**CITY OF SOMERVILLE**
Commonwealth of Massachusetts
93 Highland Avenue
Somerville, MA 02143
(617) 625-6600

# BUSINESS LICENSE APPLICATION - Small Wireless Facility

File #: 21-001930

License #: BL21-000021

Address: 2 BELMONT ST

Licensee: Derek Maheux Centerline Communications

DBA Name: Verizon Wireless

Business Ownership Type: Partnership / LLP

Legal Name of Entity: Cellco Partnership d/b/a Verizon Wireless

Owners/Officers: , , ,

**License Information:**
**Do you believe this to be a 6409(a) application?:** Don't Know
**Describe the reason for the work, and the intended beneficiaries:** The proposed small cell installation will enhance network capacity and coverage and bring improved wireless service to Somerville and the immediately surrounding area.
**Provide the detailed description of the work that should appear on the License:** Proposed installation of a small cell wireless facility on an existing Eversource utility pole
**# of installations on existing poles:** 1
**# of installations on new poles:** 0
**Provide the legal name of the entity that will own the License:** Cellco Partnership d/b/a Verizon Wireless

Approval Conditions:
**Approved By:**
**Hans Jensen, Approved**
**Karla Cuarezma, Approved**
**Malik Drayton, Approved with Conditions**
APPROVAL CONDITION: MD20210225: Contractor shall take all necessary precautions to avoid damaging any tree or tree part with equipment.
APPROVAL CONDITION: MD20210225: All nearby street tree(s) shall be protected prior to and during all construction activities using TREE BOX or TREE WRAPS. . TREE BOX shall be constructed from 2 in. x 4 in. lumber creating a box around the border of the tree pit with 2 in. x 4 in. lumber standing straight up at the corners and wrapped with orange snow fence. Detail attached. . TREE WRAPS

(TREE TRUNK WRAPPING PROTECTION LUMBER) shall consist of 2 in. x 4 in. and 8 ft. height lumber wired together in close spacing with zip ties or 16 gauge galvanized steel wire to form a protective enclosure around tree trunks. Use burlap to separate the wood from the bark if necessary to prevent wood from scraping or bruising bark. Do not use staples or puncture the trunk in any way.
APPROVAL CONDITION: MD20210225: Any tree roots less than two (2) inches in diameter that cannot be avoided during construction shall be carefully and cleanly cut with a clean pair of pruning shears or loppers. Roots are to be cut back flush with the edge of the trench. If any tree roots greater than two (2) inches in diameter are encountered, stop work immediately and contact the City Urban Forester. Any and all pruning of roots greater than 2 inches in diameter must be completed under the supervision of the City Urban Forester.

**John Power, Approved with Conditions**

Electrical Review approved, conditional upon electrical permit application/approval for scope of work.

**Mark Lawhorne, Approved**

**John J. Long, Approved**

**118 Flanders Road**
**Third Floor**
**Westborough, MA 01851**

**Sean Conway**
**Principal Engineer**

February 10, 2021

City of Somerville City Council
c/o City Clerk's Office
93 Highland Avenue
Somerville, MA 02143

Re: Verizon Application for Small Wireless Facilities ("SWF")

Dear City Clerk and City Council Members:

Enclosed please find the application of Cellco Partnership d/b/a Verizon Wireless ("Verizon") for approval to install SWF on existing wooden utility poles within Somerville's public right of way at the following locations:

| Site Name | Address | Pole # |
|---|---|---|
| BOS_SOM_032_MA | 299 Medford Street | unmarked |
| BOS_SOM_034_MA | 434 McGrath Highway | unmarked |
| BOS_SOM_060_MA | 53 Concord Avenue | 112/3 |
| BOS_SOM_061_MA | 40 Marion Street | 221/5 |
| BOS_SOM_072_MA | 15 Ivaloo Street | BECO1179/ VZ179/1 |
| BOS_SOM_076_MA | 2 Belmont Street | unmarked |
| BOS_SOM_086_MA | 40 Bow Street | unmarked |

Consistent with the City Clerk's proposed fees for a SWF license approved by the City Council on July 11, 2019, Verizon shall submit a New License Fee of $100.00 per installation upon approval of each location included in the application. Under the City's Ordinance Relative to Small Wireless Facilities in the Public Rights-of-Way ("Ordinance"), Section 12-144(a), no public hearing is required.

Included within the application are a set of plans for each proposed location along with a structural analysis for each existing utility pole as well as a license granted from the pole owner (Eversource) to Verizon to install the SWF at each proposed location. Additionally, we have included a compliance letter along with a diagram which shows that each proposed antenna array is more than fifteen (15) feet from a residence's window, door opening, porch or balcony as required by the City's Design Standards for Small Wireless Facilities Placement in the Public Right-of-Way ("Design Standards"). Further, as described in detail below, Verizon respectfully requests a waiver of two (2) dimensional requirements in the Ordinance that materially inhibit Verizon's ability to provide 5G services in Somerville.

Request For Waiver

Under the City's Design Standards, an applicant may request a waiver of any of the requirements in the Ordinance or Design Standards as long as the applicant "specif[ies] those provisions for which it seeks a waiver, and . . . include[s] specific explanations as to the need for waiver of each, including an explanation of why compliance with the requirement(s) would prohibit or effectively prohibit the provision of services as protected by applicable law." This provision acts as a "safety valve" that recognizes that advanced network equipment, including the equipment used for

5G, is evolving and subject to changes over time. Without this safety valve, restrictive dimensional requirements would act as an effective prohibition of wireless services in violation of Federal Communications Commission requirements.

- Waiver Request #1: Verizon requests that the City waive the requirement in Section 12-148(e) of the Ordinance that requires that "antennas shall be limited to snug-mount, canister-mount, and concealed . . . with a diameter of no more than six inches greater than the diameter of the [top of the] pole." It is not technically feasible to comply with the canister requirement because use of such a canister would make the antenna ineffective. Simply put, while Verizon's 5G antennas meet the "snug-mount" requirement, the antennas are not able to be located within canisters. Unlike 4G antennas, which are often referred to as "cantennas" due to their shape, Verizon's panel 5G antennas are not contained within canisters. Each individual antenna in the array has a height of 19.3", width of 11" and depth of 7.9". It is important to note that even if Verizon were able to deploy such a canister around the antenna array, the size of the resulting structure would exceed the 3 cubic foot requirement called for in the Ordinance. Additionally, a canister surrounding the antenna array could potentially interfere with transmission of Ultra-Wide-Band (UWB) 5G signals which can be blocked by nearby surfaces.

Similarly, the 5G equipment being proposed by Verizon slightly exceeds the requirement that a pole-top antenna diameter be no more than 6" greater the diameter of the top of the pole. The Verizon 5G equipment exceeds the pole top diameter by approximately 8" rather 6". This minor exception is warranted because the overall design proposed by Verizon (that does not include a canister) also eliminates the need to install fan that is required for cooling the equipment that is in a canister. The use of fans, and the resulting noise from the fans, is discouraged by the Ordinance in residential areas. In fact, the use of fans and their noise was a big part of the discussion when the City Council was developing the Ordinance. Finally, the small increase of diameter in array allows for the proper promulgation of the UWB 5G signal unique to the Verizon UWB 5G service. Attached to this letter is a diagram showing the proposed 5G SWF antenna array in detail. This design is used by Verizon in all Massachusetts 5G communities, including Boston, Arlington, Malden and Cambridge.

- Waiver Request #2: Verizon requests that the City waive the requirement in Section 12-148(d) of the Ordinance that requires that "[p]ole-mounted equipment minimum heights to the bottom of the equipment shall be 15 feet above sidewalk elevation." As shown in the detailed plans included with this application, the lowest piece of equipment associated with the SWF facility (i.e., the "load center") is located at a height of 10 feet above sidewalk elevation. It is not technically feasible to locate the load center at 15 feet height or higher because it is the utility pole owner (in this case, Eversource), that establishes SWF equipment height based on the electrical equipment and other attachers already on the pole. Moreover, the load center (also known as a "disconnect box") contains the switch that can be accessed by emergency personnel to shut off power to the antenna in an emergency and must be able to be accessed by emergency personnel. In discussions with City personnel on September 22, 2020 and October 6, 2020, it is Verizon's understanding that the City is in agreement with this waiver request.

