7.0	10.4	11.7	16.5
Cells	# of Cells		6	6	6	6
Total Weight	Weight	/kg	16.3	26.8	26.7	35.4
		/lbs	36.0	59.0	59.0	78.0

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NorthStar Battery Installation and Operation Guide

10-year Design Life at 2.27±0.02 VPC @ 25°C to 80% of C/10 Capacity

To help us better serve you, please visit our web site at www.northstarbattery.com/survey and complete our Customer Survey. We value and appreciate your input.

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Index

1 Battery Safety

For full information please read the MSDS (Material Safety Data Sheet). The MSDS document may be downloaded from the Internet at:

http://www.northstarbattery.com/MSD-430-01.pdf

When dealing with VRLA (Valve Regulated Lead Acid Batteries) some additional safety information is required.

1.1 Electrical Safety

The battery terminals are always energized and, if short-circuited, release of harmful electrical energy may occur which can injure personnel or damage equipment. Keep bare conductors away from the battery until the batteries are positioned in their final position where the battery shall be connected using the designated conductors. Keep the protective covers on!

1.2 Large Weight

The batteries are heavy objects. If they are dropped physical damage to persons can occur. A dropped battery may also expose the poisonous and corrosive contents of the battery's interior. Damage from a battery, which has been dropped, may not be visible to the human eye. The interior casing of the battery could be damaged. Never install a battery that has been dropped.

Use proper lifting procedures and the handles for lifting and carrying the batteries.

1.3 Chemical Hazards

The batteries contain concentrated sulfuric acid in water. If any fluid is found outside of the batteries it should be regarded as acid. Please observe that acid that gets on the skin does not feel cool like a stain of water. If there is suspicion of leaked or spilled acid keep a close look at clothes and hands for signs of acid. Normally there is some time before acid comes on the skin and the stinging sets in, by wiping off the acid early and rinsing early damage can be limited.

Should that fluid come in contact with a person, follow the instructions for flushing eyes or skin with water contained in the MSDS and immediately seek medical assistance. Discard clothing that has become contaminated with the battery's sulfuric acid.

Always use protective goggles when handling lead acid batteries!

Always keep a source of water and pieces of cloth or tissue paper at hand!

It is highly preferable to use acid resistant clothing and protective gloves!

Do not smoke or use open flame when handling the batteries!

Do not use garments or other things that generate static electricity!

Batteries will vent hydrogen gas from time to time. This gas, which is flammable, exits the batteries through designated ports. Sources of ignition shall be kept away from these ports.

1.4 Old Batteries

Batteries which have reached their EOL (End of Life) should be removed from the application they are in and disposed of in accordance with federal, state, and local laws concerning the handling of hazardous materials and the environment. EOL is an industry defined term for VRLA batteries which indicates that the battery has only 80% of it's original capacity left. Use of a VRLA battery after it's effective EOL results in an increased rate of grid growth on both the positive plate increasing the internal resistance of the battery. This grid growth can lead to damage of the battery case and to the application within which the battery is placed.

Additionally, it is possible with time that a battery which has passed it's end of life could, but not necessarily will, result in the possibility of thermal runaway. Thermal runaway is the rapid increase of heat within a battery, which can cause the battery case to become soft and distort leading to the possibility of electrolyte leakage.

1.5 Cleaning and Chemicals

Do not use chemical compounds to clean batteries. The chemicals in many commercial cleaning compounds can damage the battery case and cause a leakage of sulfuric acid. If the battery needs to be cleaned, use a moist cloth that has had the moisture wrung out of it.

Do not use chemical insect sprays in areas where VRLA batteries are stored. The chemicals in inspect sprays will damage the battery case and could cause a leakage of sulfuric acid.

Do not move the batteries using the battery terminals. This increases the chance of personal electric shock, but could also damage the positive and negative plates in the

battery leading to internal short circuits, damage of the battery case and the leakage of sulfuric acid.

Always store the batteries in a cool environment. Never store batteries in an environment whose temperature is > +30° C (> +86°F). High temperatures reduce the life of VRLA batteries. For more information see the section on Storage and Handling.

2 Determining Battery Manufacturing Date

It is important to be able to determine the manufacturing date of a battery. Knowing this manufacturing date, and the date when the battery was received, or placed in storage, together can help determine when, or if, a battery will require recharge prior to installing into its final application.

The manufacturing codes for NorthStar batteries are located in two places on the battery case.

1. On the front of the battery (to the left in figure 1).
2. On the right hand side towards the rear of the battery (to the right in figure 1).

