Public Facilities Committee Report

City of Newton
In City Council

Wednesday September 7, 2016

Present: Councilors Crossley (Chair), Albright, Laredo, Gentile, Lappin, Danberg, Lennon, Brousal-Glaser. Also Present: Councilors Lipof, Schwartz.
City Staff Present: Commissioner of Public Buildings Joshua Morse, Deputy City Solicitor Ouida Young, Director of Operations Shane Mark, Associate City Solicitor Alan Mandl, Commissioner of Public Works Jim McGonagle, Superintendent David Fleishman, School Committee Chair Matt Hills, Long Range Planning Manager for Schools Julie Kirrane, Director of Operations for Schools Mike Cronin, School Committee Member Diana Fisher Gomberg, Director of Finance Sue Dzikowski, Principal of Brown Middle School John Jordan.

Referred to Public Facilities Committee

#282-16 **5-58 Site plan approval for the relocation of modular classrooms**
DESIGN REVIEW COMMITTEE petitioning, pursuant to Sec. 5-58, for site plan approval to relocate four (4) modular classrooms from the Zervas Elementary School as follows: two (2) modular classrooms to be located at Newton South High School and two (2) modular classrooms at Brown Middle School to provide additional classroom space. [08/18/16 @ 12:09 PM]
Action: Public Facilities Approved 7-0 (No Lennon)

Note: Commissioner of Public Buildings Joshua Morse reviewed the petition to locate modular classrooms at Brown Middle School and Newton South High School. He noted that the School Committee approved the relocation in Spring 2016. The schematic plans were provided to the DRC who requested more complete plans for bidding and construction. On August 24, 2016 the DRC approved the plans to relocate the modular classrooms at Brown and NSHS with certain conditions as specified in their recommendation letter to the City Council (attached). Commissioner Morse welcomed questions in addition to the Q&A prepared ahead of the meeting (attached) from Committee members.

It was confirmed that the tin shed currently used for the Stabilization program at NSHS would not be used for classroom space, the unfinished storage areas will not be accessible to the new corridor and the bathrooms and corridor will be renovated, heated and ADA compliant. The wall separating the new corridor the storage areas will be a rated firewall.

At Brown, an enclosed walkway will be created from the modulars to the school to the extent that codes will allow. This means the enclosed way may not be actually connected to the school but can provide a sheltered way into the building to within inches of the main structure. Several windows adjacent to the gym office must be removed and infilled to create a firewall separation per code.

Councilors questioned if other spaces on the sites had been reviewed. Commissioner Morse stated that while other locations on both sites were considered, there were parking and space limitations at each other site and the proximity to the shed housing existing bathrooms was key.

Committee members asked if the School Department has a long range plan for program space at high schools and middle schools. It was confirmed that there is a plan and will be presented at a meeting on September 29 to address school space needs. Committee members expressed concerns about the continued use of the tin shed for students that require special attention.

The modular classrooms at Brown are needed to maintain student clusters, which is important to Newton's educational plan. Additionally it is important that the students are taught in formal classrooms and not in public areas as it could lend itself to perceptions that students are receiving different services than other students.

The Public Hearing was opened and closed with no comment from the public.

Committee members requested that abutters receive notice as soon as possible. Deputy City Solicitor Ouida Young stated that while an emergency preamble may not have previously been appropriate relating to the relocation; the impacts of the school year impact is evident on students as the school year is now underway, as well as getting close to winter weather conditions impacts the urgency of the projects.

Attorney Young stated that this would require a separate docketed item but could be docketed and voted on by the City Council in one meeting. With Councilor Gentile's moved approval with the conditions detailed in the DRC's letter on recommendation; the Committee voted 7-0 in favor.

Note: Amended Council Order Enclosed in Packet

#249-16 **Cellco petition for Grant of Location for wireless communication equipment**
CELLCO PARTNERSHIP d/b/a VERIZON WIRELESS petitioning for a grant of location to attach wireless communication equipment to existing utility poles at the following locations [(Ward 8) 07/01/2016 @11:17 AM]:

Locations

Dudley Road (near 530 Dudley Road) at Pole #10-7
Hay Road (near 16 Hay Road) at Pole #1368-1
Action: Public Facilities Held 8-0.

Note: Attorney Elizabeth Mason, representing Cellco DBA Verizon Wireless appeared to present the petition to locate wireless communication equipment on existing utility poles. The equipment is designed to offload data usage from the macro sites in the area by providing data to a smaller, intersecting area. Verizon Wireless has identified and hopes to minimize coverage gaps by locating the equipment as they identify the need.

The Public Hearing was opened on July 13, 2016 and several members of the Public expressed concerns about the equipment including detriments to health and medical equipment interference. The Committee requested at that time that the City's Law Department provide guidance relating to the Council's authority in reviewing grants of location in respect to locating wireless telecommunications equipment on existing structures in the public way. Associate City Solicitor Attorney Mandl provided a memo (attached) and reviewed some of what governs the Committee's authority.

Attorney Mandl noted that, as regulated by the FCC; the Committee may deny based on radiofrequency emissions affecting the health of the public (carriers are required to meet FCC regulations) or unreasonably discriminate. The Committee may consider the aesthetics of the equipment and whether the pole meets safety standards and the impact on the traffic flow, if any. He noted that any denial of these grants of location must be accompanied by a rationale relating to these rules. One Councilors noted concerns about the traffic impacts.

Attorney Mason stated that when evaluating the impacts of the equipment, grounds for denial are when the equipment incommodes the public way. She noted that this term generally applies to large transmission line cases. It was determined that there is currently no case law that can be referenced for guidance in regard to what constitutes interference with the public way by wireless communication equipment. Committee members shared concerns that the granting of permission to locate the wireless communication at the utility poles creates a "base station". This would allow the petitioner and other companies to add, maintain and update their wireless communication without Council approval. Attorney Mason confirmed that while this is true, Cellco DBA Verizon Wireless has no current plans to change the equipment on the poles. Committee members felt that a larger policy discussion should be had to define how the City can evaluate these petitions.

There was agreement from the Committee that additional guidance from the Law Department was necessary. Councilors did not feel that the petitioner has provided clear evidence that the equipment is necessary and questioned alternative ways to address coverage gaps. Keith Vellante, Radio Frequency Engineer was hired as a consultant by Verizon Wireless to review the proposed sites. Mr. Vellante identified where existing and proposed sites. Mr. Vellante utilizes computer simulations to incorporate the results of field tests to determine existing radio frequency coverage. Based on his research, Mr. Vellante has determined that the proposed locations of the wireless telecommunication equipment will offload the burden at this time from surrounding macro sites and will satisfy the coverage needs in the area. Because the demand for data is only increasing, Mr. Vellante was unable to say for how long the needs would be satisfied. Materials from Verizon Wireless' consultants are attached.

Committee members questioned if all commercial areas have been evaluated fully. Additionally it was determined that when leasing the equipment space, commercial areas are less cost effective than utility poles.

The Public Hearing was Opened.

Eric Gong, 525 Dudley Road, has concerns about the equipment and its emissions and his property values.

Geoffrey Stedman & Danielle Madden, 522 Dudley Road, noted that there is no case law pertaining to wireless communication equipment because technology is advancing before law can. He has concerns about the emissions from the equipment and the interference with medical equipment that his parents utilize.

Joan Siff, 533 Dudley Road, has concerns about the existing policy and the traffic impacts. She noted that the proposed site on Dudley Road is very windy and dangerous.

Steve Riley, Architect for 530 Dudley Road, has concerns about the aesthetics of the pole. He asked how the aesthetics can be controlled once the pole becomes a "base station".

The Committee left the Public Hearing open pending a discussion with the Law Department. Associate City Engineer John Dahglian indicated a similar petition by NextG in 2011. The Chair requested additional information about this petition. The Chair requested a subcommittee form to sort out information when needed to provide more comprehensive guidance on the federal and state regulations and understand potential impacts of this relatively new and rapidly changing technology on the community. Councilors Albright, Crossley and Lappin will meet with the Law Department and other involved staff. The Committee held the item 8-0.

#281-16 **Cellco petition for Grant of Location for wireless communication equipment**
CELLCO PARTNERSHIP d/b/a VERIZON WIRELESS petitioning for a grant of location to attach wireless communication equipment to existing Utility Pole #20-20 at Sargent Street (near the Sargent/Centre intersection). (Ward 7) [07/20/2016 @12:21 PM]
Action: Public Facilities Held 8-0.

Note: The Chair read the item into the record & opened the Public Hearing. No one from the Public spoke for or against the item. To wait for additional guidance from the Law Department, the Committee held the item unanimously. The Public Hearing was left open to allow additional comment at subsequent meetings.

#304-16 **Verizon petition for grant of location at Greenwood Street**
VERIZON NEW ENGLAND petitioning for a grant of location to relocate Pole #6 on Greenwood Street approximately 19'± southeast to accommodate a new driveway at house #56. (Ward 8) [08/25/16 @ 8:45 AM]
Action: Public Facilities Approved 7-0 (No Gentile)

Note: Ms. Elizabeth Kelly representing Verizon appeared to present the petition to relocate pole #6 on Greenwood Street approximately 19' southeast to allow for a new driveway at #56 Greenwood Street. Ms. Kelly confirmed that the customer would reimburse Verizon for the expense associated with the move. The Public Hearing was opened and closed with no comment from the Public. Councilor Lappin motioned to approve the item which carried 7-0.

#303-16 Request to approve traffic calming islands for Concord Street

COMMISSIONER OF PUBLIC WORKS requesting authorization to install four torpedo traffic island in Concord Street in Lower Falls between Hagar Street and St. Mary's Street to be funded using mitigation funds previously approved by the Council for Lower Falls traffic mitigation. (Ward 4) [08/25/16 @ 1:51 PM]

Action: Public Facilities Approved 8-0.

Note: Commissioner of Public Works Jim McGonagle appeared to present the petition to install traffic calming islands in Concord Street with previously approved mitigation funds. The installation of the traffic islands constricts the road which forces drivers to slow down. Commissioner McGonagle stated that with the pilot program at St. Mary's Street, they saw a definite reduction in speed. He hopes to complete the installation of the traffic islands by the end of Fall 2016. Commissioner McGonagle added that the Fire Department concerns about speed tables relates to impeding their ability to respond to an emergency. It was noted that the Fire Department prefers the traffic islands for traffic calming measures as speed tables/humps can also damage trucks and equipment. He added that snow plows must be more cautious with the speed tables, but can learn and travel around the islands. The Committee voted in favor of the item 8-0.

Referred to Public Facilities and Finance Committees

#273-16 $216,000 to purchase a new street sweeper

HIS HONOR THE MAYOR requesting authorization to appropriate two hundred sixteen thousand dollars ($216,000) from bonded indebtedness to fund the purchase of a new 2016 Elgin Pelican NP dual street sweeper. [08/01/16 @ 12:50 PM]

Action: Public Facilities Approved 8-0.

Note: Commissioner McGonagle presented the request to appropriate $216,000 from bonded indebtedness to fund the purchase of a new street sweeper. He confirmed that the department will be replacing a street sweeper that is 14 years old, noting that the recommended useful life of a street sweeper is 6-8 years and that all street sweepers in the City are beyond useful life expectancy. As street sweeping is increasing, he hopes to replace a street sweeper each year until there is a standard rotation for replacement. Councilor Laredo motioned to approve the item which carried 8-0.

Referred to Public Facilities and Finance Committees

#275-16 $4 million MWRA loan to implement lead service line replacement project

HIS HONOR THE MAYOR requesting authorization to borrow up to four million dollars ($4,000,000) in interest free loans from the Massachusetts Water Resources Authority (MWRA) for the purpose of implementing a lead service line replacement program. [08/01/16 @ 12:49 PM]

Action: Public Facilities Approved 8-0.

Note: Commissioner McGonagle presented the request to accept an interest free loan from the MWRA to fund a lead service line replacement program for private property owners. Specifics on how to regulate use of the funds, such as no interest loans will come back before the Council. After a

review of each City property, Public Works has identified and notified 600 homes in the City where there could be lead service mains. They have received responses and right of entry to the City from 516 of the homeowners to date. Public Works plans to hire a consultant to map and mark the properties and to provide cost estimates. The Council must determine how to structure the program; some communities, such as Boston, offer partial grants to offset the cost of replacing lead service lines. Alternatively, the City may consider this like other betterments, where the full cost of the replacement is borne by the homeowner, but may offer a ten year no interest loan to the property owner, reflecting the no interest MWRA loan terms.