Taken as a whole, Verizon's waiver requests allow for the use of smaller equipment that will emit less noise because it eliminates the need for fans and uses existing utility poles for the placement of 5G equipment. All of these benefits are part of the language and intent of the Ordinance and Design Standards. Without granting of these waiver requests, Verizon's ability to provide 5G in Somerville would be materially inhibited and would constitute an effective prohibition. For all these reasons, Verizon respectfully requests that the City grant its waver requests and approve the SWF applications contained herein.

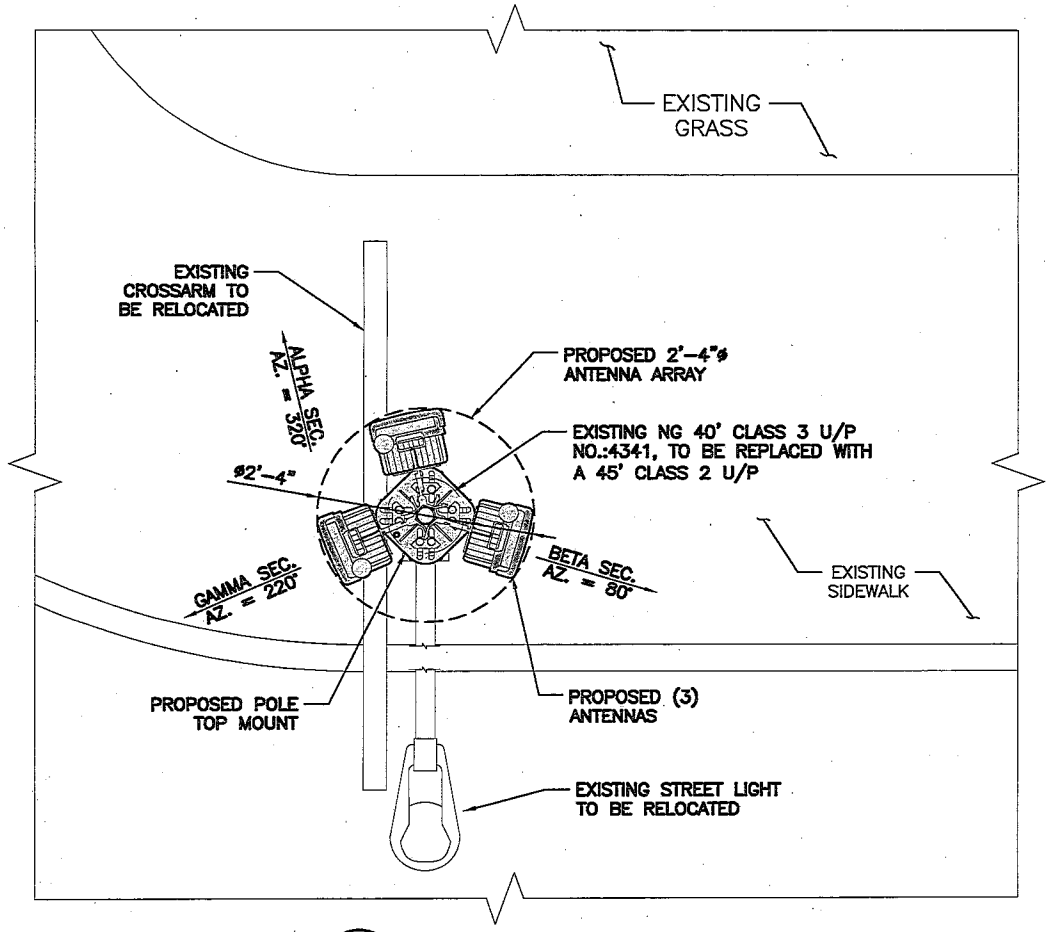
Respectfully Submitted,

*Sean Conway*

Sean Conway
Principal Engineer
(508) 320-2017

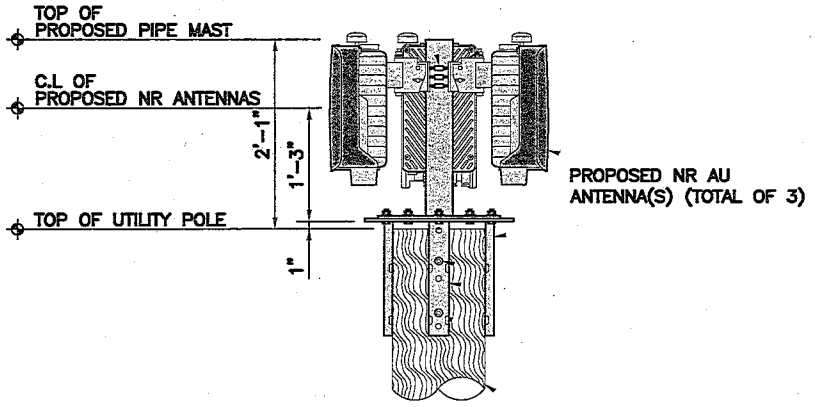
Attachment

ATTACHMENT




APPROX. NORTH

1 ANTENNA PLAN
SCALE: N.T.S.




2 ANTENNA MOUNTING DETAIL
N.T.S.

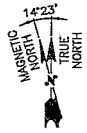
# BOS SOM 076 MA

PRESIDING POWER COMPANY
EVERSOURCE

POLE UNMARKED
2 BELMONT STREET
SOMERVILLE, MA 02143


FIELD INSPECTION DATE: 05-18-2020

SITE COORDINATES: LAT: N42° 23' 03.92"±
LONG: W71° 06' 39.46"±
LAT: N42.384422°±
LONG: W71.110961°±
APPROXIMATE GROUND ELEVATION: 23.0'± AMSL




LOCATION PLAN/ AERIAL IMAGE (1 / L-1)
SCALE: N.T.S

SHEET INDEX

| SHEET NO. | DESCRIPTION |
|---|---|
| L-1 | LOCATION PLAN/AERIAL IMAGE |
| L-2 | UTILITY POLE PHOTOGRAPH AND ELEVATION |
| L-3 | ANTENNA & ANCILLARY EQUIPMENT DETAILS AND ONE LINE-DIAGRAM |

HUDSON Design Group LLC
45 BEECHWOOD DRIVE
N. ANDOVER, MA 01845
TEL: (978) 557-5553
FAX: (978) 336-5586

CHECKED BY: JX

APPROVED BY: DPH

SUBMITTALS

| REV. | DATE | DESCRIPTION | BY |
|---|---|---|---|
| 2 | 06/02/20 | REVISED PER NEW STANDARD | SF |
| 1 | 03/05/20 | REVISED PER COMMENTS | MR |
| 0 | 01/30/19 | LEASE EXHIBIT | SF |

SITE NAME:
BOS SOM 076 MA

SITE ADDRESS:
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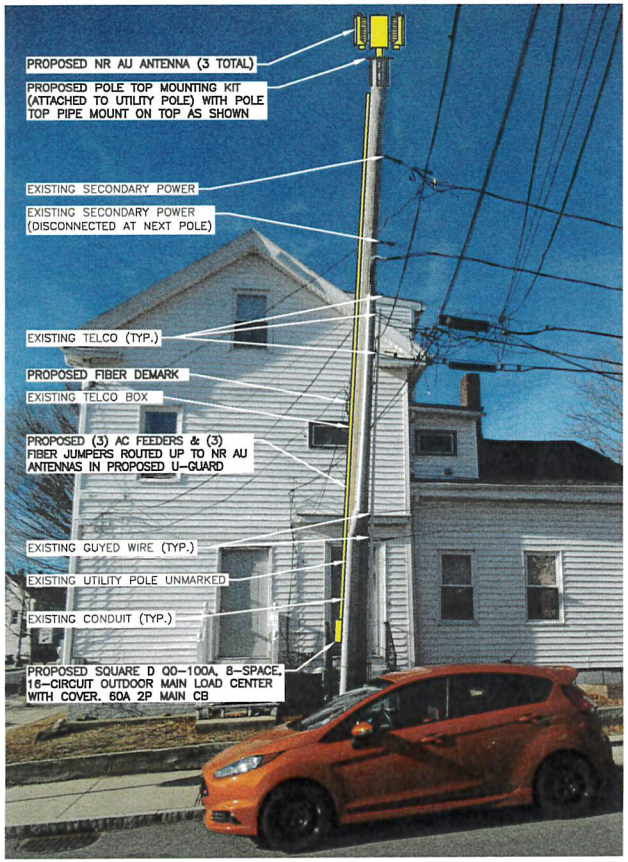
SHEET TITLE
LOCATION PLAN/AERIAL IMAGE

