ECO-SITE/T-MOBILE APPLICATION
4:1 SEPARATION REQUIREMENT WAIVER REQUEST

This information is submitted in support of the Applicants' request for a waiver authorized under Section 10.600.F.3.c.(3) of the City's Unified Development Ordinance ("UDO").

The City of Lee's Summit ("City") has adopted setback and separation distance requirements for telecommunication towers/antennas as follows:

> Section 10.600. Telecommunication towers/antennas
>
> F. General requirements:
>
> 3. Special use permit. A telecommunications tower shall be subject to a special use permit, in accordance with the following considerations:
>
> a. Setbacks. No new tower shall be constructed without setbacks from all property lines a distance equal to the height of the tower as measured from the base of the structure to its highest point **(1:1 setback)** or as otherwise authorized by the Governing Body in approval of the special use permit. Accessory structures shall be governed by the setbacks for that particular zoning district. **(Emphasis added)**.
>
> c. Separation Distances. The following are the required separation distances from other towers and residential:
>
> (2) A telecommunications tower shall be located a distance of four (4) times the tower height from any existing single-family or two-family dwelling that is not on the same lot with the tower, any property zoned for single-family or two-family residential use, and any property where the future use indicated by the Comprehensive Plan is low density residential use **(4:1 separation requirement)**. **(Emphasis added)**.
>
> (3) **This requirement may be waived if it is found to effectively prevent the provision of wireless telecommunications services within the City. (Emphasis added).**

As detailed below, Applicant has determined that T-Mobile has a significant gap in its network wireless coverage and network capacity in this area of Lee's Summit and that the Proposed Site (defined below) is the only available site to resolve these network deficiency issues. No other alternative sites are available to remedy these issues. There are no existing support structures of any kind in the Search Area (defined below) and therefore no collocation opportunities available to remedy the network deficiencies.

There are no properties in the Search Area that are "available" (defined below). The Proposed Site meets the UDO 1:1 setback requirement but does not meet the 4:1 separation requirement in

relation to residential property located north of the Proposed Site. The 4:1 separation requirement needed for the Proposed Site is 330' (75' tall tower x 4). The actual separation distance in this case is 134'. The Applicants respectfully request the City grant a waiver of 166' from the 4:1 separation requirement.

Wireless communications systems rely on an overlapping and interconnected network of wireless facilities, or WCF's. WCFs are comprised of radio antennas together with other necessary electronic equipment that receive and transmit low-power radio signals to and from mobile wireless devices, thereby facilitating wireless communications. For the system to function without "gaps" in radio signal coverage and network capacity, the WCF's must be properly located, installed and functioning. If there is no properly functioning WCF within a given area, wireless service will be significantly impaired for customers within such areas. These wireless customers will experience unacceptable levels of wireless service, including failed attempts, busy signals, dropped calls and lack of data transmission.

A WCF must be located on a support structure that is of sufficient height to transmit and receive radio signals and located within a specific geographical area to provide line-of-sight communications with wireless devices. Each WCF has a limited maximum coverage area and limited maximum capacity, the extent of which varies depending upon several factors, including the antenna height, local topography, configuration of various existing structures and population densities.

T-Mobile's radio frequency ("RF") engineers determined that a significant gap in its network wireless coverage and network capacity exists in and around this area of Lee's Summit. See T-Mobile RF Report attached as Addendum 1. To remediate these network deficiencies, T-Mobile engaged Eco-Site to construct a WCF facility in this area of Lee's Summit. The T-Mobile RF engineers defined a geographic area called a "Search Area" near which the new WCF should be located.

Eco-Site engaged the services of SSC to canvass the Search Area to determine if there were any existing support structures upon which the T-Mobile WCF could be collocated. SSC determined that there were no existing support structures of any kind in the Search Area and then canvassed the various tracts of land in the Search Area to investigate whether any of those tracts were "available" to build a new support structure to accommodate T-Mobile's WCF. To be "available" means the land tract (1) is located in the Search Area; (2) meets the requirements of the City's zoning regulations for a WCF; (3) contains sufficient land area to construct a WCF; and (4) the landowner is willing to lease the land under mutually agreeable terms. If the land tract cannot meet all 4 requirements, then it is NOT available for development of a WCF.

After a thorough investigation and serious consideration of all feasible alternative sites, T-Mobile and Eco-Site determined that the Proposed Site is the only site in the Search Area that is "available" for development of a new WCF.