Batteries manufactured prior to July 2005 are only marked on the right rear side of the battery case.

Figure 1 Location of manufacturing labels on NSB batteries

Manufacturing codes are limited to 12 alpha-numeric digits. There are two formats of manufacturing code serial numbers, one created prior to and another created after January 2009.

Format 1 (manufactured prior to January 2009)

Manufacturing serial number example: A08310632031

A = A letter which specifies the battery model

The remaining digits are interpreted using the format below:
MMDDYYXXXXX
MM = Month
DD = Date
YY = Year
XXXXX = Individual battery serial number

Using the example shown above, the serial number is interpreted as: model number NSB100FT battery manufactured on (083106) August 31, 2006 with individual serial number of (32031) 32031.

Format 2 (manufactured after January 2009)

Taking the example from Figure 1 above, it can be interpreted as follows:

SA1090781486
SA = First two digits specify the battery model
1 = Manufacturing Facility (Plant NSBI = 1, Plant NSBII = 2)

The remaining digits are interpreted using the format below:
YY = Year
XXX = Three-digit Julian calendar date (manufacturing date)
XXXX = Individual battery serial number

The example of serial number in Figure 1, SA1090781486 can be interpreted as: model number NSB110FT battery manufactured in NSB Plant 1 in 2009 (09), on the 78th day of the Julian calendar or on March 19, with an individual serial number of 1486.

3 Handling

In addition to safety requirements (see the Safety section) special care should be taken when handling batteries. The following are some do's and don'ts.

3.1 Do

- Always use the handles on the batteries when lifting or carrying them.
- Always have a straight back and lift using your legs when lifting or carrying batteries.

- Always have appropriate safety gear (see safety section) available when handling batteries.
- Always perform an OCV (Open Circuit Voltage) check on a battery PRIOR to installation. The application into which the battery is to be installed may have a function, which precludes the batteries from being connected to the system if the OCV is too low.
- Always perform a visual inspection of the battery prior to handling. If any damage, or electrolyte leakage is detected during this inspection **DO NOT INSTALL THE BATTERY!**
- Always use the battery packing from new batteries for transporting old batteries for proper disposal. Having the batteries loose during transportation can lead to either an inadvertent discharge of the batteries, or to damage of the batteries and electrolyte leakage.
- Always dispose of batteries in accordance with local and national requirements.
- Always use a mechanical lifting device such as a fork lift when lifting a crate with batteries in it. A crate weighs in excess of 140 kgs (309 lbs).
- Always follow the instructions provided with the batteries when installing them.
- Always use insulated tools when handling batteries. Failure to do so can lead to electric shock and injury to either personnel or equipment.

3.2 Don't

- Never drag a battery along the floor. Doing so could cause damage to the battery case leading to a possible leakage of electrolyte and damage to personnel or equipment.
- Never install a battery into any application that has been dropped. A dropped battery could have damage to either its internal or external casing leading to a possible leakage of electrolyte and damage to equipment.
- Never make the final connection to an application until all batteries in the string have had their interconnections finished. The batteries contain a large amount of stored energy, and can cause damage to personnel or equipment from an energy discharge.
- Never dispose of batteries in unapproved sites. The batteries contain sulfuric acid and compounds of lead that are harmful to nature and can contaminate the environment if not disposed of properly.
- Never drill, or in any other way attempt to breach the battery case. Doing so could lead to a possible leakage of electrolyte and damage to personnel or equipment.
- Never force a battery into equipment. Forcing the battery into equipment can lead to a breach in the battery's internal or external casing causing a possible leakage or electrolyte or electrical short circuit causing with injury to personnel and damage to equipment.

4 Storage

Below is a list of equipment that is recommended to be on hand in the area where batteries are stored.

1. DC volt meter
2. Battery chargers (a normal car battery charger, purchased locally, is sufficient)
3. Mechanical lifting device (such as a fork lift etc)

In addition to the above equipment, proper safety equipment should be on hand whenever batteries are handled. A listing of the proper equipment, clothing, and materials needed to clean any acid spill can be found in the MSDS (Material Safety Data Sheet) located on the Internet at:

http://www.northstarbattery.com/MSD-430-01.pdf

When received a visual check should be made on the batteries. If the batteries show transportation damage, physical damage to the battery case, leaking electrolyte etc., they should not be installed, but a claim should be initiated immediately.

