



OFFICE OF THE
LITTLETON BOARD OF APPEALS
LITTLETON, MASSACHUSETTS 01460

LITTLETON, MASSACHUSETTS 01460

Board Use Only ... Case # 749A Filing Date June 11, 2008

The undersigned, having standing in this matter, hereby petitions the Littleton Board of Appeals for a ☒ VARIANCE ☐ SPECIAL PERMIT and/or ☐ APPEAL (Check all that apply) as specified below and as provided by the Town of Littleton Zoning Bylaw

1. LOCATION OF THE PROPERTY:

A. Street Address 28 CEDAR RD. Littleton, MA *Please print*

B. Assessors' Map and Parcel # U17, 81

☒ Zoning District ☐ Aquifer District ☐ Water Resource District

C. Deed Reference Book-47115, Page-460

2. LITTLETON ZONING BYLAW SECTION(S)

A. Variance 173-131 B.5

B. Special Permit _____

C. Appeal _____

3. STATE BRIEFLY REASONS FOR THIS PETITION *Use additional sheets, if necessary*

MetroPCS Requests a height Variance to
install wireless communications equipment over
the allowable 100' height at a height OF 102'

4. PETITIONER(S) MetroPCS Massachusetts LLC

☐ Owner ☒ Tenant ☐ Licensee ☐ Agreed Purchaser ☐ Agent ☐ Other _____

NOTE: If petitioner is not the owner, furnish written authorization from owner below.

See Attached letter
Signature _____

Date _____

Mailing Address _____

Telephone # _____

Town Clerk Use ONLY

Filing Fee Paid

\$ 350.00

ck# 6682

Registry Fee Paid \$ 75.00

Date _____



May 30, 2008

VIA HAND DELIVERY

Littleton Board of Appeals
Shattuck St Municipal Building
Littleton, MA 01460

*Town Clerk's office held this until
I called to inquire where it was. Bev*

RE: MetroPCS – Application for height variance from the Board of Appeals
Site Location: 28 Cedar Rd, Littleton, MA

Dear Members of the Board:

Enclosed please find an application for a height variance, submitted on behalf of MetroPCS, for the proposed installation of a telecommunications facility onto the water tank stand pipe structure. MetroPCS proposes to install (6) panel style antennas onto the existing band mount at a height of 102' on the existing 125' water tank. MetroPCS requests relief in the form of a variance to install communication antennas / equipment above the 100' allowable height at a height of 102'.

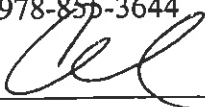
Enclosed please find the following:

- Variance Application
- Redacted lease agreement
- Certified Abutters List
- MetroPCS FCC License
- Radio Frequency Affidavit
- Radio Frequency Coverage Maps, both existing and proposed
- Zoning Drawings

Please feel free to contact me with any questions or if any additional materials are required. Thank you for your consideration.

Applicant: MetroPCS
285 Billerica Rd,
Third Floor
Chelmsford, MA 01824

Submitted By: Andy Candiello, Agent to MetroPCS
Tower Resource Management
30 Lyman St, Suite 12
Westborough, MA 01581
Cell: 978-855-3644



*July 17
Aug 21*

7:30

Room 103



PLANNING BOARD

P.O. Box 1305
Littleton, Massachusetts 01460

Wednesday, July 16, 2008

APPLICATION:

SITE PLAN MODIFICATION
Cedar Hill Telecommunications Site

PROPERTY LOCATION:

28 Cedar Road
Map U-17, Parcel 81

DESCRIPTION:

Installation of up to six wireless telecommunications antennas on water tank; with ground-based equipment cabinets, and utility interconnections.

APPLICANT:

MetroPCS Massachusetts LLC
285 Billerica Road, 3rd Floor
Chelmsford, MA 01824

OWNER:

Littleton Water Department
39 Ayer Road
Littleton, MA 01460

DATES OF MEETINGS:

June 26, and July 10, 2008

MEMBERS PRESENT:

Janet LaVigne, Steve Wheaton, Gregg S. Champney, Mark Montanari, and Richard Crowley

REFERENCE PLANS: "MetroPCS Cedar Hill Water Tank - Littleton" (10 Sheets); dated 1/10/08, last revised 7/10/08; prepared by Chappell Engineering Associates, LLC with the following sheets:

- T-1 Title Sheet
- GN-1 General Notes
- C-1 Property Plan
- A-1 Compound Plan & Elevation
- A-2 Site Details
- S-1 Equipment Plan, Sections & Detail
- S-2 Antenna Mounting Plan, Schedules & Details
- S-3 Details
- E-1 On-Line Diagram, Riser, Details & Notes
- E-2 Grounding Details

At the Board meeting of Thursday, July 10, 2008, the Planning Board voted 5 to 0 to approve the SITE PLAN MODIFICATION with the following **conditions**:



Federal Communications Commission
Wireless Telecommunications Bureau
Radio Station Authorization

Page 1 of 2
93

LICENSEE NAME: MetroPCS AWS, LLC

MARK A. STACHIW
METROPCS AWS, LLC
8144 WALNUT HILL LANE, SUITE 800
DALLAS TX 75231

FCC Registration Number (FRN) 0015005598	
Call Sign WQGA731	File Number 0002773870
Radio Service AW - AWS, 1710-1755/2110-2155 MHz bands	

Grant Date	Effective Date	Expiration Date	Print Date
11-29-2006	11-29-2006	11-29-2021	11-30-2006

Market Number	Channel Block	Sub-Market Designator
REA001	D	0

Market Name: Northeast

1st Build-out Date	2nd Build-out Date	3rd Build-out Date	4th Build-out Date

SPECIAL CONDITIONS OR WAIVERS/CONDITIONS

This authorization is conditioned upon the licensee, prior to initiating operations from any base or fixed station, making reasonable efforts to coordinate frequency usage with known co-channel and adjacent channel incumbent federal users operating in the 1710-1755 MHz band whose facilities could be affected by the proposed operations. See, e.g., FCC and NTIA Coordination Procedures in the 1710-1755 MHz Band, Public Notice, FCC 06-50, WTB Docket No. 02-353, rel. April 20, 2006.

AWS operations must not cause harmful interference across the Canadian or Mexican border. The

("Special Conditions or Waivers/Conditions" continued on next page ...)

