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PRINCE LOBEL

October 21, 2010

VIA HAND DELIVERY

City of Somerville
Zoning Board of Appeals
City Hall, 3rd Floor
93 Highland Avenue
Somerville, MA 02143

Re:	Application for Special Permit and to the Extent Necessary, Variance, and such other relief as is necessary and appropriate
Property Address:	15 Warren Avenue, Somerville, MA (the "Property") Assessor's Map 73, Block D, Lot 24
Applicant:	Clear Wireless, LLC (the "Applicant")

Dear Honorable Members of the Zoning Board of Appeals:

This firm represents Clear Wireless, LLC, a Massachusetts limited liability company in connection with an application for Special Permit and Variance to the City of Somerville Zoning Board of Appeals (the "Board"), and for such other relief as the Board deems necessary and appropriate, for the installation of a wireless communications facility (the "WCF") on the rooftop of the building (the "Building") at the Property. The Property is located in the Residential A (RA) zoning district. The use of the Property for a wireless telecommunications facility is not permitted. Pursuant to Article 5, Sections 5.1 and 5.5, and Article 14 of the City of Somerville Zoning Ordinances (the "Ordinance"), the Applicant will require a special permit from the Board, and/or, a use variance, and such other relief that the Board deems necessary and appropriate to install and operate the WCF on the Property.

The Applicant seeks to install three (3) panel antennas, and four (4) two-foot wireless backhaul dish antennas to be façade mounted to the existing penthouse located on the roof of the Building, and painted to match the Building. The WCF will also include an outdoor equipment cabinet located on a steel platform on the roof of the Building next to the existing penthouse, one (1) GPS antenna mounted to the top of the penthouse, along with associated cabling and equipment. The Applicant's proposed facilities are shown on the plans attached hereto, and incorporated herein by reference (the "Plans").

I. Background

The Applicant is licensed by the Federal Communications Commission (the "FCC") to construct and operate a wireless telecommunications network in various markets throughout the country, including the Commonwealth of Massachusetts and in particular in the City of Somerville. A copy of the Applicant's FCC license is attached hereto. The Applicant is in the process of designing and constructing a telecommunications system to serve all of the Commonwealth of Massachusetts. One of the key design objectives of its systems is to provide seamless coverage. Such a system requires a grid of radio transmitting and receiving links located approximately .5 to 2 miles apart, depending on the location of existing and proposed installations in the surrounding area, the existing use of the network and the existing topography. The radio transmitting and receiving facilities operate on a line-of-sight basis, requiring a clear path from the facility to the user on the ground. This dynamic requires the antennas to

be located in a location where the signal is not obstructed or degraded by other buildings or by topographical features such as hills.

The Property is located on Warren Avenue near Union Square. The Building is owned by the Somerville Housing Authority and is an apartment building used for multi-family residential purposes. The Building is approximately 100' tall to the roof height and 118' tall to the top of the existing penthouse. The existing Building is the most appropriate location for a wireless communication facility in this part of Somerville.

The Applicant will utilize Mobile WiMAX technology. WiMAX is an acronym for "Worldwide Interoperability for Microwave Access," which is an advanced wireless technology that permits the transmission of large quantities of data over long distances at extremely fast speeds. The Applicant's WiMAX network will utilize equipment that is similar to equipment used for cellular and PCS installations. Directional panel antennas, microwave backhaul antennas, and small global positioning system ("GPS") antennas will be used. Supporting equipment will be located in weatherproof equipment cabinets. WiMAX technology will allow the Applicant's subscribers wireless data delivery and reception capabilities at speeds currently seen with DSL and T-1 connectivity. This installation will benefit the City of Somerville residents by offering a wireless option and increased competition to high speed data consumers.

II. RF Coverage Determination

The Applicant has performed a study of radio frequency coverage for the City of Somerville and from the Property, the results of which are shown on the coverage maps submitted herewith. The Applicant has determined that a WCF located on the Property will provide adequate coverage to the targeted sections of the City of Somerville and the immediately surrounding area if the Applicant's antennas are located at the requested heights as shown on the Plans. In connection herewith, the Applicant has submitted a radio frequency propagation map, which shows its current coverage and the gap in coverage that the proposed site will fill, and a radio frequency propagation map showing the anticipated coverage from the site.

III. The Facility

The Applicant proposes to install at the Property panel and microwave antennas, base transceiver equipment (BTS) cabinets and a small GPS antenna. As the attached Plans illustrate, the equipment cabinets will be installed on a steel platform on the roof of the Building, located directly adjacent to the existing penthouse, out of view. As shown on the Plans, the Applicant proposes to façade mount the panel and microwave antennas to the existing penthouse and paint them to match the penthouse. The panel antennas will be mounted at a height of 113' and the microwave backhaul antennas will be mounted at a height of 117' as noted in the Plans. All antenna heights referenced herein are the centerline of the applicable antenna. The top of the proposed microwave antennas will be approximately 118' which is the same as the height of the penthouse.

Per FCC mandate, enhanced emergency (E911) service is required to meet nationwide standards for wireless communications systems. To comply with this federal standard, the Applicant will also install one (1) Global Positioning System (GPS) antenna measuring approximately 3" in diameter x 5" high on the top of the existing penthouse.

After installation, the facility will be unmanned and will only require twice a month maintenance visits. The only utilities required to operate this facility are standard 120-volt electrical power as well as telephone service. These are presently in place at the Property. The traffic generated by the facility will be approximately two vehicle trips per month by maintenance personnel who will inspect the facility to ensure it remains in good working order. The facility will comply with all applicable local, state and federal safety codes.

IV. Legal Arguments

The Applicant complies with the Wireless Communication provisions set forth in Article 14 of the Ordinance

Section 14.3 Location and Design Guidelines

Telecommunications facilities are to be permitted only in those zoning districts specified under Section 7.11.15.3 of the Somerville Zoning Ordinance, as amended herein, subject to the granting of a special permit. To the maximum extent feasible, the following guidelines should be followed when locating and designing such facilities:

Although the RA zoning district is not one of the zoning districts specified under Section 7.11.15.3 of the Ordinance, for the reasons set forth herein, the Applicant respectfully requests the Board to grant a special permit and such other relief as necessary and appropriate for the Applicant to install and operate the WCF on the Property.

14.3.1. Location.

a.

To the maximum extent feasible, service providers shall co-locate on a single site. Towers and/or mountings shall be designed to structurally accommodate the maximum number of foreseeable users (within a ten-year period) technically practical;

The Applicant will comply with this provision of the Ordinance.

b.

To the maximum extent feasible, service providers shall locate facilities on properties owned or managed by the City of Somerville;

Although the Property is not owned or managed by the City of Somerville, it is owned and managed by the Somerville Housing Authority, which is affiliated with the City of Somerville. The Applicant responded to a request for proposal issued by the Somerville Housing Authority.

c.

To the maximum extent feasible, service providers shall locate facilities on industrial or commercially zoned land;

It is not feasible for the Applicant to locate a wireless communications facility on industrial or commercially zoned land to provide wireless coverage to the objective area.

d.

Whenever possible, antennas shall be concealed from view through the use of interior-mounting (e.g., inside church steeples, cupolas, bell-towers, or penthouses), or side-mounting onto existing structures and painted to match the surrounding materials and colors; and

The WCF will be side-mounted to the existing penthouse and painted to match the penthouse and will thus comply with this provision of the Ordinance.

e.

To the maximum extent feasible, locations shall be chosen with a sensitivity to the surrounding topography and sight-lines, to minimize impact on the City's predominant viewscapes. Whenever possible, the use of free-standing towers and monopoles is to be avoided.

The Applicant will comply with this provision of the Ordinance.

14.3.2. Size and Height.

a)

Free-standing towers and monopoles for communications facilities shall be subject to all the height requirements of the underlying zoning district;

Not applicable.

b)

Antennas or dishes located on a structure shall not exceed ten (10) feet in height above the roofline; and

The Applicant will comply with this provision of the Ordinance.

c)

To the maximum extent feasible, antenna technology shall be chosen to minimize the visual effect of "massing" panels on a rooftop.

The Applicant will comply with this provision of the Ordinance to the extent reasonably feasible.

14.3.3. Screening and Landscaping.

a.

Existing on-site vegetation shall be preserved to the maximum extent practical;

Not Applicable.

b.

To the maximum extent feasible, facilities shall minimize adverse visual effects on the environment. The Special Permit Granting Authority (SPGA) may impose reasonable conditions to ensure this result, including landscaping, painting, and lighting standards; and

The Applicant will comply with this provision of the Ordinance to the extent reasonably feasible.

c.

Satellite dishes and/or antennas shall be situated on a structure in the least obtrusive location feasible, preferably with limited visibility from abutting streets.

The Applicant will comply with this provision of the Ordinance to the extent reasonably feasible.

14.3.4. Setbacks.

a.

A free-standing tower or monopole shall not be erected nearer to any property line than a distance equal to the vertical height of the tower (inclusive of any appurtenant device) measured at the mean finished grade of the tower base;

Not Applicable.

b.

Rooftop antennas or dishes shall be located a minimum of ten (10) feet from the roof edge; and

The Applicant will comply with this provision of the Ordinance to the extent reasonably feasible.

c.

Rooftop antennas or dishes shall be setback below a plane inclined at forty-five (45) degrees from the vertical, beginning at each cornice-line of the building.

The Applicant will comply with this provision of the Ordinance to the extent reasonably feasible.

14.3.5. Screening and Location of Associated Equipment.

a.

To the maximum extent feasible, all network interconnections from the communications site shall be via underground lines;

Due to the Applicant's network requirements, including without limitation the large quantities of data being transmitted with the WiMax technology, network interconnections from the WCF must be made via microwave backhaul antennas.

b.

Traffic associated with the antennas and accessory facilities shall not adversely affect abutting ways;

After installation, the facility will be unmanned and will only require twice a month maintenance visits.

c.

Night lighting of facilities shall be prohibited unless required by the Federal Aviation Administration. Lighting shall be limited to that needed for emergencies and/or as required by the FAA; and

The Applicant will comply with this provision of the Ordinance.

d.

There shall be no signs associated with facilities, except for small instructional signs, "No Trespassing" signs, and a required sign giving a phone number where the owner can be reached on a 24-hour basis. All signs shall conform to the provisions of Article 12 of the Zoning Ordinance, as amended.

The Applicant will comply with this provision of the Ordinance.

V. Legal Arguments for Use

Notwithstanding the restrictions set forth in Section 7.11.15.3 and Article 14 of the Ordinance, the Applicant respectfully suggests that the enforcement of the City's zoning criteria for wireless communications facilities results in significant gaps in wireless coverage within Somerville. The Applicant's proposed WCF satisfies the requirements for the granting of the requested relief pursuant to the Ordinance, Massachusetts General Laws Chapter 40A § 10[1] and the Telecommunications Act of 1996 (the "TCA") as set forth below and the Applicant's proposed WCF satisfies the following conditions for the Board to grant the requested relief, pursuant to the Ordinance, Massachusetts General Laws Ch 40A, and the TCA:

a. A literal enforcement of the provisions of the Ordinance would involve substantial hardship, financial or otherwise, to the Applicant.

The intent of the TCA enacted by the U.S. Congress was to institute a framework to promote competition and innovation within the telecommunications industry. Under its license from the FCC, the Applicant is obligated to provide a reliable "product" (i.e. wireless communications service) to the population in the greater Boston region, which includes the City of Somerville. Likewise, consumer expectations for increasingly robust and reliable service requires competing service providers (such as the Applicant's, operating under the brand name Clearwire) to identify and remedy existing gaps in reliable network coverage, or gaps that result from increasing subscriber voice and data traffic beyond the limits of existing network infrastructure. A carrier's failure to remedy network gaps in a timely fashion can result in a significant loss of subscribers to competing telecommunications carriers. As demonstrated in the Affidavit of Radio Frequency Expert and Service Coverage maps provided by the Applicant and attached hereto, the proposed WCF and corresponding requested relief are necessary to remedy a gap in reliable service coverage within the Applicant's existing network infrastructure.

Given the location of the significant gap in coverage, and the location of the existing site to which the proposed WCF must connect, both depicted on the coverage maps submitted herewith, the proposed wireless communications services cannot be provided without requiring the requested relief. The Applicant has investigated alternative sites in and around the defined geographic area within which its engineers determined that a facility must be located to fill the gap in service coverage and to function effectively within the Applicant's network of existing and planned facilities. No existing structure or property near the vicinity of the proposed WCF is feasible to accommodate the Applicant's network requirements.

Accordingly, a literal enforcement of the provisions of the Ordinance would prevent the Applicant from eliminating an existing gap in reliable service coverage, resulting in a potential loss of subscribers and the inability to effectively compete for subscribers with FCC licensed competitors in the market, contrary to the intent of the Ordinance and the U.S. Congress in enacting the TCA.

b. The hardship is owing to circumstances relating to the soil conditions, shape or topography of such land or structures and especially affecting such land and structures but not affecting generally the zoning district in which it is located.

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[1] M.G.L. ch. 40A § 10 provides that the Board of Appeals may grant a variance when it finds that:

> owing to circumstances relating to the soil conditions, shape, or topography of such land or structures and especially affecting such land or structures but not affecting generally the zoning district in which it is located, a literal enforcement of the provisions of the ordinance or by-law would involve substantial hardship, financial or otherwise, to the petitioner or appellant, and that desirable relief may be granted without substantial detriment to the public good and without nullifying or substantially derogating from the intent or purpose of such ordinance or by-law.

The Property is a large parcel that abuts a commercial mixed use district. The surrounding area is comprised of residential and commercial properties however there are no other feasible locations on which to locate a wireless telecommunications facility. Existing structures and buildings in the area are insufficient in height to allow the Applicant to operate thereon and provide adequate coverage to this significant gap in its network. The Property provides a unique opportunity – given the character and size of the existing Building – to allow the Applicant to install the WCF on an existing building, thereby minimizing any adverse visual impacts to the surrounding area. Accordingly, the proposed design conforms to the existing characteristics of the Property by façade mounting the antennas to the existing penthouse and painting them to match. The WCF however, requires relief for this use in the Residential A zoning district under the Ordinance.

Radio frequency engineers determine the placement of network points-of-presence using computer engineering models that simultaneously evaluate area topography and population patterns to identify specific geographic areas to be serviced by each antenna facility in the network. As a result of this modeling, combined with actual coverage data provided by existing "on air" facilities, the Applicant's radio frequency engineers have identified a limited geographic area as a necessary location for a communications facility to remedy an existing gap in reliable service coverage in the general vicinity of the Property. Without the requested relief, there would remain a substantial "gap" in reliable service coverage in the Applicant's network. Radio frequency coverage maps and an Affidavit of Radio Frequency Expert, provided by the Applicant and attached hereto, confirm that a wireless communications facility located at the Property is required to remedy the existing gap in the Applicant's network coverage in the area. The requested height has been determined by the Applicant's engineers to be the minimum height necessary to connect coverage from the proposed WCF with coverage from adjacent cell sites in the Applicant's network (i.e., to remedy the existing "gap" in service and to effect reliable handoffs between adjacent cell sites as a subscriber travels through the area). Further, in the context of a utility service where the critical criteria in the development of each facility is its ability to integrate with a network of surrounding sites and, subsequently, for each cluster of sites to function within a regional/national network, there is an underlying premise that each site chosen by the Applicant for a facility possesses a unique location and topographical characteristics.

Finally, as noted in *Nextel Communications of the Mid-Atlantic, Inc. v. Town of Wayland*, 231 F.Supp. 2d 396, 406-407 (D. Mass. 2002), the "need for closing a significant gap in coverage, in order to avoid an effective prohibition of wireless services, constitutes another unique circumstance when a zoning variance is required." The existing structures located near the Property are not at a height sufficient to allow the Applicant to provide adequate coverage to this significant gap in its network and there is no property available to the Applicant that would not require the requested relief. Consequently, the proposal to install the WCF is required. Given the height of the Building, as well as the proposed design of the WCF, the proposed installation will have a minimal visual impact to the surrounding neighborhood while achieving the Applicant's requisite coverage.

c. Desirable relief may be granted without either substantial detriment to the public good or nullifying or substantially derogating from the intent or purpose of the Ordinance.

Although the use is prohibited under the Table of Uses, pursuant to §7.11.15.3 of the Ordinance the Applicant provides that the WCF is in harmony with the intent of the Ordinance. As §6.1.1 of the Ordinance provides, Residential A zoning districts are "to establish and preserve quiet neighborhoods of one- and two-family homes, free from other uses except those which are both compatible with and convenient to the residents of such districts." The Applicant's proposed installation satisfies this requirement of the Ordinance. As explained in more detail below, the proposed WCF will produce no objectionable noise, glare, dust, smoke, fumes, odors, or effluent, and will not have any impact on traffic or circulation. Further, the proposed WCF is compatible and convenient to the inhabitants of the City by enhancing telecommunication services within the City. Accordingly, relief may be granted by the Board without substantial detriment to the public good or nullifying or substantially derogating from the intent or purpose of the Ordinance.