Commissioner McGonagle also noted the presence of "goosenecks", 2 foot piece of flexible lead connector pipe. He stated that the City does not have complete records for the goosenecks and they are replacing them as they encounter them, and will investigate further once service lines are replaced.

The Chair commended the aggressive pursuit of replacing and eliminating lead in the City. Councilor Danberg motioned to approve the item which carried 8-0.

Respectfully Submitted,

Deborah J. Crossley

City of Newton

282-16

Design Review Committee
PUBLIC BUILDINGS DEPARTMENT
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Joshua R. Morse, Commissioner
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Setti D. Warren
Mayor

Honorable Board of Aldermen
City of Newton
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24 August 2016

RE: Modular Classroom Projects at Newton South High School and Brown Middle School

SUBJECT: 100% Schematic Design and Site Plan Review

Honorable City Council:

The Design Review Committee has met to discuss the drawings prepared by RDA Architects dated July 25, 2016 for the proposed modular classroom projects at Newton South High School and Brown Middle School. The Committee discussed site lighting, modular placement, accessibility, circulation, and building foundation systems.

Further the DRC indicated that the use of the existing metal building at NSH for classroom space was not acceptable and that classrooms may only be located in the relocated modular units. For the Brown School project the Committee expressed concerns with respect to students and staff having to go out doors to come and go from the proposed modular classroom and that that outdoor exposure be minimized.

The Design Review Committee determined that the schematic design and site plans are appropriate. The Committee believes that the proposed circulation and placement of modular classrooms is appropriate for both schools. The Committee voted unanimously to recommend that the project be presented for site plan approval. In accordance with Section 5-58 of the Revised Ordinances, this letter is to petition the City Council on behalf of the School Department for Site Plan Approval.

Furthermore, upon approval by the City Council and prior to releasing construction documents to the City's on-call General Contractor for construction, the DRC identified the following areas of design which must be addressed.

- Newton South High School – No space within the existing metal building shall designed / used for classrooms.
- Brown Middle School – Provide a continuous enclosed walkway to shelter the users from the climate to the maximum extent allowable by code.
- General:
  - Site lighting should be installed in a way that maximizes student and staff safety, while ensuring no light pollution to abutters.
  - Ensure the foundation system is built in a way that protects the modular infrastructure from animals and pests.
  - Ensure there are no site drainage issues.

Sincerely,

Signed PJB

Peter Barrer
Co-Chair Design Review Committee

CC: Joshua R. Morse, Commissioner of Public Buildings
Dori Zaleznik, Chief Administrative Officer
Maureen Lemieux, Chief of Staff/CFO
David Fleishman, School Superintendent

Q & A **#282-16 5-58 Site plan approval for the relocation of modular classrooms**

DESIGN REVIEW COMMITTEE petitioning, pursuant to Sec. 5-58, for site plan approval to relocate four (4) modular classrooms from the Zervas Elementary School as follows: two (2) modular classrooms to be located at Newton South High School and two (2) modular classrooms at Brown Middle School to provide additional classroom space. [08/18/16 @ 12:09 PM]

Q1: When was site specific design initiated and who paid for it?

A: Initial design documents were requested and began in March 2016. Construction (bid) documents were then requested which were delivered as a Permit Set dated July 25, 2016. The School Department paid for all design and construction documents, using the on-call architects approved by Public Buildings.

Q: When was it finally determined where to put the four Zervas modulars?

A: Planning was refined throughout calendar year 2015 (FY15 and FY16) as enrollments were updated and overall priorities for the three grade levels of the stabilization programs were assessed. By way of history, with the opportunity for re-use of the Zervas modulars, planning began in the fall of 2014 to re-use the modulars for this high priority need. At that time, it was thought that the stabilization program would require all four modulars and serve multiple grade levels at the Newton South location. There was a funding request at that time and a discussion at the December 3, 2014 meeting of the public facilities committee; the item was held for future discussion. During 2015 it was determined that the stabilization program site at South should serve just the high school grade level, with two modulars providing sufficient space for improvement. The need for middle school space at Brown has been identified since 2013, and was incorporated into facilities planning although a potential solution was not yet identified. At the time, growth at Day was the highest, where growth of 200 students over the past six years was being addressed by the addition of six additional classrooms. Brown had growth of about 100 students in that same time period and enrolled a total of 743 students by 2013. Last year in 2015-16, Brown had enrollment of 780 students with enrollments projected to increase to almost 800 students in two of the next five years. The HMFH facilities assessment done in 2007 and updated in 2011 determined a capacity for Brown at 850 students. Since 2007, however, several district wide special education programs had to be situated at Brown. Today, there are three citywide programs housed at Brown including the Comprehensive Applied Behavior Analysis Program (ABA), the SPARK social pragmatics program serving students on the Autism spectrum, and the FOCUS program serving students with challenges in executive function and sensory awareness. Meeting student needs in combination with enrollment growth has resulted in crowded conditions and use of spaces within the building that are not the most suitable for their educational purpose.

Q: When was it finally determined where to put the four Zervas modular?

A: The vote of the School Committee was taken on May 9, 2016. History leading up to the vote is detailed in the previous answer.

Q: How was it determined that the modular could be moved to the sites chosen by the School Department, without seeking the usual required approvals?

A: It was never determined that the modular "could be moved to the sites chosen by the School Department without seeking the usual required approvals". This process began because the Design Review Committee wanted detailed construction drawings of modulars whose detailed drawings had already been reviewed. This would have caused the City to incur a cost of $80K - $100K. The administration did not feel that was the highest and best use of City resources. Both administrations (both City and School) welcomed the input of the DRC on the site, but felt strongly that the modulars had already been designed. Therefore, the request was made of the City Council to waive the process. Since that time, DRC has reviewed the plans, provided their input, and so the waiver request should be "N.A.N.'d"

Q: What is the review process or protocol for cutting trees on City property? Is it different on school property? Who initiated tree removal? What is the Tree Warden's role and authority?

A: All trees eight inches in diameter or greater on City owned land (with the exception of land designated as Conservation Land) are covered by the Public Tree Regulation ordinance. If a tree is dead, dying, or dangerous Forestry can proceed with the removal as deemed necessary. For eight inch diameter or greater trees that are not deemed dead, dying or dangerous inch for inch replacement is generally required and approval must be given by the Tree Warden (the duties of Tree Warden are assigned to the Director of Urban Forestry) prior to trees being removed. This process has been followed at all of the recent school site construction projects and Fire Station projects. If inch for inch replacement cannot be achieved on the site then money is transferred into an account for tree planting elsewhere.

The removal of trees is typically initiated by whoever is in charge of the land. In the case of Parks it would be parks and Rec., on school sites it would be School Department, at fire station land it is the Fire Department, etc. It is up to this entity to decide if the tree is to come down and why. The Tree Warden's role is to determine if the tree(s) require replacement and grant permission to cut down once the replacement process has been determined.

The process is the same at School sites. If the School Department or other entity managing a project determines trees need to be removed then they must get permission from the Tree Warden and replace trees as required.

The authority of the Tree Warden is to determine replacement requirements. Once it has been determined if replacement is required the Tree Warden will grant permission for the process to proceed.

In this particular case, Mike Cronin notified Public Buildings (Art Cabral) that some trees would need to be removed in preparation for the modular. Art then met Marc Welch at the site. He showed Marc the area where the modulars were to go and told Marc which trees he would need to cut down. About half the trees were in poor condition and did not require replacement, the others did. Marc provided him with the cost the project would need to pay for tree replacement, $8,230. He indicated the project would pay so Marc told him he could proceed with the removal of the trees.

An exception to the above process is on Conservation Land and/or areas governed by Wetlands Protection Laws. In these cases Approval is needed from the Conservation Commission.

Q: When was the stabilization program conceived? Is there a record of successfully reintegrating students? When did using the tin shed for the stabilization program begin? How was this determined? Were any improvements/changes made?

A: HSP was conceived, over ten years ago, after the successful development and implementation of ESP (elementary school) and MSP (middle school). HSP successfully assists students, families, and the school district to find the next appropriate placement for students. Although many times there is a change in services or placement, the majority of students remain in district. Prior to HSP, students were placed out of district for 45 days. HSP has been a cost savings to the district by eliminating the need for most out of district 45 day placements. The mission of HSP is to create a safe and positive environment for high schools students in need of a 45-day diagnostic, therapeutic, and educational placement. Together with students, parents/guardians, educators, therapists, and other outside supports, HSP staff works to stabilize, evaluate, and transition the student to the next appropriate placement. The shed has always been the location of HSP. The Southside Program had used the space prior to HSP. Although the location was not ideal, the limited space available required Student Services to use this location.

Programmatic changes

HSP staff works to support students in their overall goals of earning credit while allowing space for therapeutic goals to be addressed as well. To that end, the programming has become more robust and includes the following staff:

1.0 English/special education teacher
1.0 teaching assistant
1.0 guidance counselor
0.25 math teacher
0.25 science teacher
0.0527 art teacher
0.05 music teacher

Consultation is provided by the Student Services Clinical Director and Assistant Director of Student Services.

Building improvements

The key room was opened and made available to use for tutoring space.

Q: Could the School Department provide background related to Sandy Guryan's September 15, 2014 memo stating that the shed didn't meet building codes and was going to be demolished in 2015? Were repairs made to the shed to make it compliant with building codes? Why wasn't it demolished in 2015?

A: The first plan was to take the shed out of service in 2015 and replace it with 4-modulars but this did not happen due to changing circumstances and the need to revisit all options; securing additional space at Brown Middle School due to enrollment increases became a priority, and the freeing up of space at the Ed Center due to the pending relocation of the preschool allowed for the middle school stabilization program to remain at the Ed Center. Repairs were made to meet the building codes of the era in which the shed was built. However, because the shed is a nonconforming structure, it cannot meet the most up to date building codes. With two versus four modulars added, there is space at the site for the building to be maintained (to be used

primarily for storage), with HSP continuing to access the bathrooms in the building. It was not demolished because it was still in use.

Q: Where will the program held within the shed be housed prior to and during construction of the modulars?

A: The programming for HSP will take place in their current location (across from South - green building). They will be flexible in using the space until the construction is complete. The HSP staff is meeting on 9/1/16 to discuss how to set up the space for the short term.

Q: Who parks in the parking lot adjacent to the tin shed? When will the solar carports be installed in that lot and will the timing of that installation interfere with the construction of the modulars or access to parking?

A: The parking lot adjacent to the tin shed is a student parking lot, and it is slated for solar carports at this time. The student parking lot will be temporarily relocated.

Q: How long has it taken to determine where these modular should go and what discussions were had in Council.

A: 11/24/2014 Item is docketed - #471-14 HIS HONOR THE MAYOR requesting authorization to appropriate the sum of four hundred thousand dollars ($400,000) from Free Cash to fund the design, construction, and relocation of modular buildings from Zervas Elementary School to Newton South High School for special education program needs. [11/24/14 @ 3:43 PM]

12/03/2014 Public Facilities Committee Report

The School Department's Director of Operations Michael Cronin provided an introduction of a project that will move the modular classrooms at Zervas Elementary School to Newton South High School. Mr. Cronin explained that the student population at Lincoln-Eliot Elementary School is growing and the school needs more classroom space. In order to provide more space, the pre-school located at Lincoln-Eliot will need to be moved to the Education Center. The move of the pre-school will require a special education program at the Education Center move to Newton South High School. The plan is to house the special education program in either the modular classrooms from the Zervas Elementary School or an existing building on the site that could be rehabilitated.

The installation of the modular at Newton South High School would be required to go through the site plan approval process. The School Department will pay for the schematic and site plan design for the modular. The project is still in the early planning phase and further information will be provided to the Committee as it becomes available. The Administration would like the Committee to hold the item for a future discussion.

There was some concern among Committee members that the City was continuing to use modular classrooms to house students, especially at Newton South High School because additional space was added at the school during the recent renovations. When the School Department and Public Buildings Department comes back to the Committee for the site plan approval, more information will be available. Ald. Lappin moved hold on the item, which carried unanimously.

01/07/2015: The School Department is evaluating where to reuse the Zervas modular classrooms. They indicate possible relocation to NSHS. Commissioner Morse will update the Committee when a decision is made and a proposal available. If no decision is made prior to the demolition of Zervas, the modulars will be moved off-site.