Conditions:
Pursuant to Section 309(h) of the Communications Act of 1934, as amended, 47 U.S.C. Section 309(h), this license is subject to the following conditions: This license shall not vest in the licensee any right to operate the station nor any right in the use of the frequencies designated in the license beyond the term thereof nor in any other manner than authorized herein. Neither the license nor the right granted thereunder shall be assigned or otherwise transferred in violation of the Communications Act of 1934, as amended. See 47 U.S.C. Section 310(d). This license is subject in terms to the right of use or control conferred by Section 706 of the Communications Act of 1934, as amended. See 47 U.S.C. Section 606.

To view the geographic areas associated with the license, go to the Universal Licensing System (ULS) homepage at <http://wireless.fcc.gov/uls> and select "License Search". Follow the instructions on how to search for license information.

Licensee Name: MetroPCS AWS, LLC

Call Sign
WQGA731

File Number
0002773870

Print Date
11-30-2006

Special Conditions or Waivers/Conditions

authority granted herein is subject to future international agreements with Canada or Mexico, as applicable.

STATEMENT OF AQUILINO BEN ORICHI, RADIO FREQUENCY ENGINEER

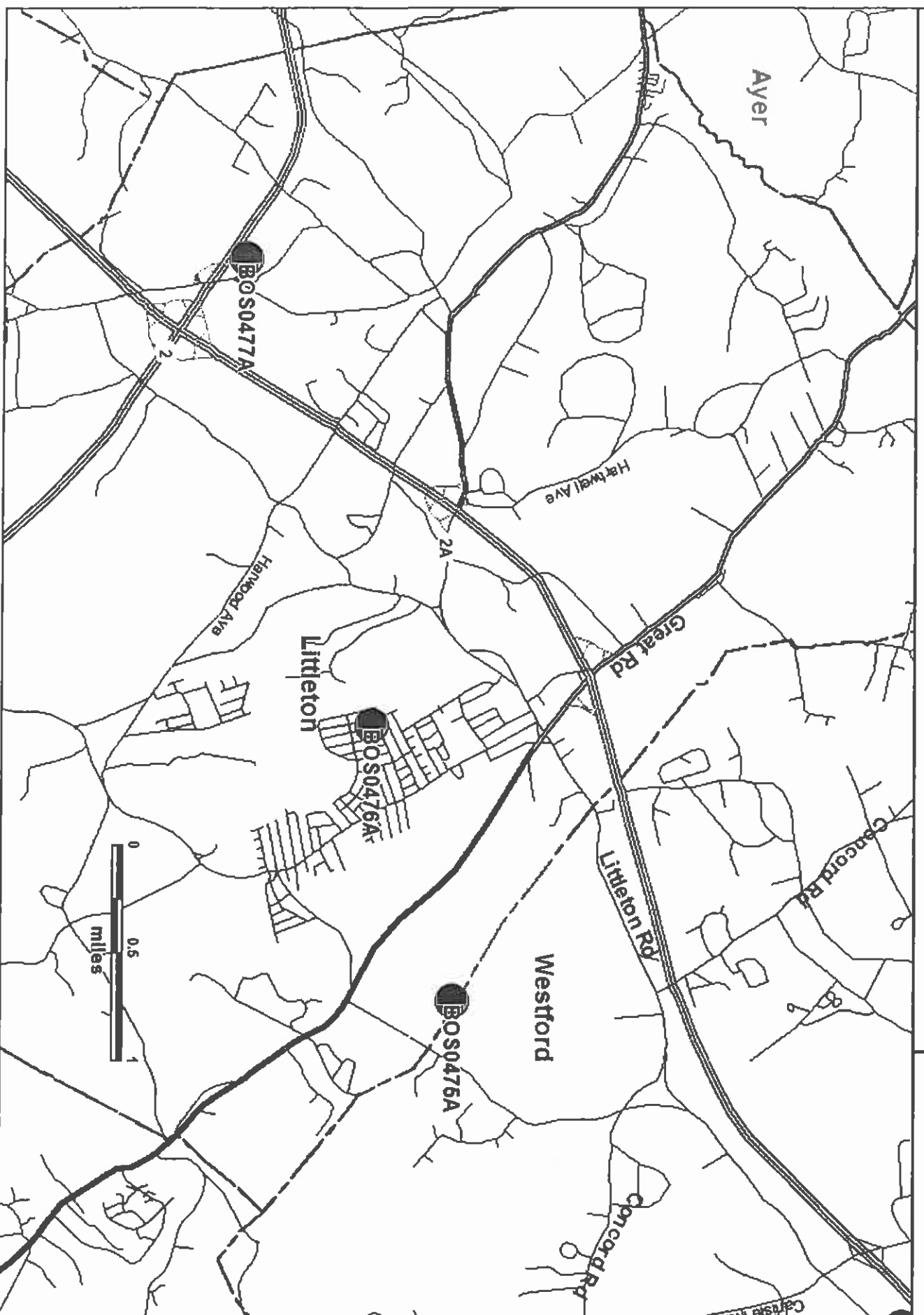
I, Aquilino Ben Orichi hereby state the following in support of the application by MetroPCS Massachusetts LLC (hereinafter "metroPCS") to construct and operate a wireless telecommunications facility at 28 Cedar Road, Littleton, MA (hereinafter "site"). The proposed facility would consist of a total of six (6) panel antennas, with necessary accessory equipment on the existing Water Tank.