The WCF produces no odors, smoke, dust, glare or waste. Visits to and from the WCF will be limited to one or two per month by maintenance personnel so it will not produce large amounts of traffic. Accordingly, the requested relief may be granted without substantial detriment to the public good. In fact, the WCF will provide a benefit to the community in the form of improved communications infrastructure. As a substantial part of the intent and purpose of the Wireless Communication Ordinance is to minimize potential adverse impacts on adjacent properties and residential neighborhoods, the Applicant respectfully suggests that its proposed WCF is consistent with the intent and purpose of the Ordinance. The Applicant's proposed structure is camouflaged, unmanned and will generate approximately two vehicle trips per month for routine maintenance. The WCF is serviced by electricity and no back-up generator will be required. The proposed use will discharge no wastewater on the site nor will it involve on-site storage or disposal of toxic or hazardous waste. The Applicant's WCF will be a benefit to the community by allowing for more competitive wireless telecommunications services to the residents and businesses of the City of Somerville. In addition, granting the requested relief will not cause substantial detriment to the public good or impair the intent or purpose of the Ordinance because:

1. The proposed use complies with the Ordinance to the extent reasonably feasible and will reduce the number of new structures ultimately needed to provide wireless communication services in the surrounding area by the use of an existing Building.

2. The proposed location is reasonably adaptable to the proposed wireless communications use.

3. The proposed WCF is designed to be at the minimum height necessary to provide adequate coverage to the area and keep potential visual impacts to a minimum.

4. The WCF will comply in all respects with radio frequency emission standards established by the Federal Communications Commission.

5. The proposed use is passive in nature, requires no employees on the premises, will not generate large amounts of traffic, and will not burden municipal systems.

6. The proposed WCF is compatible and convenient to the inhabitants of the city by enhancing telecommunications services within the City of Somerville.

7. The proposed WCF will lessen the danger from fire and natural disasters by providing emergency communications in the event of such fires and natural disasters.

8. The proposed WCF will involve no overcrowding of land or undue concentration of population because it is an unmanned installation.

9. The proposed WCF will preserve and increase the amenities of the City by enhancing telecommunications services.

10. The proposed WCF will not adversely affect water supplies as it neither uses water nor produces waste.

11. The proposed WCF will facilitate the adequate provision of transportation by improving mobile telecommunications for business, personal, and emergency uses.

12. The proposed WCF will involve no adverse effects on drainage, schools, parks, or open space.

13. The proposed WCF will involve no excessive noise.

14. The proposed WCF will not adversely impact upon historic sites.

15. The proposed WCF will be an appropriate use of the Property within the City of Somerville.

d. The Telecommunications Act of 1996

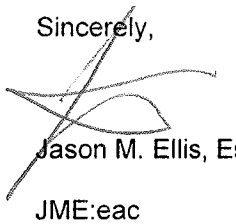
In a growing number of cases, the federal courts have found that denials of applications based on a particular use violate the TCA, even if such denials would be valid under state law. For example, in *Omnipoint Communications v. Town of Lincoln*,107 F. Supp. 2d 108 (D. Mass. 2000), the court found that denial of a variance for a location outside of the town's wireless overlay district violated the TCA and ordered the variance to issue despite a by-law provision prohibiting use variances. Additionally, in *Nextel Communications of the Mid-Atlantic, Inc. v. Town of Wayland*, 231 F. Supp. 2d 396 (D. Mass. 2002), the court reached the same result. In that case, the court stated: "Although the Board's statement [regarding its lack of authority to issue a use variance] may be a correct statement in Massachusetts regarding variances, it is not controlling in the special case of wireless communications facilities...under the Telecommunication Act, the Board cannot deny the variance if in so doing it would have the effect of prohibiting wireless services."

The Applicant has demonstrated a need for coverage in an area immediately surrounding the Property. The installation proposed by the Applicant is the only feasible means reasonably available to the Applicant to fill its gap in coverage. Therefore, the need to close this significant gap in coverage constitutes another unique circumstance which is relevant to the grant of the requested relief.

VI. Summary

In light of the findings discussed above, the Applicant hereby requests that the Board determine that its proposed WCF complies with the Wireless Communication provisions set forth in Articles 5 and 14 of the Ordinance and approve the application for a Special Permit and/or Variance, to install the proposed WCF. The findings are made in view of the particular characteristics of the Property and of the proposed siting and equipment, as detailed above. This Property is the most appropriate location for the installation and operation of the WCF.

Sincerely,



Jason M. Ellis, Esq.

JME:eac

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CLEAR

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www.clear.com

RF ENGINEERING AFFIDAVIT
License Agreement ("Agreement") dated:
Licensee: **Clearwire US LLC**
Clearwire Site ID: MA-BOS7501-b
Site Address: 15 Warren Ave, Somerville MA 01243

The undersigned hereby state the following in support of the application by Clearwire US LLC, hereafter referred to as Clearwire, to install equipment at approximately Hundred and seventeen (117) feet above ground level (AGL) at the property located at : 15 Warren Ave, Somerville, MA 01243 (hereinafter the "Site").

1. I am a Radio Frequency Engineer employed by Clearwire, with an office located at 200 fifth Ave, Waltham MA.

2. My primary responsibilities include radio frequency design and planning in the State of Massachusetts, including such areas as the Town of Somerville and surrounding communities.

3. I have thoroughly reviewed the radio frequency engineering studies, reports and computer models prepared by Clearwire, with respect to the Site.

4. Clearwire is licensed by the Federal Communications Commission (herein after "FCC") to provide wireless broadband communication services by building a network of communication sites using World Interoperability for Microwave Access (WiMAX) technology. This technology, also referred to as IEEE 802.16, utilizes digital transmission to improve the quality and number of available services including, without limitation, Data Services such as Internet and email access, voice over IP and other data applications.

5. In order to build out its network and meet customer demand for Wireless Broadband Services, Clearwire must have in place a system of 'wireless access points' (herein after "WAP") to serve portable wireless communication data devices. A typical WAP, such as the one proposed, consists of three panel antennas and backhaul dishes mounted to a building, tower, church or other structure. The antennas are connected to radio operating equipment housed at or near the structure.

6. To maintain effective, reliable and uninterrupted service, there must be a continuous series of WAPs located within close proximity to each other so as to overlap in a system comparable to a honeycomb pattern. If there is no WAP available to accept/receive the signal, network service to the mobile data service will terminate involuntarily. Accordingly, the overlap of coverage is necessary for the signal to transfer from one WAP to another WAP seamlessly and without involuntary termination.

7. A number of factors determine the distance between cell WAPs, including, but not limited to, topography, physical obstructions, foliage, antenna height and line-of-sight.

8. Based on the radio frequency studies, reports and computer models prepared in connection with this project, it is my professional assertion that there would be inadequate network service for Clearwire customers due to a coverage gap within the city of Somerville in the area encompassing Somerville Ave, Washington St, Summer St and the surrounding nearby roads.

9. Based on the radio frequency studies, reports and computer models prepared in connection with this project, it is my further professional opinion that Clearwire would be able to alleviate this

CLEAR

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www.clear.com

significant gap in coverage by locating Clearwire antennas at an approximate height of Hundred and seventeen (117) feet AGL on the above referenced property as proposed.

10. The proposed wireless broadband communications equipment shall be in compliance with the FCC Guidelines for Evaluating the Environmental Effects of Radio Frequency Radiation. It is the responsibility of Clearwire to make RF field measurements once this WAP will be in service in compliance with FCC guidelines.

11. The proposed wireless communications equipment will be installed, erected, maintained and used in compliance with all applicable Federal, State and local regulations, including, but not limited to: the radio frequency emissions regulations set forth in the 1996 Federal Communications Act, applicable regulations administered by the Federal Aviation Administration (FAA), Federal Communications Commission (FCC), Massachusetts Aeronautics Commission and the Massachusetts Department of Public Health.

12. The RF emission from these proposed WAP antennas would not exceed the State and Federal standards, when combined with all other existing PWSA facilities on the building at: 15 Warren Ave and also that the new antennas would not "interfere" with the other existing PWS structures from other carriers at the site location.

13. Based upon the best radio frequency technology available at this time, it is my professional opinion that the proposed WAP is at the minimum height that is needed to ensure adequate service to area residents and businesses within the geographic area described above.

Ajay Sawant

Ajay Sawant

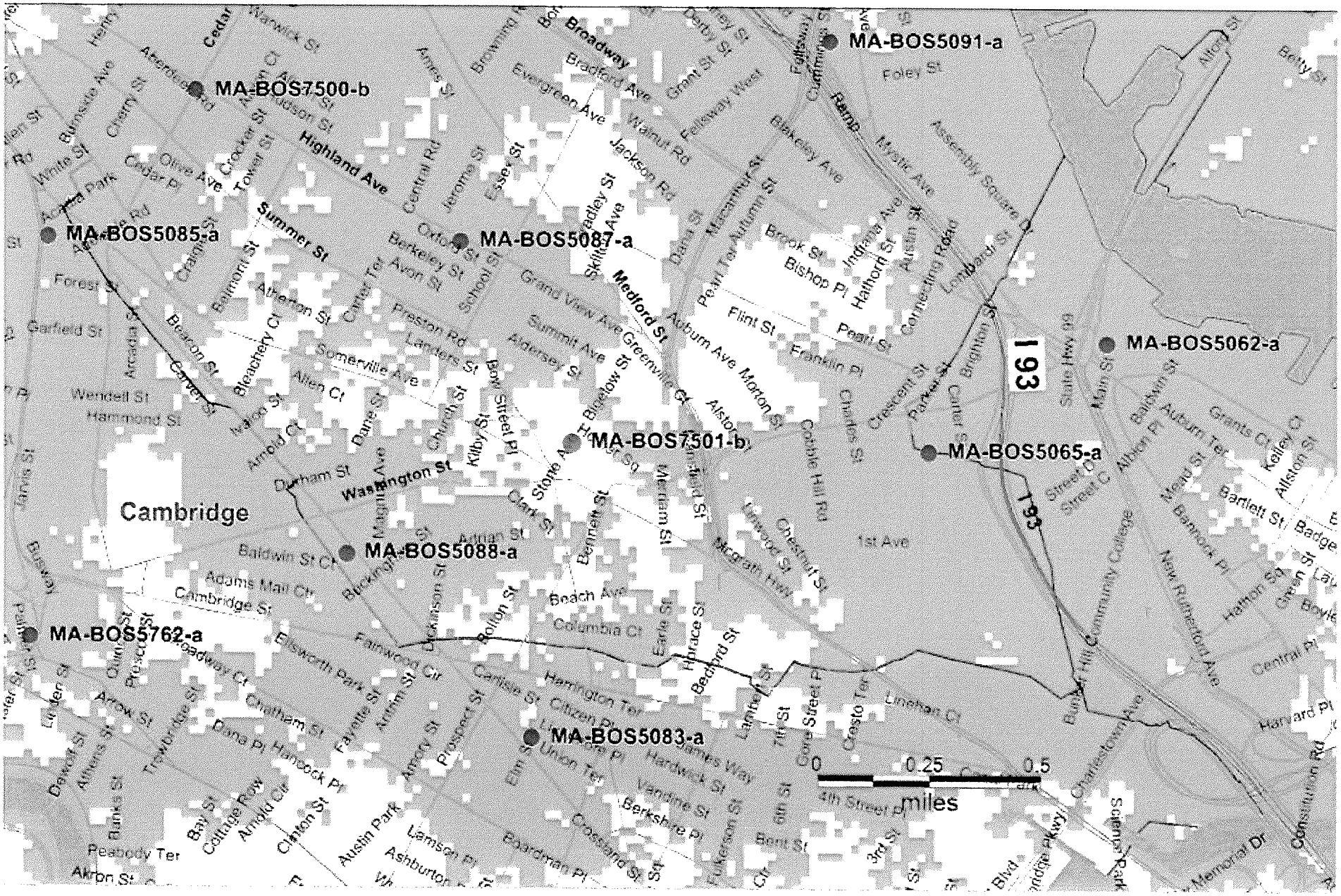
RF ENGINEER, Clearwire US LLC
August 6, 2010