The proposed location of the WCF is legally described is located at 244 NW Executive Way, Lee's Summit and is legally described as follows:

Lot 6, Parkway Plaza, 2nd Plat, Jackson County, Missouri (the "Proposed Site").

The other alternative locations in the Search Area and the reasons they were not available are described below. An aerial map showing the Search Area, the Proposed Site, and the alternative locations is attached as Addendum 2.

1. **Hearth & Home:** There are no undeveloped areas that are practically capable of supporting a new WCF on this property. The property owner refused to allow a new WCF on the undeveloped northern portion of the property. The only other possible location would be along the east side of the property, which does not meet the UDO 1:1 setback requirement. Additionally, there is a significant drainage "ditch" in this area and insufficient ground space available to construct a WCF on this side of the property.

2. **Park Lane West Condominiums:** There are no undeveloped areas that are practically capable of supporting a new WCF on this property. The only undeveloped space is a small green space in the pool/courtyard area that serves as an amenity for the residents. The owner would not approve a new WCF to be constructed in this area. Additionally, this area would not meet either the UDO 1:1 setback or 4:1 separation requirement. Finally, placing a WCF on residential property is not preferred, according to the UDO, due to perceived visual impacts.

3. **Don Kahan Motors**: Multiple attempts were made to contact the owner but the owner was non-responsive.

4. **Summit Park**: There are no undeveloped areas that are practically capable of supporting a new WCF on this property. The west side of the park is developed with a parking lot and active uses (tennis court, ball field, etc.). The only potential option would be to place the WCF in the eastern portion of the property which would be much closer to and in very plain site of multiple single-family houses adjacent to the east side of the park. Additionally, this area of the property would not meet either the UDO 1:1 setback or 4:1 separation requirement.

5. **Summit Shopping Center**: Multiple attempts were made to contact the owner but the owner was non-responsive.

6. **John Knox Village:** There are no undeveloped areas that are practically capable of supporting a new WCF on this property. Also, placing a WCF on residential property is not preferred, according to the UDO, due to perceived visual impacts. Additionally, most areas on the property would not meet both the UDO 1:1 setback and the 4:1 separation requirement.

7. **First Presbyterian Church**: The owner refused to allow a WCF on the only undeveloped portion of the property, which is on the north side. This area is close to and in very plain site of multiple single-family houses adjacent to the west side of the property. Additionally, this area would not meet either the UDO 1:1 setback or 4:1 separation requirement.

8. **Our Lady of the Presentation Catholic Church**: The owner refused to allow a WCF on the only undeveloped portion of the property, which is on the west side. This area is close to and in very plain site of multiple single-family houses adjacent to the west side of the property. Additionally, this area of the property would not meet either the UDO 1:1 setback or 4:1 separation requirement.

For the reasons stated above, these alternative sites were not "available" according to the 4 criteria above. The Proposed Site is the only site meeting all 4 criteria. Denial of the waiver would effectively prevent the provision of wireless telecommunications services within the City.

ADDENDUM 1

AFFIDAVIT

STATE OF KANSAS)
) ss.
COUNTY OF JOHNSON)

I, Russell Pope, being of lawful age and duly sworn upon oath, depose and state as follows:

1. I am the RF Manager for T-Mobile Central LLC d/b/a T-Mobile (hereinafter "T-Mobile") in the Kansas and Missouri markets. I have a Bachelor of Science in Electrical Engineering from the University of Kansas, and have been working in the telecommunications industry for over 22 years, with over 20 years in RF engineering at T-Mobile.

2. This Affidavit is intended to support and will accompany an Application for a Special Use Permit to be filed with the Planning and Development Department of the City of Lee's Summit, Missouri (hereinafter "City") to construct, operate, and maintain a wireless telecommunications facility consisting of antennas on a proposed seventy-five (75) feet monopole tower and ground equipment contained within the proposed compound. T-Mobile will install antennas at a seventy (70) feet centerline on said tower and the site will be located within the leased area of the proposed special use permit on property situated at 244 NW Executive Way, Lee's Summit, Missouri 64063 ("Site" or "Facility").

3. This Affidavit is submitted for the purpose of complying with the City of Lee's Summit, Missouri Zoning Ordinance, which governs the procedure and requirements for authorizing Special Uses which authorizes Wireless Communication Towers and Antennae.