1. I am a Radio Frequency (RF) Engineer for the New England Region of metroPCS, with an office at 285 Billerica Road, Chelmsford, Massachusetts. I have a degree in Electronics and Communication and have worked as an RF Engineer for the past 10 years. In that capacity, I am responsible for the metroPCS network design in Middlesex, including the town of Littleton. I have testified as a Radio Frequency Expert in various Planning and Zoning Boards in the states of MA, RI, NH, and NY.
2. MetroPCS is an FCC licensed provider of Advanced Wireless Services (AWS) throughout New England including the town of Littleton, Massachusetts.
3. In order to meet its obligations under the Code of Federal Regulations 47 C.F.R. § 27.14(a), metroPCS must have in place a network of "cell sites" to serve mobile telephones or portable wireless devices throughout its license areas which includes the town of Littleton. As shown in the attached application, a typical "cell site" consist of BTS (Base station Trans-ceive system) equipment cabinets installed on the ground, BTS are connected to antennas mounted on a the tower with coaxial cables, and the equipment cabinet is then connected to regular telephone lines from which calls will be routed to their intended destinations.
4. Cell sites are important to metroPCS in order to provide its subscribers reliable coverage. Cell sites are carefully located close to each other in an overlap of grid like pattern to provide contiguous coverage to mobile telephone users traveling in a given area.
5. I have reviewed the accompanying application and have analyzed the potential benefits this site would represent to the metroPCS wireless network and its users and the town. This is an existing tower with multiple carriers already existing on this tower. We employ a propagation modeling software called Planet EV to determine the RF coverage for the metroPCS wireless network and identify gaps in the network. Please see the attached Radio frequency coverage propagation Maps with and without the proposed site.
6. This site was determined to be the most suitable location within the search limit specified by metroPCS propagation software to provide coverage to route 110 Littleton Road, route 119 Great Road, and I-495 in Littleton and all the surrounding commercial and residential areas.
7. An evaluation of the proposed site has indicated that an antenna height of 102 ft above ground level (AGL) at this location is required to satisfy the coverage requirements in the vicinity of along route 110 Littleton Road, route 119 Great Road, and I-495 in Littleton and all the surrounding commercial and residential areas.

8. The absence of a telecommunications facility at or near this location would adversely impact metroPCS' ability to provide the FCC mandated quality of wireless communications services in the area and would require metroPCS to locate a different telecommunications facility else where.
9. The town of Littleton is crucial to the network launch of metroPCS in New England. Any delays in building its network will impede metroPCS's ability to satisfy the mandated time requirements set forth by the FCC and impact its ability to compete in the wireless industry.
10. All MetroPCS equipment operating at the proposed location will be compliant with Federal Communications Commissions requirements as well as health and safety standards.

Aquilino Ben Orichi
RF Engineer,
metroPCS
285 Billerica Road,
Chelmsford, MA 01824
(978) 244 7251