SHEET NUMBER
L-1

LEASE EXHIBIT
(NOT FOR CONSTRUCTION)

**GENERAL NOTE:**

1. THESE DRAWINGS ARE DIAGRAMMATIC IN NATURE AND ARE INTENDED TO PROVIDE GENERAL INFORMATION REGARDING THE LOCATION, SIZE AND ORIENTATION OF THE PROPOSED WIRELESS TELECOMMUNICATIONS EQUIPMENT INSTALLATION ON THE UTILITY POLE AND ARE NOT SPECIFICALLY INTENDED FOR CONSTRUCTION.
2. VERIZON WIRELESS SHALL PLACE WEATHER RESISTANT PHENOLIC PLACARDS ON UTILITY POLE AND ANCILLARY EQUIPMENT TO IDENTIFY EQUIPMENT OWNERSHIP & CONTACT INFORMATION TO BE UTILIZED IN THE CASE OF EMERGENCY.
3. AN ANALYSIS OF THE CAPACITY OF THE EXISTING UTILITY POLE TO SUPPORT THE PROPOSED LOADING HAS BEEN COMPLETED BY HUDSON DESIGN GROUP, LLC. REFER TO LATEST STRUCTURAL ANALYSIS.
4. VERIZON WIRELESS' GENERAL CONTRACTOR SHALL EXTEND EFFORTS TO ENSURE THAT ALL PROPOSED EQUIPMENT MEETS THE REQUIREMENTS OF THE EXISTING UTILITY COMPANY OR COMPANIES CURRENTLY OCCUPYING THE UTILITY POLE AND THE 2017 NATIONAL ELECTRICAL SAFETY CODE.

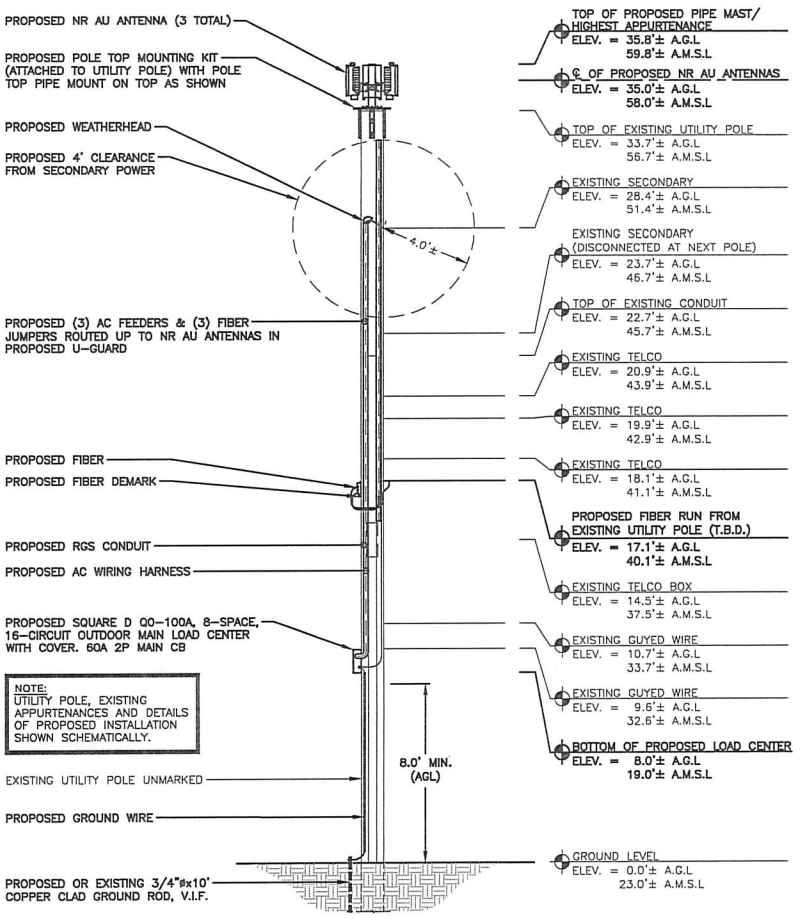



UTILITY POLE (UNMARKED) PHOTOGRAPH
(EXISTING CONDITIONS/SCHEMATIC RENDERING)
SCALE: N.T.S

1
L-2

**ANTENNA AND MOUNT NOTE:**
CONTRACTOR SHALL POSITION/ROTATE PROPOSED ANTENNA MOUNT/BRACKET IN SUCH A WAY SO AS TO NOT INTERFERE WITH EXISTING STREET LIGHT, PRIMARY POWER CROSSARM(S) (IF PRESENT), BRACKETS, BRACES, SECONDARY POWER SUPPORTS OR ANY OTHER MISCELLANEOUS APPURTENANCES AND RELATED SUPPORT BRACKETS ENCOUNTERED LOCATED ON THE EXISTING UTILITY POLE.

**EQUIPMENT AND MOUNT NOTE:**
CONTRACTOR SHALL POSITION/ROTATE PROPOSED EQUIPMENT AND ASSOCIATED MOUNTS/BRACKETS IN SUCH A WAY SO AS TO NOT INTERFERE WITH EXISTING WIRES/PANELS ETC. OR ANY OTHER MISCELLANEOUS APPURTENANCES AND RELATED SUPPORT BRACKETS ENCOUNTERED LOCATED ON THE FACE OF THE EXISTING UTILITY POLE.




UTILITY POLE (UNMARKED) ELEVATION
(PROPOSED CONDITIONS)
22x34 SCALE: 3/8"=1'-0"
11x17 SCALE: 3/16"=1'-0"

2
L-2

GRAPHIC SCALE
0 1'-4" 2'-8" 5'-4" 8'-0"

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SHEET TITLE
UTILITY POLE PHOTOGRAPH AND ELEVATION

SHEET NUMBER
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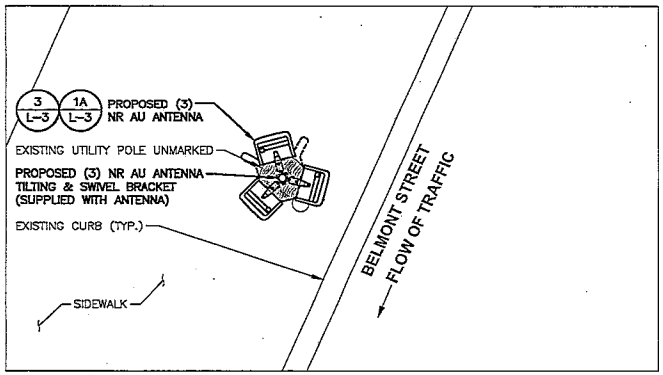


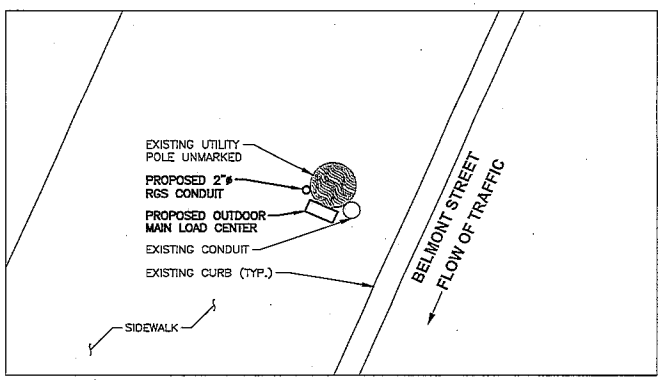

14°23' MAGNETIC NORTH TRUE NORTH

## ANTENNA ORIENTATION PLAN 1 L-3

22x34 SCALE: 3/4"=1'-0"
11x17 SCALE: 3/8"=1'-0"

GRAPHIC SCALE
0 8" 1'-4" 2'-8" 4'-0"

NOTES:
REFER TO RFDS FOR REQUIRED AZIMUTHS.