The OCV should also be checked when a battery is received, and just before installation. A low OCV could indicate that a charge may be required. The Performance Calculation Program gives the charging time needed to achieve a SOC (State of Charge) >95% as a function of voltage. The Performance Calculation Program is available by contacting NorthStar Customer Service at +1 (417) 575-8201.

The float charging voltage shall be 13.62 V per battery provided that the temperature is a nominal +25°C (+77°F). Ranges of +20°C - +30°C (+68°F - +86°F) are acceptable. For UPS equipment multiply the voltage with the number of blocs. If the temperature varies strongly, please consult the manufacturer's (NorthStar) application manual. The manual can be found on the Internet at:

http://www.northstarbattery.com/SES-544-01.pdf

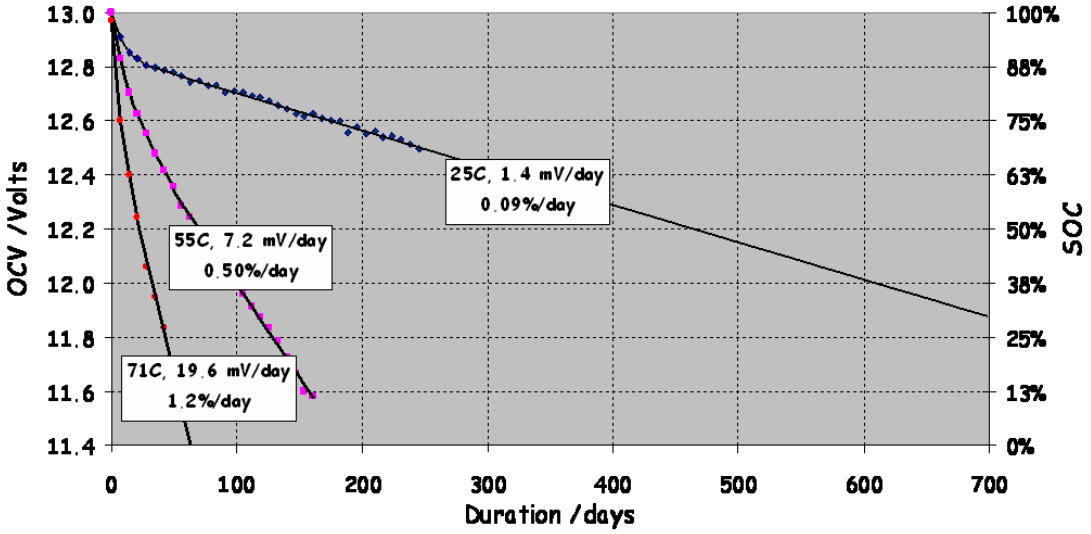
The batteries should be stored in the containers in which they were shipped, but if removed, make sure that the batteries are all evenly spaced, aligned and rest on a flat surface while being stored. It is strongly recommended that the surface the batteries rest on be an acid resistant electrically insulated surface. In some markets, this is a requirement.

Figure 2 Different ways to correctly store batteries

4.1 Storage Life

The storage life of NSB batteries while in storage is 2 years at +25°C (+77°F). The manufacturer's recommendation is that batteries be stored in a cool dry place, away from an ignition source, and properly ventilated. However, many storage facilities are not climate controlled, and due to this, the storage life of a NSB battery may be significantly less than 2 years. This is why it is vital that the OCV of a battery is checked before it is sent to site for installation and if the OCV is found to be low, the battery MUST be recharged before installing. Failure to perform the OCV check, and recharge as necessary, may mean that the battery will not function properly at commissioning.

Graph 1 below shows that the storage life of a battery is reduced as the temperature is increased above +25°C (+77°F).



Graph 1 Open-circuit voltage (OCV) state-of-charge (SOC) of a NSB battery in relation to ambient temperature

5 Installation

Always use the installation instructions provided with the batteries and follow all outlines for safety and handling mentioned earlier in this document.

5.1 Unpacking the Batteries

Make sure the shipment has no transportation damage. If there should be transportation damage the batteries may not be fit for service. Contact the battery distributor in that case.

Make sure all the accessories are present in the delivery. Please observe the cardboard material around the batteries has no bottom! The cardboard should be removed prior to lifting the batteries.

If the batteries cannot be put into place directly in the end application and need to be put on the floor/ground, put some of the cardboard material under them in order to protect the battery from hard surfaces. An alternative material is to use the top of the crate that the batteries were shipped it.