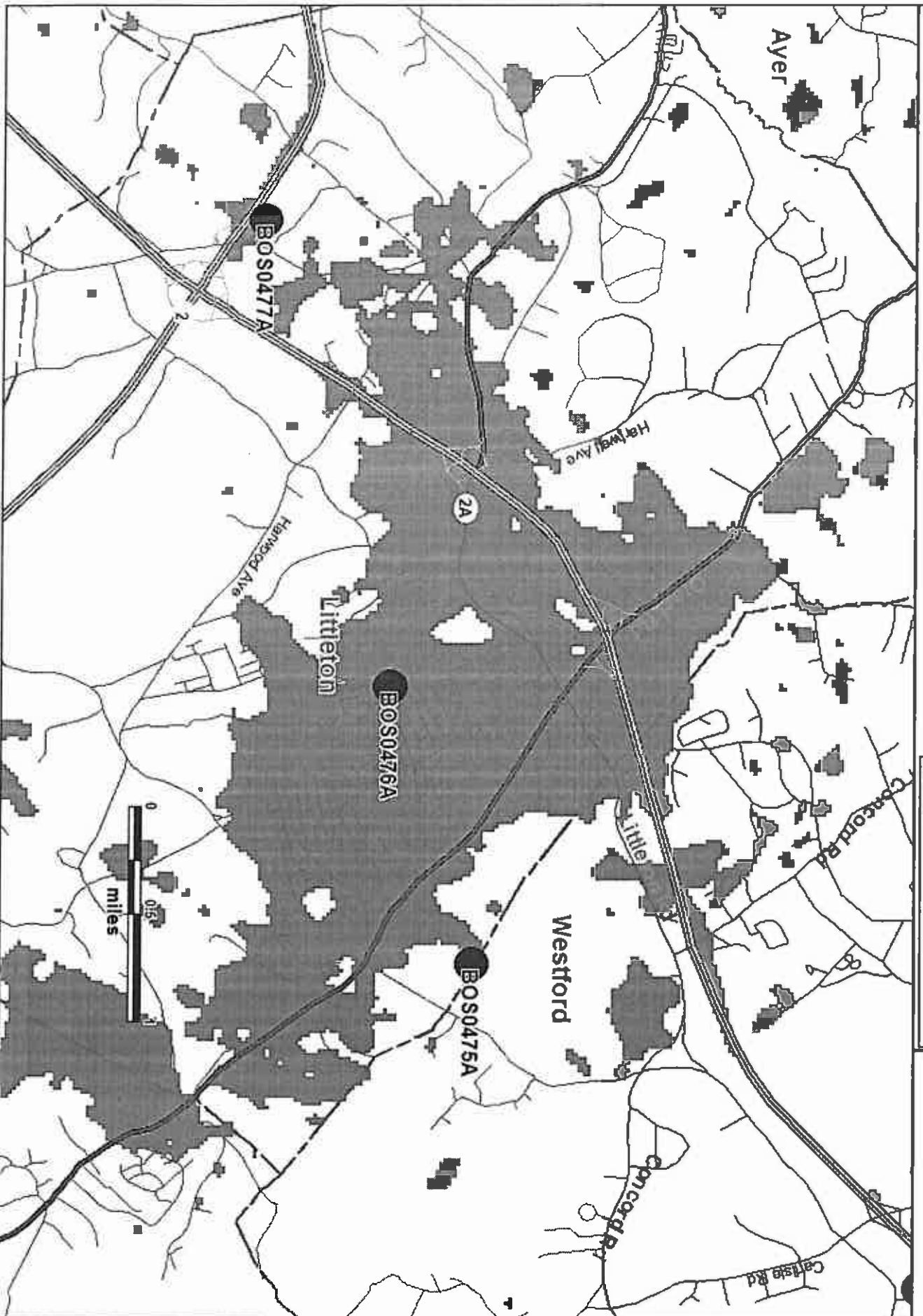
Littleton, MA - Existing Coverage



Littleton, MA - Proposed Coverage BOS0476A

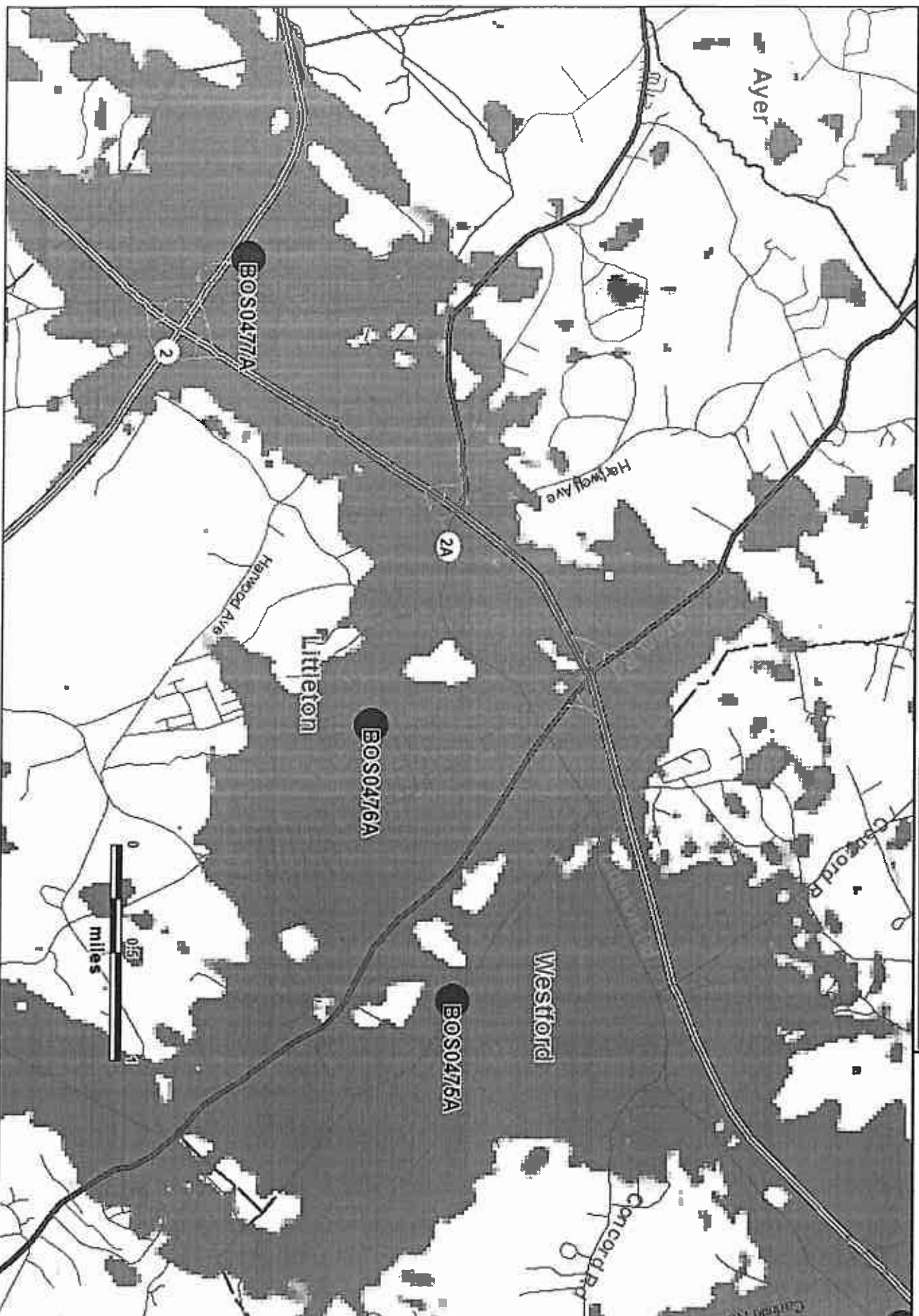
Signal Strength
Reliable Coverage

metroPCS
Verizon Wireless

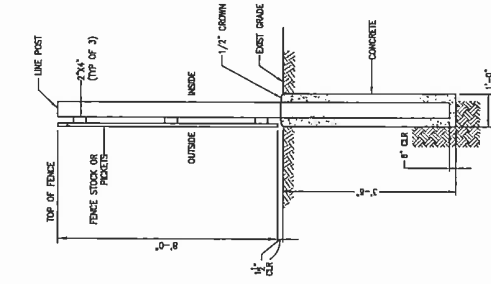


Littleton, MA - Surrounding Sites
With Proposed BOS0476A

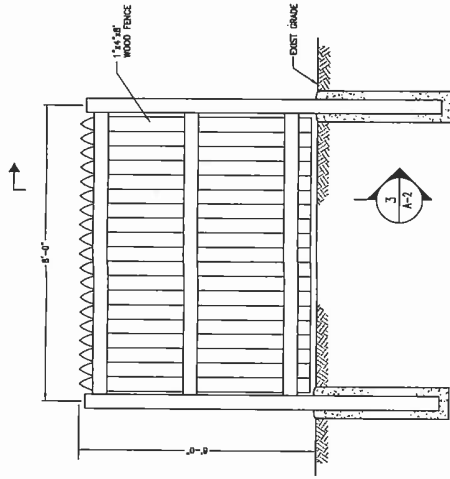
Signal Strength
Reliable Coverage



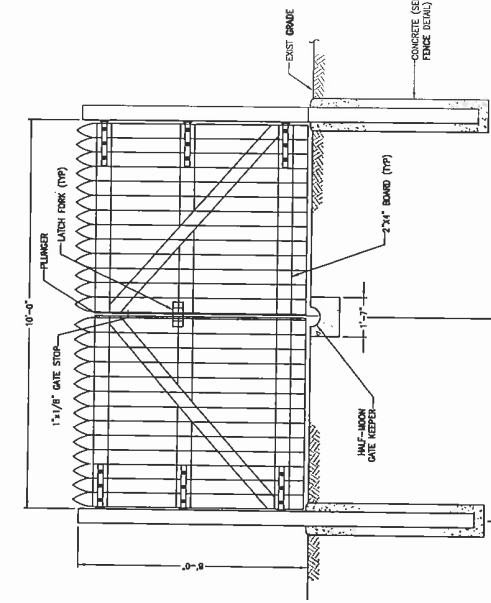
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FENCE SECTION DETAIL
SCALE: 3/8" = 1'-0"



STOCKADE FENCE DETAIL
SCALE: 3/8" = 1'-0"