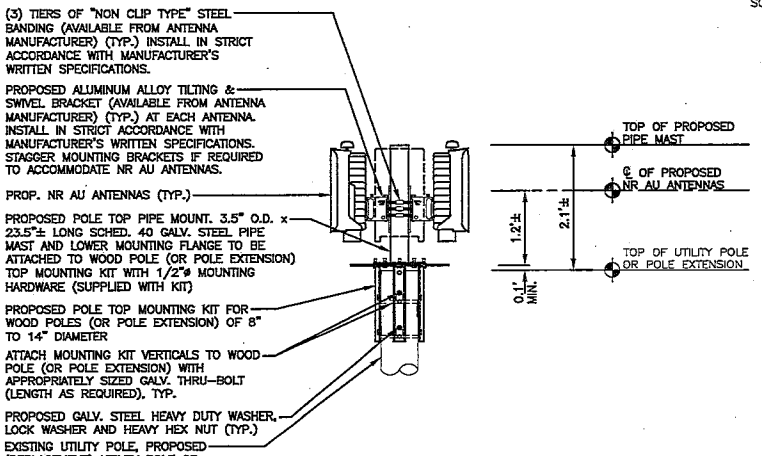

14°23' MAGNETIC NORTH TRUE NORTH

## ANCILLARY EQUIPMENT ORIENTATION PLAN 2 L-3

22x34 SCALE: 3/4"=1'-0"
11x17 SCALE: 3/8"=1'-0"

GRAPHIC SCALE
0 8" 1'-4" 2'-8" 4'-0"

NOTES:
1. CONFIRM DOWNTILT REQUIREMENTS (IF ANY) AND AZIMUTH SPECIFICATIONS WITH VERIZON WIRELESS "RF" ENGINEER AT TIME OF CONSTRUCTION.
2. MOUNT SHALL BE INSTALLED IN SUCH A WAY TO ENSURE PLUMB INSTALLATION OF PIPE MAST.
3. UTILITY POLE APPURTENANCES NOT SHOWN FOR CLARITY.




## NR AU ANTENNA MOUNT DETAIL 1A L-3

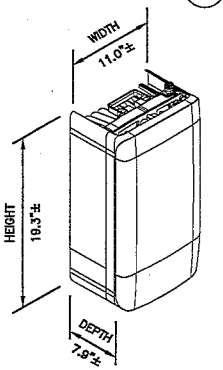
22x34 SCALE: 1"=1'-0"
11x17 SCALE: 1/2"=1'-0"

SQUARE D QO-100A, 8-SPACE, 16-CIRCUIT OUTDOOR MAIN LOAD CENTER, SINGLE PHASE IN 3R ENCLOSURE

| CKT # | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 |
|---|---|---|---|---|---|---|---|---|
| DESCRIPTION | NR AU ANTENNAS | BLANK | BLANK | BLANK | BLANK | BLANK | SURGE ARRESTOR | |
| AMP | 20 | – | – | – | – | – | 20 | |

## ELECTRICAL LOAD CENTER PANEL SCHEDULE 4A L-3

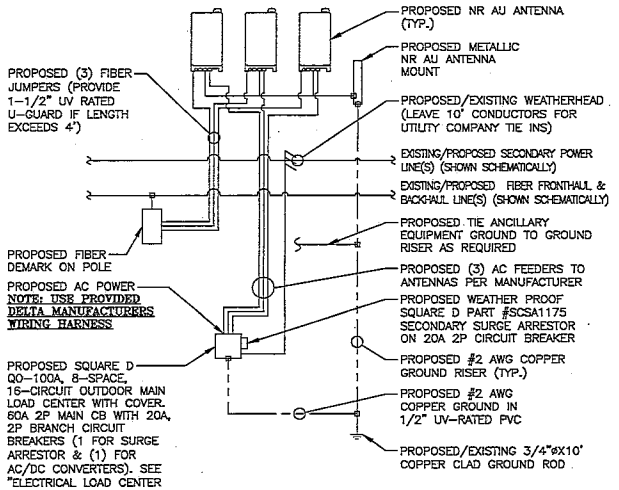
SCALE: N.T.S




| TYPICAL ANTENNA |
|---|
| DIMENSIONS: 7.9"X11.0"X19.3"H |
| WEIGHT: 38.0± LBS |

## TYPICAL ANTENNA 3 L-3

SCALE: N.T.S




ONE-LINE DIAGRAM NOTES:
1. PROVIDE WEATHER TIGHT SEAL CONNECTORS ON ALL CONNECTIONS EACH SIDE OF ENCLOSURE HOUSING.
2. COORDINATE ANY FURTHER MISCELLANEOUS WIRING AND CONDUIT REQUIREMENTS WITH VERIZON WIRELESS AND ELECTRIC COMPANY

## FIBER/ ELECTRICAL ONE-LINE DIAGRAM 4 L-3

SCALE: N.T.S

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SHEET TITLE
ANTENNA & ANCILLARY EQUIPMENT DETAILS AND ONE-LINE DIAGRAM

SHEET NUMBER
L-3

# STRUCTURAL ANALYSIS REPORT

For

# BOS_SOM_076_MA

2 Belmont Street
Somerville, MA 02143

## Equipment Mounted on Utility Pole

**Prepared for:**

verizon

**118 Flanders Road**
**Westborough, MA 01581**

**Dated: June 4, 2020**

COMMONWEALTH OF MASSACHUSETTS
DANIEL P. HAMM
CIVIL
No. 40720
REGISTERED PROFESSIONAL ENGINEER

HUDSON Design Group LLC

45 Beechwood Drive
North Andover, MA 01845
Phone: (978) 557-5553
www.hudsondesigngroupllc.com

HUDSON
Design Group LLC

## SCOPE OF WORK:

Hudson Design Group LLC (HDG) has been authorized by Verizon to conduct a structural evaluation of the existing utility pole supporting the proposed Verizon equipment.

This report represents this office's findings, conclusions and recommendations pertaining to the support of the proposed Verizon equipment listed below.

This office conducted an on-site visual survey of the above areas on May 18, 2020. Attendees included Patrick Barrett (HDG – Field Technician).

## CONCLUSION SUMMARY:

Based on our evaluation, we have determined that the existing pole **is in conformance** with the National Electric Safety Code 2017 (NESC). The utility pole structure is rated at 88.9%.

## APPURTENANCES CONFIGURATION:

| Appurtenances | Elevation | Mount |
|---|---|---|
| (3) Lessee Antennas | 35'-0" | Top of Wood Pole |
| (1) Demarc Box | 17'-2" | Side of Wood Pole |
| (1) Disconnect Switch | 9'-0" | Side of Wood Pole |

## ANALYSIS RESULTS SUMMARY:

| Component | Max. Stress Ratio | Elev. of Component (ft.) | Pass/Fail |
|---|---|---|---|
| **SYP 3 (Existing)** | **88.9%** | **0 – 33.7** | **PASS** |

HUDSON
Design Group LLC

**DESIGN CRITERIA:**

| National Electric Safety Code 2017 (NESC) and the Massachusetts State Building Code 9th Edition. | | |
|---|---|---|
| **Wind** | | |
| City/Town: | Somerville | |
| County: | Middlesex | |
| NESC Rule | Rule 250B | NESC Section 25 |
| Construction Grade | C | NESC Section 25 |
| Wind Load: | 39.53 mph | NESC Table 230-2 |
| **Ice** | | |
| Loading District | Heavy | NESC Figure 250-1 |
| Radial Ice Thickness: | 0.50 in | NESC Table 230-1 |

1. Approximate height above grade to center of the proposed Antenna: 35'-0" +/-

***Calculations and referenced documents are attached.**

HUDSON Design Group LLC

## EXISTING STRUCTURE:

The existing 33'-9" +/- wood pole is assumed to be Southern Yellow Pine Class 3 (Fb=8000 psi) with a 12.0" diameter base. If field conditions differ from what is assumed in this report, then the engineer of record is to be notified as soon as possible.

## ANTENNA SUPPORT RECOMMENDATIONS:

The new antennas are proposed to be installed on a top mounting kit secured to the wood pole using thru bolts.

## EQUIPMENT SUPPORT RECOMMENDATIONS:

The new equipment is proposed to be installed on the wood pole using the approved manufacturer's mounts.

Limitations and assumptions:

1. Reference the latest HDG construction drawings for all the equipment locations details.
2. Mount all equipment per manufacturer's specifications.
3. All structural members and their connections are assumed to be in good condition and are free from defects with no deterioration to its member capacities. Contractor to perform pre-inspection prior to construction.
4. All antennas and waveguide cables are assumed to be properly installed and supported as per the manufacturer requirements.
5. HDG is not responsible for any modifications completed prior to and hereafter which HDG was not directly involved.
6. If field conditions differ from what is assumed in this report, then the engineer of record is to be notified as soon as possible.
7. HDG did not perform any geotechnical analysis / or / investigation. Soil Information is unknown.