4. The purpose of this Affidavit is to explain and demonstrate T-Mobile's significant gap in service and the need for the Site to provide in-vehicle and in-building residential/commercial coverage and capacity necessary to support reliable voice and data services in the area surrounding the Site. In this report, I use key system performance indicator data and capacity charts to scientifically and reliably demonstrate T-Mobile's significant gap in reliable service in accordance with accepted methodology and standards.

5. T-Mobile is licensed by the Federal Communications Commission ("FCC") to operate its network in the 1900 MHz frequency band, 2100 MHz frequency band and the 700 MHz frequency band. T-Mobile currently operates "second generation," so-called 2G (GSM), 3G (UMTS) and 4G (LTE) technologies on these frequency bands. While all technology will eventually migrate to the LTE standard, T-Mobile must support its legacy network technology to allow users' wireless phones and devices to continue to operate as technology advances. Therefore, to implement new technologies, such as LTE, requires T-Mobile (and other wireless service providers) to re-allocate parts of their licensed spectrum for the new technology (4G) that is being shared by the older 2G and 3G networks. T-Mobile's spectrum holdings at 2100 MHz are best suited for deployment of

high speed LTE technology due to the 15 MHz channel bandwidth available. The significant gap in service, described further herein, is based upon a lack of system capacity in the 2100 MHz frequency band and LTE technology. As set forth below, my analysis demonstrates that the existing data usage in the commercial/residential areas near the proposed Facility is excessively high for T-Mobile's personal wireless facilities at surrounding sites to adequately accommodate, leading to a significant gap due to insufficient capacity to service T-Mobile's customers.

6. T-Mobile has a significant gap in reliable wireless service in the area of the Site. The gap in reliable in-vehicle and in-building service currently exists in the vicinity of the Site and is south of I-470 east from Pryor and west of Donavan Road along Highway 50 down to just north of 3rd Street.

7. A gap in reliable wireless service, which includes voice and/or data, can occur if there is: (i) a lack of reliable signal, including poor signal quality; and/or (ii) a lack of system capacity. Since T-Mobile operates on a limited number of radio frequencies licensed by the FCC, each wireless facility is capable of handling only a limited number of wireless users at any given time. T-Mobile's significant gap in this matter is due to a lack of system capacity. Providing quality in-vehicle and in-building voice and data services, with sufficient system capacity and high-speed data rates, is critical to T-Mobile's customers and is essential to T-Mobile's ability to compete effectively with its functionally equivalent competitors.

8. T-Mobile strives to provide all customers with a positive wireless voice and data experience. Simply put, a positive wireless experience includes the customer connecting to the network on their first try, staying connected throughout the call or data transmission, and the customer ending the call or data session when they are ready. For data connections, the speed is as fast as the technology allows. For LTE technology, all services (including voice) are performed as data communications. A gap in reliable service causes a negative experience: customers cannot place calls when they want to; and even when calls are connected, voice call quality does not meet customer expectations or they do not choose when to end the call; or, the call simply drops off (disconnects) without notice. The data experience is not instantaneous or is much slower than the customer requires. This overall customer experience is negative and it is inconsistent with the level of service T-Mobile strives to achieve. Gaps in service such as those present in this area of Lee's Summit are associated with poor or unreliable service due to capacity constraints on the surrounding sites, and thus result in a negative customer experience.

9. T-Mobile has a significant gap in service in the vicinity of the Site caused by a lack of capacity affecting both in-vehicle and in-building services. T-Mobile's significant gap in reliable wireless service is confirmed by reviewing existing site locations and key performance indicator data.

10. Signal strength is not the single most important objective when designing and operating 4G LTE networks; signal quality is of greater importance because the same frequencies are used at each adjoining site. Operating efficient LTE networks requires that signal interference among adjoining sites be strictly controlled. This is accomplished through proper site selection (location) and design (height). When users access the LTE network they are assigned finite LTE resources to perform various applications over the data channel. These applications consist of

voice, known as voice over LTE or ("VoLTE"), and broadband internet access services, such as streaming video, internet browsing, email, text messages, 911 calls and a host of future applications. The effect of an over-utilized LTE sector causes poor signal quality, resulting in significantly reduced throughput and the inability for users to access the LTE network (high access failure rate) all of which contribute to a significant gap in service.