STOCKADE GATE DETAIL
SCALE: 3/8" = 1'-0"

PLANTING NOTES

1. WATERING SCHEDULE SHALL BE DETERMINED BY THE LANDSCAPE ARCHITECT AFTER PLANTING.
 2. TREE SHALL BE SET PLUMB.
 3. DO NOT CUT LEADER.
 4. AN IRRIGATION SCHEDULE SHALL BE IMPLEMENTED BY THE LANDSCAPE ARCHITECT TO ENSURE THE TREE WILL TAKE ROOT AND SURVIVE.
 5. ARBORVITAE PLANTINGS SHALL BE PLANTED IN A RANGE BETWEEN 2' AND 6' AND SHALL BE 4'-5' ON CENTER.
- TREE SHALL BE PLANTED SO THAT CROWN IS 3" ABOVE FINISHED GRADE AFTER SETTLEMENT.
- 2" DIAMETER (1/4" DIA. BARK) MULCH AWAY FROM TRUNK OF TREE)
- PLANTING SOIL MIX PER SPECIAL PROVISIONS
- 3" HIGH EARTH WATERING SALTER AROUND TREE PIT
- CUT & ROLL BACK 1/2 OF MULCH TO EXPOSE ROOTS. COMPLETELY REMOVE SYNTHETIC BURLAP & LACING
- ROOTBALL SHALL BE PLACED ON COMPACTED OR UNDISTURBED SURFACE
- 3 x ROOTBALL DIAMETER
- 6" BELOW ROOTBALL

ARBORVITAE SHRUB PLANTING
SCALE: NTS

**CHAPPELL
ENGINEERING
ASSOCIATES, LLC**
Civil Structural Land Surveying

CONCORD OFFICE CENTER
2352 MAIN STREET CONCORD,
MA 01742
(978) 823-0054
www.chappellengineering.com

DRAWING NO: S-2



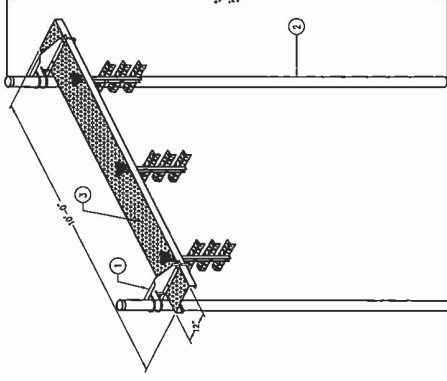
REVISIONS			
REV. #	DATE	DESCRIPTION	
2	05/12/04	ZONING/CONSTRUCTION FINAL	
1	04/28/04	ISSUED FOR ZONING/CONST.	
0	01/11/04	ISSUED FOR REVIEW	
PROJECT NO.	738-048	SCALE	
DRAWN BY:	WJC	AS SHOWN	
CHECKED BY:	JAT		

SITE NAME:
**BOS0476A
CEDAR HILL WATER
TANK
LITTLETON**

SITE ADDRESS:
**28 CEDAR ROAD
LITTLETON, MA 01460**

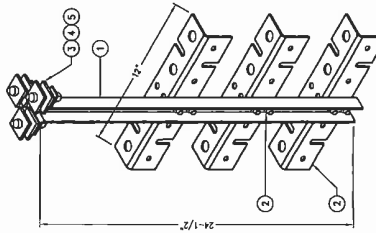
DRAWING TITLE:
DETAILS

DRAWING NO:
S-3



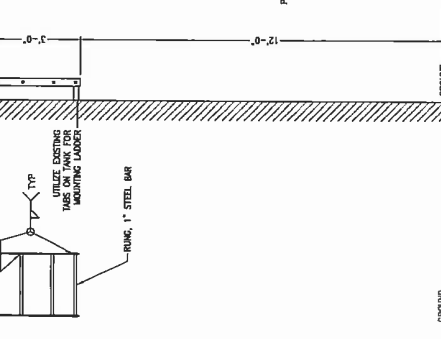
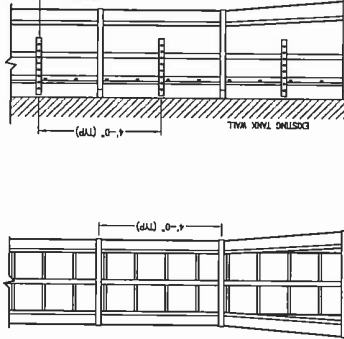
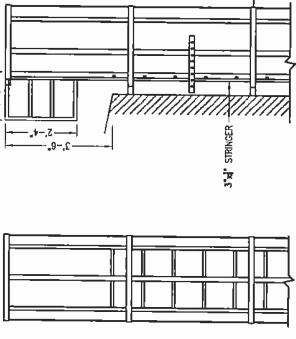
ITEM	PART NO.	DESCRIPTION	QTY.
1	WBJ-23.08	12" WAVEGUIDE BRIDGE SUPPORT BRACKET	2
2	MF-130	DIRECT BURIAL PIPE COLLAR, 13'-4"	2
3	WB-CY110	12" SAFETY GRATING	1
4	WB-K1108H	HARDWARE KIT PER FIG. F-16	1

CABLE BRIDGE DETAIL
SCALE: NTS



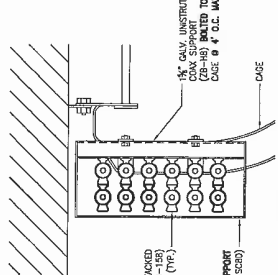
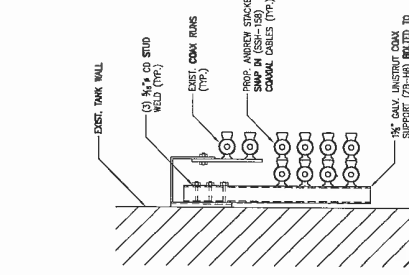
ITEM	PART NO.	DESCRIPTION	QTY.
1	WBT43.01	VERTICAL TRAPPEZ SECTION	1
2	WBT12.02	12" HORIZONTAL TRAPPEZ SECTION	3
3	MF-387	SQUARE WASHER, 1 1/2" X 1 1/2" X 7/16"	6
4	GB-4335	3/8" X 2" GALV. BOLT KIT	3
5	GB-4335	3/8" X 2" GALV. FLAT WASHER	3
6	GB-4335	3/8" X 1" GALV. BOLT KIT	6