HUDSON
Design Group LLC

**FIELD PHOTOS:**

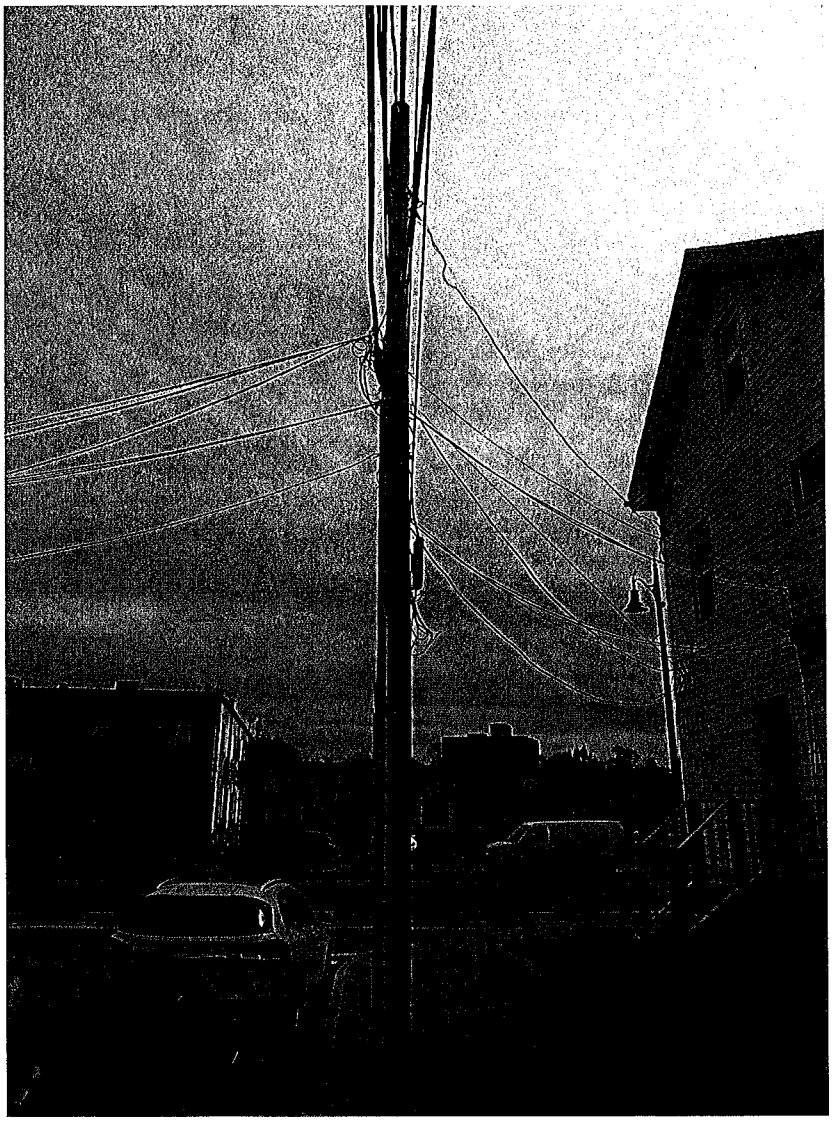
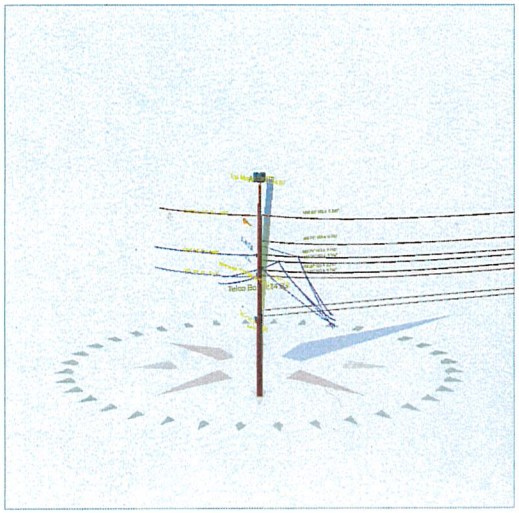


**Photo 1:** Sample photo illustrating the existing wood pole.

HUDSON
Design Group LLC

# Calculations

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| Pole Num: | **Pole Unmarked** | Pole Length / Class: | **39.07 / 3** | Code: | **NESC** | Structure Type: | **Guyed Tangent** |
| Pole Number: | **Pole Unmarked** | Species: | **SOUTHERN PINE** | NESC Rule: | **Rule 250B** | Status* | **Guy Wires Adequate** |
| Site Name: | **BOS_SOM_076_MA** | Setting Depth (ft): | **5.33** | Construction Grade: | **C** | Pole Strength Factor: | **0.85** |
| Address: | **2 Belmont Street** | G/L Circumference (in): | **37.70** | Loading District: | **Heavy** | Transverse Wind LF: | **1.75** |
| Town, State: | **Somerville, MA** | G/L Fiber Stress (psi): | **8,000** | Ice Thickness (in): | **0.50** | Wire Tension LF: | **1.30** |
| Zip Code: | **02143** | Allowable Stress (psi): | **6,800** | Wind Speed (mph): | **39.53** | Vertical LF: | **1.90** |
| Designed By: | **RL/CL** | Fiber Stress Ht. Reduc: | **No** | Wind Pressure (psf): | **4.00** | | |
| Latitude: | | **42.384425° N** | Longitude: | | **71.110964° W** | Elevation: | **23' 0"** |



| Pole Capacity Utilization (%) | | Height (ft) | Wind Angle (deg) |
|---|---|---|---|
| Maximum | **88.9** | 0.0 | 303.4 |
| Groundline | **88.9** | 0.0 | 303.4 |
| Vertical | **0.8** | 18.83 | 204.4 |

| Pole Moments (ft-lb) | | Load Angle (deg) | Wind Angle (deg) |
|---|---|---|---|
| Max Cap Util | **84,960** | 10.2 | 303.4 |
| Groundline | **84,960** | 10.2 | 303.4 |
| GL Allowable | **96,140** | | |

| Guy System Component Summary | | | | Load From Worst Wind Angle on Pole | | Individual Maximum Load With Overload Applied | |
|---|---|---|---|---|---|---|---|
| **Description** | **Lead Length (ft)** | **Lead Angle (deg)** | **Height (ft)** | **Nominal Capacity (%)** | **Wind Angle (deg)** | **Max* Load Capacity (%)** | **Wind Angle (deg)** |
| Anchor | 104.3 | 24.4 | | **0.0** | 303.4 | **0.0** | 0.0 |
| EHS 3/8 (Span/Head) | | | 10.7 | **0.0** | 303.4 | **0.0** | 0.0 |
| EHS 3/8 (Span/Head) | | | 9.6 | **0.0** | 303.4 | **0.0** | 0.0 |
| | | | **System Capacity Summary:** | **Adequate** | | **Adequate** | |

**Groundline Load Summary - Reporting Angle Mode: Load - Reporting Angle: 10.2°**

| | Shear Load* (lbs) | Applied Load (%) | Bending Moment (ft-lb) | Applied Moment (%) | Pole Capacity (%) | Bending Stress (+/- psi) | Vertical Load (lbs) | Vertical Stress (psi) | Total Stress (psi) | Pole Capacity (%) |
|---|---|---|---|---|---|---|---|---|---|---|
| Powers | 1,608 | 41.0 | 41,570 | 48.9 | 43.2 | 2,934 | 305 | 3 | 2,936 | 43.2 |
| Comms | 2,180 | 55.6 | 41,031 | 48.3 | 42.7 | 2,896 | 1,506 | 13 | 2,909 | 42.8 |
| GuyBraces | 22 | 0.6 | 227 | 0.3 | 0.2 | 16 | 85 | 1 | 17 | 0.2 |
| GenericEquipments | 27 | 0.7 | 736 | 0.9 | 0.8 | 52 | 321 | 3 | 55 | 0.8 |
| Pole | 74 | 1.9 | 1,245 | 1.5 | 1.3 | 88 | 1,935 | 17 | 105 | 1.5 |
| Risers | 8 | 0.2 | 151 | 0.2 | 0.2 | 11 | 97 | 1 | 12 | 0.2 |
| Insulators | 0 | 0.0 | 0 | 0.0 | 0.0 | 0 | 86 | 1 | 1 | 0.0 |
| Pole Load | 3,919 | 100.0 | 84,960 | 100.0 | 88.4 | 5,996 | 4,335 | 38 | 6,034 | 88.7 |
| Pole Reserve Capacity | | | 11,180 | | 11.6 | 805 | | | 766 | 11.3 |