03/18/2015: The School Committee is undecided on whether to move the modular classrooms from Zervas to NSHS. The move would cost more than anticipated and requested. The Administration requests that the Committee votes No Action Necessary. The Committee NANs the item.

Q: Regarding recent experience relocating modular, what design/engineering and review processes (5-58) have we used and what is an expected time frame for moving the 5-58 process once requested?

A: The Design Review Committee met on August 24th to review the plans for the modular classrooms at NSHS and Brown Middle School. They unanimously voted to approve 5-58 Site Plan Approval for the modulars at both schools. The City Council can assign a public hearing on 9/6, the project will be taken up in a joint meeting of Public Facilities and Programs and Services on the 9/7, and if approved it will be taken up at the next City Council meeting. There is then a 20 day waiting period before work can begin.

#10952

249-16

MCLANE MIDDLETON

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June 30, 2016

VIA OVERNIGHT MAIL AND EMAIL (*dolson@newtonma.gov*)

Office of the City Council
Newton City Hall, Room 105
1000 Commonwealth Avenue
Newton, MA 02459

Re: **Petitions for Grant of Location to Attach Small Cell Antennas and Supporting Equipment to Existing Non-Municipal Utility Poles**

Applicant: **Cellco Partnership d/b/a Verizon Wireless ("Verizon Wireless")**

Address: **Utility Pole #10-7 located in public right of way on Dudley Road, Newton (adjacent to 530 Dudley Road)**

Utility Pole #1368-1 located in public right of way on Hay Road, Newton (adjacent to 16 Hay Road)

Dear Office of the City Council:

In accordance with Chapter 166, Section 22 of the Massachusetts General Laws and City of Newton requirements, Verizon Wireless is submitting herewith the enclosed Petitions for Grant of Location so that it may install, operate and maintain single "Small Cell" wireless communication antennas on each of the two above-described Verizon Telephone/ Eversource-owned utility poles. As described in detail below, the proposed antennas will provide capacity relief and improve network service throughout Newton, particularly in areas of dense demand for Verizon Wireless's Long Term Evolution ("LTE" or "4G") voice and data services. Small Cell technology is a large component of Verizon Wireless's greater initiative to deploy *non-intrusive* and *inconspicuous* wireless technology solutions throughout New England.

PETITIONER INFORMATION

Verizon Wireless is one of the nation's leading FCC-licensed providers of wireless telecommunications services, extending coverage to almost all of the top 100 markets in the United States. It has developed one of the largest and most reliable national networks to provide wireless voice and data services to an ever-growing customer base, last counted at over 135 million. Verizon Wireless continuously works to enhance and improve its wireless network through the deployment of its voice, data, LTE and Advanced Wireless Services ("AWS")

communications services. One of the key design objectives of Verizon Wireless's system is to provide seamless and reliable coverage without significant gaps or dead spots or the inability to handle and off-load voice and data traffic, particularly in areas of high data demand.

"SMALL CELL" TECHNOLOGY

The strategic integration of Small Cell antenna technology is a surgical approach to the continued deployment of Verizon Wireless's LTE and AWS networks in Newton and throughout Massachusetts, particularly in those areas of high data traffic. When Small Cell antennas are strategically placed throughout a targeted geographic area, the end result is an overall increase in performance and efficiency, both within the target area and the network as a whole. Practically speaking, cellular signals from Small Cells are transmitted from antennas throughout high traffic areas at elevations lower than those from traditional wireless communications facilities ("WCFs") such as towers and monopoles. Here, the Small Cell antennas will be placed on existing utility poles. Verizon Wireless will be relying on Small Cell technology as it continues to deploy its network in Newton in the months to come.

ORDERS FOR GRANT OF LOCATION

Federal and state law provide a legal framework allowing—and in fact mandating—the installation of this stealth antenna technology on utility poles. At the federal level, the Pole Attachment Act (47 U.S.C. § 224) mandates that utility pole owners grant nondiscriminatory access to their poles for attachments by cable television systems and telecommunication carriers. At the state level, the Massachusetts Pole Attachment Act (M.G.L. c. 166, § 25A) specifically addresses wireless communications-related pole attachments, providing that "utilities shall provide wireless providers with nondiscriminatory access to any pole or right of way ... for the purpose of installing a wireless attachment."

VERIZON WIRELESS'S PROPOSAL

With the aim of rapidly deploying Small Cell technology throughout Massachusetts, Verizon Wireless has entered into pole attachment licensing agreements with utility providers, including Eversource Energy and Verizon Telephone, among others, which allow for the installation of compact Small Cell canister antennas on existing utility poles throughout the Commonwealth.

The installation on Dudley Road will primarily consist of a canister antenna that will be mounted to the side of the utility pole, while the Hay Road installation will consist of a similar antenna mounted atop that pole. In each installation, the antenna will resemble a traditional electric transformer and be virtually indistinguishable from such transformers already located on utility poles throughout the area. Additional supporting equipment—a remote radio head, electrical junction box and meter, and fiberoptic and power connections—will be mounted to the exterior of the pole, resulting in a self-contained antenna facility without the need for further infrastructure. With respect to visual impacts, this equipment is substantially similar to the equipment of electric, telephone and cable utility providers.

Following installation, Verizon Wireless technicians will monitor and occasionally visit the pole site for maintenance purposes. Except for standard electrical service, the installation will not impact utilities, schools, traffic or other municipal resources. A key component of this technology, from Verizon Wireless's perspective, is the ability to deploy this equipment quickly, without the arduous processes involved in typical WCF permitting.

MATERIALS ENCLOSED

We have enclosed the following materials for your review and consideration:

1. Petition for Grant of Location for each proposed installation;

2. Proposed Order for Grant of Location for each proposed installation; and

3. Ten (10) sets of 11"x17" plans detailing the specifics of each proposed installation.

These are organized by proposed installation as follows: at **Tab 1**, the materials for the Dudley Road site, and at **Tab 2**, the materials for the Hay Road site. We will provide copies of the pole attachment licenses issued to Verizon by Verizon Telephone and Eversource for each installation under separate cover. In addition, we will deliver a check payable to the City of Newton in the amount the City indicates is appropriate to cover the petition fees.

CONCLUSION

The proposed Small Cell antennas are by far the least intrusive means available to address gaps in coverage in those areas of dense demand for Verizon Wireless's LTE voice and data services that exist in Newton. The equipment as proposed will provide enhanced service to areas of concentrated demand, while avoiding the aesthetic impacts of traditional wireless facilities.

Thank you for your timely attention to this matter. If you should have any questions regarding the enclosed application, please do not hesitate to contact me directly.

Very truly yours,

Elizabeth F. Mason

ec. C. Webberly, SCG (w/o enc.)
M. Frankel, SCG (w/o enc.)
T. Hildreth, MM (w/o enc.)

104792\10901454

Tab 1

249-16

PETITION FOR GRANT OF LOCATION
UNDER MGL c. 166, §§ 22 and 25A

To the City Council
Of Newton, Massachusetts

Cellco Partnership d/b/a Verizon Wireless requests permission to locate on an existing utility pole a small cell wireless antenna, including the necessary sustaining and protecting fixtures, along and across the following public way:

Dudley Road, one pole, number 10-7.

Location approximately as shown on plans attached.

Wherefore Cellco Partnership d/b/a Verizon Wireless prays that after due notice and hearing , because the pole in question is previously approved and already existing – as provided by law – it be granted a location for and permission to erect and maintain an antenna, radio unit, meter, AC/DC converter, 60A disc., RGS conduit, ground rod, power and fiber together with such sustaining and protecting fixtures as it may find necessary, said equipment to be installed substantially in accordance with the plans filed herewith, plan name:

Newton MA SC28, dated June 7, 2016.

June 30, 2016

Cellco Partnership d/b/a Verizon Wireless

By:_____
Elizabeth F. Mason, Agent for Cellco Partnership d/b/a Verizon Wireless, duly authorized

104792\10902317

ORDER FOR GRANT OF LOCATION
UNDER MGL c. 166, §§ 22 and 25A

In the City of Newton, Massachusetts
Notice having been given and public hearing held, as provided by law

IT IS HEREBY ORDERED:

that Cellco Partnership d/b/a Verizon Wireless be and it is hereby granted a location for and permission to install on an existing pole and maintain pole and wires to be placed thereon, together with such sustaining and protecting fixtures as said Company may deem necessary, in the public way or ways hereinafter referred to, as requested in petition of said Company dated the 30th day of June, 2016.

All construction under this order shall be in accordance with the following conditions:

Plan name: **Newton MA SC28, dated June 7, 2016**, filed with this order.

There may be attached to said pole antenna, radio unit, meter, AC/DC converter, 60A disc., RGS conduit, ground rod, power and fiber and fixtures as needed in their business and all of said wires and cables.

The following are the public ways or part of ways along which the poles above referred to may be erected, and the number of poles which may be erected thereon under this order:

Dudley Road, one pole, number 10-7.

I hereby certify that the foregoing order was adopted at a meeting of the City Council of the City of Newton, Massachusetts held on the _____ day of _____, 2016 .

City Clerk
Newton, Massachusetts

Received and entered in the records of location orders of the City of Newton at Book _____, Page _____.

Attest: _____
Newton City Clerk

verizon

AFFIDAVIT OF RADIO FREQUENCY ENGINEER

The undersigned, in support of the application to install a wireless communications facility consisting of one antenna and associated radio equipment on two existing utility poles located in the City of Newton, Massachusetts, states the following:

1. My name is Keith Vellante. I have a Bachelor of Science degree in Electrical Engineering from the University of New Hampshire and I am employed as a Radio Frequency (RF) Engineer for C Squared Systems, LLC. C Squared Systems has entered into a contract with Verizon Wireless to provide RF consulting services on behalf of Verizon Wireless. I have reviewed the proposed sites with the Radio Frequency Engineer responsible for the Verizon Wireless network design in the area of Massachusetts that includes the City of Newton, MA.
2. Verizon Wireless is a federally licensed provider of wireless communications services with a national footprint.
3. The proposed facilities are located within areas where Verizon Wireless has identified a need to install a wireless telecommunications facility in order to provide reliable wireless service. The search area for each proposed facility was determined by the fact that wireless service needs significant improvement in these areas of Newton, MA. Furthermore, it was determined that the areas served by each facility would interact well with those of existing and planned facilities in the surrounding area.

The following table provides details of each proposed facility:

Site Name:	Site Address:	Utility Pole Number:	Latitude:	Longitude:	Elevation (AMSL):	Antenna Centerline Height (AGL):
Newton S SC01	Hay Road	1368-1	42.2938	-71.1866	111.5'	40.5'
Newton SC28	Near 530 Dudley Road	N/A	42.3063	-71.1759	179.9'	28.5'

4. A conventional Verizon Wireless LTE macro-site consists (in part) of RRH's (Remote Radio Heads) located near the antennas on a tower, rooftop, or other support structure, which are connected via fiber optic cables to a BBU (Baseband Unit) located on site in an equipment shelter or other weatherproof enclosure. The BBU performs network signal processing between the RRH's at the site, and Verizon's LTE core network.
5. C-RAN (Cloud Radio Access Network) nodes and Small Cells also utilize RRH's at each site, however a centralized BBU capable of supporting RRH's at multiple sites is implemented to gain certain efficiencies, both from a network and environmental standpoint. The proposed locations are two of the multiple C-RAN nodes and Small Cells planned to address capacity and coverage deficiencies in Newton and the surrounding area.
6. C-RAN and Small Cell deployments are intended to complement, not replace, the conventional LTE macro-network sites, and are typically used as a capacity solution targeting isolated areas of heavy network usage, a.k.a "hot spots." In doing so, the C-RAN and Small Cells serve to offload the demand on the existing sites serving these "hot spots." This not only improves service to the specifically targeted area, but also improves overall system performance elsewhere in the network.

7. The purpose of the proposed facilities is to provide adequate service capacity and coverage improvement to the residential areas generally encompassed by Wiswall Road and Saw Mill Brook Parkway (SC01), the neighborhoods along Dudley Road to the northeast of Bald Pate Hill (SC28), and the areas immediately surrounding each small cell location. Verizon Wireless does not currently provide acceptable LTE service on its network in these areas.

8. To find a site that provides acceptable capacity and coverage improvement, the Verizon Wireless RF Design Group utilizes computer modeling to define a search area. The search area is designed such that a site located within the area and at a given height would have a high probability of completing the capacity and coverage objectives in the target areas. The RF Design Group develops the network by working off existing sites from which to build out the network design.