CABLE LADDER DETAIL
SCALE: NTS

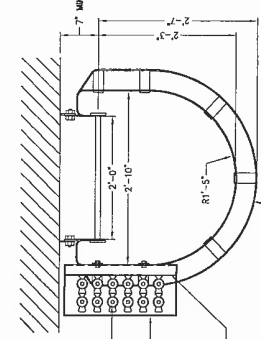


FRONT ELEVATION
SCALE: 1/2" = 1'-0"

CLIMBING LADDER DETAILS
SCALE: AS NOTED

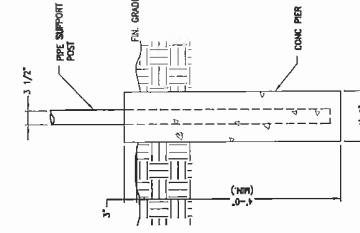


CABLE HANGER DETAIL
SCALE: 1-1/2" = 1'-0"



CAGE TOP VIEW
SCALE: 1" = 1'-0"

CABLE BRIDGE PIER
SCALE: NTS



- NOTES:
- FOR EXPOSED LEDGE PROVIDE ABOUT LEAVING PAD. INITIAL (2) 1/2" EXPANSION ANCHORS, 6" LONG.
 - FOR BORED LEDGE AT LESS THAN 3'-4" FROM EXISTING LEDGE, PROVIDE ABOUT LEAVING PAD. INITIAL (2) 1/2" EXPANSION ANCHORS, 6" LONG. PROVIDE ABOUT LEAVING PAD. INITIAL (2) 1/2" EXPANSION ANCHORS, 6" LONG. PROVIDE ABOUT LEAVING PAD. INITIAL (2) 1/2" EXPANSION ANCHORS, 6" LONG.
 - FOR CONCRETE FASTEN INSULATE W/ (2) 1/2" EXPANSION ANCHORS, 6" LONG.
 - FOR POSTS ON CONCRETE OR EXPOSED LEDGE, PROVIDE 4"x6"x24" INSULATE WITH (2) 1/2" HOLES 6" O.C.

285 BILLERICA ROAD
THIRD FLOOR
CHELMSFORD, MA 01824
TEL (978) 244-7000
FAX (978) 244-7240

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ENGINEER/LAND SURVEYOR DATE

REVISIONS			
REV. #	DATE	DESCRIPTION	
2	05/12/08	ZONING/CONSTRUCTION FINAL	
1	04/28/08	ISSUED FOR ZONING/CONST.	
0	01/11/08	ISSUED FOR REVIEW	

PROJECT NO.	DESIGNED BY: JMT	SCALE:
73LD46	DRAWN BY: MNC	AS SHOWN

SITE NAME: BOS0476A
CEDAR HILL WATER
TANK
LITTLETON

SITE ADDRESS: 28 CEDAR ROAD
LITTLETON, MA 01460

DRAWING TITLE:
ONE-LINE DIAGRAM,
RISER, DETAILS &
NOTES

DRAWING NO: E-1

ELECTRICAL

ELECTRICAL AND GROUNDING NOTES:

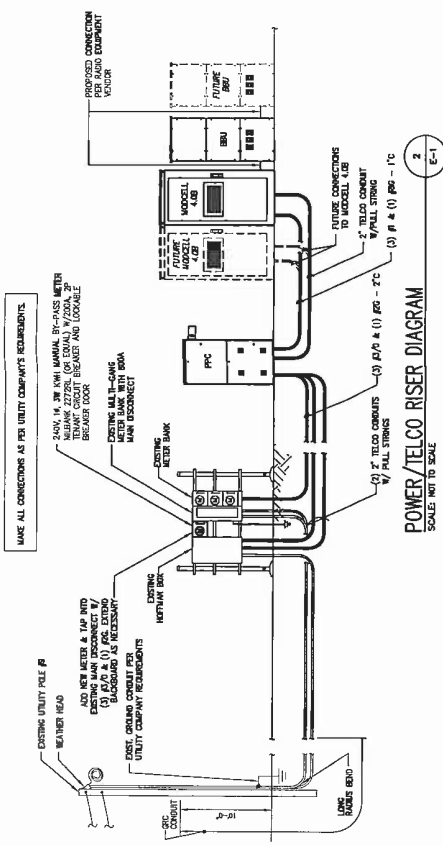
1. ALL ELECTRICAL WORK SHALL BE PERFORMED IN ACCORDANCE WITH THE NATIONAL ELECTRICAL CODE (NEC) AND ALL APPLICABLE LOCAL CODES. PERMIT SPECIFICATIONS AND ALL APPLICABLE LOCAL CODES.
2. CONDUIT ROUTINGS ARE SCHEMATIC. SUBSEQUENT SHALL INSTALL CONDUIT TO MATCH THIS ACCESS TO EQUIPMENT IS NOT BLOCKED.
3. SERVICE TO EQUIP. SHALL BE 10/240 VAC, 200 AMP, 1A, 40 Hz.
4. THE SUBCONTRACTOR IS RESPONSIBLE FOR PROTECTING EXISTING UTILITIES AND UNDERGROUND CONDUIT INSTALLATION AS TO PREVENT ANY LOSS OF CONTINUITY IN THE EXISTING SYSTEM OR DAMAGE TO THE EXISTING SYSTEM.
5. **GROUNDING**
a. ALL GROUNDING SHALL BE IN ACCORDANCE WITH THE NATIONAL ELECTRICAL CODE (NEC) AND ALL APPLICABLE LOCAL CODES.
b. COMPRESSION GROUND CONNECTIONS MAY BE REPLACED BY EXTERIOR (AUGURED) CONNECTIONS.
c. ALL GROUND CONNECTIONS BELOW GRADE SHALL BE EXTERIOR (AUGURED).
d. ALL GROUND CONNECTIONS ABOVE GRADE (INDOOR) SHALL BE PERMANENTLY WELDED TO THE GROUNDING SYSTEM.
e. ALL INTERIOR CONNECTIONS TO THE GROUNDING SHALL BE MADE AT THE TOP OF A VERTICAL EXHAUSTION OF 1/2" FOR EVERY ADDITIONAL CONNECTION.
f. ALL EXTERIOR GROUND CONNECTIONS SHALL BE COATED WITH A CORROSION RESISTANT MATERIAL.
g. ALL EXTERIOR GROUND CONNECTIONS SHALL BE 2" AND SOLD TINED COPPER UNLESS OTHERWISE INDICATED.
6. ALL EXTERIOR GROUND CONNECTIONS SHALL BE 2" AND SOLD TINED COPPER UNLESS OTHERWISE INDICATED.
7. ALL EXTERIOR GROUND CONNECTIONS SHALL BE 2" AND SOLD TINED COPPER UNLESS OTHERWISE INDICATED.
8. ALL EXTERIOR GROUND CONNECTIONS SHALL BE 2" AND SOLD TINED COPPER UNLESS OTHERWISE INDICATED.
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12. ALL EXTERIOR GROUND CONNECTIONS SHALL BE 2" AND SOLD TINED COPPER UNLESS OTHERWISE INDICATED.
13. ALL EXTERIOR GROUND CONNECTIONS SHALL BE 2" AND SOLD TINED COPPER UNLESS OTHERWISE INDICATED.
14. ALL EXTERIOR GROUND CONNECTIONS SHALL BE 2" AND SOLD TINED COPPER UNLESS OTHERWISE INDICATED.
15. ALL EXTERIOR GROUND CONNECTIONS SHALL BE 2" AND SOLD TINED COPPER UNLESS OTHERWISE INDICATED.