SOMERVILLE : 15 Warren Ave

Coverage from future Neighboring Sites

Legend
- Proposed site
- Future sites
- Reliable coverage

CLEARWIRE

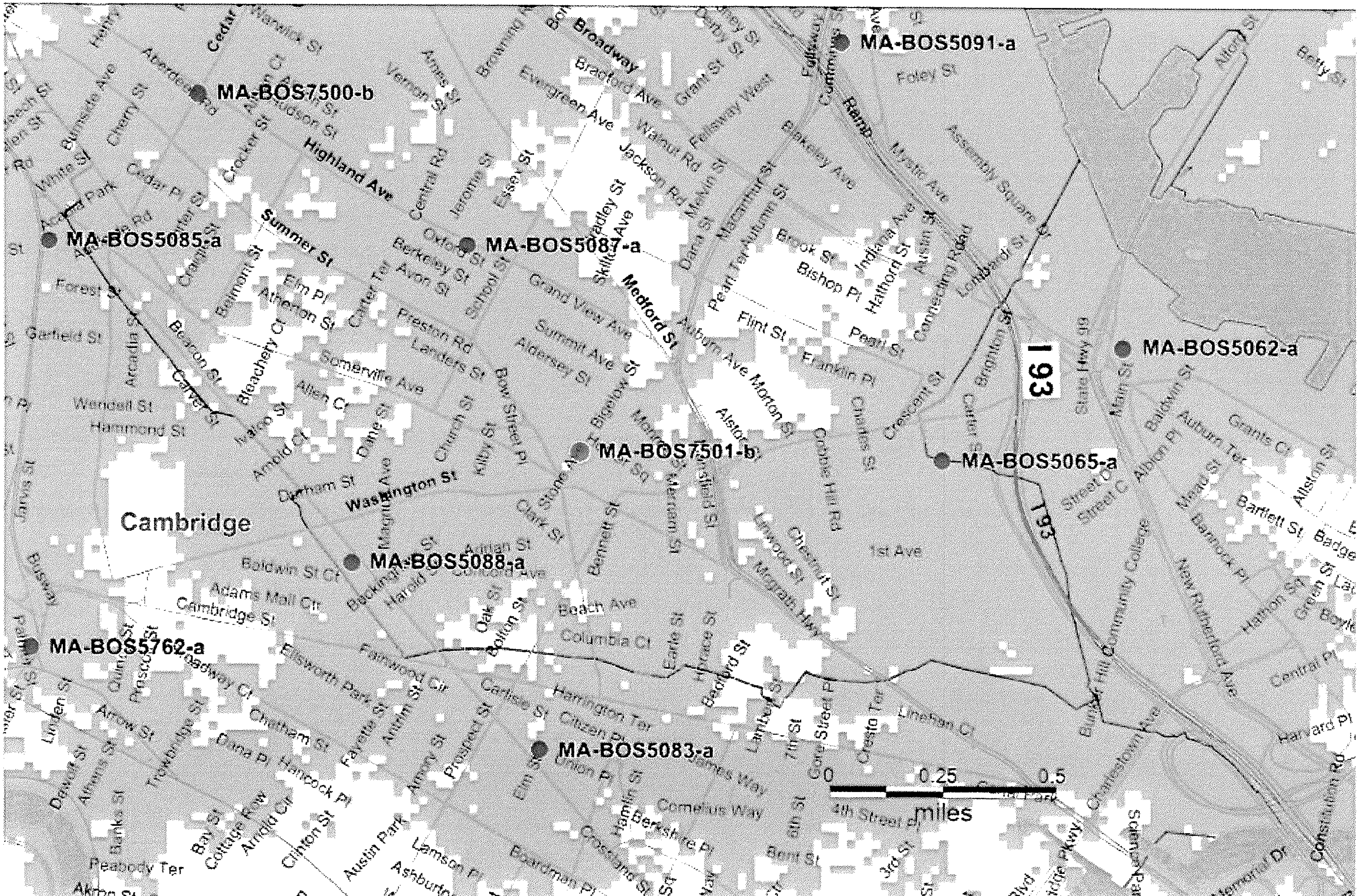


SOMERVILLE : 15 Warren Ave

Coverage from the Proposed and future Neighboring Sites

Legend
- Proposed site
- Future sites
- Reliable coverage

CLEARWIRE

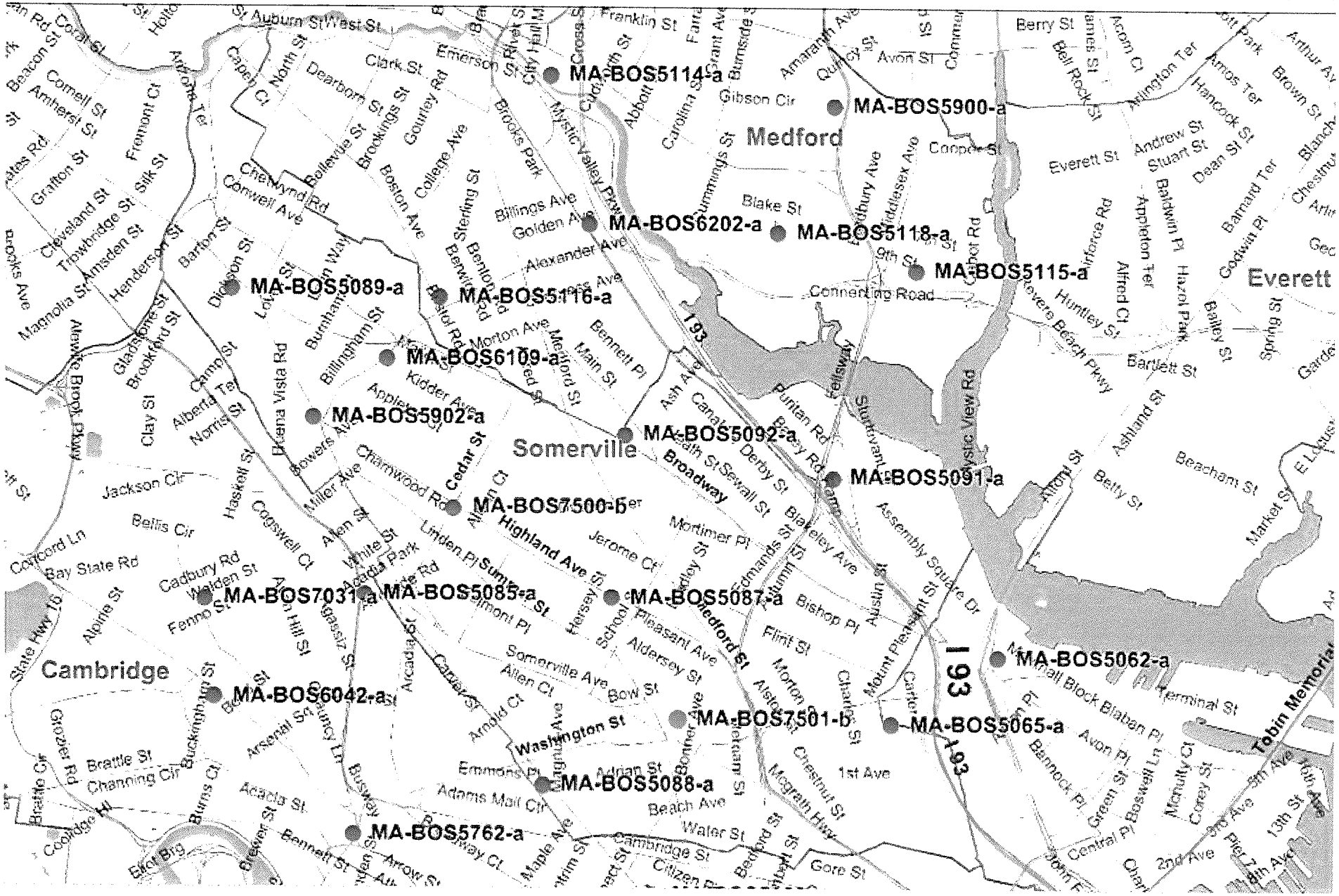


SOMERVILLE : 15 Warren Ave

Sites in Somerville

Legend
- Proposed site
- Future sites
- Reliable coverage

CLEARWIRE

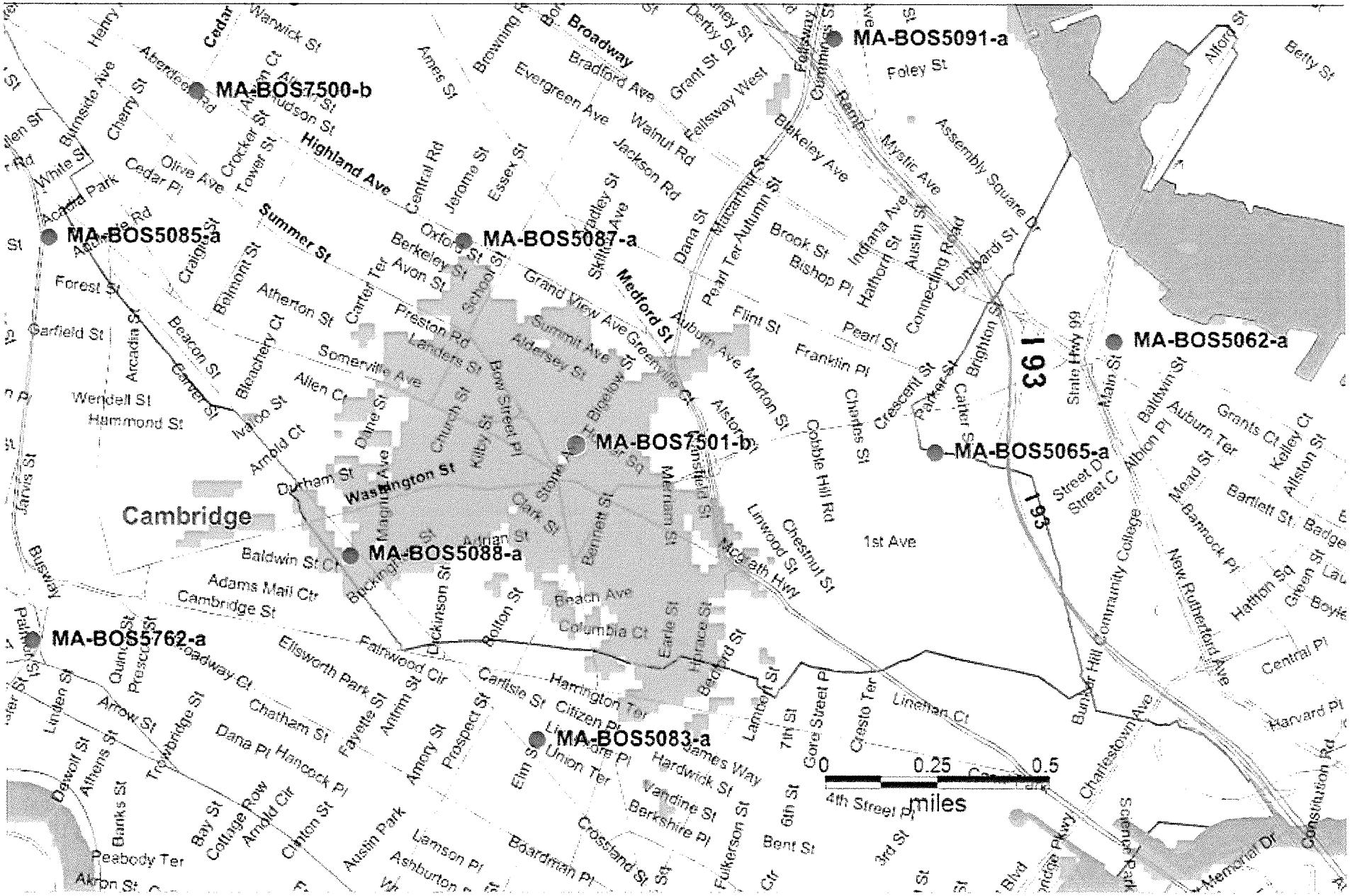


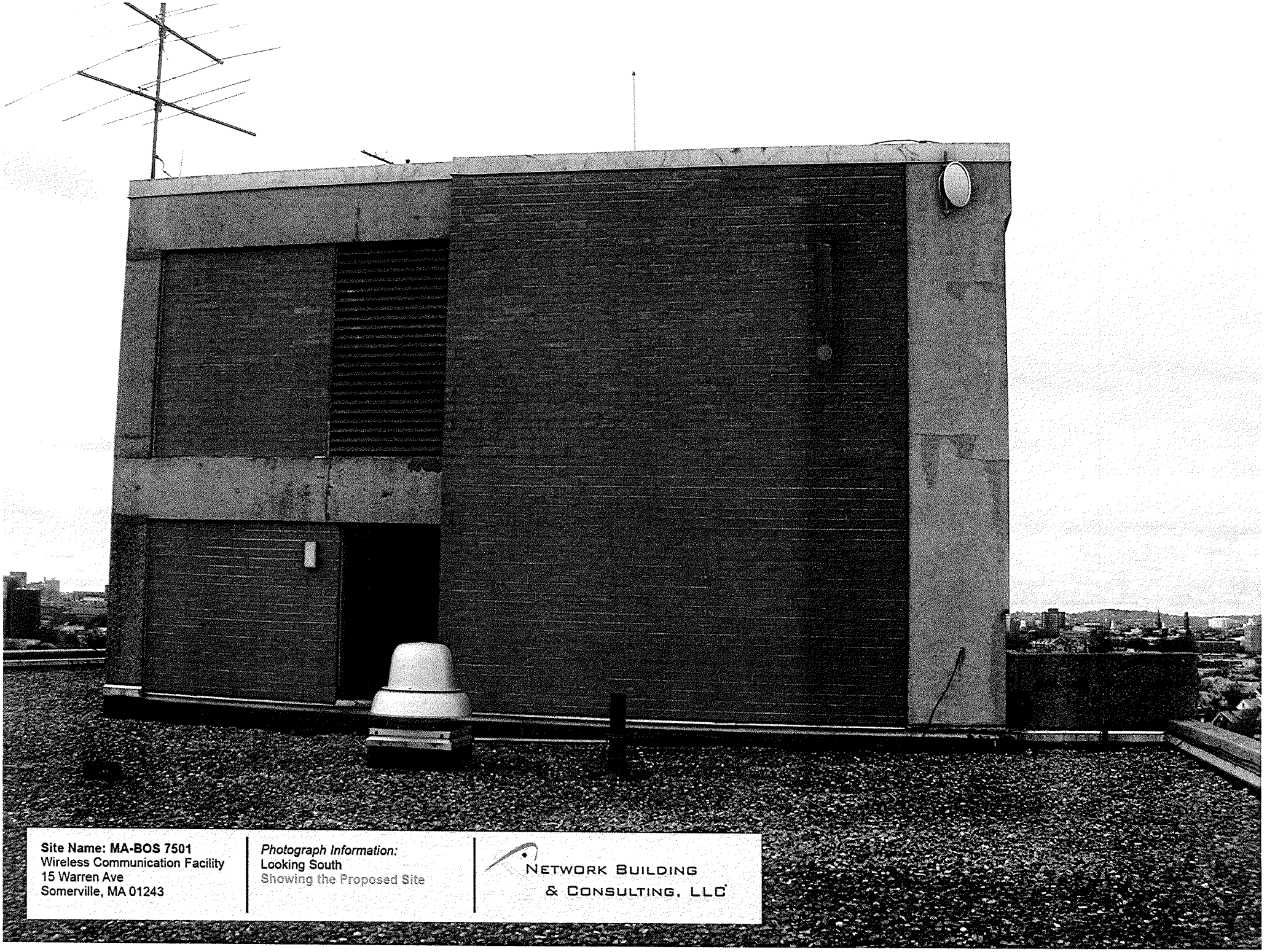
SOMERVILLE : 15 Warren Ave

Coverage from Proposed Site.

Legend
- Proposed site
- Future sites
- Reliable coverage

CLEARWIRE

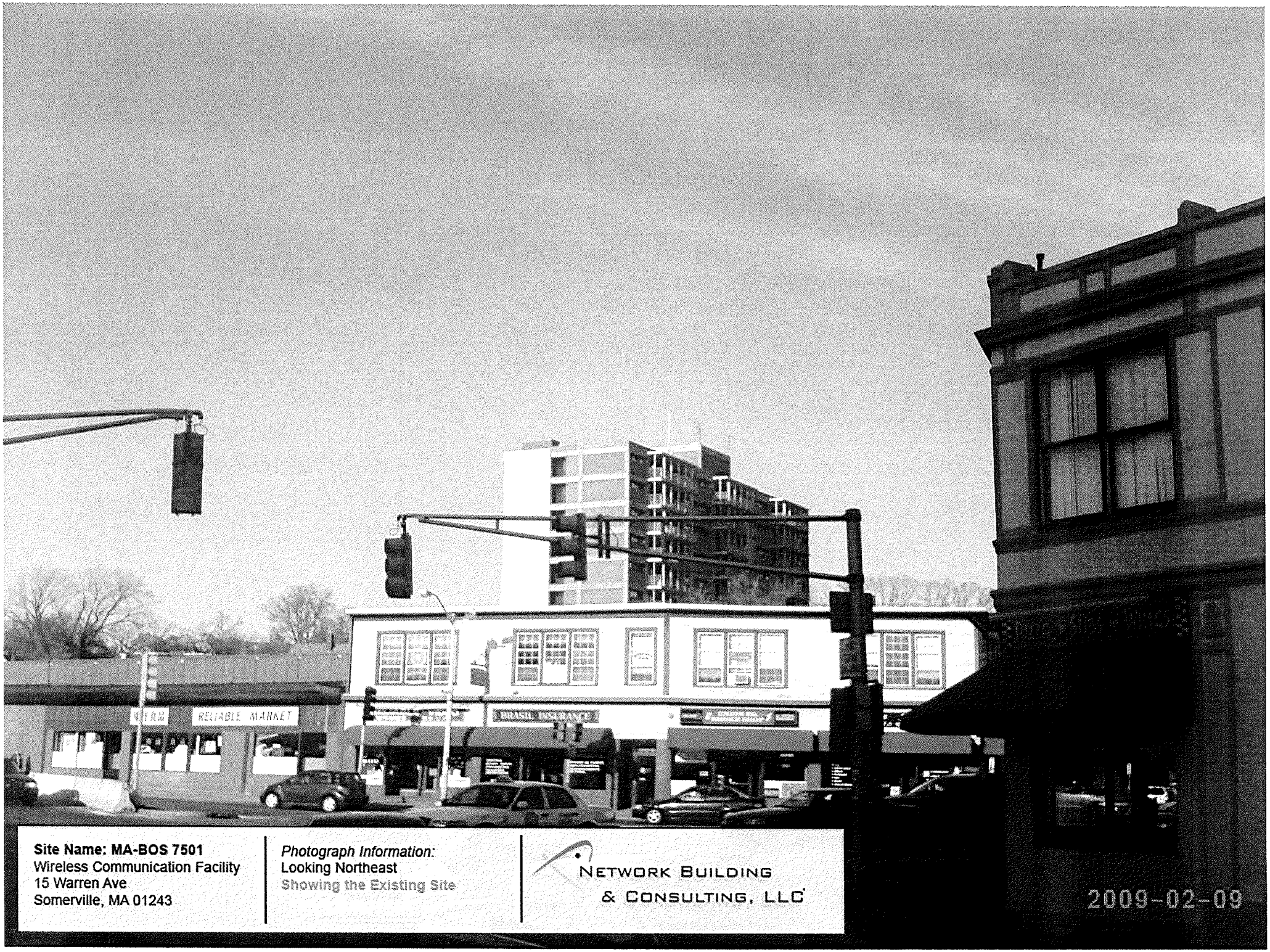




Site Name: MA-BOS 7501
Wireless Communication Facility
15 Warren Ave
Somerville, MA 01243

Photograph Information:
Looking South
Showing the Proposed Site

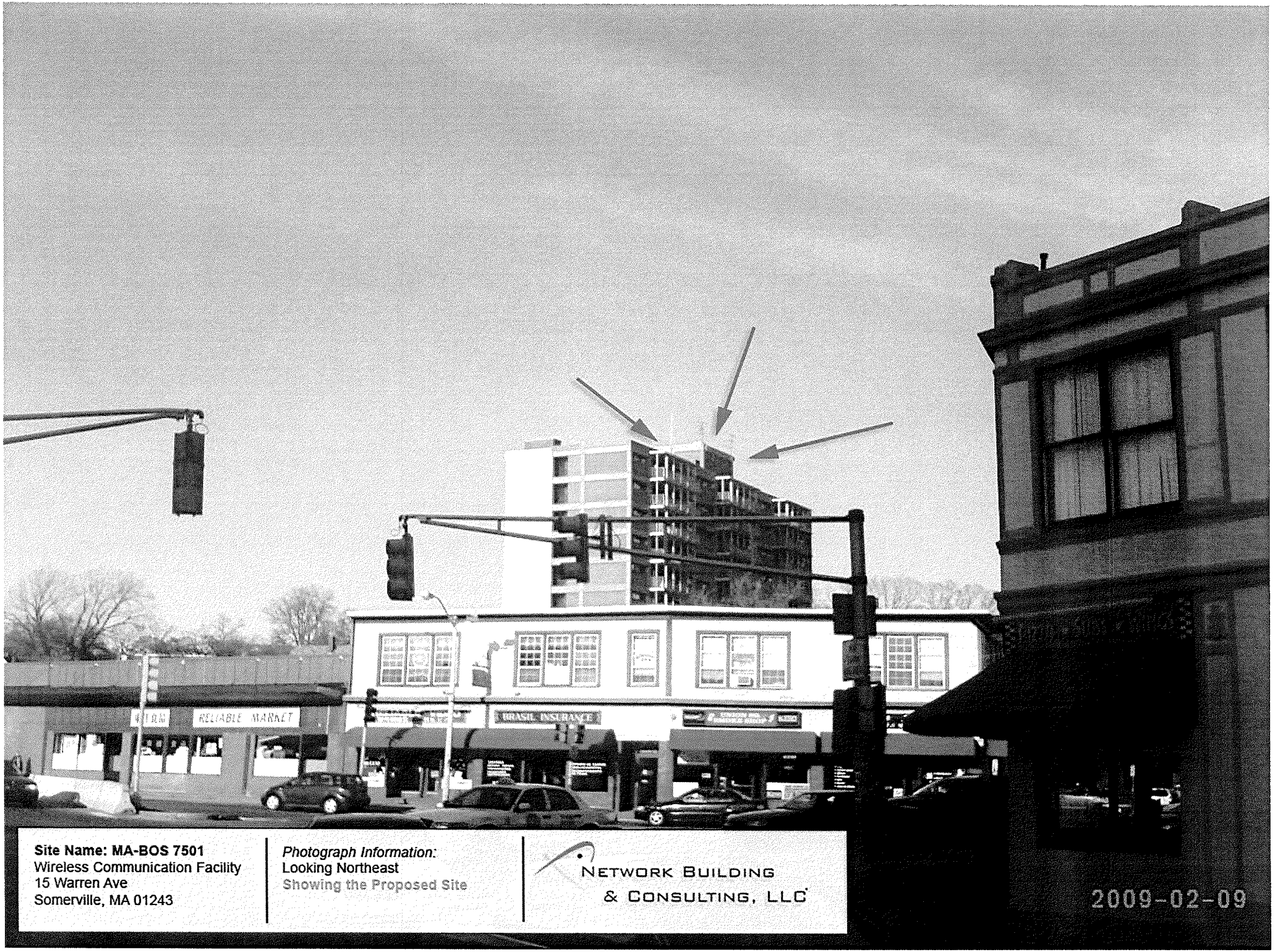
NETWORK BUILDING
& CONSULTING, LLC



Site Name: MA-BOS 7501
Wireless Communication Facility
15 Warren Ave
Somerville, MA 01243