9. Verizon Wireless' search of the area and subsequent analysis determined that installing the proposed facilities on the subject utility poles would be the most appropriate solution to meet its network capacity and coverage objectives.

10. I have reviewed the proposed installations to be placed on the subject utility poles as well as the other existing and planned antenna site locations used in Verizon Wireless' system in and around the surrounding areas. I have analyzed the potential benefits these sites would represent to Verizon Wireless' network and its users. I employ computer simulations, which incorporate the results of field tests of existing facilities, to determine existing radio frequency (RF) coverage for Verizon Wireless' system. These simulations model characteristics such as antenna types, antenna height, output power, terrain, ground elevations and RF propagation effects of the frequency utilized.

11. The following table details site specific information of the surrounding Verizon Wireless telecommunications facilities used to generate the RF plots attached hereto.

Cell Name:	Latitude:	Longitude:	Street Address:	City, State:	Structure Type:	Antenna Centerline Height (AGL):	Status:
Boston College	42.3377	-71.1748	219 Commonwealth Avenue	Chestnut Hill, MA	Rooftop	50	On-Air
Brookline	42.3195	-71.1826	345 Boylston Street	Newton, MA	Rooftop	48	On-Air
Brookline 2	42.3262	-71.1493	850 Boylston Street	Chestnut Hill, MA	Rooftop	78	On-Air
Brookline 3	42.3048	-71.1395	282 Newton Street	Brookline, MA	Rooftop	55.3	On-Air
Chestnut Hill	42.3226	-71.1665	1244 Boylston Street	Brookline, MA	Rooftop	43	On-Air
Dedham 2	42.2550	-71.2093	200 West Street	Dedham, MA	Monopole	42	On-Air
Dedham 3	42.2559	-71.1667	5 Incinerator Road	Dedham, MA	Smokestack	105	On-Air
Jamaica Plain 2	42.3031	-71.1272	1125 Centre Street	Jamaica Plain, MA	Rooftop	41	On-Air
Jamaica Plain South	42.2968	-71.1319	1200 Centre Street	Roslindale, MA	Rooftop	83.2	On-Air
Needham	42.3036	-71.2180	141 Cabot Street	Needham, MA	Lattice	152	On-Air
Needham 2	42.2800	-71.2332	858 Great Plain Avenue	Needham, MA	Steeple	68	On-Air
Needham Cutler	42.2949	-71.2032	1 Well Avenue	Newton, MA	Rooftop	73.3	On-Air
Needham Heights	42.2911	-71.2363	460 Hillside Avenue	Needham, MA	Rooftop	49	On-Air
Newton 4	42.3183	-71.2109	56 Ramsdell Street	Newton, MA	Rooftop	28	On-Air
Newton Center Rep	42.3285	-71.1954	1320 Centre Street	Newton, MA	Rooftop	48	On-Air
Roslindale MT Hope	42.2851	-71.1288	4254 Washington Street	Roslindale, MA	Rooftop	35	On-Air
W Roxbury 2	42.2791	-71.1821	225 Rivermoor Street	West Roxbury, MA	Monopole	75	On-Air
W Roxbury Georgetown	42.2655	-71.1520	5050 Washington Street	West Roxbury, MA	Rooftop	46	On-Air
W Roxbury MSC	42.2751	-71.1392	4600 Washington Street	Roslindale, MA	Lattice	150	On-Air
W Roxbury North	42.3026	-71.1635	50/56 Broadlawn Park	Chestnut Hill, MA	Rooftop	55.3	On-Air
Wellesley 2	42.3175	-71.2307	20 William Street	Wellesley Hills, MA	Rooftop	58	On-Air

12. The signal propagation plot provided as an attachment was produced using deciBel Planner™, a Windows-based RF propagation computer modeling program and network planning tool. The software takes into account the geographical features of an area, land cover, antenna models, antenna heights, RF transmitting power and receiver thresholds to predict coverage and other related RF parameters used in site design and network expansion.

13. The RF map titled "Newton MA S SC01, SC28 – Existing 700 MHz LTE Sector Footprints" attached hereto depicts the areas primarily served by the sectors (a.k.a. signal "footprints") of the existing "On-Air" Verizon Wireless macro sites in the area, which are shown by a unique color for each particular sector of interest. For clarity, all other sectors of less interest with respect to the proposed sites are shown in grey. As demand for wireless voice and data services continues to grow, Verizon Wireless manages the footprint of each sector so that it can support the demand within the area it is primarily serving. In addition to improving coverage to the immediate area, the proposed sites are also needed to serve existing and anticipated demand in the vicinity and thereby offload some of the burden experienced by the surrounding sites. In that way, those sites will be able to more adequately serve the demand for service in the areas nearer to those surrounding sites. Please note that the outer parts of each sector footprint include areas that presently have signal strength below the targeted value required for reliable service to Verizon Wireless' customers. The fact that low-level signal is capable of reaching these areas does not mean that these areas experience adequate coverage. These unreliable areas of low signal level impose a significant capacity burden on the sites primarily serving the area.

14. As shown in the aforementioned plot, the proposed facilities are centrally located within the targeted areas of deficient service, making them suitable to provide the intended capacity relief to the area. In addition to providing a dominant server and improved capacity and coverage to these "hot spots" of network usage throughout the residential areas, the proposed facilities will offload some of the burden experienced by the surrounding sites, particularly to the sectors highlighted, improving the overall system performance within their respective service areas.

15. I have concluded that the proposed facilities will satisfy the present capacity and coverage needs that motivated Verizon Wireless to establish search rings in this vicinity. Any reduction in the proposed antenna configuration and/or equipment would also limit optimal performance of the sites, which would substantially limit the sites' effectiveness.

16. Verizon Wireless certifies that the proposed facilities will not cause interference to any lawfully operating emergency communication system, television, telephone or radio, in the surrounding area. The FCC has licensed Verizon Wireless to transmit and receive in the Upper C Block of the 700 MHz band, B Block of the Cellular (850 MHz) band, the F, C3, and C4 Blocks of the PCS (1900 MHz) band, and the A and B Blocks of the AWS (2100 MHz) band of the RF spectrum. As a condition of the FCC licenses, Verizon Wireless is prohibited from interfering with other licensed devices that are being operated in a lawful manner. Furthermore, no emergency communication system, television, telephone, or radio is licensed to operate on these frequencies, and therefore interference is highly unlikely.

17. Pursuant to its Federal Communications Commission (FCC) licenses, Verizon Wireless is required to ensure that all radio equipment operating at the proposed communications facilities and the resulting radio frequency exposure levels are compliant with FCC requirements as well as federal and state health and safety standards.

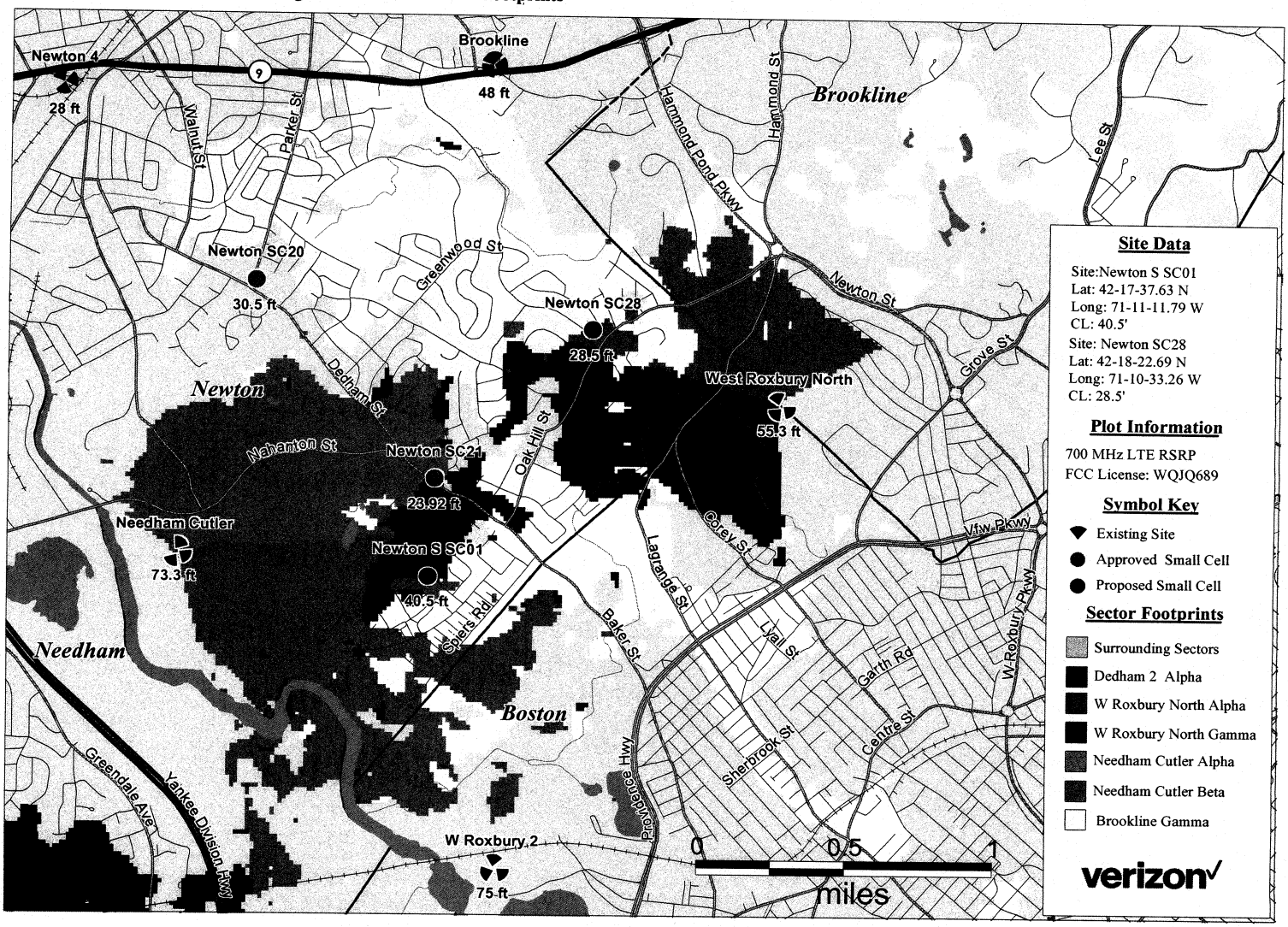
18. Providing wireless communication services is a benefit to the residents of Newton, as well as to mobile customers traveling throughout the area. The proposed facilities are well suited to meet Verizon Wireless' network requirements for the intended areas. The absence of a wireless telecommunications facility at or near these immediate locations will result in the continued existence of inadequate network capacity and coverage gaps in this area. Without the proposed facilities, Verizon Wireless will be unable to provide reliable wireless communication services in this area of Newton; therefore, Verizon Wireless respectfully requests that the City of Newton act favorably upon the proposed facilities.

Signed and sworn under the pains and penalties of perjury August 5th, 2016.

Keith Vellante

Keith Vellante
Radio Frequency (RF) Engineer
C Squared Systems, LLC
65 Dartmouth Drive
Auburn, NH 03032

Newton MA S SC01, SC28 - Existing 700 MHz LTE Sector Footprints



DONALD L. HAES, JR., PH.D., CHP

Radiation Safety Specialist

MA Radiation Control Program Health Physics Services Provider Registration #65-0017

PO Box 198, Hampstead, NH 03841 603-303-9959 Email: donald_haes_chp@comcast.net

August 4, 2016

RE: Proposed installation of radio base station antenna and associated equipment for the Verizon Wireless Small Cell Personal Wireless Services facility to be located on the top of a utility pole on Hay Road in Newton, MA.

PURPOSE

I have reviewed the information pertinent to the Verizon Wireless proposed installation of this small cell (SC) personal wireless services (PWS) facility on Hay Road in Newton, MA. To determine regulatory compliance, theoretical calculations of maximal radio-frequency (RF) fields have been prepared. The physical conditions are that Verizon Wireless proposes to install a PWS omni-directional canister type antenna on the top an existing utility pole. The antenna arrangement will include a single canister antenna on the top of existing utility pole and a remote radio head (RRH) set. The mounting centerline height of the antenna is proposed to be 40'6" above ground level (AGL). This report provides written proof that the proposed facility would comply with the FCC RF exposure guidelines, including residential areas and in the surrounding neighborhood.