11. To confirm T-Mobile's significant gap in service, I have evaluated Key System Performance Indicator Data ("KPI Data"). The KPI Data relied upon consists of downlink utilization. Downlink utilization is a measure of the percentage of physical resource blocks being assigned to users within the coverage area of each sector surrounding the Site. Sound RF engineering practices and standard industry practice dictate that capacity relief for a sector should be investigated when the utilization reaches 65%. Capacity relief is obtained through "cell splitting" which is the installation of another site and/or sectors of coverage to off-load the over-utilized surrounding sites. Such is the purpose and objective of the proposed Facility in this matter.

12. Attached hereto as Exhibit A is a chart that shows the trend of LTE 2100 downlink utilization for the T-Mobile facility near the Site. The chart demonstrates that the neighboring site, A5C0133A21, is experiencing over 65% utilization. Indeed, the chart shows that from May 2016 until approximately October 2016, utilization was at or above 80%. T-Mobile was able to temporarily achieve some improvement through adjustments to neighboring sites, but the chart clearly demonstrates that the trend is going back up and is now averaging above 65% utilization already. Those downlink utilization percentages thus demonstrate that T-Mobile has a significant gap in reliable wireless service in the area surrounding the Site due to insufficient system capacity that is recognizable now and will continue to worsen absent the proposed Facility.

13. The proposed height of the T-Mobile Facility is the minimum necessary to remedy T-Mobile's significant gap in service. The primary factor in determining an appropriate antenna height is the gap in reliable service that the proposed Facility is intended to resolve. Antenna heights that are too low cause a loss in coverage which typically results in poor quality and loss of service. The correct antenna height in the correct location in relation to existing surrounding on-air sites is essential to delivering a reliable wireless network. The location of the proposed Facility and the 70' antenna centerline are the lowest appropriate to relieve the significant gap in T-Mobile's service.

14. The above and foregoing statements are based on my personal knowledge and belief and I reasonably believe said statements to be accurate and true.

FURTHER AFFIANT SAITH NOT.

DATED this 21st day of February, 2017.

Russell Pope

Russell Pope
T-Mobile Central LLC d/b/a T-Mobile
12980 Foster, Suite 200
Overland Park, Kansas 66213

STATE OF KANSAS)
) ss.
COUNTY OF JOHNSON)

Subscribed and sworn to before me on this 21st day of February, 2017, by Russell Pope.