Photograph Information:
Looking Northeast
Showing the Existing Site

NETWORK BUILDING
& CONSULTING, LLC

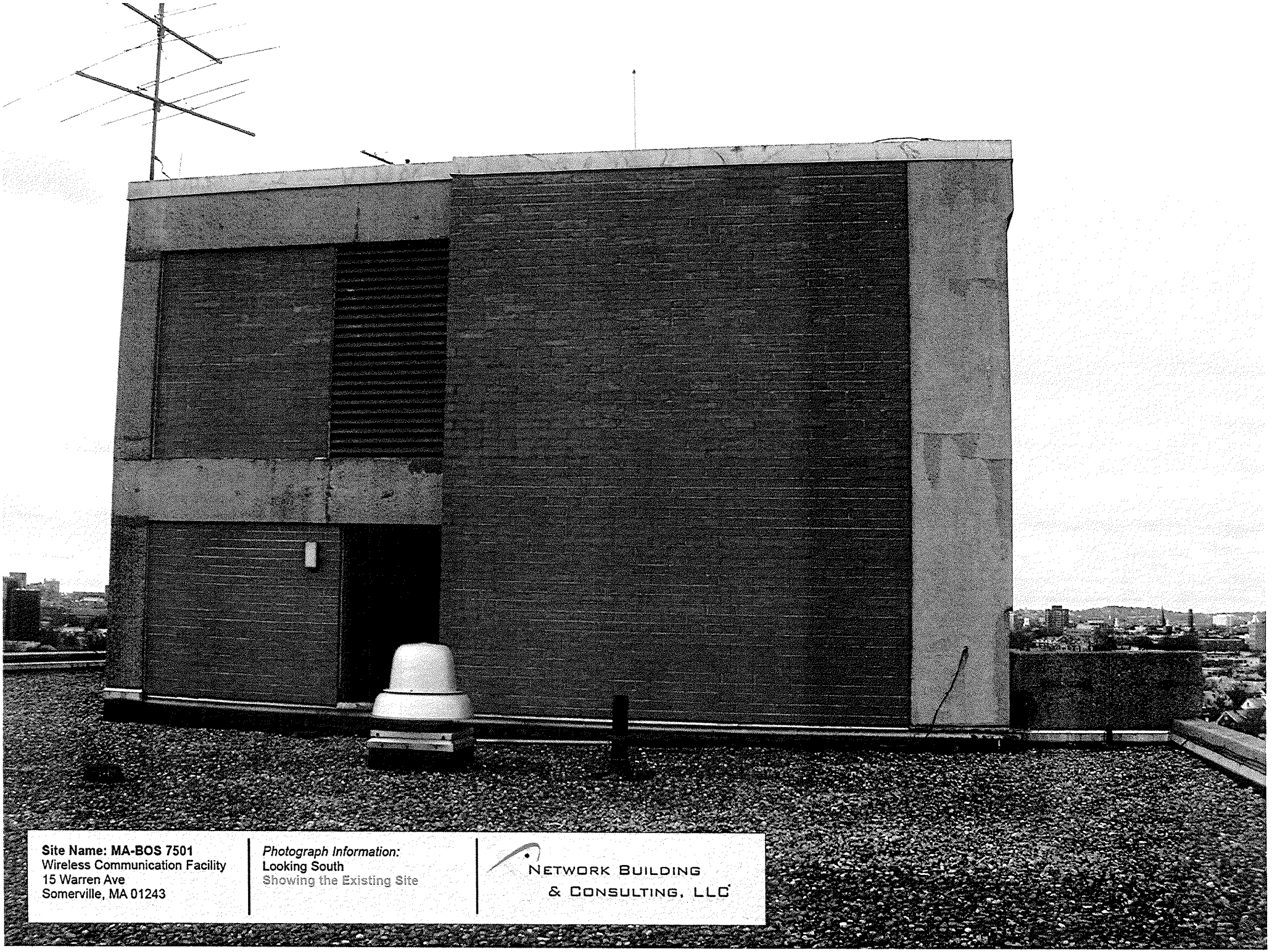


Site Name: MA-BOS 7501
Wireless Communication Facility
15 Warren Ave
Somerville, MA 01243

Photograph Information:
Looking Northeast
Showing the Proposed Site

NETWORK BUILDING
& CONSULTING, LLC

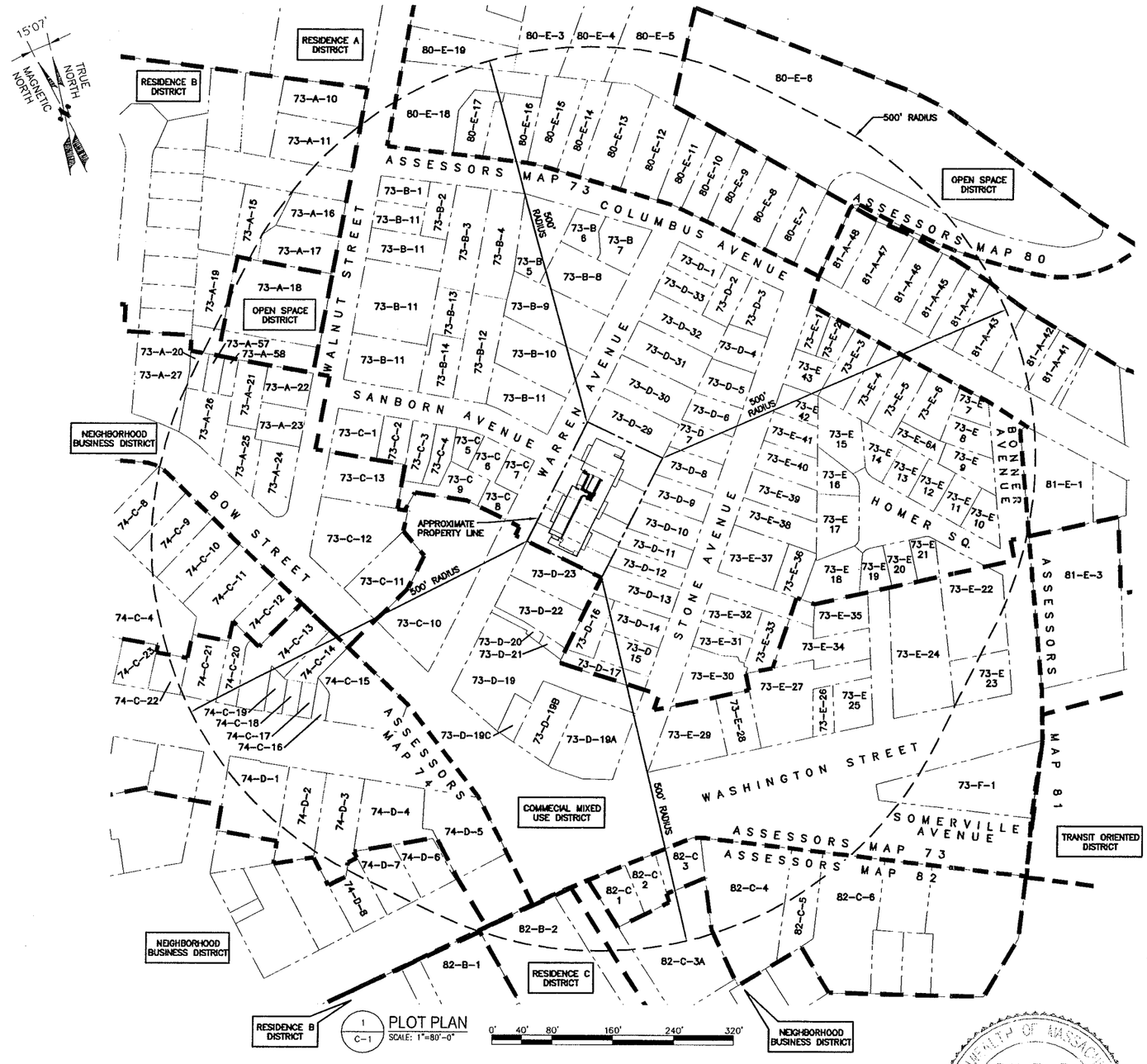
2009-02-09

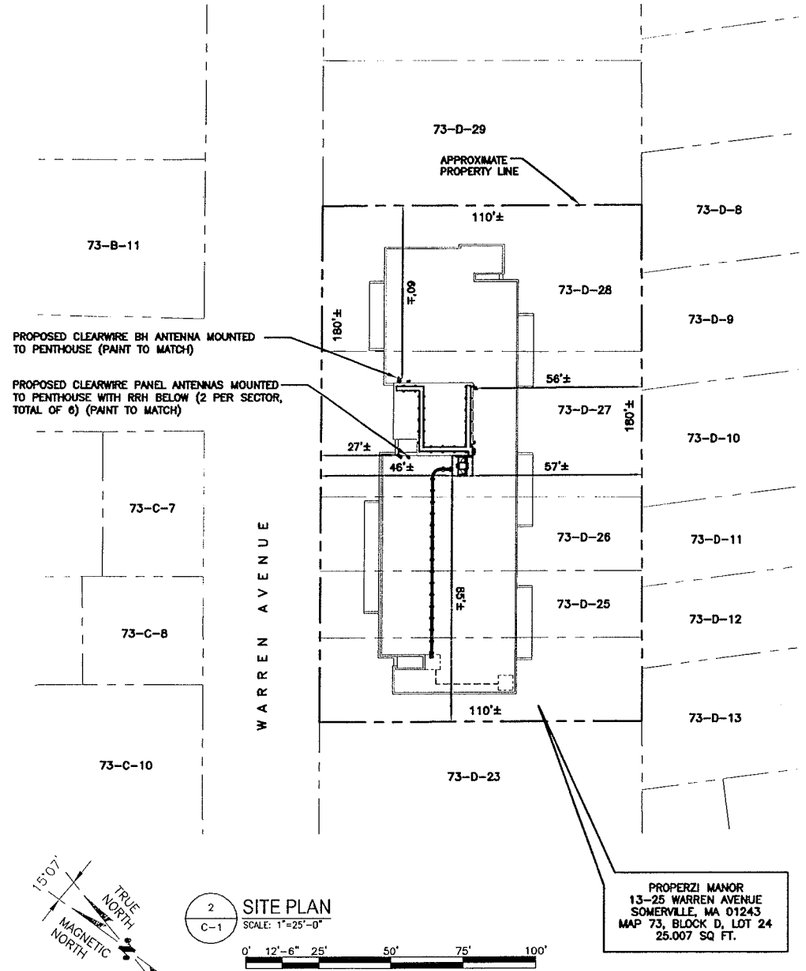


Site Name: MA-BOS 7501
Wireless Communication Facility
15 Warren Ave
Somerville, MA 01243

Photograph Information:
Looking South
Showing the Existing Site

NETWORK BUILDING
& CONSULTING, LLC





ZONING SUMMARY TABLE

ZONING DISTRICT: RESIDENTIAL A DISTRICT – 1/2 FAMILY
ASSESSORS MAP: MAP 73 BLOCK D LOT 24
PROPOSED USE: WIRELESS COMMUNICATION FACILITY

DIMENSION:	REQUIRED MINIMUM	PROPOSED ANTENNA	PROPOSED EQUIPMENT
LOT AREA	10,000 FT	N/A	49 SF
LOT FRONTAGE	50 FT	29'	29'
FRONT YARD SETBACK*	15 FT	27'±	46'±
SIDE YARD SETBACK*	7 FT	60'±	85'±
REAR YARD SETBACK*	20 FT	56'±	57'±

* DIMENSIONS MEASURED FROM THE CLOSEST POINT OF EQUIPMENT TO NEAREST LOT LINE.

SOURCE:
PLANS ASSEMBLED FROM CITY OF SOMERVILLE ASSESSING MAPS. ACCESSED ON 06/01/10.

COMMONWEALTH OF MASSACHUSETTS
DANIEL P. HAMM
No. 40726
REGISTERED PROFESSIONAL ENGINEER

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TEL: (978) 557-5553
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clear w're®
4400 CARILLON PT
KIRKLAND, WA 98033

SITE NUMBER: MA-BOS7501B
SITE NAME: WARREN AVE

15 WARREN AVENUE
SOMERVILLE, MA 01243

NO.	DATE	REVISIONS	BY	CHK	APP'D
0	08/31/10	ISSUED FOR CONSTRUCTION	DB	JX	DPH
A	06/01/10	ISSUED FOR CONSTRUCTION REVIEW	BR	JX	DPH

SCALE: AS SHOWN | DESIGNED BY: JX | DRAWN BY: BR

IF THE PLANS ARE PRINTED 24x36 THE SCALE IS 1:1
IF THE PLANS ARE PRINTED 11x17 THE SCALE IS 1:2

PLOT PLAN

JOB NUMBER	DRAWING NUMBER	REV
MA-BOS7501B	C-1	0

ANTENNA INFORMATION

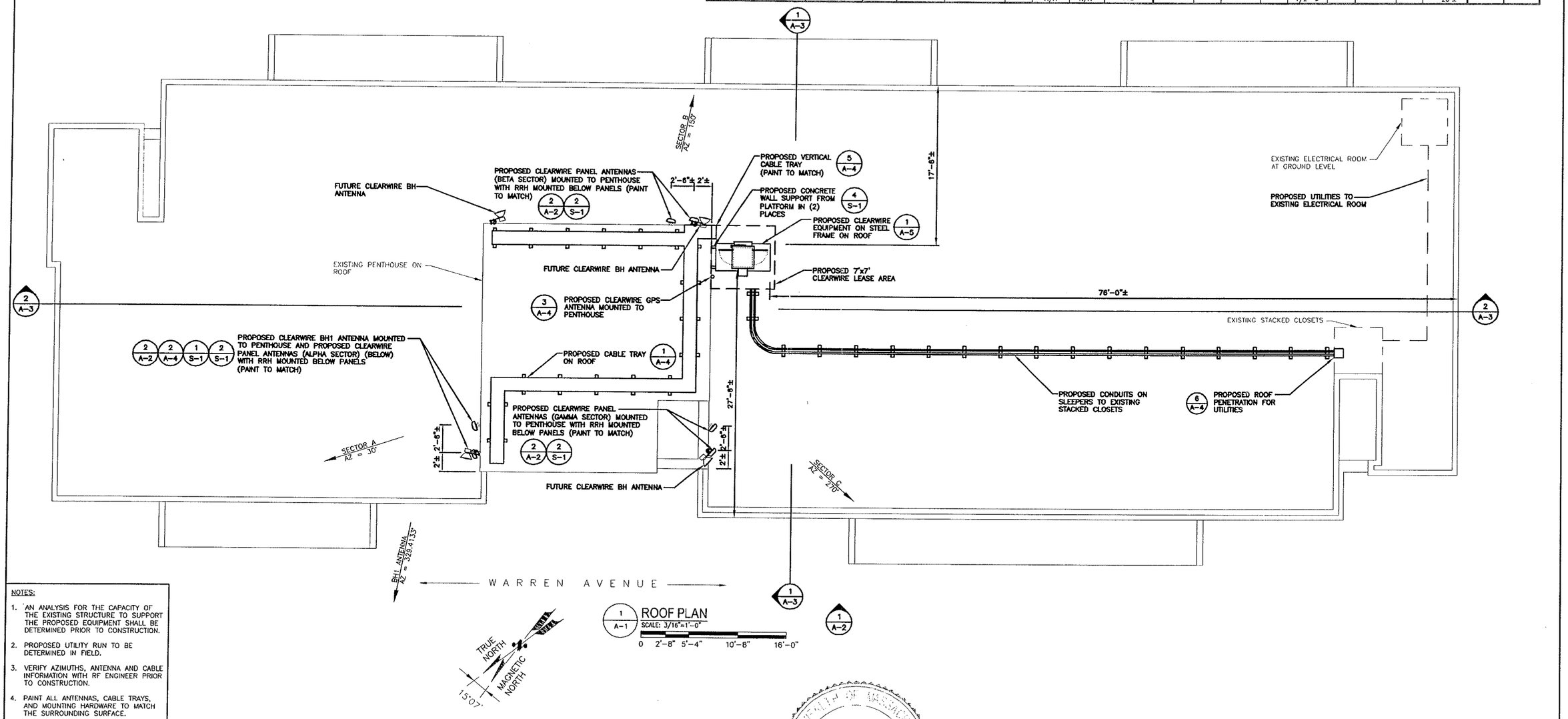
SECTOR	ANTENNA DIMENSION	FREQ. BAND	AZIMUTH	MAKER	MODEL	QTY.	MECH. DOWNTILT	ELEC. DOWNTILT	RAD CTR FT. AGL
A	42"Hx11.8"Wx4.5"D	2300-2700MHz	30°	ARGUS	LLPX310R	2	0	-2	114'-7"
B	42"Hx11.8"Wx4.5"D	2300-2700MHz	150°	ARGUS	LLPX310R	2	0	-2	114'-7"
C	42"Hx11.8"Wx4.5"D	2300-2700MHz	270°	ARGUS	LLPX310R	2	0	-2	114'-7"
1	1'ø BH ANT	80GHz	329.4133°	BRIDGEWAVE	E-BAND 80GHz	1	N/A	N/A	117'-4"
2	TBD	TBD	TBD	TBD	TBD	1	N/A	N/A	TBD
3	TBD	TBD	TBD	TBD	TBD	1	N/A	N/A	TBD
4	TBD	TBD	TBD	TBD	TBD	1	N/A	N/A	TBD
	1 GPS			PCTEL		1	N/A	N/A	118