This report considers the contributions of the Verizon Wireless PWS transmitters operating at their proposed capacity. The calculated values of RF fields are presented as a percent of current Maximum Permissible Exposures (%MPE) as adopted by the Federal Communications Commission (FCC),[i,ii] and those established by the Massachusetts Department of Public Health (MDPH).[iii]

SUMMARY

Theoretical RF field calculations data indicate the summation of the proposed Verizon Wireless RF contributions would be well within the established RF exposure guidelines at the proposed site; see Figure 3. These results indicate there could be many more similar installations at this location, and still be within Federal and State guidelines for RF exposure. This report provides written proof that the proposed facility would comply with the FCC RF exposure guidelines, including residential areas and in the surrounding neighborhoods.

Based on the theoretical RF fields I have calculated, it is my expert opinion that this facility would comply with all regulatory guidelines for RF exposure to members of the public. The antenna installation proposed by Verizon Wireless would not produce significant changes to the ambient RF environment.

Note: The analyses, conclusions and professional opinions are based upon the precise parameters and conditions of these particular sites; **Utility light pole Hay Road, Newton, MA.** Utilization of these analyses, conclusions and professional opinions for any personal wireless services installation, existing or proposed, other than the aforementioned has not been sanctioned by the author, and therefore should not be accepted as evidence of regulatory compliance.

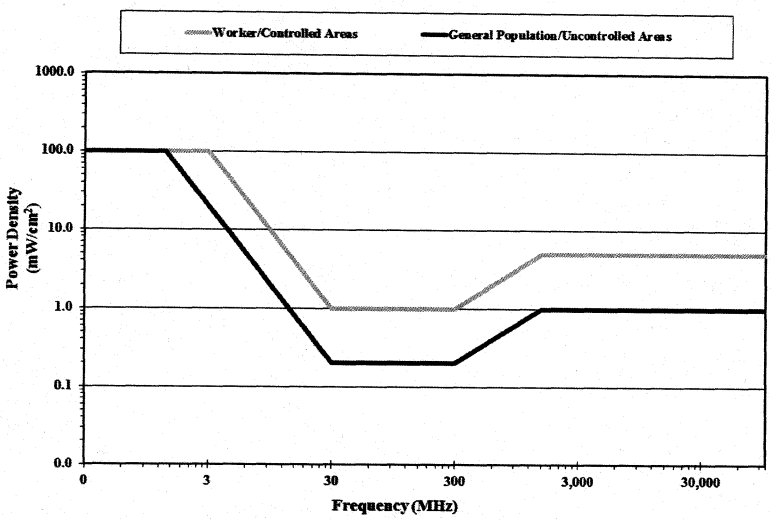


Figure 1: FCC Limits for Maximum Permissible Exposure (MPE)

EXPOSURE LIMITS AND GUIDELINES

The RF exposure guidelines adopted by the FCC are a combination of the standards published by the American National Standards Institute (ANSI) [iv] and the National Council on Radiation Protection and Measurement (NCRP). [v] Also applicable are those published by the MDPH. The RF exposure guidelines are divided into two categories: "Controlled/Occupational areas" (those areas restricted to access by RF workers only) and "Uncontrolled/Public Areas" (those areas unrestricted for public access). Listed in Table 1 below and shown in Figure 1 above are the applicable RF exposure guidelines for uncontrolled areas as they pertain to the operating frequency band of the PWS facility.

Table 1: Maximum Permissible Exposure Values for Uncontrolled/Public Areas

Frequency Band:	Maximum Permissible Exposure:
300 - 1500 MHz	f/ 1.5 in $\mu W/cm^2$
1500 - 100,000 MHz	1000 $\mu W/cm^2$ *

Note: 1 μW = 0.000001 Watt

* For equivalent plane-wave power density, where f is the frequency in MHz (10^6 Hz).

A word about RF exposure standards outside of North America by the FCC: [1]

Many countries in Europe and elsewhere use exposure guidelines developed by the International Commission on Non-Ionizing Radiation Protection (ICNIRP). The ICNIRP safety limits are generally similar to those of the NCRP and IEEE, with a few exceptions. For example, ICNIRP recommends somewhat different exposure levels in the lower and upper frequency ranges and for localized exposure due to such devices as hand-held cellular telephones. One of the goals of the WHO EMF Project (see above) is to provide a framework for international harmonization of RF safety standards. The NCRP, IEEE and ICNIRP exposure guidelines identify the same threshold level at which harmful biological effects may occur, and the values for Maximum Permissible Exposure (MPE) recommended for electric and magnetic field strength and power density in both documents are based on this level. The threshold level is a Specific Absorption Rate (SAR) value for the whole body of 4 watts per kilogram (4 W/kg).

RF EXPOSURE GUIDELINES FOR IMPLANTED MEDICAL DEVICES (IMDS)

The manufacturers of Implanted Medical Devices (IMDS; e.g. pacemakers, sub-dermal infusion pumps, implanted defibrillators, etc.) follow strict guidelines for Electromagnetic Compatibility (EMC) [2] and susceptibility to Electromagnetic Interference (EMI). This recommended practice is to evaluate the electromagnetic immunity of medical devices to radiated RF emissions from common RF transmitters (e.g., two-way radios; walkie-talkies; mobile phones; wireless-enabled tablets, e-readers, laptop computers, and similar devices; radio-frequency identification (RFID) readers; networked mp3 players; two-way pagers; and wireless personal digital assistants [PDAs]).

For the frequency bands in use by the PWS industry, the major manufactures of IMDs have proposed the following limits for RF exposure. **Note that modern pacemakers and defibrillators are designed to operate normally within RF levels that meet the government Maximum Permissible Exposure (MPE) limits.**

Medtronic Implanted Heart Devices:

High Frequency (150 kHz & up): < 100 V/m

Modulated Magnetic Fields (> 10 kHz) < 1 A/m

Boston Scientific's Cardiac Rhythm Management Devices

High frequency E-fields (500 kHz to 6 GHz): 140 V/m RMS

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[1] https://www.fcc.gov/engineering-technology/electromagnetic-compatibility-division/radio-frequency-safety/faq/rf-safety#Q9.

[2] C63.18: C63.18-2014 On-site, Ad-Hoc Test Method for Estimating Radiated Electromagnetic Immunity of Medical Devices to Specific Radio Frequency Transmitters.

THEORETICAL RF FIELD CALCULATIONS - GROUND LEVELS

METHODOLOGY

These calculations are based on what are called "worst-case" estimates. That is, the estimates assume 100% use of all transmitters simultaneously. Additionally, the calculations make the assumption that the surrounding area is a flat plane. The resultant values are thus conservative in that they over predict actual resultant power densities. The calculations are based on the following information for VERIZON WIRELESS:

1. Effective Radiated Power (ERP): See Table 2 inventory.
2. Antenna height (centerline, above ground level (AGL) See Table 2 inventory.
3. Antenna vertical radiation patterns; the source of the negative gain (G) values. "Omni directional" antennas are designed to focus the RF signal, resulting in "patterns" of signal loss and gain. These patterns (see **APPENDIX A**) display the loss of signal strength relative to the direction of propagation due to elevation angle changes.
   Note: G is a unitless factor usually expressed in decibels (dB); where $G = 10^{(dB/10)}$.
   For example: for an antenna *gain* of 3 dB, the net factor $(G) = 10^{(3/10)} = 2$.
   For an antenna *loss* of -3 dB, the net factor $(G) = 10^{(-3/10)} = 0.5$.

To determine the magnitude of the RF field, the power density (S) from an isotropic RF source is calculated, making use of the power density formula as outlined in FCC's OET Bulletin 65, Edition 97-01: [vi]

$$S = \frac{P \cdot G}{4 \cdot \pi \cdot R^2}$$

Where:
P → Power to antenna (watts)
G → Gain of antenna
R → Distance (range) from antenna source to point of intersection with the ground (feet)
$R^2 = (\text{Height})^2 + (\text{Horizontal distance})^2$

Since: $P \cdot G$ = EIRP (Effective Isotropic Radiated Power) for broadcast antennas, the equation can be presented in the following form:

$$S = \frac{EIRP}{4 \cdot \pi \cdot R^2}$$

In the situation of off-axis power density calculations, apply the negative elevation gain (G^E) value from the vertical radiation patterns with the following formula:

$$S = \frac{EIRP \cdot G^E}{4 \cdot \pi \cdot R^2}$$

Ground reflections may add in-phase with the direct wave, and essentially double the electric field intensity. Because power density is proportional to the *square* of the electric field, the power density may quadruple, that is, increase by a factor of four (4). Since ERP is routinely used, it is necessary to convert ERP into EIRP; this is readily done by multiplying the ERP by the factor of 1.64, which is the gain of a half-wave dipole relative to an isotropic radiator. Therefore, downrange power density estimates can be calculated by using the formula:

$$S = \frac{4 \cdot (ERP \cdot 1.64) \cdot G^E}{4 \cdot \pi \cdot R^2} = \frac{ERP \cdot 1.64 \cdot G^E}{\pi \cdot R^2} = \frac{0.522 \cdot ERP \cdot G^E}{R^2}$$

To calculate the % MPE, use the formula:

$$\% \text{ MPE} = \frac{S}{MPE} \cdot 100$$

ANTENNA INSTALLATION LOCATION

The location of the proposed utility light pole which would host a Verizon Wireless SC antenna is shown below in Figure 2. The latitude and longitude are listed in Table 2.

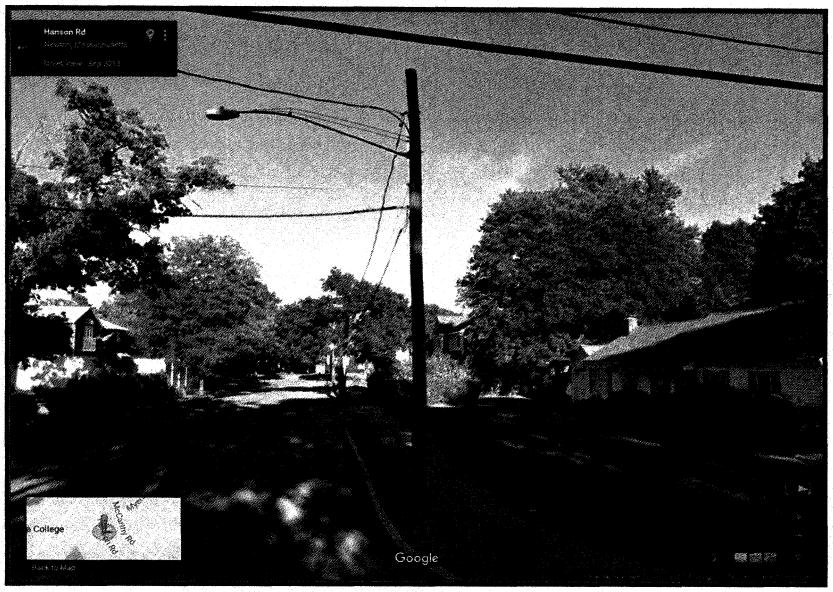


Figure 2: Location (center) of Proposed Utility Pole Which Would Host A Verizon Wireless SC Antenna, Hay Road in Newton, MA

The results of the percent Maximum Permissible Exposure (%MPE) calculations for the summation of the proposed Verizon Wireless contributions are depicted in Figure 3 as plotted against linear distance from the base of the utility pole. The values have been calculated for a height of six feet above ground level in accordance with regulatory rationale. In addition to the six-foot height, and depicted on the graph for reference only, values have been plotted for a height of 16 feet above ground level for comparison with a typical two-story structure. A logarithmic scale was used to plot the calculated theoretical %MPE values in order to compare with the MPE of 100%, which is so much larger that it would be off the page in a linear plot. The curves in the figures resemble a straight-line on the log-linear plots at distances beyond about one thousand feet. Within that distance, the curves are variable due to the application of the vertical radiation patterns.

OBSERVATIONS IN CONSIDERATION WITH FCC RULES §1.1307(B) & §1.1310

Is it physically possible to stand next to or touch any omni-directional antenna? No, access to the utility poles is restricted, and the utility companies will adhere to RF safety guidelines regarding potential access to the proposed PWS antennas mounted on the poles.