LEGEND:

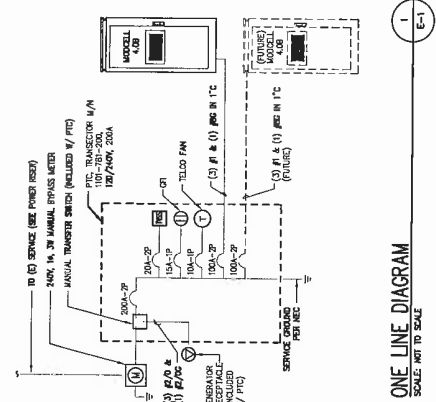
- | | |
|---|--------------------------|
|  | GROUND TEST WELL |
|  | GROUND ROD |
|  | DISCONNECT SWITCH |
|  | METER |
|  | CABLEWELL TYPE CONNECTOR |
|  | COMPRESSION TYPE |
| <hr/> | |
|  | GROUNDING WIRE |
|  | REPRESENTS DETAIL |
|  | PFC DRAWING NUMBER |

ABBREVIATIONS:

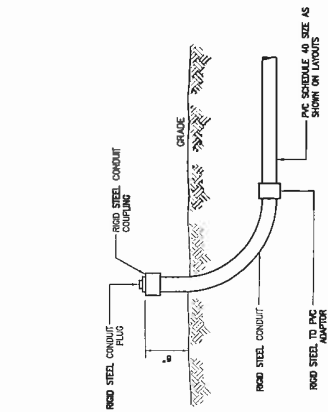
- | | |
|------|---|
| AWG | AMERICAN WIRE GAUGE |
| BWH | BARE COPPER WIRE |
| COBE | COAX GROUND BAR EXTERNAL |
| COBE | COAX SOLID GROUND BAR EXTERNAL |
| DWG | DRAWING |
| EUT | ELECTRICAL METALLIC TUBING |
| WGR | MASTER GROUND BAR |
| PES | PERSONAL COMMUNICATION SYSTEM |
| PVC | POLY (SCH. 40) POLYVINYL CHLORIDE CONDUIT |
| RST | ROD GALVANIZED STEEL |
| RFT | RAILWAY |
| TTP | TYPICAL |



POWER/TELCO RISER DIAGRAM



ONE LINE DIAGRAM
SCALE: NOT TO SCALE

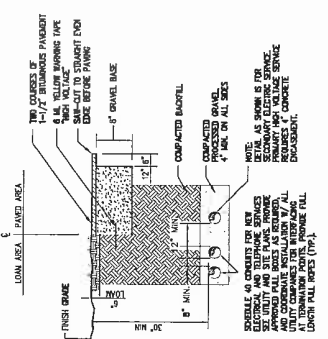


STUB-UP DETAIL

SCALE: NTS

6

E-1



BURIED CONDUIT DETAIL

QTY	DESCRIPTION	AMP	DESCRIPTION	QTY
1				1
1	MAD CELL f1	100	SPARE	1
3			SPARE	4
5			SPARE	8
5	MAD CELL f2 (MURDER)	100	SPARE	8
7			SPARE	8
6			SPARE	8
11	SPARE	-	SPARE	10
13			SPARE	12
13			SPARE	14
18	SPARE	-	SPARE	16
17			SPARE	18
18	SPARE	-	SPARE	20
21			SPARE	22
21	SURGE SUPPRESSOR	20	TELLED PAN	24
23			SPARE	25
			15 QTY RUDFALL	28

PANEL SCHEDULE
SCALE: NTS
4
E-1

metroPCS.
Unlimit Yourself.

285 BILLERICA ROAD
THIRD FLOOR
CHELSEA, MA 01824
TEL (978) 244-1300
FAX (978) 244-1240

CHAPPELL ENGINEERING
ASSOCIATES, LLC
Civil Structural / Land Surveying
CONCORD OFFICE CENTER
2352 MAIN STREET
CONCORD, MA 01742
(978) 823-0054
www.chappellengineering.com



ENGINEER/AND SURVEYOR DATE
IT IS A VIOLATION OF LAW FOR ANY PERSON, FIRM OR INDIVIDUAL TO REPRODUCE OR TRANSMIT ANY INFORMATION FROM THIS DOCUMENT TO ANY OTHER PERSON OR ENTITY.