CABLE INFORMATION

POWER CABLE		FIBER		COAXIAL IF		RET		CABLE LENGTH
SIZE	QTY.	SIZE	QTY.	SIZE	QTY.	SIZE	QTY.	
5/8" ø	1	1/4" ø	1			5/16" ø	1	78'±
5/8" ø	1	1/4" ø	1			5/16" ø	1	25'±
5/8" ø	1	1/4" ø	1			5/16" ø	1	52'±
				1/2" ø	1			78'±
				1/2" ø	1			TBD
				1/2" ø	1			TBD
				1/2" ø	1			TBD
				1/2" ø				20'±

JUMPERS

TYPE	LENGTH



NOTES:

1. AN ANALYSIS FOR THE CAPACITY OF THE EXISTING STRUCTURE TO SUPPORT THE PROPOSED EQUIPMENT SHALL BE DETERMINED PRIOR TO CONSTRUCTION.
2. PROPOSED UTILITY RUN TO BE DETERMINED IN FIELD.
3. VERIFY AZIMUTHS, ANTENNA AND CABLE INFORMATION WITH RF ENGINEER PRIOR TO CONSTRUCTION.
4. PAINT ALL ANTENNAS, CABLE TRAYS, AND MOUNTING HARDWARE TO MATCH THE SURROUNDING SURFACE.

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Daniel P Hamm

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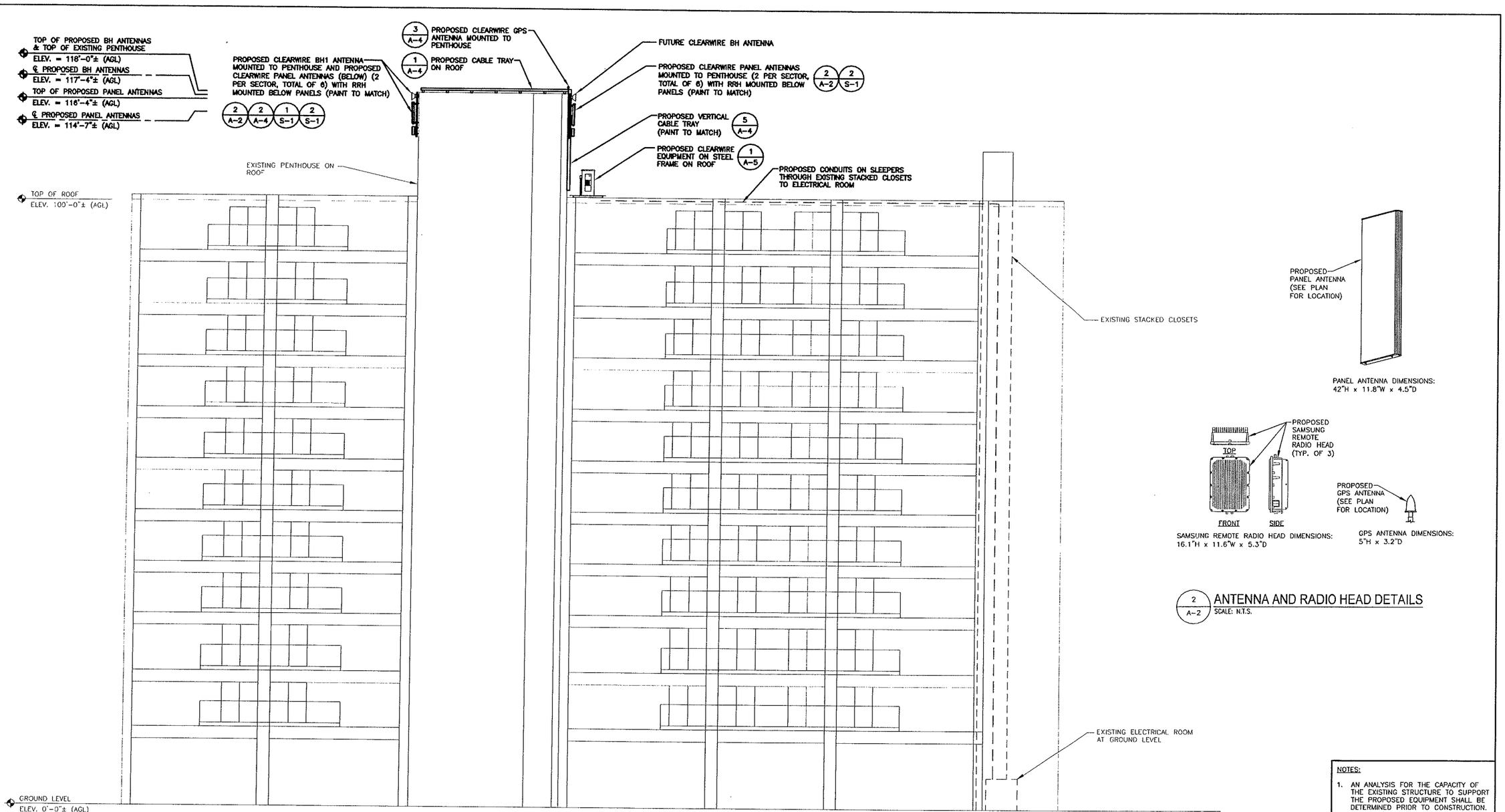
ROOF PLAN

JOB NUMBER	DRAWING NUMBER	REV
MA-BOS7501B	A-1	0



2 A-2 ANTENNA AND RADIO HEAD DETAILS
SCALE: N.T.S.

1 A-2 NORTHWEST ELEVATION
SCALE: 1/8"=1'-0"
0 4'-0" 8'-0" 16'-0" 24'-0"

NOTES:

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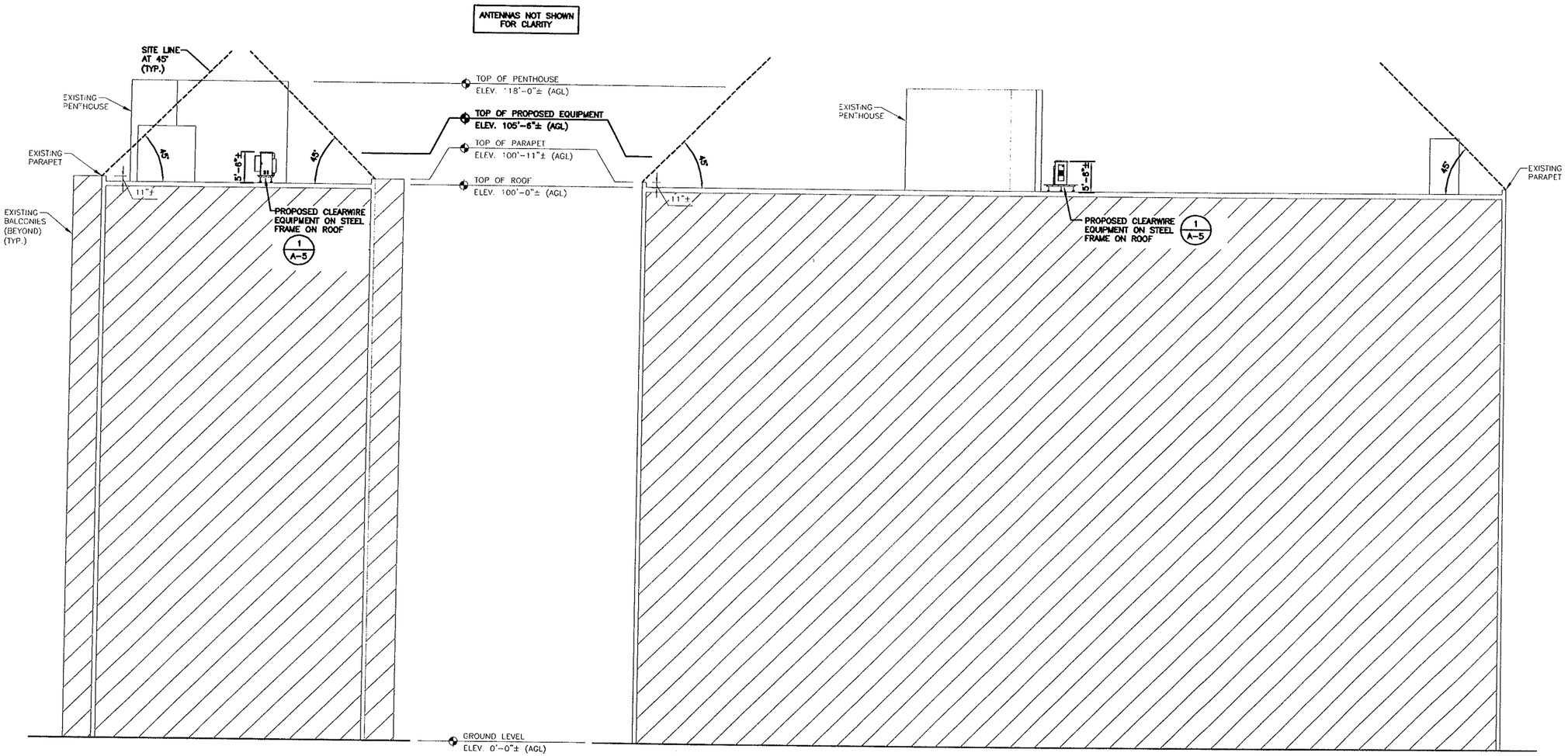
IF THE PLANS ARE PRINTED 11x17 THE SCALE IS 1:2

ELEVATION

JOB NUMBER	DRAWING NUMBER	REV
MA-BOS7501B	A-2	0



1 A-3 SOUTHWEST SECTION
SCALE: 1"=10'-0"
0 5'-0" 10'-0" 20'-0" 30'-0"

2 A-3 NORTHWEST SECTION
SCALE: 1"=10'-0"
0 5'-0" 10'-0" 20'-0" 30'-0"

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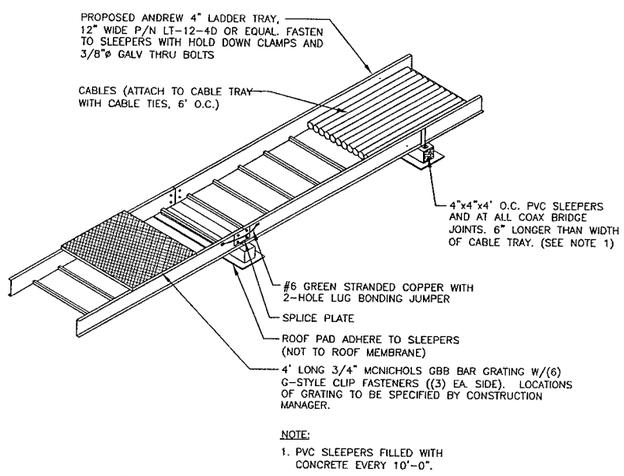
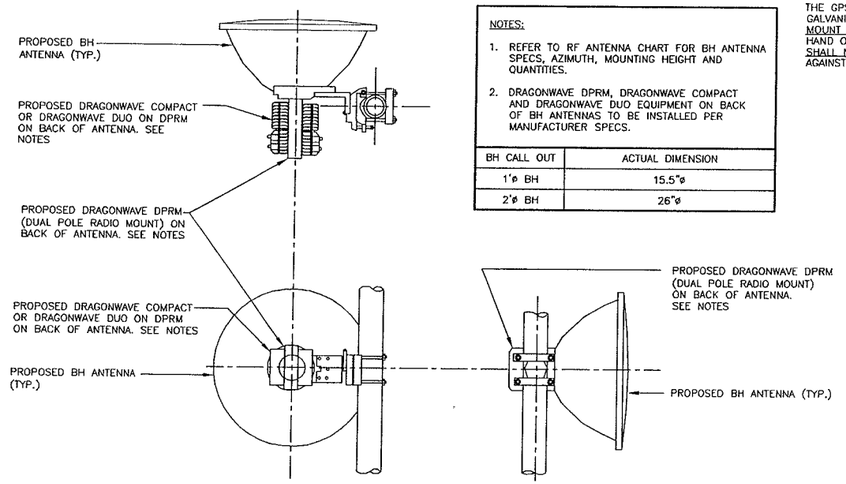
LINE OF SITE SECTIONS

JOB NUMBER	DRAWING NUMBER	REV
MA-BOS7501B	A-3	0



1 / A-4 CABLE TRAY DETAIL
SCALE: N.T.S.

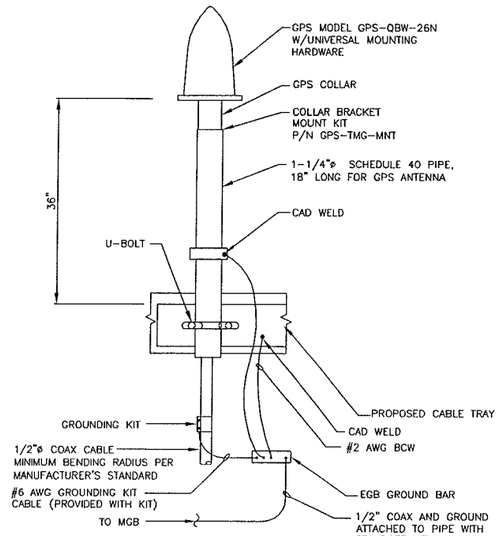


2 / A-4 BH ANTENNA DETAIL
SCALE: N.T.S.

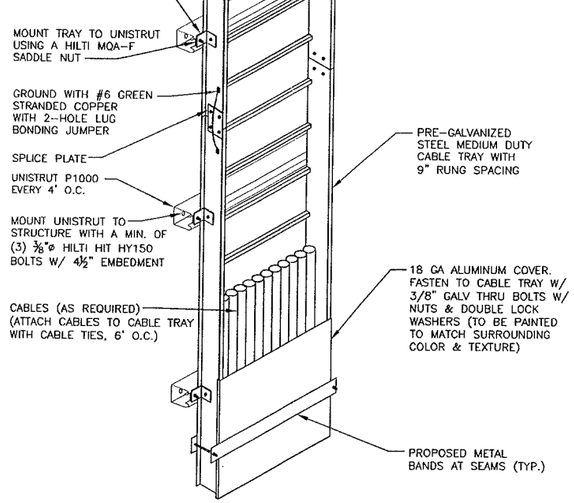
NOTES:
1. REFER TO RF ANTENNA CHART FOR BH ANTENNA SPECS, AZIMUTH, MOUNTING HEIGHT AND QUANTITIES.
2. DRAGONWAVE DPRM, DRAGONWAVE COMPACT AND DRAGONWAVE DUO EQUIPMENT ON BACK OF BH ANTENNAS TO BE INSTALLED PER MANUFACTURER SPECS.

BH CALL OUT	ACTUAL DIMENSION
1'ø BH	15.5"ø
2'ø BH	26"ø

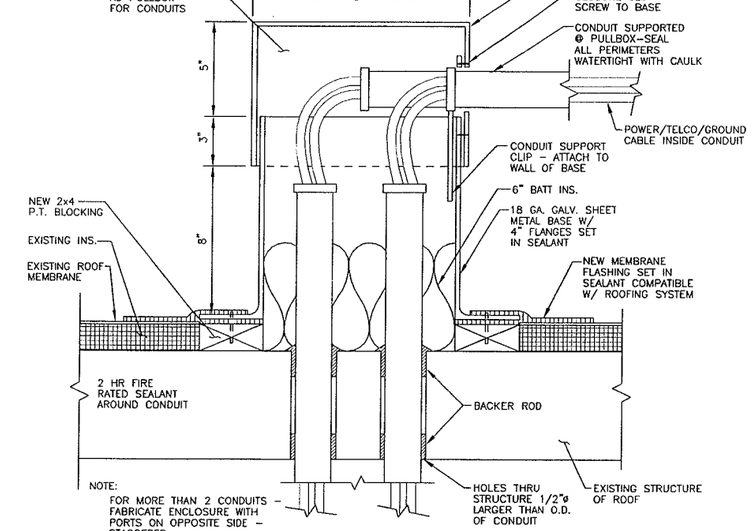
THE GPS ANTENNA MOUNT IS DESIGNED TO FASTEN TO A STANDARD 1-1/4" DIAMETER, SCHEDULE 40, GALVANIZED STEEL OR STAINLESS STEEL PIPE. THE PIPE MUST NOT BE THREADED AT THE ANTENNA MOUNT END. THE PIPE SHALL BE CUT TO THE REQUIRED LENGTH (MINIMUM OF 18 INCHES) USING A HAND OR ROTARY PIPE CUTTER TO ASSURE A SMOOTH AND PERPENDICULAR CUT. A HACK SAW SHALL NOT BE USED. THE CUT PIPE END SHALL BE DEBURRED AND SMOOTH IN ORDER TO SEAL AGAINST THE NEOPRENE GASKET ATTACHED TO THE ANTENNA MOUNT.