ANTENNA INVENTORY

Table 2: Proposed Verizon Wireless Antenna Inventory
Utility Pole at Hay Road, Newton, MA

Parameters: 1072 watts ERP* of AWS @ 2150 MHz

Site Name	Latitude Longitude	Antenna Centerline (AGL)	Antenna Model
"Newton_S_MA _SC01" (Hay Road)	42°17'37.63"N -71°11'11.79"W	40'6"	NH360QM-DG-2XR
Information relevant to the antennas proposed by Verizon Wireless on file.			

Table Notes:
AWS: Advanced Wireless Services
* ERP = Power out per channel (CH) X # channels per remote radio head (RRH) X #RRHs X gain the antenna provides within that frequency band.

RESULTS

The results of the RF field calculations for the summation of the proposed Verizon Wireless AWS technologies are depicted in Figure 3.

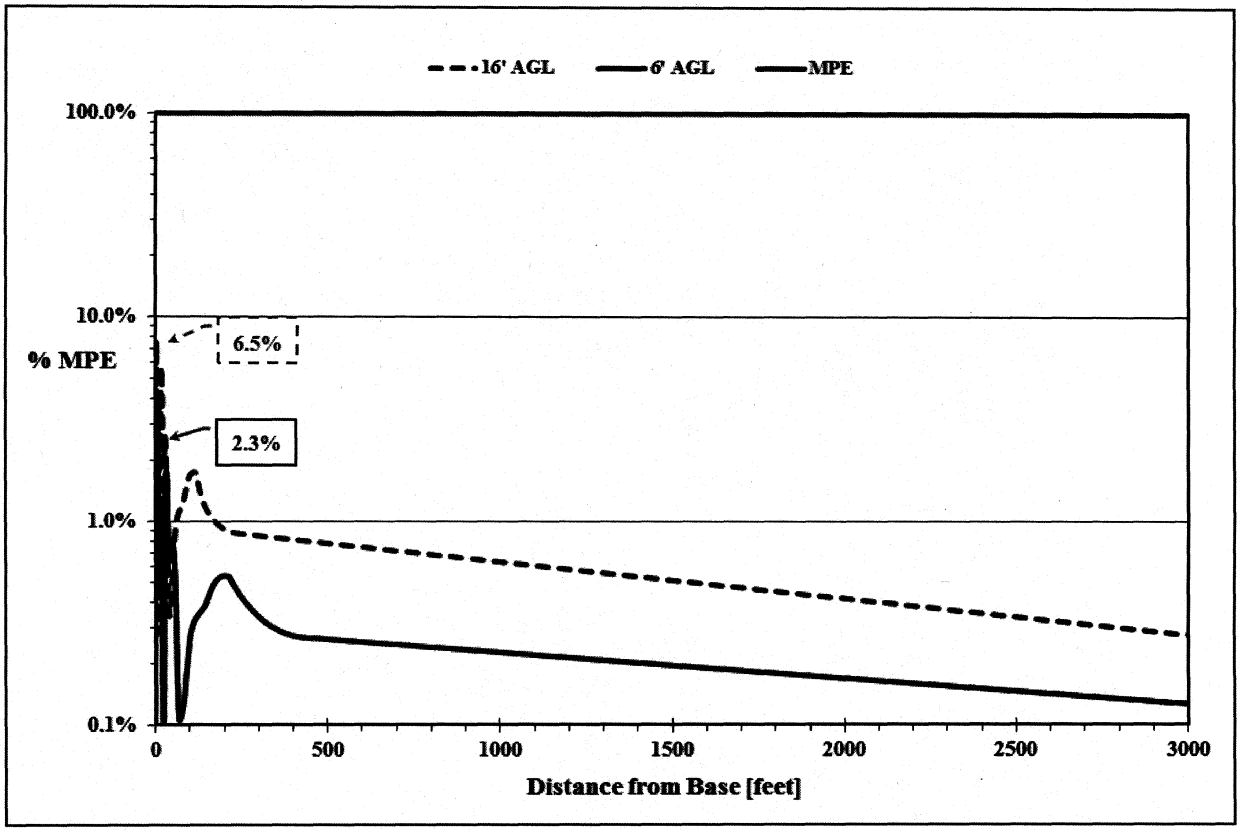


Figure 3: Theoretical RF field calculations for the summation of the Proposed Verizon Wireless Small Cell Antenna Site "Newton_S_MA_SC01" Hay Road, Newton, MA

CONCLUSION

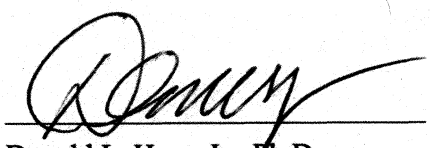
Theoretical RF field calculations data indicate the summation of the proposed Verizon Wireless RF contributions would be well within the established RF exposure guidelines at the proposed site; see Figure 3. These results indicate there could be many more similar installations at this location, and still be within Federal and State guidelines for RF exposure. This report provides written proof that the proposed facility would comply with the FCC RF exposure guidelines, including residential areas and in the surrounding neighborhoods.

The number and duration of calls passing through PWS facilities cannot be accurately predicted. Thus, in order to estimate the highest RF fields possible from operation of these installations, the maximal amount of usage was considered. Even in this so-called "worst-case", the resultant increase in RF field levels are far below established levels considered safe.

Based on the theoretical RF fields I have calculated, it is my expert opinion that this facility would comply with all regulatory guidelines for RF exposure to members of the public. The antenna installation proposed by Verizon Wireless would not produce significant changes to the ambient RF environment.

Feel free to contact me if you have any questions.

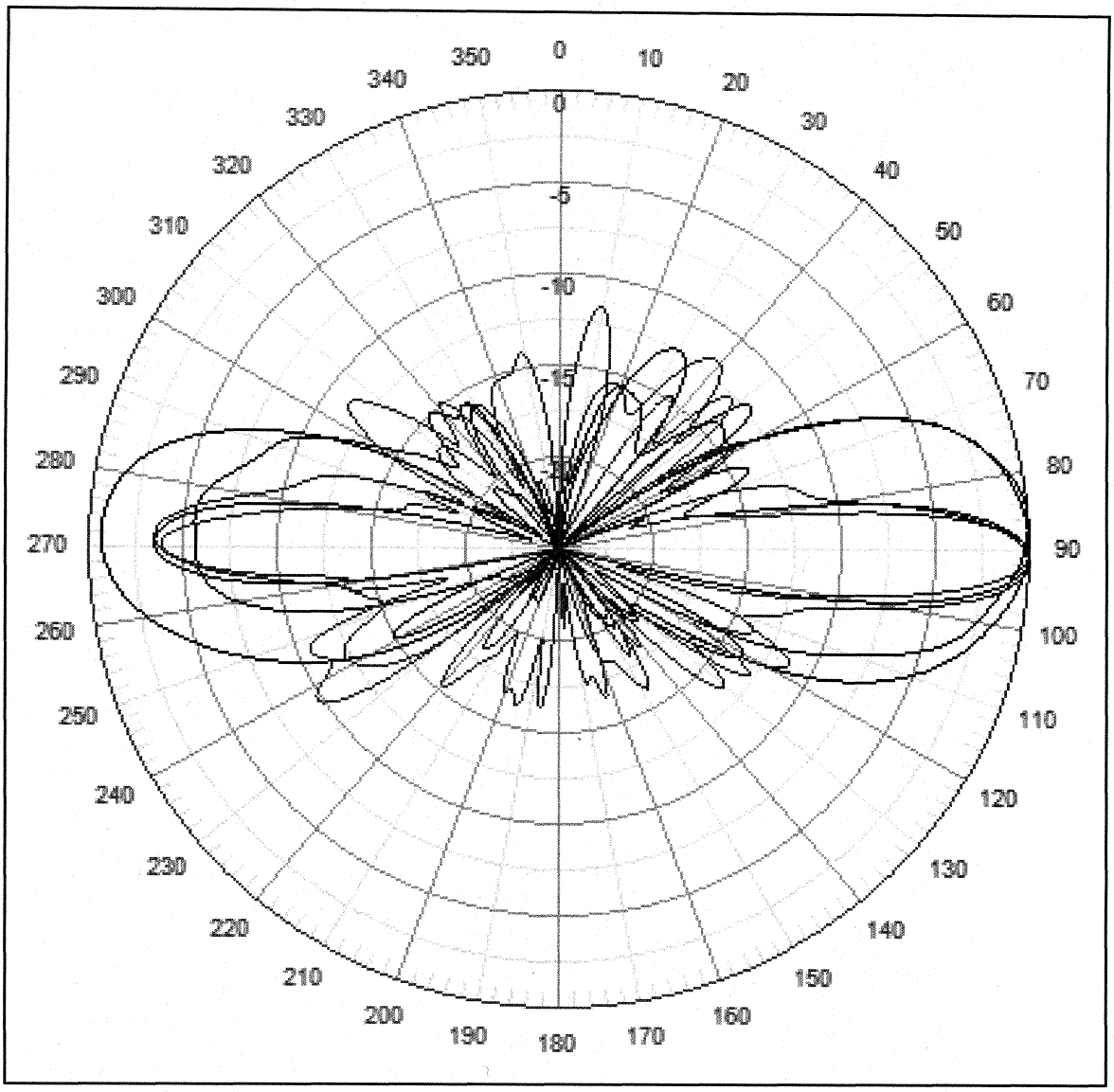
Sincerely,



Donald L. Haes, Jr., Ph.D
Certified Health Physicist

Note: The analyses, conclusions and professional opinions are based upon the precise parameters and conditions of these particular sites; **Utility light pole Hay Road, Newton, MA.** Utilization of these analyses, conclusions and professional opinions for any personal wireless services installation, existing or proposed, other than the aforementioned has not been sanctioned by the author, and therefore should not be accepted as evidence of regulatory compliance.

APPENDIX A



Composite Vertical Radiation Patterns for Proposed Small Cell Omni Antennas For Specific Verizon Wireless Proposed PWS AWS Frequencies

DONALD L. HAES, JR., PH.D., CHP
Radiation Safety Specialist
MA Radiation Control Program Health Physics Services Provider Registration #65-0017
PO Box 198, Hampstead, NH 03841 603-303-9959 Email: donald_haes_chp@comcast.net

STATEMENT OF CERTIFICATION

1. I certify to the best of my knowledge and belief, the statements of fact contained in this report are true and correct.

2. The reported analyses, opinions, and conclusions are limited only by the reported assumptions and limiting conditions, and are personal, unbiased professional analyses, opinions and conclusions.

3. I have no present or prospective interest in the property that is the subject of this report and I have no personal interest or bias with respect to the parties involved.

4. My compensation is not contingent upon the reporting of a predetermined energy level or direction in energy level that favors the cause of the client, the amount of energy level estimate, the attainment of a stipulated result, or the occurrence of a subsequent event.

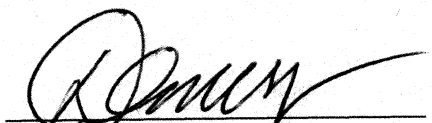
5. This assignment was not based on a requested minimum environmental energy level or specific power density.

6. My compensation is not contingent on an action or event resulting from the analyses, opinions, or conclusions in, or the use of, this report.

7. The consultant has accepted this assessment assignment having the knowledge and experience necessary to complete the assignment competently.

8. My analyses, opinions, and conclusions were developed and this report has been prepared, in conformity with the *American Board of Health Physics* (ABHP) statements of standards of professional responsibility for Certified Health Physicists.

Date: August 4, 2016



Donald L. Haes, Jr., Ph.D
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ENDNOTES

[i]. Federal Register, Federal Communications Commission Rules; *Radiofrequency radiation; environmental effects evaluation guidelines* Volume 1, No. 153, 41006-41199, August 7, 1996. (47 CFR Part 1; Federal Communications Commission).

[ii]. Telecommunications Act of 1996, 47 USC; Second Session of the 104th Congress of the United States of America, January 3, 1996.

[iii]. 105 CMR 122.000: Massachusetts Department of Public Health, *Non-Ionizing Radiation Limits for: The General Public from Non-Occupational Exposure to Electromagnetic Fields, Employees from Occupational Exposure to Electromagnetic Fields, and Exposure from Microwave Ovens*.

[iv]. ANSI/IEEE C95.1-1999: American National Standard, *Safety levels with respect to human exposure to radio frequency electromagnetic fields, from 3 KHz to 300 GHz* **(Updated in 2010)**.

[v]. National Council on Radiation Protection and Measurements (NCRP); *Biological Effects and Exposure Criteria for Radiofrequency Electromagnetic Fields*, NCRP Report 86, 1986.