**Load Summary by Owner - Reporting Angle Mode: Load - Reporting Angle: 10.2°**

| | Shear Load* (lbs) | Applied Load (%) | Bending Moment (ft-lb) | Applied Moment (%) | Pole Capacity (%) | Bending Stress (+/- psi) | Vertical Load (lbs) | Vertical Stress (psi) | Total Stress (psi) | Pole Capacity (%) |
|---|---|---|---|---|---|---|---|---|---|---|
| <Undefined> | 3,807 | 97.2 | 82,711 | 97.4 | 86.0 | 5,837 | 1,933 | 17 | 5,854 | 86.1 |
| Proposed | 34 | 0.9 | 939 | 1.1 | 1.0 | 66 | 429 | 4 | 70 | 1.0 |
| Existing | 4 | 0.1 | 65 | 0.1 | 0.1 | 5 | 38 | 0 | 5 | 0.1 |
| Pole | 74 | 1.9 | 1,245 | 1.5 | 1.3 | 88 | 1,935 | 17 | 105 | 1.5 |
| **Totals:** | 3,919 | 100.0 | 84,960 | 100.0 | 88.4 | 5,996 | 4,335 | 38 | 6,034 | 88.7 |

**Detailed Load Components:**

| Power | | Owner | Height (ft) | Horiz. Offset (in) | Cable Diameter (in) | Sag at Max Temp (ft) | Cable Weight (lbs/ft) | Lead/Span Length (ft) | Span Angle (deg) | Wire Length (ft) | Tension (lbs) | Tension Moment* (ft-lb) | Offset Moment* (ft-lb) | Wind Moment* (ft-lb) | Moment at GL* (ft-lb) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Secondary | DUPLEX 6 AWG | | 28.17 | 6.41 | 0.5370 | | 0.071 | 103.4 | 24.4 | 103.6 | | | 23 | 90 | 113 |
| Secondary | DUPLEX 6 AWG | | 28.23 | 6.41 | 0.5370 | | 0.071 | 103.4 | 24.4 | 103.6 | | | 23 | 90 | 113 |
| Secondary | TRIPLEX 1/0 | | 28.20 | 6.41 | 1.0300 | 0.43 | 0.399 | 20.7 | 250.0 | 20.7 | 255 | -4,708 | 14 | 240 | -4,454 |
| Secondary | DUPLEX 6 AWG | | 23.47 | 6.76 | 0.5370 | | 0.071 | 103.4 | 24.4 | 103.6 | | | 24 | 75 | 99 |
| Secondary | DUPLEX 6 AWG | | 23.53 | 6.76 | 0.5370 | | 0.071 | 103.4 | 24.4 | 103.6 | | | 24 | 75 | 100 |
| Overlashed Bundle | 10M | | 28.20 | 6.41 | 0.3060 | 2.88 | 0.165 | 103.4 | 24.4 | 103.6 | 707 | 25,118 | 28 | 296 | 25,442 |
| Overlashed Bundle | 8M | | 23.50 | 6.76 | 0.2720 | 2.91 | 0.131 | 103.4 | 24.4 | 103.6 | 668 | 19,786 | 28 | 246 | 20,060 |
| | | | | | | | | | | | **Totals:** | **40,197** | **165** | **1,113** | **41,474** |

| Comm | | Owner | Height (ft) | Horiz. Offset (in) | Cable Diameter (in) | Sag at Max Temp (ft) | Cable Weight (lbs/ft) | Lead/Span Length (ft) | Span Angle (deg) | Wire Length (ft) | Tension (lbs) | Tension Moment* (ft-lb) | Offset Moment* (ft-lb) | Wind Moment* (ft-lb) | Moment at GL* (ft-lb) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Overlashed Bundle | 6M | | 21.00 | 6.94 | 0.2420 | 2.86 | 0.104 | 103.4 | 24.4 | 103.6 | 724 | 19,160 | 36 | 246 | 19,441 |
| Telco | TELE 1.0 | | 20.95 | 6.94 | 1.0000 | | 0.400 | 103.4 | 24.4 | 103.6 | | | 52 | 93 | 145 |
| CATV | CATV .50 | | 20.06 | 90.37 | 0.5700 | 0.75 | 0.600 | 37.8 | 128.4 | 37.9 | 284 | -3,240 | 24 | -25 | -3,241 |
| CATV | CATV .50 | | 20.06 | 90.37 | 0.5700 | 0.75 | 0.600 | 37.8 | 128.4 | 37.9 | 284 | -3,240 | 24 | -25 | -3,241 |
| CATV | CATV .75 | | 20.06 | 90.37 | 1.0700 | 1.14 | 0.900 | 37.8 | 128.4 | 37.9 | 290 | -3,325 | 27 | -33 | -3,331 |
| CATV | CATV .75 | | 20.06 | 90.37 | 1.0700 | 1.14 | 0.900 | 37.8 | 128.4 | 37.9 | 290 | -3,325 | 27 | -33 | -3,331 |
| CATV | CATV .50 | | 20.06 | 90.37 | 0.5700 | 0.21 | 0.600 | 14.8 | 285.9 | 14.8 | 1,199 | 2,901 | 6 | 38 | 2,945 |
| Overlashed Bundle | 6M | | 20.00 | 7.02 | 0.2420 | 2.86 | 0.104 | 103.4 | 24.4 | 103.6 | 724 | 18,247 | 36 | 234 | 18,518 |
| Telco | TELE 1.0 | | 19.95 | 7.02 | 1.0000 | | 0.400 | 103.4 | 24.4 | 103.6 | | | 53 | 88 | 141 |
| CATV | CATV .50 | | 19.55 | 43.00 | 0.5700 | 0.76 | 0.600 | 37.8 | 122.4 | 37.8 | 289 | -2,682 | 23 | 5 | -2,654 |
| CATV | CATV .50 | | 19.55 | 43.00 | 0.5700 | 0.76 | 0.600 | 37.8 | 122.4 | 37.8 | 289 | -2,682 | 23 | 5 | -2,654 |
| CATV | CATV .75 | | 19.55 | 43.00 | 1.0700 | 1.14 | 0.900 | 37.8 | 122.4 | 37.9 | 290 | -2,698 | 28 | 7 | -2,662 |
| CATV | CATV .50 | | 19.55 | 43.00 | 0.5700 | 0.50 | 0.600 | 14.8 | 271.4 | 14.9 | 68 | -244 | 12 | 67 | -165 |
| CATV | CATV .75 | | 19.55 | 43.00 | 1.0700 | 0.50 | 0.900 | 14.8 | 271.4 | 14.9 | 101 | -363 | 18 | 89 | -256 |
| CATV | CATV .75 | | 19.55 | 43.00 | 1.0700 | 0.50 | 0.900 | 14.8 | 271.4 | 14.9 | 101 | -363 | 18 | 89 | -256 |
| CATV | CATV .50 | | 20.90 | 7.00 | 0.5700 | 0.44 | 0.600 | 20.7 | 250.0 | 20.7 | 251 | -3,436 | -7 | 137 | -3,305 |
| CATV | CATV .75 | | 20.90 | 7.00 | 1.0700 | 0.44 | 0.900 | 20.7 | 250.0 | 20.7 | 382 | -5,231 | -11 | 181 | -5,060 |
| Overlashed Bundle | 6M | | 18.20 | 7.15 | 0.2420 | 2.86 | 0.104 | 103.4 | 24.4 | 103.6 | 724 | 16,605 | 37 | 213 | 16,855 |
| Telco | TELE 1.0 | | 18.15 | 7.15 | 1.0000 | | 0.400 | 103.4 | 24.4 | 103.6 | | | 54 | 80 | 134 |
| CATV | CATV .50 | | 17.00 | 7.23 | 0.5700 | 0.55 | 0.600 | 20.7 | 250.0 | 20.7 | 152 | -1,691 | -8 | 112 | -1,586 |
| CATV | CATV .50 | | 17.00 | 7.23 | 0.5700 | 0.50 | 0.600 | 14.8 | 285.9 | 14.9 | 65 | 139 | -9 | 34 | 164 |
| CATV | CATV .50 | | 17.00 | 7.23 | 0.5700 | 0.50 | 0.600 | 14.8 | 285.9 | 14.9 | 65 | 139 | -9 | 34 | 164 |
| CATV | CATV .50 | | 17.00 | 7.23 | 0.5700 | 0.40 | 0.600 | 14.8 | 285.9 | 14.8 | 82 | 173 | -10 | 34 | 197 |
| CATV | CATV .50 | | 18.72 | 7.13 | 0.5700 | 0.78 | 0.600 | 37.8 | 117.1 | 37.8 | 301 | -2,127 | 6 | 34 | -2,087 |
| Overlashed Bundle | 6M | | 17.20 | 7.22 | 0.2420 | 2.86 | 0.104 | 103.4 | 24.4 | 103.6 | 724 | 15,693 | 37 | 201 | 15,931 |
| Fiber | TELE 1.0 | Proposed | 17.15 | 7.22 | 1.0000 | | 0.400 | 103.4 | 24.4 | 103.6 | | | 54 | 76 | 130 |
| | | | | | | | | | | | **Totals:** | **38,410** | **542** | **1,985** | **40,936** |