5.2 Checking the Battery Voltage on Arrival

Measure the voltage of the batteries. Depending on the voltage of the batteries the batteries might need a charge with a higher voltage initially. Table 1 gives the charging time needed to achieve above 95% state of charge as a function of voltage.

OCV	Charge
>12,80 V	Overnight charge at float voltage
12,6-12,8 V	3 days of charging
12,3-12,6 V	24 h of charging at 14,4 V
12,1-12,3 V	72 h of charging at 14,4 V

Table 1 Charge times in relation to OCV

5.3 Checking the Voltage Spread

Before connecting the batteries in series the voltage variation must be checked. If the voltage varies more than 0,15 V the batteries should be charged individually before being connected in series.

Alternatively the batteries may be matched in each string so that all the batteries with voltage spread less than 0,15V.

5.4 Putting the Batteries in Place

Make sure the batteries are all evenly spaced, aligned and rest on a flat surface. It is strongly recommended that the surface the batteries rest on shall be an acid resistant electrically insulated surface. (On some markets this is a requirement).

5.5 Connecting the Batteries

The batteries shall be connected into series using the cable and connectors designed for the particular layout of your delivery. We refer to the particular layout of the system. Please observe the risk for arcing and high currents when connecting the battery string to the system. Preferably the last connection should be made at distance from the battery string. If the system comprises a battery circuit breaker or any other means of disconnection this shall be in an off condition when connecting the battery to the system. A torque wrench must be used for tightening the bolts on the battery. The covers shall be put back after all connections have been completed. Please observe that when heavy cables are use these need to be supported in order not to stress the battery terminals.

5.6 Putting the Battery Into Service

Depending on the voltage of the batteries at the time of installation charge at elevated voltage may be needed. Please consult the table above.

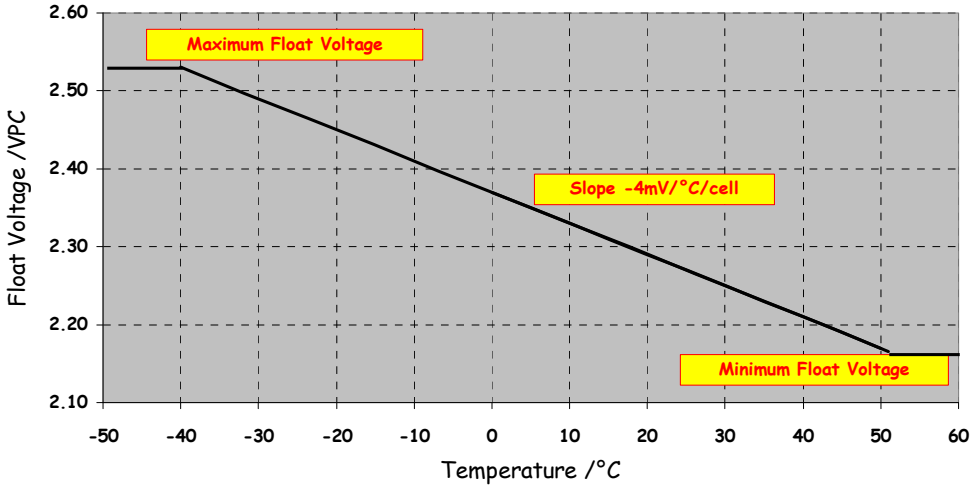
5.7 Charging Voltage

In order to achieve the design life, the recommended float charging voltage must be employed. The recommended float voltage is 2.27 ± 0.02 VPC @ 25°C; this equates to 13.62 V per battery provided that the temperature will be close to 25°C (20-30°C). For other temperature please refer to our table below. If temperature varies strongly please consult our application manual. For UPS equipment multiply the voltage with the number of blocs.

T °C	U(float) V	24 V	48 V
20	13,74	27,5	55,0
25	13,62	27,2	54,5
30	13,50	27,0	54,0
35	13,38	26,8	53,5

Table 2 OCV limits in relation to temperature

The graph below shows the float voltage per cell. Depending upon the string configuration, the voltages below should be multiplied by 6, 12 or 24.