[vi]. OET Bulletin 65: Federal Communications Commission Office of Engineering and Technology, *Evaluating Compliance with FCC Guidelines for Human Exposure to Radiofrequency Electromagnetic Fields*; Edition 97-01, August 1999.

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August 3, 2016

RE: Proposed installation of radio base station antenna and associated equipment for the Verizon Wireless Small Cell Personal Wireless Services facility to be located on a utility pole on Dudley Road in Newton, MA.

PURPOSE

I have reviewed the information pertinent to the Verizon Wireless proposed installation of this small cell (SC) personal wireless services (PWS) facility on Dudley Road in Newton, MA. To determine regulatory compliance, theoretical calculations of maximal radio-frequency (RF) fields have been prepared. The physical conditions are that Verizon Wireless proposes to install a PWS omni-directional canister type antenna on an existing utility pole. The antenna arrangement will include a single canister antenna side-mounted on an existing utility pole and a remote radio head (RRH) set. The mounting centerline height of the antenna is proposed to be 28'6" above ground level (AGL). This report provides written proof that the proposed facility would comply with the FCC RF exposure guidelines, including residential areas and in the surrounding neighborhood.

This report considers the contributions of the Verizon Wireless PWS transmitters operating at their proposed capacity. The calculated values of RF fields are presented as a percent of current Maximum Permissible Exposures (%MPE) as adopted by the Federal Communications Commission (FCC),[i,ii] and those established by the Massachusetts Department of Public Health (MDPH).[iii]

SUMMARY

Theoretical RF field calculations data indicate the summation of the proposed Verizon Wireless RF contributions would be well within the established RF exposure guidelines at the proposed site; see Figure 3. These results indicate there could be many more similar installations at this location, and still be within Federal and State guidelines for RF exposure. This report provides written proof that the proposed facility would comply with the FCC RF exposure guidelines, including residential areas and in the surrounding neighborhoods.

Based on the theoretical RF fields I have calculated, it is my expert opinion that this facility would comply with all regulatory guidelines for RF exposure to members of the public. The antenna installation proposed by Verizon Wireless would not produce significant changes to the ambient RF environment.

Note: The analyses, conclusions and professional opinions are based upon the precise parameters and conditions of these particular sites; **Utility light pole Dudley Road, Newton, MA.** Utilization of these analyses, conclusions and professional opinions for any personal wireless services installation, existing or proposed, other than the aforementioned has not been sanctioned by the author, and therefore should not be accepted as evidence of regulatory compliance.

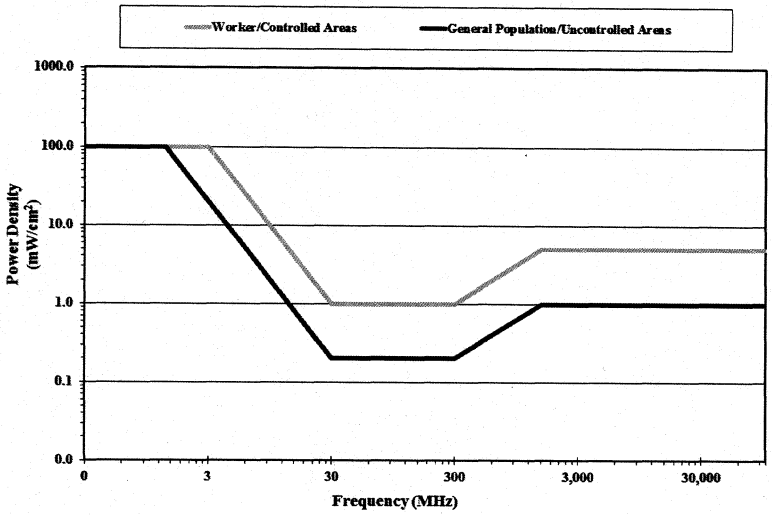

Figure 1: FCC Limits for Maximum Permissible Exposure (MPE)

EXPOSURE LIMITS AND GUIDELINES

The RF exposure guidelines adopted by the FCC are a combination of the standards published by the American National Standards Institute (ANSI) [iv] and the National Council on Radiation Protection and Measurement (NCRP). [v] Also applicable are those published by the MDPH. The RF exposure guidelines are divided into two categories: "Controlled/Occupational areas" (those areas restricted to access by RF workers only) and "Uncontrolled/Public Areas" (those areas unrestricted for public access). Listed in Table 1 below and shown in Figure 1 above are the applicable RF exposure guidelines for uncontrolled areas as they pertain to the operating frequency band of the PWS facility.

Table 1: Maximum Permissible Exposure Values for Uncontrolled/Public Areas

Frequency Band:	Maximum Permissible Exposure:
300 - 1500 MHz	f/ 1.5 in $\mu W/cm^2$
1500 - 100,000 MHz	1000 $\mu W/cm^2$ *

Note: 1 μW = 0.000001 Watt

* For equivalent plane-wave power density, where f is the frequency in MHz (10^6 Hz).

A word about RF exposure standards outside of North America by the FCC: [1]

Many countries in Europe and elsewhere use exposure guidelines developed by the International Commission on Non-Ionizing Radiation Protection (ICNIRP). The ICNIRP safety limits are generally similar to those of the NCRP and IEEE, with a few exceptions. For example, ICNIRP recommends somewhat different exposure levels in the lower and upper frequency ranges and for localized exposure due to such devices as hand-held cellular telephones. One of the goals of the WHO EMF Project (see above) is to provide a framework for international harmonization of RF safety standards. The NCRP, IEEE and ICNIRP exposure guidelines identify the same threshold level at which harmful biological effects may occur, and the values for Maximum Permissible Exposure (MPE) recommended for electric and magnetic field strength and power density in both documents are based on this level. The threshold level is a Specific Absorption Rate (SAR) value for the whole body of 4 watts per kilogram (4 W/kg).

RF Exposure Guidelines for Implanted Medical Devices (IMDs)

The manufacturers of Implanted Medical Devices (IMDS; e.g. pacemakers, sub-dermal infusion pumps, implanted defibrillators, etc.) follow strict guidelines for Electromagnetic Compatibility (EMC) [2] and susceptibility to Electromagnetic Interference (EMI). This recommended practice is to evaluate the electromagnetic immunity of medical devices to radiated RF emissions from common RF transmitters (e.g., two-way radios; walkie-talkies; mobile phones; wireless-enabled tablets, e-readers, laptop computers, and similar devices; radio-frequency identification (RFID) readers; networked mp3 players; two-way pagers; and wireless personal digital assistants [PDAs]).

For the frequency bands in use by the PWS industry, the major manufactures of IMDs have proposed the following limits for RF exposure. **Note that modern pacemakers and defibrillators are designed to operate normally within RF levels that meet the government Maximum Permissible Exposure (MPE) limits.**

Medtronic Implanted Heart Devices:

High Frequency (150 kHz & up): < 100 V/m

Modulated Magnetic Fields (> 10 kHz) < 1 A/m

Boston Scientific's Cardiac Rhythm Management Devices

High frequency E-fields (500 kHz to 6 GHz): 140 V/m RMS

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[1] https://www.fcc.gov/engineering-technology/electromagnetic-compatibility-division/radio-frequency-safety/faq/rf-safety#Q9.

[2] C63.18: C63.18-2014 On-site, Ad-Hoc Test Method for Estimating Radiated Electromagnetic Immunity of Medical Devices to Specific Radio Frequency Transmitters.

THEORETICAL RF FIELD CALCULATIONS - GROUND LEVELS

METHODOLOGY

These calculations are based on what are called "worst-case" estimates. That is, the estimates assume 100% use of all transmitters simultaneously. Additionally, the calculations make the assumption that the surrounding area is a flat plane. The resultant values are thus conservative in that they over predict actual resultant power densities. The calculations are based on the following information for VERIZON WIRELESS:

1. Effective Radiated Power (ERP): See Table 2 inventory.
2. Antenna height (centerline, above ground level (AGL) See Table 2 inventory.
3. Antenna vertical radiation patterns; the source of the negative gain (G) values. "Omni directional" antennas are designed to focus the RF signal, resulting in "patterns" of signal loss and gain. These patterns (see **APPENDIX A**) display the loss of signal strength relative to the direction of propagation due to elevation angle changes.
   Note: G is a unitless factor usually expressed in decibels (dB); where $G = 10^{(dB/10)}$.
   For example: for an antenna *gain* of 3 dB, the net factor $(G) = 10^{(3/10)} = 2$.
   For an antenna *loss* of -3 dB, the net factor $(G) = 10^{(-3/10)} = 0.5$.

To determine the magnitude of the RF field, the power density (S) from an isotropic RF source is calculated, making use of the power density formula as outlined in FCC's OET Bulletin 65, Edition 97-01: [vi]

$$S = \frac{P \cdot G}{4 \cdot \pi \cdot R^2}$$

Where:
- $P \rightarrow$ Power to antenna (watts)
- $G \rightarrow$ Gain of antenna
- $R \rightarrow$ Distance (range) from antenna source to point of intersection with the ground (feet)
- $R^2 = (\text{Height})^2 + (\text{Horizontal distance})^2$

Since: $P \cdot G = EIRP$ (Effective Isotropic Radiated Power) for broadcast antennas, the equation can be presented in the following form:

$$S = \frac{EIRP}{4 \cdot \pi \cdot R^2}$$

In the situation of off-axis power density calculations, apply the negative elevation gain (G^E) value from the vertical radiation patterns with the following formula:

$$S = \frac{EIRP \cdot G^E}{4 \cdot \pi \cdot R^2}$$

Ground reflections may add in-phase with the direct wave, and essentially double the electric field intensity. Because power density is proportional to the *square* of the electric field, the power density may quadruple, that is, increase by a factor of four (4). Since ERP is routinely used, it is necessary to convert ERP into EIRP; this is readily done by multiplying the ERP by the factor of 1.64, which is the gain of a half-wave dipole relative to an isotropic radiator. Therefore, downrange power density estimates can be calculated by using the formula:

$$S = \frac{4 \cdot (ERP \cdot 1.64) \cdot G^E}{4 \cdot \pi \cdot R^2} = \frac{ERP \cdot 1.64 \cdot G^E}{\pi \cdot R^2} = \frac{0.522 \cdot ERP \cdot G^E}{R^2}$$

To calculate the % MPE, use the formula:

$$\%\ MPE = \frac{S}{MPE} \cdot 100$$

ANTENNA INSTALLATION LOCATION

The location of the proposed utility light pole which would host a Verizon Wireless SC antenna is shown below in Figure 2. The latitude and longitude are listed in Table 2.

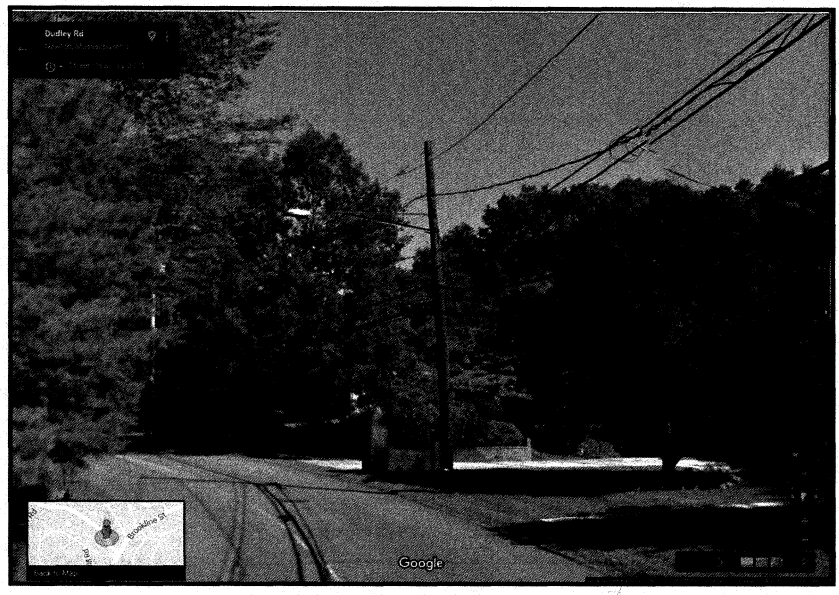


Figure 2: Location (center) of Proposed Utility Pole Which Would Host A Verizon Wireless SC Antenna, Dudley Road in Newton, MA

The results of the percent Maximum Permissible Exposure (%MPE) calculations for the summation of the proposed Verizon Wireless contributions are depicted in Figure 3 as plotted against linear distance from the base of the utility pole. The values have been calculated for a height of six feet above ground level in accordance with regulatory rationale. In addition to the six-foot height, and depicted on the graph for reference only, values have been plotted for a height of 16 feet above ground level for comparison with a typical two-story structure. A logarithmic scale was used to plot the calculated theoretical %MPE values in order to compare with the MPE of 100%, which is so much larger that it would be off the page in a linear plot. The curves in the figures resemble a straight-line on the log-linear plots at distances beyond about one thousand feet. Within that distance, the curves are variable due to the application of the vertical radiation patterns.