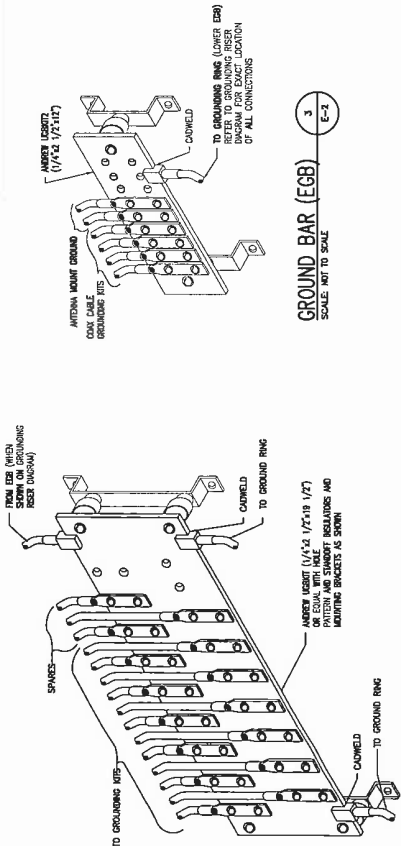
REVISIONS	
REV. #	DATE
1	06/12/08
2	06/12/08
3	06/12/08
4	06/12/08
5	06/12/08
6	06/12/08
7	06/12/08
8	06/12/08
9	06/12/08
10	06/12/08
11	06/12/08
12	06/12/08
13	06/12/08
14	06/12/08
15	06/12/08
16	06/12/08
17	06/12/08
18	06/12/08
19	06/12/08
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SITE NAME
BOS0476A
CEDAR HILL WATER
TANK
LITTLETON

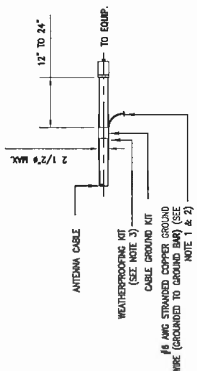
SITE ADDRESS
28 CEDAR ROAD
LITTLETON, MA 01460

DRAWING TITLE
GROUNDING DETAILS

DRAWING NO.
E-2



MASTER GROUND BAR (MGB)
SCALE: NOT TO SCALE



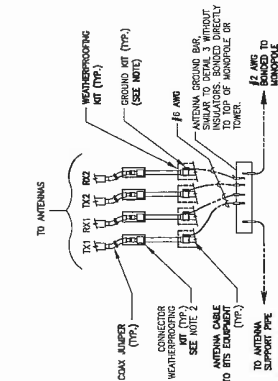
GROUND BAR (EGB)
SCALE: NOT TO SCALE

CONNECTION OF CABLE GROUND KIT TO ANTENNA CABLE

NOTES:

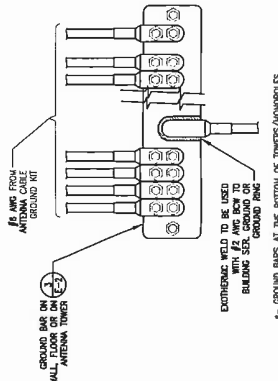
- DO NOT INSTALL CABLE GROUND KIT AT A BEND AND ALWAYS DIRECT GROUND WIRE DOWN TO GROUND BAR.
- GROUNDING KIT SHALL BE TYPE AND PART NUMBER AS SUPPLIED OR RECOMMENDED BY CABLE MANUFACTURER.
- WEATHER PROOFING SHALL BE TWO-PART TYPE SUPPLIED WITH KIT. COLD SPARK SHALL NOT BE USED.

DETAIL
SCALE: NOT TO SCALE



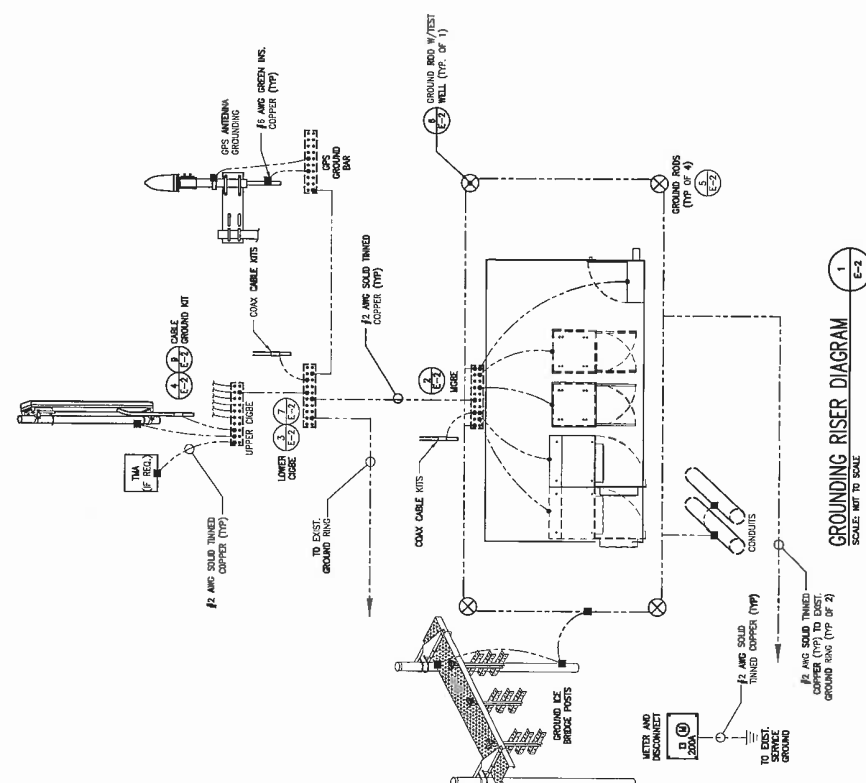
CONNECTION OF GROUND WIRE TO GROUNDING BAR, TOWER/MONOPOLE

DETAIL
SCALE: NOT TO SCALE

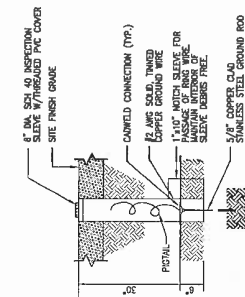


INSTALLATION OF GROUND WIRE TO GROUND BAR

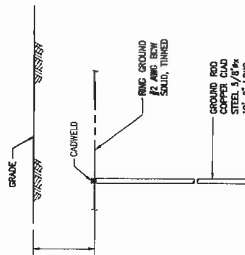
DETAIL
SCALE: NOT TO SCALE



GROUNDING RISER DIAGRAM
SCALE: NOT TO SCALE



GROUND ROD TEST WELL DETAIL
SCALE: NOT TO SCALE



GROUND ROD
SCALE: NOT TO SCALE