Graph 2 Float voltage per cell

6 Operation

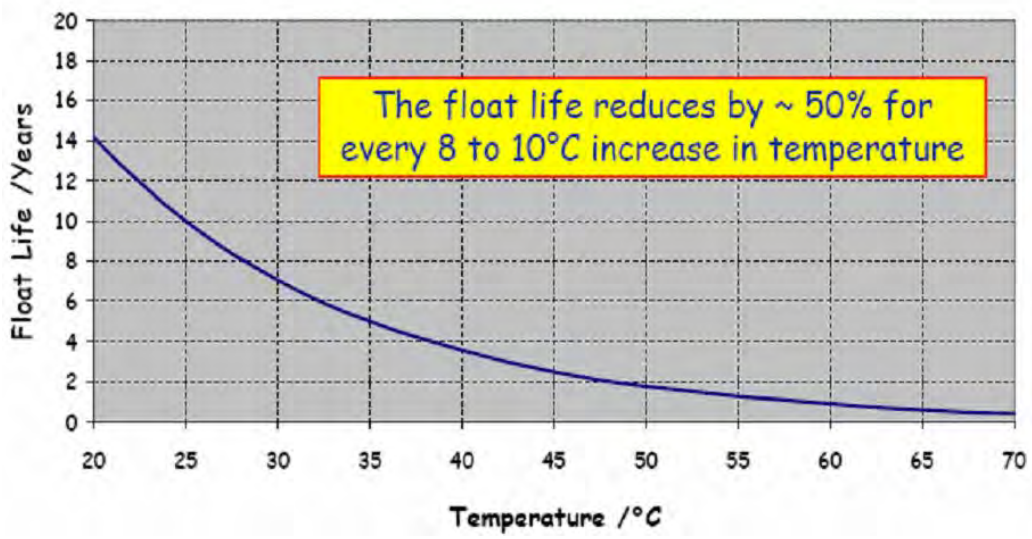
This section describes how several parameters affect the float life of Valve Regulated Lead Acid (VRLA) batteries. Batteries once charged, have a constant chemical reaction occurring regardless of whether they are installed or not. In storage, depending upon temperature, it may be necessary to check the OCV of batteries every 3 months. In an application, as a minimum, the OCV should be checked annually, but certain applications may require more frequent maintenance.

Use the information below to estimate battery float life. The practical life of a battery is strongly influenced by the operating conditions for the specific installation. The main factors are:

- Temperature (both of the battery itself, and it's operating environment)
- Number and depth of discharges

6.1 Effects of Temperature on Float Life

High battery and/or battery environment temperatures are one of the main causes of battery aging. An additional factor, no less influential, is the number and depth of discharges.



Graph 3 Effect on battery life by temperature

A good rule of thumb on the relation of temperature to float life is that for every approximately 10°C (18°F) increase in temperature reduces the float life by 50%. This is illustrated in the top graph above.

The end of life for any VRLA battery is industry defined as the battery having reached 80% of its rated capacity. After a VRLA battery reaches 80% of its rated capacity, the capacity loss increases dramatically. Additionally, the resistance between the positive and negative grids within the battery increases. This creates more heat and could lead to thermal runaway. Also, the subsequent grid growth on the positive plate increases pressure on the case. The main point to remember about a VRLA battery's EOL is:

NEVER OPERATE A VRLA BATTERY PAST IT'S EOL!!!!!!!!!!!!

6.2 Effects of Cycling on Float Life

The cycling effects on float life of a battery are dependent upon two discharge factors. These factors are:

1. DOD (Depth of Discharge)
2. The number of discharge cycles

The two graphs below illustrate these points.