| GenericEquipment | | Owner | Height (ft) | Horiz. Offset (in) | Offset Angle (deg) | Rotate Angle (deg) | Unit Weight (lbs) | Unit Height (in) | Unit Depth (in) | Unit Diameter (in) | Unit Length (in) | Offset Moment* (ft-lb) | Wind Moment* (ft-lb) | Moment at GL* (ft-lb) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Box | Telco Box | Existing | 14.83 | 6.15 | 300.0 | 0.0 | 20.00 | 20.00 | 2.50 | -- | 7.00 | 7 | 58 | 64 |
| Box | Verizon Fiber Demarc | Proposed | 17.20 | 6.42 | 205.0 | 0.0 | 3.00 | 12.30 | 3.40 | -- | 3.00 | -3 | 21 | 18 |
| Cylinder | Top Mount Kit | Proposed | 34.67 | 0.82 | 0.0 | 0.0 | 15.16 | 30.00 | -- | 3.50 | -- | -2 | 70 | 68 |
| Box | Antenna | Proposed | 35.00 | 6.88 | 0.0 | 0.0 | 38.00 | 19.30 | 7.90 | -- | 11.00 | 41 | 249 | 290 |
| Box | Antenna | Proposed | 35.00 | 8.14 | 125.0 | 0.0 | 38.00 | 19.30 | 7.90 | -- | 11.00 | -21 | 229 | 209 |
| Box | Antenna | Proposed | 35.00 | 8.14 | 235.0 | 0.0 | 38.00 | 19.30 | 7.90 | -- | 11.00 | -35 | 120 | 85 |

| | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Box | Disconnect Switch | Proposed | 9.00 | 7.43 | 205.0 | 0.0 | 17.00 | 12.60 | 4.20 | -- | 8.80 | -19 | 20 | 1 |
| | | | | | | | | | | | **Totals:** | **-32** | **767** | **734** |

| **Riser** | | **Owner** | **Height (ft)** | **Horiz. Offset (in)** | **Offset Angle (deg)** | **Rotate Angle (deg)** | **Unit Weight (lbs)** | **Unit Height (in)** | **Unit Depth (in)** | **Unit Diameter (in)** | **Unit Length (in)** | **Offset Moment* (ft-lb)** | **Wind Moment* (ft-lb)** | **Moment at GL* (ft-lb)** |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Riser Guard 120.0° H:22.69 | Riser Guard | | 22.69 | 6.10 | 120.0 | 120.0 | 22.69 | 272.25 | 4.00 | 4.00 | 272.25 | -4 | 18 | 15 |
| 2" U-Guard 90.0° H:28.2 | 2" U-Guard | Proposed | 28.20 | 6.10 | 90.0 | 90.0 | 28.20 | 338.40 | 2.00 | 2.00 | 338.40 | 2 | 134 | 136 |
| | | | | | | | | | | | **Totals:** | **-1** | **152** | **151** |

| **Insulator** | | **Owner** | **Height (ft)** | **Horiz. Offset (in)** | **Offset Angle (deg)** | **Rotate Angle (deg)** | **Unit Weight (lbs)** | **Unit Diameter (in)** | **Unit Length (in)** | **Offset Moment* (ft-lb)** | **Wind Moment* (ft-lb)** | **Moment at GL* (ft-lb)** |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Bolt | Single Bolt | | 28.20 | 0.00 | 20.0 | 20.0 | 5.00 | 3.00 | 0.00 | 0 | 0 | 0 |
| Bolt | Single Bolt | | 23.50 | 0.00 | 20.0 | 20.0 | 5.00 | 3.00 | 0.00 | 0 | 0 | 0 |
| Bolt | Single Bolt | | 21.00 | 0.00 | 0.0 | 0.0 | 5.00 | 3.00 | 0.00 | 0 | 0 | 0 |
| Bolt | Single Bolt | | 20.00 | 0.00 | 20.0 | 20.0 | 5.00 | 3.00 | 0.00 | 0 | 0 | 0 |
| J-Hook | J-Hook | | 20.90 | 0.00 | 250.0 | 250.0 | 5.00 | 3.00 | 0.00 | 0 | 0 | 0 |
| Bolt | Single Bolt | | 18.20 | 0.00 | 0.0 | 0.0 | 5.00 | 3.00 | 0.00 | 0 | 0 | 0 |
| J-Hook | J-Hook | | 17.00 | 0.00 | 250.0 | 250.0 | 5.00 | 3.00 | 0.00 | 0 | 0 | 0 |
| J-Hook | J-Hook | | 18.72 | 0.00 | 90.0 | 90.0 | 5.00 | 3.00 | 0.00 | 0 | 0 | 0 |
| Bolt | Single Bolt | | 17.20 | 0.00 | 0.0 | 0.0 | 5.00 | 3.00 | 0.00 | 0 | 0 | 0 |
| | | | | | | | | | **Totals:** | **0** | **0** | **0** |

| **Guy Wire and Brace** | | **Owner** | **Attach Height (ft)** | **End Height (ft)** | **Lead/Span Length (ft)** | **Wire Diameter (in)** | **Percent Solid (%)** | **Lead Angle (deg)** | **Incline Angle (deg)** | **Wire Weight (lbs/ft)** | **Rest Length (ft)** | **Stretch Length (in)** |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| EHS 3/8 | Span/Head | | 10.71 | 10.71 | 104.30 | 0.375 | 75.00 | 24.4 | 0.0 | 0.273 | 101.51 | 0.00 |
| EHS 3/8 | Span/Head | | 9.60 | 9.60 | 104.30 | 0.375 | 75.00 | 24.4 | 0.0 | 0.273 | 101.50 | 0.00 |

| **Guy Wire and Brace (Loads and Reactions)** | | **Elastic Modulus (psi)** | **Rated Tensile Strength (lbs)** | **Guy Strength Factor** | **Allowable Tension (lbs)** | **Initial Tension (lbs)** | **Loaded Tension*[2] (lbs)** | **Maximum Tension[2] (lbs)** | **Applied Tension[3] (lbs)** | **Vertical Load (lbs)** | **Shear Load In Guy Dir (lbs)** | **Shear Load At Report Angle (lbs)** | **Moment at GL[3] (ft-lb)** |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| EHS 3/8 | Span/Head | 2.30e+7 | 15,400 | 0.90 | 13,860 | 700 | 0 | 0 | 0 | 0 | 0 | 0 | 119 |
| EHS 3/8 | Span/Head | 2.30e+7 | 15,400 | 0.90 | 13,860 | 700 | 0 | 0 | 0 | 0 | 0 | 0 | 107 |
| | | | | | | | | | **Totals:** | **0** | **0** | **0** | **226** |

| **Anchor/Rod Load Summary** | **Owner** | **Rod Length AGL (in)** | **Lead Length (ft)** | **Lead Angle (deg)** | **Strength of Assembly (lbs)** | **Anchor/Rod Strength Factor** | **Allowable Load (lbs)** | **Max Load[2] (lbs)** | **Load at Pole MCU[3] (lbs)** | **Max Required Capacity[2] (%)** |
|---|---|---|---|---|---|---|---|---|---|---|
| Anchor | | 30.00 | 104.30 | 24.4 | 20,000 | 1.00 | 20,000 | 0 | 0 | 0.0 |