3 / A-4 GPS MOUNTED TO CABLE TRAY
SCALE: N.T.S.



5 / A-4 WALL MOUNTED CABLE TRAY DETAIL
SCALE: N.T.S.



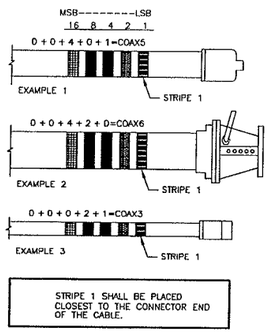
6 / A-4 CONDUIT PENETRATION THRU ROOF
SCALE: N.T.S.

SECTOR (PANEL ANTENNA and MW-BH DISH)	MARKING METHOD COLORED BANDS	MARKING METHOD NUMBER OF BANDS
ALPHA	RED	1
BETA	BLUE	1
GAMMA	YELLOW	1
BH 1	GRAY	1
BH 2	GRAY	2
BH 3	GRAY	3
BH 4	GRAY	4
GPS	YELLOW and BLUE	1 and 1

LABEL MARKINGS SHALL BE PLACED AT:

1. WITHIN 12" OF CABLE AT BOTH ENDS.
2. AT/NEAR TOWER MCB
3. EITHER PRIOR TO ENTRY INTO THE CABINET FOR A CABLE SUPPORT BRIDGE

* COORDINATE BACKHAUL INSTALLATION WITH FINAL ENGS.



NOTE: STRIPE 1 SHALL BE PLACED CLOSEST TO THE CONNECTOR END OF THE CABLE.

4 / A-4 CLEARWIRE ANTENNA INFORMATION & COLOR CODING
SCALE: N.T.S.

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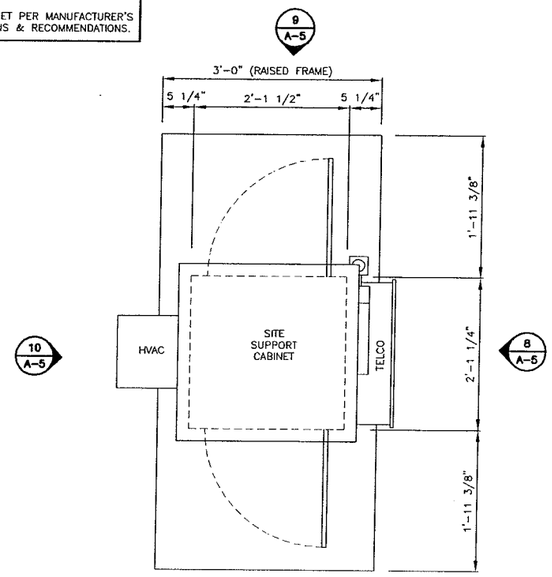
SECTIONS & DETAILS

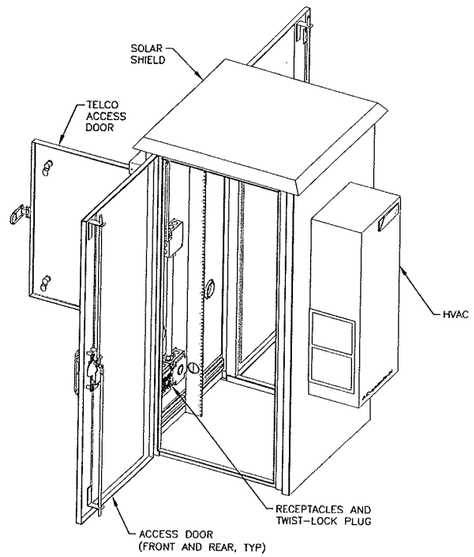
JOB NUMBER	DRAWING NUMBER	REV
MA-BOS7501B	A-4	0

NOTE:

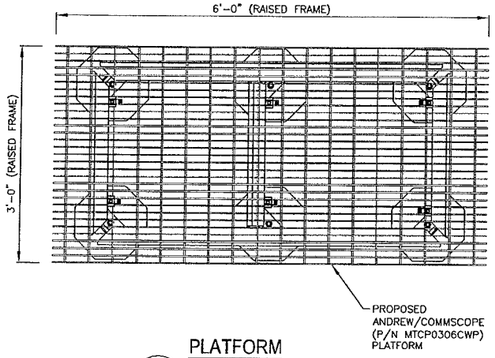
MOUNT CABINET PER MANUFACTURER'S SPECIFICATIONS & RECOMMENDATIONS.



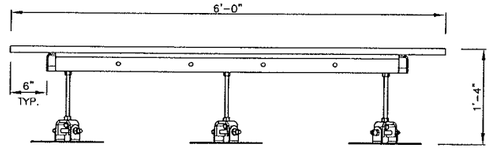
1 A-5 EQUIPMENT PLAN
SCALE: 1"=1'-0"
0 0'-6" 1'-0" 2'-0" 3'-0"



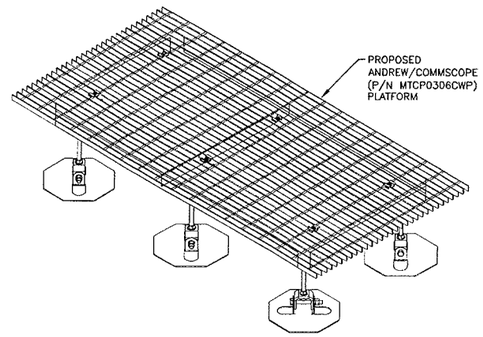
2 A-5 WIMAX CABINET ISOMETRIC VIEW
SCALE: N.T.S.



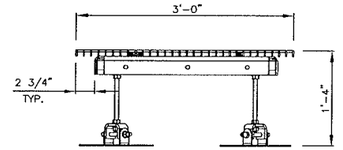
3 A-5 PLATFORM PLAN VIEW
SCALE: 1"=1'-0"
0 0'-6" 1'-0" 2'-0" 3'-0"



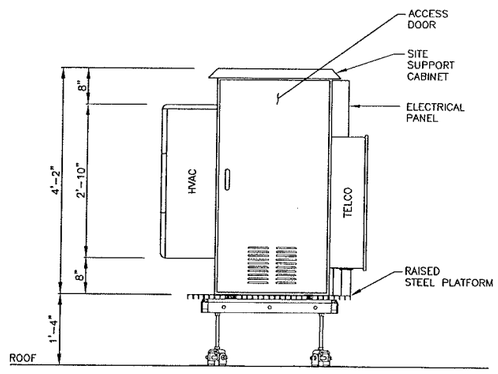
4 A-5 PLATFORM FRONT/REAR VIEW
SCALE: 1"=1'-0"
0 0'-6" 1'-0" 2'-0" 3'-0"



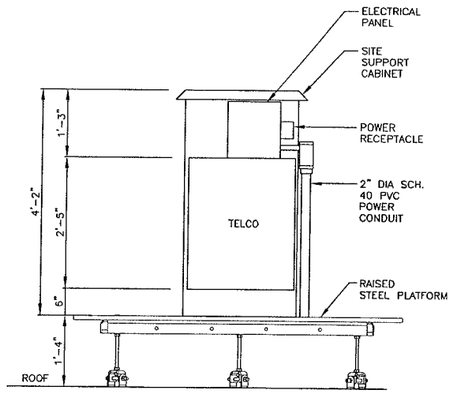
5 A-5 PLATFORM ISOMETRIC VIEW
SCALE: N.T.S.



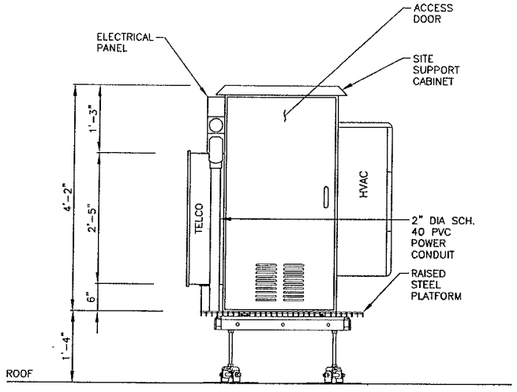
6 A-5 PLATFORM SIDE VIEW
SCALE: 1"=1'-0"
0 0'-6" 1'-0" 2'-0" 3'-0"



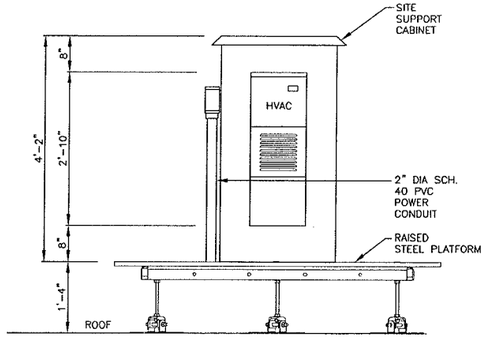
7 A-5 EQUIPMENT ELEVATION
SCALE: 3/4"=1'-0"
0 0'-8" 1'-4" 2'-8" 4'-0"



8 A-5 EQUIPMENT ELEVATION
SCALE: 3/4"=1'-0"
0 0'-8" 1'-4" 2'-8" 4'-0"



9 A-5 EQUIPMENT ELEVATION
SCALE: 3/4"=1'-0"
0 0'-8" 1'-4" 2'-8" 4'-0"



10 A-5 EQUIPMENT ELEVATION
SCALE: 3/4"=1'-0"
0 0'-8" 1'-4" 2'-8" 4'-0"

FOR REFERENCE ONLY

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CABINET & EQUIPMENT FRAME DETAILS

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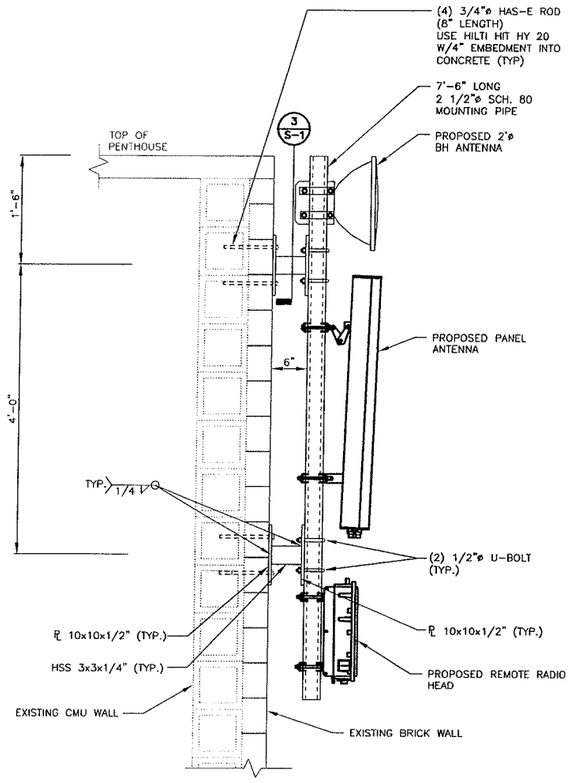
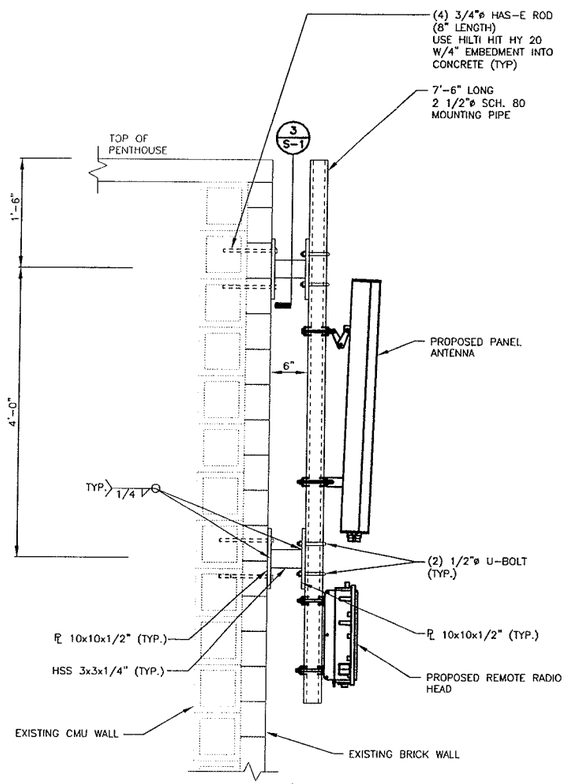
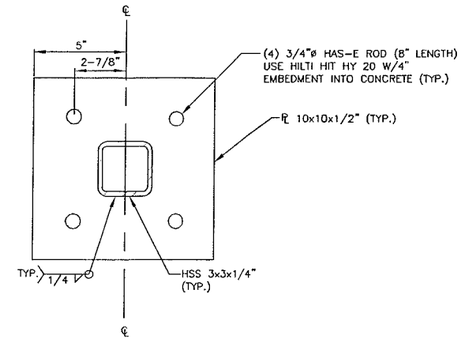
MA-BOS7501B	A-5	0



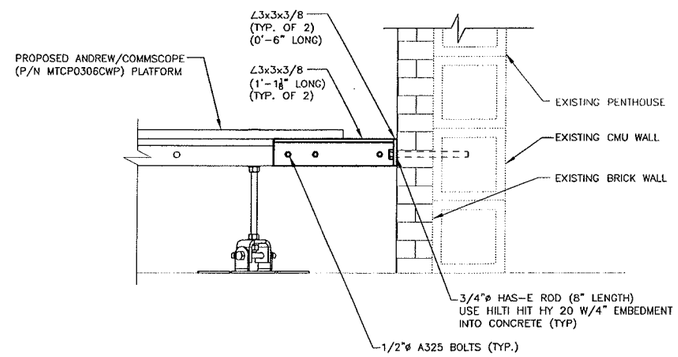
1 S-1 ANTENNA MOUNTING DETAIL
SCALE: 1"=1'-0"
0 0'-6" 1'-0" 2'-0" 3'-0"



2 S-1 ANTENNA MOUNTING DETAIL
SCALE: 1"=1'-0"
0 0'-6" 1'-0" 2'-0" 3'-0"



3 S-1 PLATE DETAIL
SCALE: 3"=1'-0"
0 0'-2" 0'-4" 0'-8" 1'-0"



4 S-1 SUPPORT DETAIL
SCALE: N.T.S.

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SITE NUMBER: MA-BOS7501B
SITE NAME: WARREN AVE

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SOMERVILLE, MA 01243

COMMONWEALTH OF MASSACHUSETTS
DANIEL P. HAMM
No. 40726
REGISTERED PROFESSIONAL ENGINEER

NO.	DATE	REVISIONS	BY	CHK	APP'D
0	08/31/10	ISSUED FOR CONSTRUCTION	DB	JX	DPH
A	06/01/10	ISSUED FOR CONSTRUCTION REVIEW	BR	JX	DPH

SCALE: AS SHOWN | DESIGNED BY: JX | DRAWN BY: BR

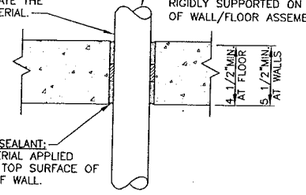
IF THE PLANS ARE PRINTED 24x36 THE SCALE IS 1:1
IF THE PLANS ARE PRINTED 11x17 THE SCALE IS 1:2

STRUCTURAL DETAILS

JOB NUMBER	DRAWING NUMBER	REV
MA-BOS7501B	S-1	0

PACKING MATERIAL: MIN 1-1/2 in. THICKNESS OF MIN 6 pcf MINERAL WOOL BATT INSULATION FIRMLY PACKED INTO OPENING AS A PERMANENT FORM. PACKING MATERIAL TO BE RECESSED FROM TOP SURFACE OF FLOOR OR FROM BOTH SURFACES OF WALL AS REQUIRED TO ACCOMMODATE THE REQUIRED THICKNESS OF FILL MATERIAL.