OBSERVATIONS IN CONSIDERATION WITH FCC RULES §1.1307(B) & §1.1310

Is it physically possible to stand next to or touch any omni-directional antenna? No, access to the utility poles is restricted, and the utility companies will adhere to RF safety guidelines regarding potential access to the proposed PWS antennas mounted on the poles.

ANTENNA INVENTORY

Table 2: Proposed Verizon Wireless Antenna Inventory
Utility Pole at Dudley Road, Newton, MA

Parameters: 715 watts ERP* of AWS @ 2150 MHz
298 watts ERP* of LTE @ 700 MHz

Site Name	Latitude Longitude	Antenna Centerline (AGL)	Antenna Model
"Newton_MA_SC 28" (Dudley Road)	42°18'22.69"N -71°10'33.26"W	28'6"	NH360QM-DG-2XR
Information relevant to the antennas proposed by Verizon Wireless on file.			

Table Notes:
AWS: **A**dvanced **W**ireless **S**ervices
LTE: **L**ong **T**erm **E**volution (i.e. "4G")

* ERP = Power out per channel (CH) X # channels per remote radio head (RRH) X #RRHs X gain the antenna provides within that frequency band.

RESULTS

The results of the RF field calculations for the summation of the proposed Verizon Wireless AWS & LTE technologies are depicted in Figure 3.

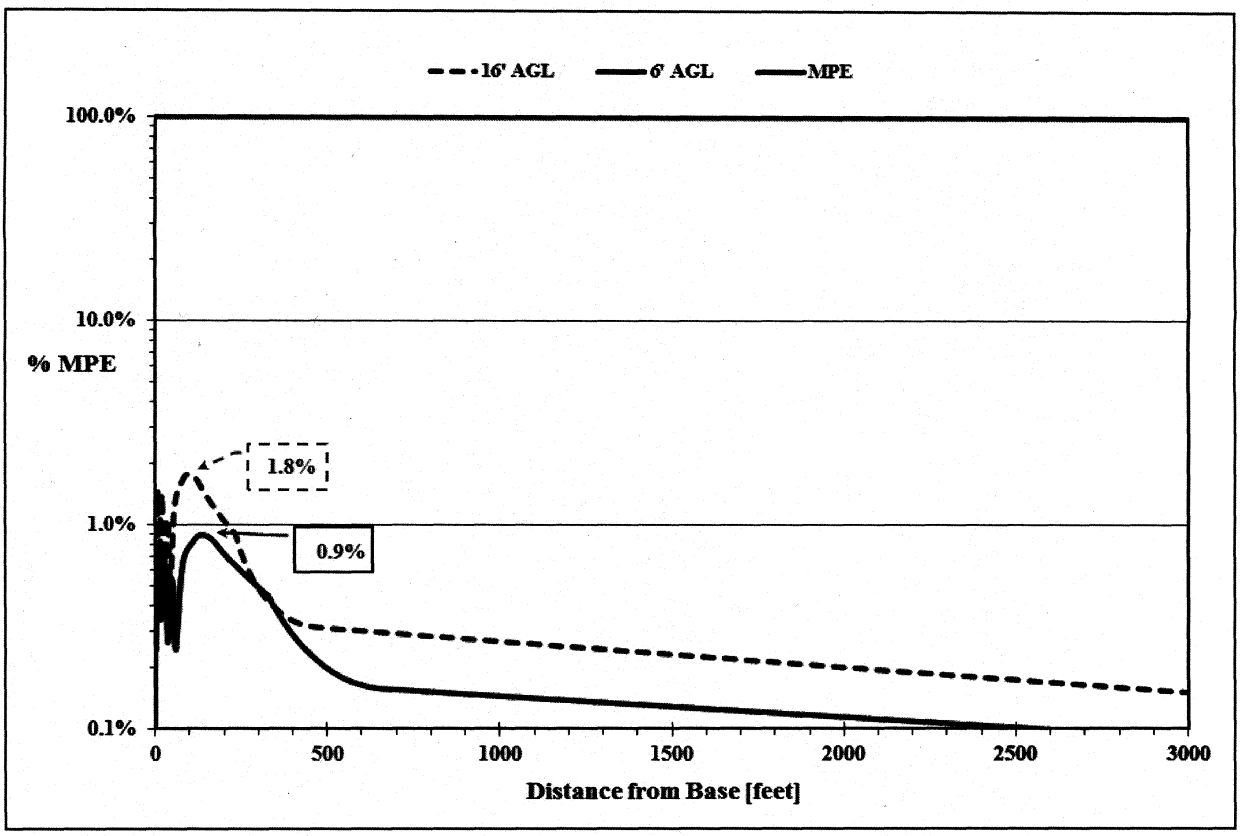


Figure 3: Theoretical RF field calculations for the summation of the Proposed Verizon Wireless Small Cell Antenna Site "Newton_MA_SC28" Dudley Road, Newton, MA

CONCLUSION

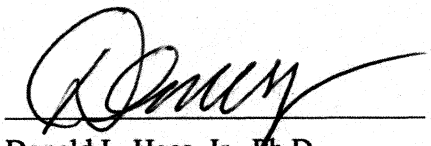
Theoretical RF field calculations data indicate the summation of the proposed Verizon Wireless RF contributions would be well within the established RF exposure guidelines at the proposed site; see Figure 3. These results indicate there could be many more similar installations at this location, and still be within Federal and State guidelines for RF exposure. This report provides written proof that the proposed facility would comply with the FCC RF exposure guidelines, including residential areas and in the surrounding neighborhoods.

The number and duration of calls passing through PWS facilities cannot be accurately predicted. Thus, in order to estimate the highest RF fields possible from operation of these installations, the maximal amount of usage was considered. Even in this so-called "worst-case", the resultant increase in RF field levels are far below established levels considered safe.

Based on the theoretical RF fields I have calculated, it is my expert opinion that this facility would comply with all regulatory guidelines for RF exposure to members of the public. The antenna installation proposed by Verizon Wireless would not produce significant changes to the ambient RF environment.

Feel free to contact me if you have any questions.

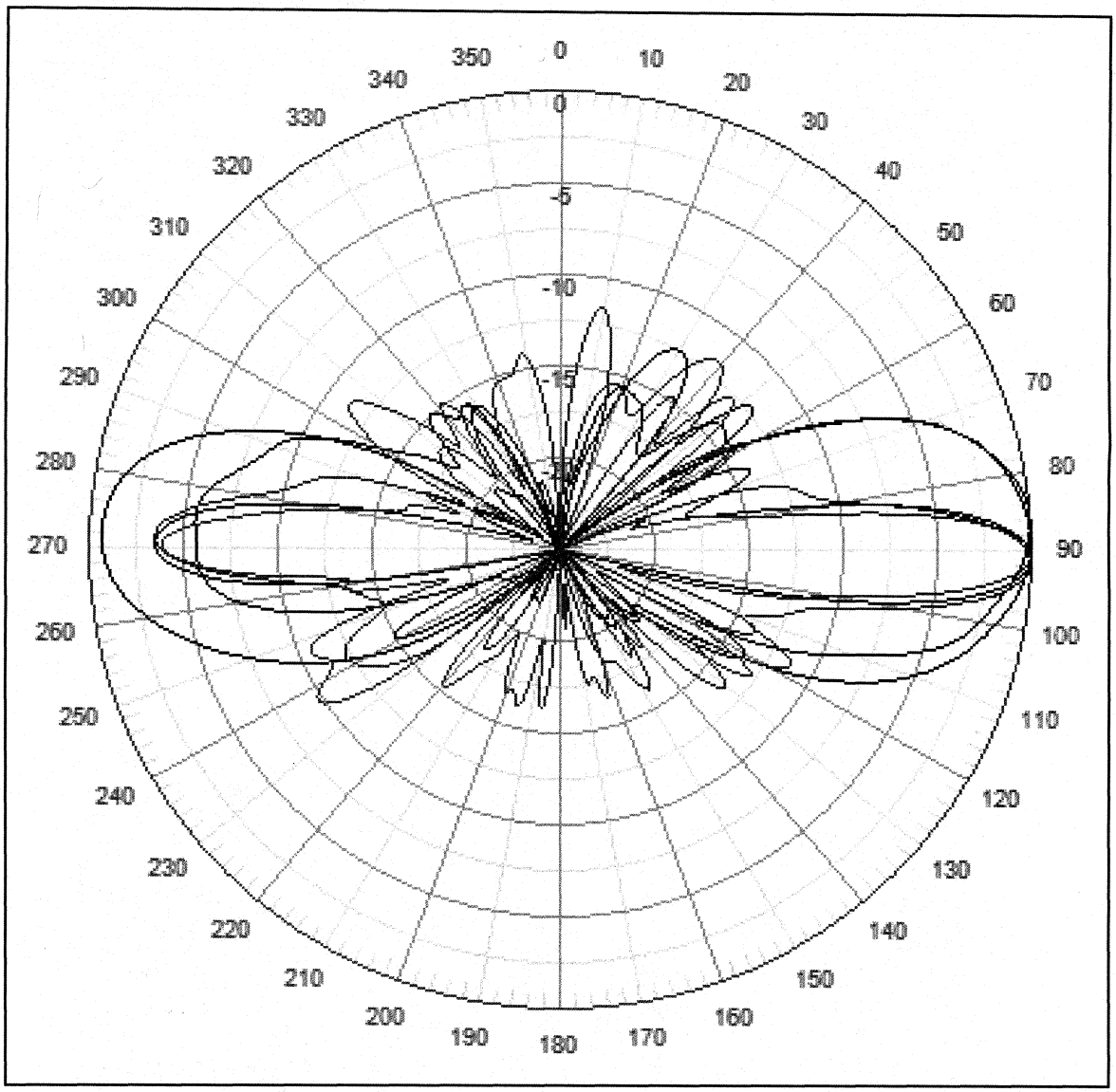
Sincerely,



Donald L. Haes, Jr., Ph.D
Certified Health Physicist

Note: The analyses, conclusions and professional opinions are based upon the precise parameters and conditions of these particular sites; **Utility light pole Dudley Road, Newton, MA**. Utilization of these analyses, conclusions and professional opinions for any personal wireless services installation, existing or proposed, other than the aforementioned has not been sanctioned by the author, and therefore should not be accepted as evidence of regulatory compliance.

APPENDIX A



Composite Vertical Radiation Patterns for Proposed Small Cell Omni Antennas For Specific Verizon Wireless Proposed PWS LTE & AWS Frequencies

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STATEMENT OF CERTIFICATION

1. I certify to the best of my knowledge and belief, the statements of fact contained in this report are true and correct.

2. The reported analyses, opinions, and conclusions are limited only by the reported assumptions and limiting conditions, and are personal, unbiased professional analyses, opinions and conclusions.

3. I have no present or prospective interest in the property that is the subject of this report and I have no personal interest or bias with respect to the parties involved.

4. My compensation is not contingent upon the reporting of a predetermined energy level or direction in energy level that favors the cause of the client, the amount of energy level estimate, the attainment of a stipulated result, or the occurrence of a subsequent event.

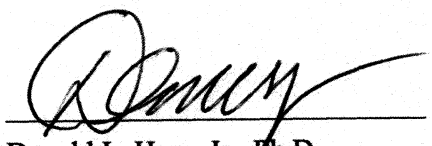
5. This assignment was not based on a requested minimum environmental energy level or specific power density.

6. My compensation is not contingent on an action or event resulting from the analyses, opinions, or conclusions in, or the use of, this report.

7. The consultant has accepted this assessment assignment having the knowledge and experience necessary to complete the assignment competently.

8. My analyses, opinions, and conclusions were developed and this report has been prepared, in conformity with the *American Board of Health Physics* (ABHP) statements of standards of professional responsibility for Certified Health Physicists.

Date: August 3, 2016



Donald L. Haes, Jr., Ph.D

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ENDNOTES

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