## Pole Buckling

| Buckling Constant | Buckling Column Height* (ft) | Buckling Section Height (% Buckling Col. Hgt.) | Buckling Section Diameter (in) | Minimum Buckling Diameter at GL (in) | Diameter at Tip (in) | Diameter at GL (in) | Modulus of Elasticity (psi) | Pole Density (pcf) | Ice Density (pcf) | Pole Tip Height (ft) | Buckling Load Capacity at Height (lbs) | Buckling Load Applied at Height (lbs) | Buckling Load Factor of Safety |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 0.71 | 18.80 | 33.49 | 11.07 | 3.63 | 7.00 | 12.01 | 2.13e+6 | 60.00 | 57.00 | 33.70 | 517,188 | **5418.35** | **125.00** |

HUDSON
Design Group LLC

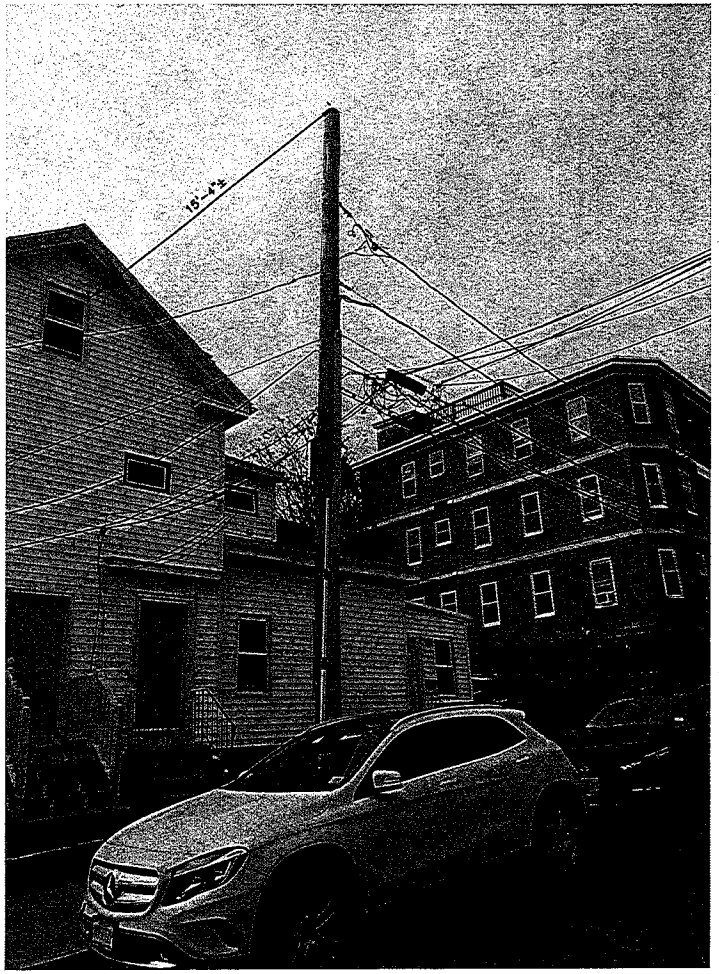
June 1, 2020

Nicole O'Brien
Verizon Wireless
118 Flanders Rd, 3Rd Fl.
Westborough, MA 01581

RE: BOS SOM 076 MA
Pole Unmarked
2 Belmont Street
Somerville, MA 02143
Lat: N42.384422°
Long: W71.110961°

The following letter has been prepared to illustrate that the pole top at this site is more than 15 feet from the nearest window. HDG has visited the site on May 20, 2020 to confirm the measurement.

Sincerely,
Jose Xavier
Project Executive
Hudson Design Group LLC




TOP OF POLE ABUTTERS (1 / SK-1)
SCALE: N.T.S

HUDSON
Design Group LLC
45 BEECHWOOD DRIVE
N. ANDOVER, MA 01845
TEL: (978) 557-5553
FAX: (978) 336-5586

CHECKED BY: JX

APPROVED BY: DPH

SUBMITTALS

| REV. | DATE | DESCRIPTION | BY |
|---|---|---|---|
| 0 | 06/01/20 | TOP OF POLE ABUTTERS | SF |

SITE NAME:
BOS SOM 076 MA

SITE ADDRESS:
POLE UNMARKED
2 BELMONT STREET
SOMERVILLE, MA 02143

SHEET TITLE
TOP OF POLE ABUTTERS

SHEET NUMBER
SK-1

2349188

Form 1

**APPLICATION AND POLE ATTACHMENT LICENSE**

## ANTENNA / NODE LICENSE

Licensee VERIZON WIRELESS
Street Address ONE VERIZON WAY, MAIL STOP 4AW100
City, State and Zip BASKING, RIDGE NEW JERSEY 07920
Date 6/25/19

In accordance with the terms and conditions of the **CONSTRUCTION REQUIREMENTS FOR DISTRIBUTED ANTENNA SYSTEMS (DAS) ON DISTRIBUTION POLES AGREEMENT,** application is hereby made for a license to make 1 Antenna (Node) Attachment to pole and 1 Power Supply and 2 other attachments located in the municipality of Somerville in the State of Massachusetts.

This request will be designated **Pole Attachment License Application Number** BosSom076MA-525017
**Attached are my power supply specifications if applicable. The cable's strand size is 0.5 and weight per foot of cable is 0.2.**

Licensee's Name (Print) Barbara Kassabian

Signature Barbara Kassabian

**NSTAR d/b/a EVERSOURCE**
**Power Company**

Title _____

Tel. No. _____

Fax No. _____

E-mail _____

**********************For licensor use, do not write below this line*******************

Pole Attachment License Application Number _____ is hereby granted to make 1 Antenna / Node attachment described in this application to _____ attachments to JO[1] pole _____ attachment to FO[2] pole, _____ attachment to JU[3] pole, _____ Power Supplies and _____ other attachments located in the municipality of _____, in the State of Massachusetts as indicated on the attached Form 3.

Licensor's Name (Print) Richard Cumeau

Signature Richard Cumeau

_____
(AGREEMENT ID #)

Title Supervisor

Date 3/17/2020

Tel. No. _____

**The Licensee shall submit an original copy of this application to NSTAR Electric Company d/b/a EVERSOURCE ENERGY.**

FORM 3 – EVERSOURCE ITEMIZED Pole Make-Ready Work Charges *PAGE___ OF___*

**RCE to Complete: Total Poles Surveyed _____ Total Poles Requiring NSTAR Make-Ready _____**

**Appendix IV Form 3**

| FIELD SURVEY / MAKE READY WORK FORM | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **SURVEYORS:** | | | | ***DATE OF SURVEY:*** | | | | | | | | CWO #: | | | |
| Verizon | | | | ***MUNIC:*** | | | | ***STATE:*** | | | | Exch Code: Munic Code: | | | |
| ***Licensee*** | Barbara Kassabian | | | ***LICENSEE NAME: Verizon Wireless*** | | | | | | | | ***LICENSEE APPLICATION #:*** | | | |
| **EVERSOURCE** | | | | ***ELCO NAME:*** EVERSOURCE | | | | | | | | **NSTAR APPLICATION #** BosSom076MA-525017 | | | |
| ***LOCATION*** | | ***POLE #*** | | ***ATT*** | ***OWNERSHIP*** | | | | | | | CHARGE | | WORK DESCRIPTION | |
| ***TEL RTE / STREET NAME*** ***List one pole per line*** | | ***Tel*** | ***El*** | ***F/C P.S. Riser*** | ***J.O.*** | | ***J.U.*** | | ***F.O.*** | | | YES | NO | TASK #S / REMARKS | * Height of Att. |
| | | | | | ***Tel*** | ***El*** | ***Tel*** | ***El*** | ***Tel*** | ***El*** | | | | | |
| 2 Belmont St (cross street Somerville Ave) 42.384422/-71.110961 | | N/A | N/A | | | | | | | | | | | | * |
| 27/1 | | | | | | | | | | | | | | | * |
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| **TOTALS:** | | | 1 | | | | | | | | | | | | |

- **Height of Attachment = Height of Licensee Attachment shall be 40" below ELCO MGN unless otherwise noted here by Verizon and EVERSOURCE surveyor.**

Revised 03/06/2015