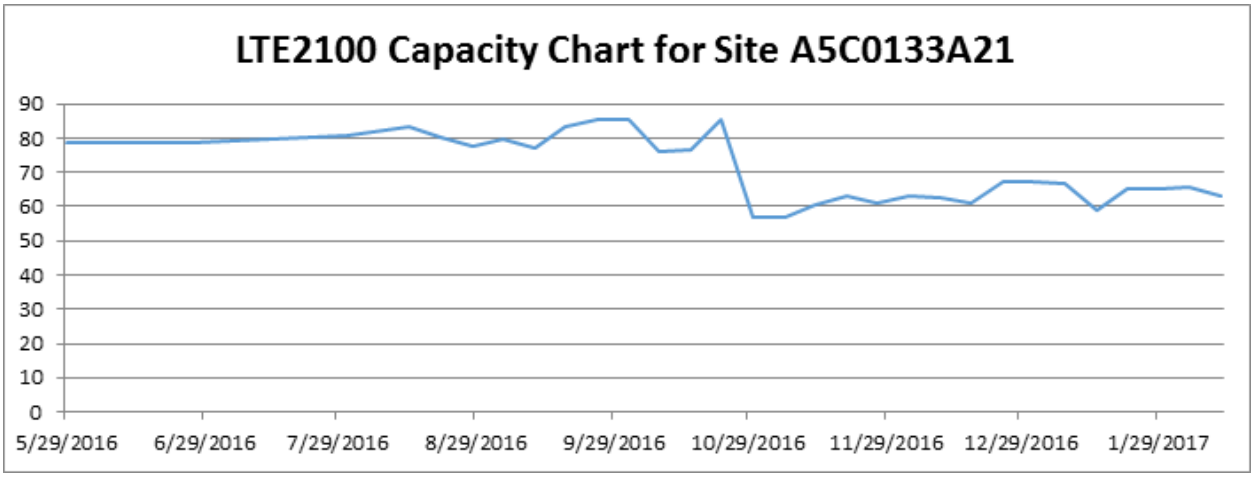
Stephanie R McGranahan

Notary Public (SEAL)
My commission expires 1/24/21

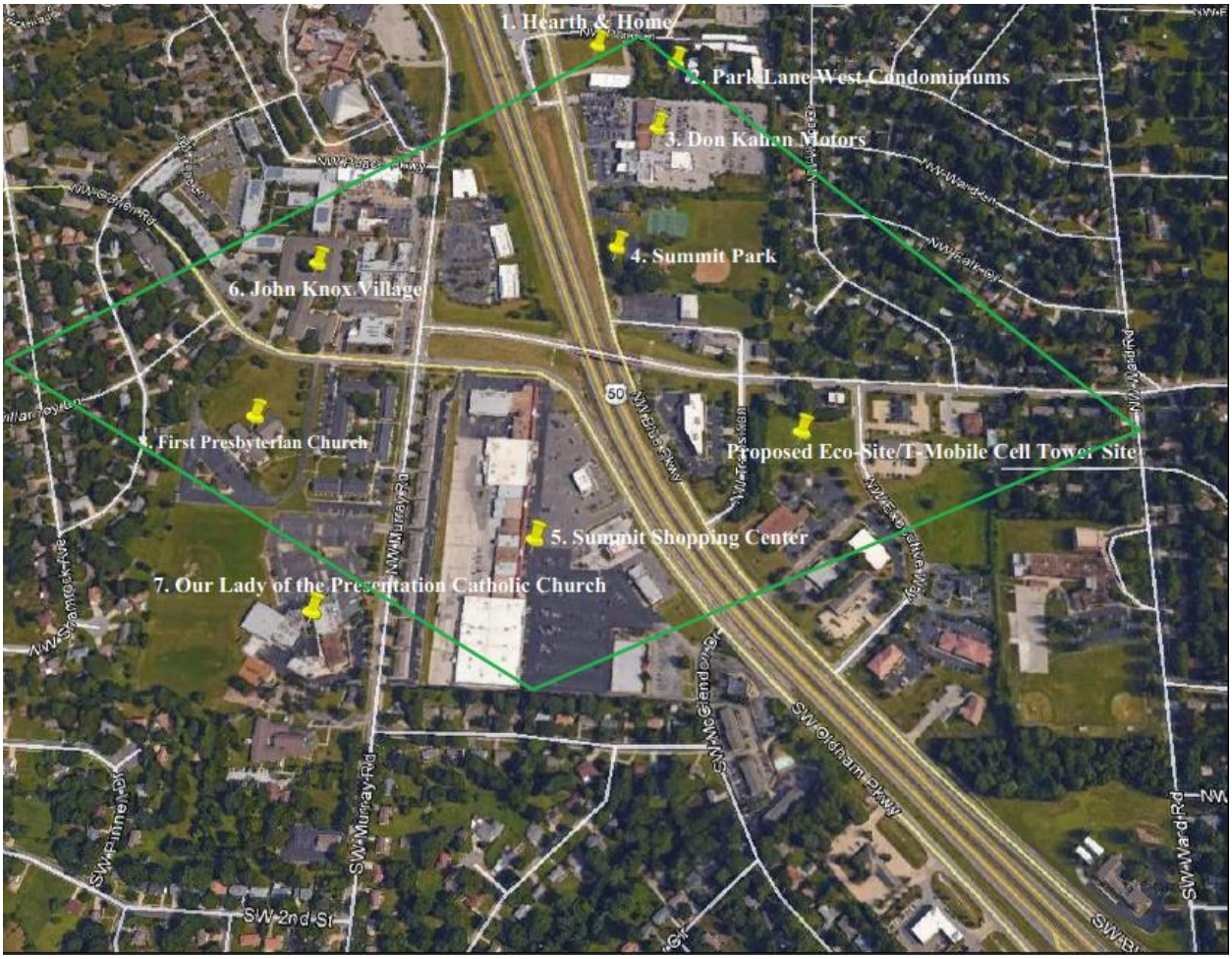
STEPHANIE R. MCGRANAHAN
My Appointment Expires
January 24, 2021

4851-5296-0067v.1 0048172-000792

EXHIBIT A
TO ADDENDUM 1



ADDENDUM 2


1. Hearth & Home
2. Park Lane West Condominiums
3. Don Kahan Motors
4. Summit Park
6. John Knox Village
First Presbyterian Church
Proposed Eco-Site/T-Mobile Cell Tower Site
5. Summit Shopping Center
7. Our Lady of the Presentation Catholic Church
NW Murray Rd
SW Murray Rd
NW Pilot Knob Pkwy
SW Oldham Pkwy
SW 2nd St