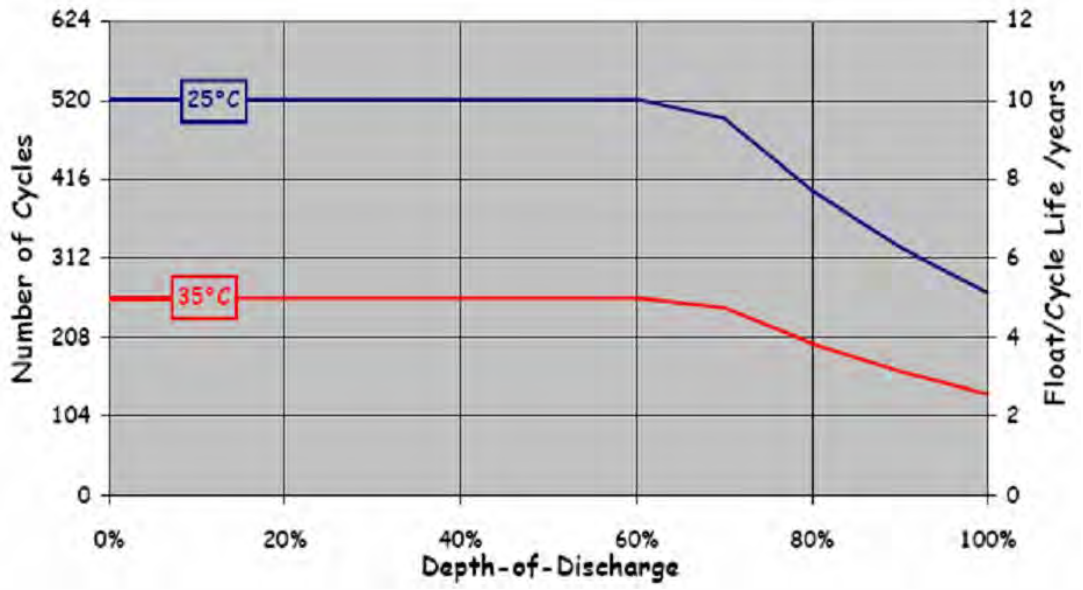


Figure 3 Effect on number of cycles by temperature and DOD

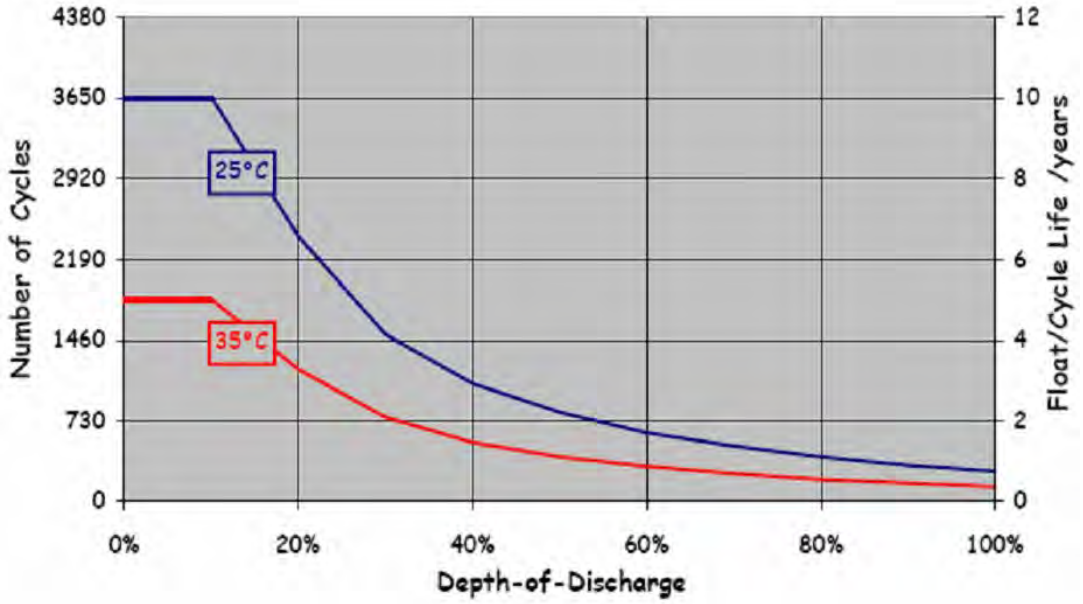


Figure 4 Effect on number of cycles by temperature and DOD

The top graph above shows that the effect cycling has on the float life starts at a DOD value greater than 60%. The graph also shows that the estimated battery float life is about 4 years, compared with 5 years at 35°C (95°F) for batteries with no cycling effects, that is a DOD of less than 60%.

The graph below it shows that the float life is influenced by the cycling effects at a much lower DOD value of 10% due to the 7 times higher cycle rate. The estimated battery float life is about 2 years, compared with 5 years at 35°C (95°F) for batteries with no cycling effects, that is a DOD of less than 10%.

7 Testing

NorthStar Battery LLC endorses the use of the Midtronics Celltron-Ultra meter as a state-of-health tool for their range of batteries. A conductance manual detailing the principals behind conductance testing, the full rage of NSB conductance values, what the limitations are and how to use the device in a correct manner can be downloaded from the Internet at:

http://www.northstarbattery.com/Conductance_Manual.pdf

8 Abbreviations

°C	Degrees Celsius
DC	Direct Current
EOL	End of Life (of a battery)
Etc	Et Cetera
°F	Degrees Fahrenheit
Kgs	Kilograms
Lbs	Pounds
MSDS	Material Safety Data Sheet
NSB	NorthStar Battery
OCV	Open Circuit Voltage
SOC	State of Charge (of a battery)
V	Volt
VRLA	Valve Regulated Lead Acid (Battery)