ONE 2"ø SCHEDULE 40 PVC PIPE TO BE CENTERED WITHIN FIRESTOP SYSTEM. A NOM. ANNULAR SPACE OF 5/16" IS REQUIRED WITHIN THE FIRESTOP SYSTEM PIPE SHALL BE RIGIDLY SUPPORTED ON BOTH SIDES OF WALL/FLOOR ASSEMBLY

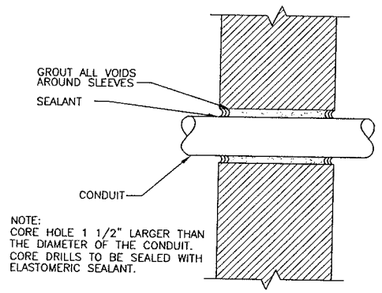


FILL, VOID OR CAVITY MATERIAL – SEALANT:
MIN 2 in. THICKNESS OF FILL MATERIAL APPLIED WITHIN ANNULUS, FLUSH WITH THE TOP SURFACE OF FLOOR OR WITH BOTH SURFACES OF WALL.

SPECIFIED TECHNOLOGIES INC:
SPECSEAL SERIES SSS SEALANT OR SPECSEAL LCI SEALANT.

UL SYSTEM NUMBER: C-AJ-2057
F RATING - 2 HR.

PVC CONDUIT PENETRATION DETAIL IN CONCRETE OR MASONRY

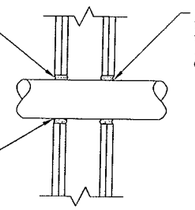


NOTE:
CORE HOLE 1 1/2" LARGER THAN THE DIAMETER OF THE CONDUIT. CORE DRILLS TO BE SEALED WITH ELASTOMERIC SEALANT.

PIPE AND CONDUIT PENETRATION DETAIL IN NON-RATED PARTITION

PACKING MATERIAL: MIN. 1 in. THICKNESS OF MIN. 3.5 pcf FIBERGLASS INSULATION SHALL BE WRAPPED AROUND THE THROUGH-PENETRANT AND SECURED TOGETHER BY MEANS OF NO. 24 AWG STEEL TIE WIRE. PACKING MATERIAL SHALL BE CENTERED AT MID-DEPTH OF OPENING AND RECESSED FROM BOTH SURFACES OF WALL ASSEMBLY REQUIRED TO ACCOMMODATE THE REQUIRED THICKNESS OF FILL MATERIAL.

FILL, VOID OR CAVITY MATERIAL – CAULK OR PUTTY:
IN 2 HR FIRE RATED ASSEMBLIES MIN 3/4 IN. THICKNESS FILL MATERIAL APPLIED WITHIN THE ANNULUS, FLUSH BOTH SURFACES OF WALL. ADDITIONAL FILL MATERIAL TO BE INSTALLED SUCH THAT A MIN 1/4 in. CROWN IS FORMED AROUND THE PENETRATING ITEM. IN 1 HR FIRE RATED ASSEMBLIES, MIN 5/8 in. THICKNESS OF FILL MATERIAL APPLIED WITHIN ANNULUS ON BOTH SURFACES OF WALL. ADDITIONAL FILL MATERIAL TO BE INSTALLED SUCH THAT A MIN 3/8 in. CROWN IS FORMED AROUND THE PENETRATING ITEM AND LAPPING 1 in. BEYOND THE PERIPHERY OF THE OPENING.



ONE 2"ø METALLIC PIPE OR CONDUIT TO BE CENTERED WITHIN FIRESTOP SYSTEM. PIPE SHALL BE RIGIDLY SUPPORTED ON BOTH SIDES OF WALL/FLOOR ASSEMBLY

SPECIFIED TECHNOLOGIES INC:
SPECSEAL SERIES SSS SEALANT,
SPECSEAL LCI SEALANT OR SPECSEAL PUTTY.

UL SYSTEM NUMBER: W-L-1029
F RATING - 1 & 2 HR.

PIPE AND CONDUIT PENETRATION DETAIL IN GYPSUM WALLBOARD

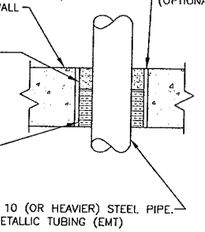
ALL CORES THROUGH ELECTRIC ROOMS TO BE FIRE-STOPPED.

USE FULL CONDUIT RUNS THROUGH PENETRATIONS

MAXIMUM PIPE DIAMETER (%)	MAXIMUM EMT	ANNULAR SPACE (in.)	FORMING MATERIAL THICKNESS (in.)	MINIMUM SEALANT THICKNESS (in.)	F RATING (HOURS)	T RATING (HOURS)
1-1/2	–	3/8 TO 2-1/8	2-1/2	2	3	1
6	4	3/8 TO 3/4	3-1/2	1	3	0
6	4	3/8 TO 1	2-1/2	2	3	0

CONCRETE FLOOR OR WALL ASSEMBLY, MINIMUM 4-1/2 in. THICKNESS FLOOR/ MINIMUM 6-1/2 in. WALL

STEEL SLEEVE (OPTIONAL)



TYPE AS OR TYPE SS:
MINIMUM THICKNESS OF SEALANT AS SPECIFIED IN THE TABLE BELOW, APPLIED WITHIN THE OPENING, FLUSH WITH THE TOP SURFACE OF THE FLOOR OR BOTH SURFACES OF THE WALL.

FORMING MATERIAL:
MINERAL WOOL INSULATION (MINIMUM 4.0 pcf) FIRMLY PACKED INTO THE OPENING AS A PERMANENT FORM; SEE TABLE FOR MINIMUM REQUIRED THICKNESS

METALLIC PIPE:
STEEL PIPE: 6"ø (OR SMALLER) SCHEDULE 10 (OR HEAVIER) STEEL PIPE.
CONDUIT: 4"ø (OR SMALLER) ELECTRICAL METALLIC TUBING (EMT) OR 6"ø RIGID STEEL CONDUIT.

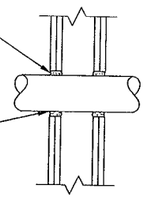
UL SYSTEM NUMBER: C-AJ-1020
F RATING - 3 HR.

PIPE AND CONDUIT PENETRATION DETAIL IN CONCRETE OR MASONRY

WALL HR	MAX DIAM OF THROUGH PENETRANT in.	T RATING HR
1	2	1
1	1-1/4	1
2	2	1
2	1-1/4	1 1/2

THE HOURLY F RATING OF THE FIRESTOP SYSTEM IS EQUAL TO THE HOURLY FIRE RATING OF THE WALL ASSEMBLY IN WHICH IT IS INSTALLED.

THROUGH PENETRANTS: ONE 2"ø NONMETALLIC PIPE, CONDUIT OR RACEWAY TO BE CENTERED WITHIN THE FIRESTOP SYSTEM. A NOM ANNULAR SPACE OF 5/16 in. IS REQUIRED WITHIN THE FIRESTOP SYSTEM. PIPE, CONDUIT OR RACEWAY TO BE RIGIDLY SUPPORTED ON BOTH SIDES OF THE FLOOR OR WALL ASSEMBLY.



FILL, VOID OR CAVITY MATERIAL – SEALANT:
MIN 5/8 in. THICKNESS OF FILL MATERIAL APPLIED WITHIN ANNULUS, FLUSH WITH BOTH SURFACES OF WALL. ADDITIONAL FILL MATERIAL TO BE INSTALLED SUCH THAT A MIN 1/4 in. THICK CROWN IS FORMED AROUND THE PENETRATING ITEM AND LAPPING 1 in. BEYOND THE PERIPHERY OF THE OPENING.

SPECIFIED TECHNOLOGIES INC:
SPECSEAL SERIES SSS SEALANT,
SPECSEAL LCI SEALANT.

UL SYSTEM NUMBER: W-L-2093
F RATING - 1 & 2 HR.

PVC CONDUIT PENETRATION DETAIL IN GYPSUM WALLBOARD

(1/E-1) PENETRATION DETAILS
SCALE: NTS

LEGEND:

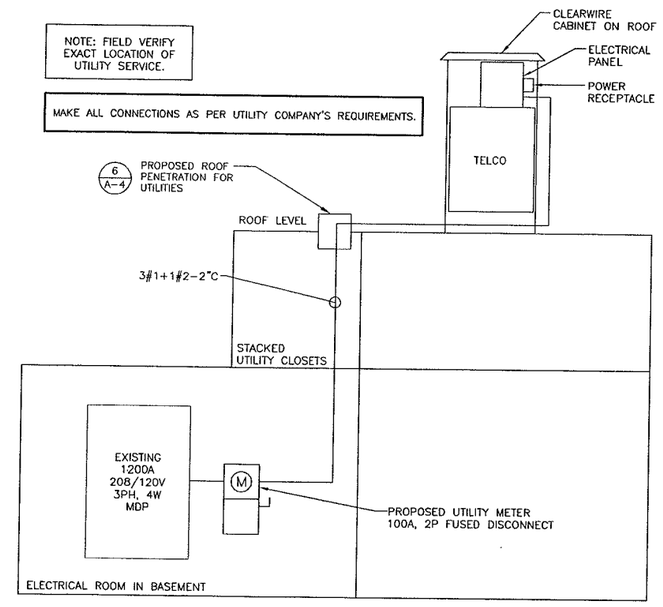
- GROUND TEST WELL
- GROUND ROD
- DISCONNECT SWITCH
- METER
- CADWELD TYPE CONNECTION
- COMPRESSION TYPE CONNECTION
- GROUNDING WIRE
- XXX / XXX — REPRESENTS DETAIL NUMBER / REF. DRAWING NUMBER

ABBREVIATIONS:

AWG	AMERICAN WIRE GAUGE
BCW	BARE COPPER WIRE
CGBE	COAX GROUND BAR EXTERNAL
CIGBE	COAX ISOLATED GROUND BAR EXTERNAL
DWG	DRAWING
EMT	ELECTRICAL METALLIC TUBING
MGB	MASTER GROUND BAR
PCS	PERSONAL COMMUNICATION SYSTEM
PVC	RIGID (SCH. 40) POLYVINYL CHLORIDE CONDUIT
RGS	RIGID GALVANIZED STEEL
RWY	RACEWAY
TYP	TYPICAL

NOTE: FIELD VERIFY EXACT LOCATION OF UTILITY SERVICE.

MAKE ALL CONNECTIONS AS PER UTILITY COMPANY'S REQUIREMENTS.



(2/E-1) ONE LINE DIAGRAM
SCALE: N.T.S.

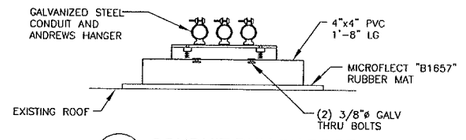
ELECTRICAL AND GROUNDING NOTES:

ELECTRICAL

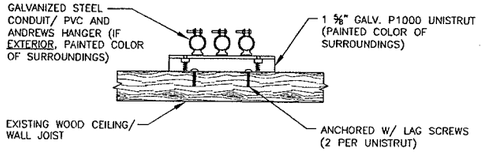
1. ALL ELECTRICAL WORK SHALL BE PERFORMED IN ACCORDANCE WITH THE PROJECT SPECIFICATIONS AND ALL APPLICABLE LOCAL CODES.
2. CONDUIT ROUTINGS ARE SCHEMATIC. SUBCONTRACTOR SHALL INSTALL CONDUITS SO THAT ACCESS TO EQUIPMENT IS NOT BLOCKED.
3. SERVICE TO EQUIP. SHALL BE 120/240 VAC, 100 AMP, 1ø, 60 Hz.
4. THE SUBCONTRACTOR IS RESPONSIBLE FOR PROPERLY SEQUENCING GROUNDING AND UNDERGROUND CONDUIT INSTALLATION AS TO PREVENT ANY LOSS OF CONTINUITY IN THE GROUNDING SYSTEM OR DAMAGE TO THE CONDUIT.
5. CONTRACTOR TO PERFORM A 30 DAY LOAD STUDY USING A TRUE RMS METER PER NEC 220.87 TO DETERMINE ADDITIONAL SPARE CAPACITY ON EXISTING PANEL. EXISTING PLUS NEW LOAD SHALL NOT EXCEED CAPACITY OF EXISTING PANEL. NOTIFY HDG IN CASE OF DISCREPANCY.

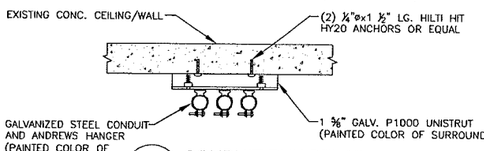
GROUNDING

1. COMPRESSION GROUND CONNECTIONS MAY BE REPLACED BY EXOTHERMIC (CADWELD) CONNECTIONS.
2. ALL GROUND CONNECTIONS BELOW GRADE SHALL BE EXOTHERMIC (CADWELD).
3. ALL GROUND CONNECTIONS ABOVE GRADE (INTERIOR & EXTERIOR) SHALL BE FORMED USING HIGH PRESS CRIMPS.
4. ALL EXOTHERMIC CONNECTIONS TO THE GROUND RODS SHALL START AT THE TOP & HAVE A VERTICAL SEPARATION OF 6" FOR EVERY ADDITIONAL CONNECTION.
6. ALL EXTERIOR GROUND CONNECTIONS SHALL BE COATED WITH A CORROSION RESISTANT MATERIAL.
7. ALL EXTERIOR GROUND CONDUCTORS SHALL BE #2 AWG SOLID TINNED COPPER UNLESS OTHERWISE INDICATED.
8. GROUND RODS SHALL BE COPPER CLAD STEEL, 5/8"ø 10-FT. LONG, AND SHALL BE DRIVEN VERTICALLY WITH THEIR TOPS 48" BELOW FINAL GRADE.
9. CONNECTIONS TO THE GROUND BUS SHALL NOT BE DOUBLED UP OR STACKED. BACK TO BACK CONNECTIONS ON OPPOSITE SIDES OF THE GROUND BUS ARE PERMITTED.
10. USE OF 90° BENDS IN THE PROTECTION GROUNDING CONDUCTORS SHALL BE AVOIDED WHEN 45° BENDS CAN BE ADEQUATELY SUPPORTED.
11. MAXIMUM RESISTANCE OF THE COMPLETED GROUND SYSTEM SHALL NOT EXCEED 5 OHMS. TESTING SHALL BE PERFORMED IN ACCORDANCE WITH PROJECT SPECIFICATION FOR FACILITY GROUNDING, USING FALL OF POTENTIAL METHOD.
11. ALL GROUND BARS SHALL BE TINNED COPPER.



(3/E-1) CONDUIT RUN ON ROOF
SCALE: N.T.S.





(4/E-1) CONDUIT RUN DETAIL
SCALE: N.T.S.

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COMMONWEALTH OF MASSACHUSETTS — DANIEL P. HAMM — No. 24072 — REGISTERED PROFESSIONAL ENGINEER

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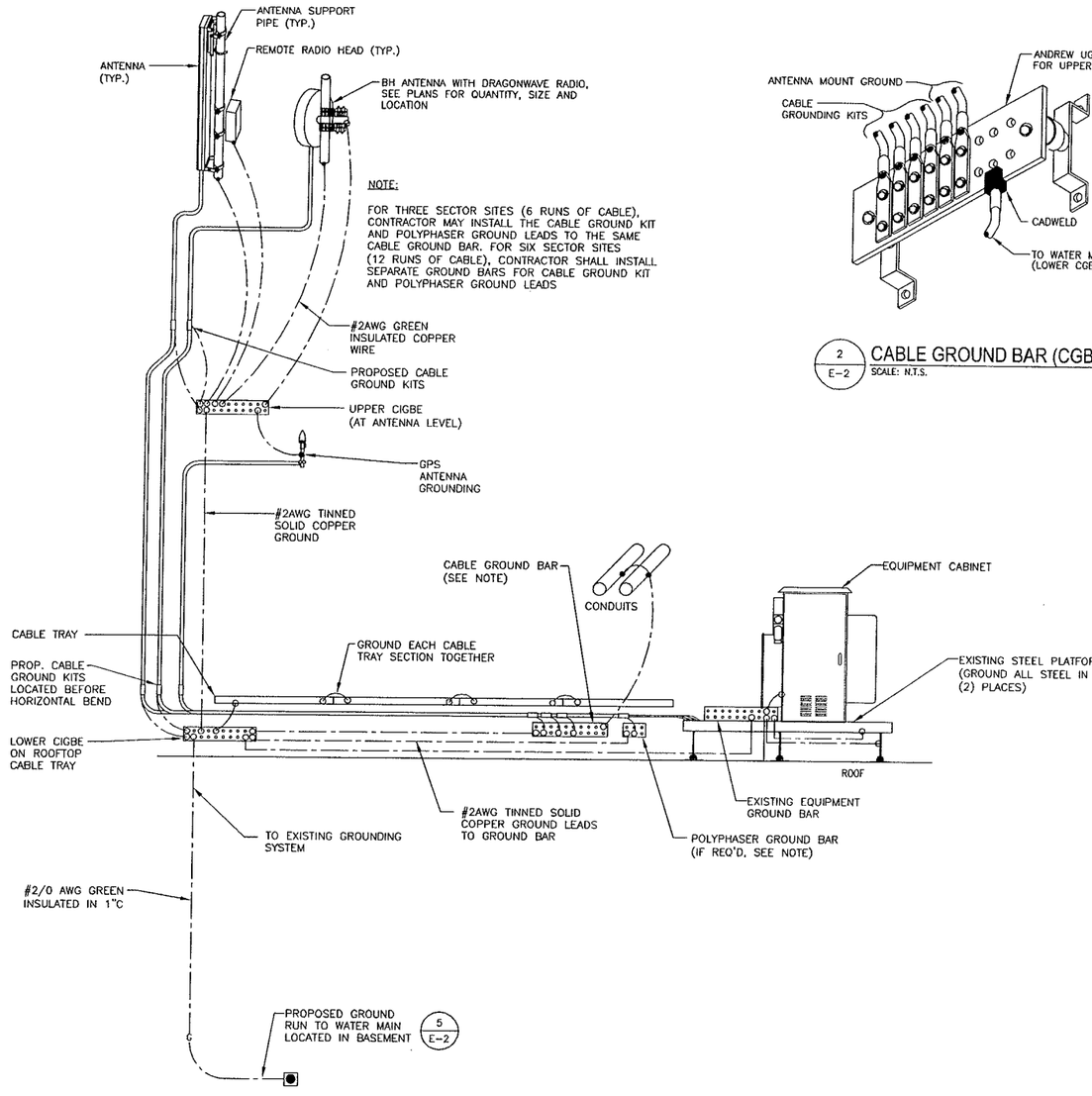
UTILITY RISER & DETAILS

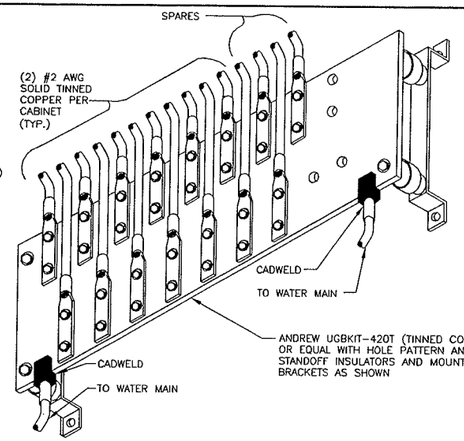
SCALE: AS SHOWN | DESIGNED BY: JX | DRAWN BY: BR

JOB NUMBER	DRAWING NUMBER	REV
MA-BOS7501B	E-1	0



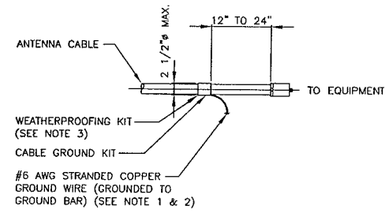
1 E-2 GROUNDING RISER DIAGRAM
SCALE: N.T.S.

2 E-2 CABLE GROUND BAR (CGB)
SCALE: N.T.S.

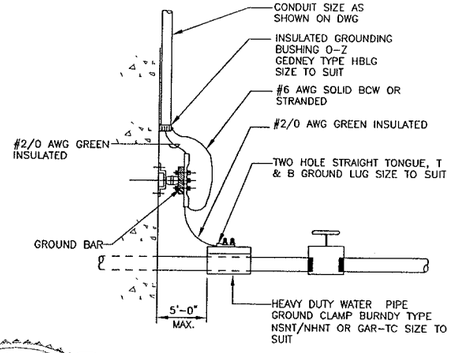


3 E-2 EQUIPMENT GROUND BAR (EGB)
SCALE: N.T.S.

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

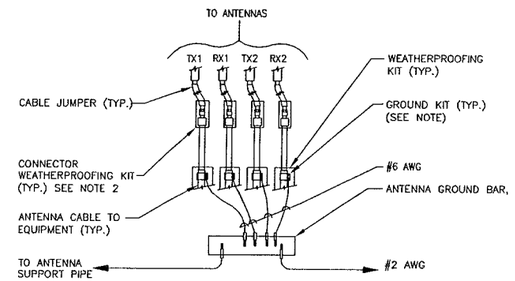


4 E-2 CONNECTION OF CABLE GROUND KIT TO ANTENNA CABLE
SCALE: N.T.S.

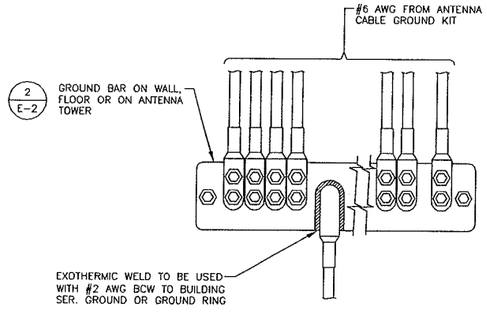


WATER MAIN GROUNDING
SCALE: NTS

NOTES:
1. DO NOT INSTALL CABLE GROUND KIT AT A BEND AND ALWAYS DIRECT GROUND WIRE DOWN TO ANTENNA GROUND BAR.
2. WEATHER PROOFING SHALL BE TWO-PART TAPE KIT. COLD SHRINK SHALL NOT BE USED.



6 E-2 CONNECTION OF GROUND WIRE TO GROUNDING BAR
SCALE: N.T.S.



* - GROUND BARS AT THE BOTTOM OF TOWERS/MONOPOLES SHALL ONLY USE EXOTHERMIC WELDS.

7 E-2 INSTALLATION OF GROUND WIRE TO GROUND BAR
SCALE: N.T.S.

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GROUNDING RISER & DETAILS

JOB NUMBER	DRAWING NUMBER	REV
MA-BOS7501B	E-2	0

GENERAL NOTES:

1. FOR THE PURPOSE OF CONSTRUCTION DRAWINGS, THE FOLLOWING DEFINITIONS SHALL APPLY:
   CONTRACTOR – CLEARWIRE
   SUBCONTRACTOR – GENERAL CONTRACTOR (CONSTRUCTION)
   OWNER – CLEARWIRE
   OEM – ORIGINAL EQUIPMENT MANUFACTURER

2. PRIOR TO THE SUBMISSION OF BIDS, THE BIDDING SUBCONTRACTOR SHALL VISIT THE CELL SITE TO FAMILIARIZE WITH THE EXISTING CONDITIONS AND TO CONFIRM THAT THE WORK CAN BE ACCOMPLISHED AS SHOWN ON THE CONSTRUCTION DRAWINGS. ANY DISCREPANCY FOUND SHALL BE BROUGHT TO THE ATTENTION OF CONTRACTOR.

3. ALL MATERIALS FURNISHED AND INSTALLED SHALL BE IN STRICT ACCORDANCE WITH ALL APPLICABLE CODES, REGULATIONS, AND ORDINANCES. SUBCONTRACTOR SHALL ISSUE ALL APPROPRIATE NOTICES AND COMPLY WITH ALL LAWS, ORDINANCES, RULES, REGULATIONS, AND LAWFUL ORDERS OF ANY PUBLIC AUTHORITY REGARDING THE PERFORMANCE OF THE WORK.

4. ALL WORK CARRIED OUT SHALL COMPLY WITH ALL APPLICABLE MUNICIPAL AND UTILITY COMPANY SPECIFICATIONS AND LOCAL, STATE AND FEDERAL JURISDICTIONAL CODES, ORDINANCES AND APPLICABLE REGULATIONS.

5. DRAWINGS PROVIDED HERE ARE NOT TO BE SCALED AND ARE INTENDED TO SHOW OUTLINE ONLY.

6. UNLESS NOTED OTHERWISE, THE WORK SHALL INCLUDE FURNISHING MATERIALS, EQUIPMENT, APPURTENANCES, AND LABOR NECESSARY TO COMPLETE ALL INSTALLATIONS AS INDICATED ON THE DRAWINGS.

7. THE SUBCONTRACTOR SHALL INSTALL ALL EQUIPMENT AND MATERIALS IN ACCORDANCE WITH MANUFACTURER'S RECOMMENDATIONS UNLESS SPECIFICALLY STATED OTHERWISE.

8. IF THE SPECIFIED EQUIPMENT CANNOT BE INSTALLED AS SHOWN ON THESE DRAWINGS, THE SUBCONTRACTOR SHALL PROPOSE AN ALTERNATIVE INSTALLATION FOR APPROVAL BY THE CONTRACTOR.

9. SUBCONTRACTOR SHALL DETERMINE ACTUAL ROUTING OF CONDUIT, POWER, T1 CABLES AND GROUNDING CABLES AS SHOWN ON THE POWER, GROUNDING AND TELCO PLAN DRAWING. SUBCONTRACTOR SHALL UTILIZE EXISTING TRAYS AND/OR SHALL ADD NEW TRAYS AS NECESSARY. SUBCONTRACTOR SHALL CONFIRM THE ACTUAL ROUTING WITH THE CONTRACTOR AND/OR LANDLORD PRIOR TO CONSTRUCTION.

10. THE SUBCONTRACTOR SHALL PROTECT EXISTING IMPROVEMENTS, PAVEMENTS, CURBS, LANDSCAPING AND STRUCTURES. ANY DAMAGED PART SHALL BE REPAIRED AT SUBCONTRACTOR'S EXPENSE TO THE SATISFACTION OF THE OWNER.

11. SUBCONTRACTOR SHALL LEGALLY AND PROPERLY DISPOSE OF ALL SCRAP MATERIALS SUCH AS COAXIAL CABLES AND OTHER ITEMS REMOVED FROM THE EXISTING FACILITY.

12. SUBCONTRACTOR SHALL LEAVE PREMISES IN CLEAN CONDITION AND RETURN DISTURBED AREAS TO ORIGINAL CONDITIONS.

13. THE SUBCONTRACTOR SHALL SUPERVISE AND DIRECT THE PROJECT DESCRIBED HEREIN. THE SUBCONTRACTOR SHALL BE SOLELY RESPONSIBLE FOR ALL CONSTRUCTION MEANS, METHODS, TECHNIQUES, SEQUENCES, AND PROCEDURES FOR COORDINATING ALL PORTIONS OF THE WORK UNDER THE CONTRACT.

14. SUBCONTRACTOR SHALL NOTIFY HUDSON DESIGN GROUP, LLC 48 HOURS IN ADVANCE OF POURING CONCRETE OR BACKFILLING TRENCHES, SEALING ROOF AND WALL PENETRATIONS AND POST DOWNS, FINISHING NEW WALLS OR FINAL ELECTRICAL CONNECTIONS FOR ENGINEERING REVIEW.

15. CONSTRUCTION SHALL COMPLY WITH ALL CLEARWIRE STANDARDS AND SPECIFICATIONS.

16. SUBCONTRACTOR SHALL VERIFY ALL EXISTING DIMENSIONS AND CONDITIONS PRIOR TO COMMENCING ANY WORK. ALL DIMENSIONS OF EXISTING CONSTRUCTION SHOWN ON THE DRAWINGS MUST BE VERIFIED. SUBCONTRACTOR SHALL NOTIFY THE CONTRACTOR OF ANY DISCREPANCIES PRIOR TO ORDERING MATERIAL OR PROCEEDING WITH CONSTRUCTION.

17. THE EXISTING CELL SITES ARE IN FULL COMMERCIAL OPERATION. ANY CONSTRUCTION WORK BY SUBCONTRACTOR SHALL NOT DISRUPT THE EXISTING NORMAL OPERATION. ANY WORK ON EXISTING EQUIPMENT MUST BE COORDINATED WITH CONTRACTOR. ALSO, WORK SHOULD BE SCHEDULED FOR AN APPROPRIATE MAINTENANCE WINDOW USUALLY IN LOW TRAFFIC PERIODS AFTER MIDNIGHT.

18. IF THE EXISTING CELL SITE IS ACTIVE, ALL SAFETY PRECAUTIONS MUST BE TAKEN WHEN WORKING AROUND HIGH LEVELS OF ELECTROMAGNETIC RADIATION. EQUIPMENT SHOULD BE SHUTDOWN PRIOR TO PERFORMING ANY WORK THAT COULD EXPOSE THE WORKERS TO DANGER. PERSONAL RF EXPOSURE MONITORS ARE TO BE WORN TO ALERT OF ANY DANGEROUS EXPOSURE LEVELS.

SITE WORK GENERAL NOTES:

1. THE SUBCONTRACTOR SHALL CONTACT UTILITY LOCATING SERVICES PRIOR TO THE START OF CONSTRUCTION.

2. ALL EXISTING ACTIVE SEWER, WATER, GAS, ELECTRIC, AND OTHER UTILITIES WHERE ENCOUNTERED IN THE WORK, SHALL BE PROTECTED AT ALL TIMES, AND WHERE REQUIRED FOR THE PROPER EXECUTION OF THE WORK, SHALL BE RELOCATED AS DIRECTED BY ENGINEERS. EXTREME CAUTION SHOULD BE USED BY THE SUBCONTRACTOR WHEN EXCAVATING OR DRILLING PIERS AROUND OR NEAR UTILITIES. SUBCONTRACTOR SHALL PROVIDE SAFETY TRAINING FOR THE WORKING CREW. THIS WILL INCLUDE BUT NOT BE LIMITED TO A) FALL PROTECTION B) CONFINED SPACE C) ELECTRICAL SAFETY D) TRENCHING AND EXCAVATION.

3. ALL SITE WORK SHALL BE AS INDICATED ON THE DRAWINGS AND PROJECT SPECIFICATIONS.

4. IF NECESSARY, RUBBISH, STUMPS, DEBRIS, STICKS, STONES AND OTHER REFUSE SHALL BE REMOVED FROM THE SITE AND DISPOSED OF LEGALLY.

5. THE SITE SHALL BE GRADED TO CAUSE SURFACE WATER TO FLOW AWAY FROM THE BTS EQUIPMENT AND TOWER AREAS.

6. NO FILL OR EMBANKMENT MATERIAL SHALL BE PLACED ON FROZEN GROUND. FROZEN MATERIALS, SNOW OR ICE SHALL NOT BE PLACED IN ANY FILL OR EMBANKMENT.

7. THE SUB GRADE SHALL BE COMPACTED AND BROUGHT TO A SMOOTH UNIFORM GRADE PRIOR TO FINISHED SURFACE APPLICATION.

8. ALL EXISTING INACTIVE SEWER, WATER, GAS, ELECTRIC AND OTHER UTILITIES, WHICH INTERFERE WITH THE EXECUTION OF THE WORK, SHALL BE REMOVED AND/OR CAPPED, PLUGGED OR OTHERWISE DISCONTINUED AT POINTS WHICH WILL NOT INTERFERE WITH THE EXECUTION OF THE WORK, SUBJECT TO THE APPROVAL OF ENGINEERING, OWNER AND/OR LOCAL UTILITIES.

9. THE AREAS OF THE OWNERS PROPERTY DISTURBED BY THE WORK AND NOT COVERED BY THE TOWER, EQUIPMENT OR DRIVEWAY, SHALL BE GRADED TO A UNIFORM SLOPE AND STABILIZED TO PREVENT EROSION AS SPECIFIED IN THE PROJECT SPECIFICATIONS.

10. SUBCONTRACTOR SHALL MINIMIZE DISTURBANCE TO EXISTING SITE DURING CONSTRUCTION. EROSION CONTROL MEASURES, IF REQUIRED DURING CONSTRUCTION, SHALL BE IN CONFORMANCE WITH THE LOCAL GUIDELINES FOR EROSION AND SEDIMENT CONTROL.

11. THE SUBCONTRACTOR SHALL PROVIDE SITE SIGNAGE IN ACCORDANCE WITH THE CLEARWIRE SPECIFICATION FOR SITE SIGNAGE.

CONCRETE AND REINFORCING STEEL NOTES:

1. ALL CONCRETE WORK SHALL BE IN ACCORDANCE WITH THE ACI 301, ACI 318, ACI 336, ASTM A184, ASTM A185 AND THE DESIGN AND CONSTRUCTION SPECIFICATION FOR CAST-IN-PLACE CONCRETE.

2. ALL CONCRETE SHALL HAVE A MINIMUM COMPRESSIVE STRENGTH OF 3000 PSI AT 28 DAYS, UNLESS NOTED OTHERWISE. A HIGHER STRENGTH (4000PSI) MAY BE USED. ALL CONCRETE WORK SHALL BE IN ACCORDANCE WITH THE ACI 381 CODE REQUIREMENTS

3. REINFORCING STEEL SHALL CONFORM TO ASTM A 615, GRADE 60, DEFORMED UNLESS NOTED OTHERWISE. WELDED WIRE FABRIC SHALL CONFORM TO ASTM A 185 WELDED STEEL WIRE FABRIC UNLESS NOTED OTHERWISE. SPLICES SHALL BE CLASS "B" AND ALL HOOKS SHALL BE STANDARD, UNO.

4. THE FOLLOWING MINIMUM CONCRETE COVER SHALL BE PROVIDED FOR REINFORCING STEEL UNLESS SHOWN OTHERWISE ON DRAWINGS:
   CONCRETE CAST AGAINST EARTH.....3 IN.
   CONCRETE EXPOSED TO EARTH OR WEATHER:
   #6 AND LARGER .....2 IN.
   #5 AND SMALLER & WWF .....1½ IN.
   CONCRETE NOT EXPOSED TO EARTH OR WEATHER OR NOT CAST AGAINST THE GROUND:
   SLAB AND WALL .....¾ IN.
   BEAMS AND COLUMNS .....1½ IN.

5. A CHAMFER ¾" SHALL BE PROVIDED AT ALL EXPOSED EDGES OF CONCRETE, UNO, IN ACCORDANCE WITH ACI 301 SECTION 4.2.4.

6. INSTALLATION OF CONCRETE EXPANSION/WEDGE ANCHORS SHALL BE PER MANUFACTURER'S WRITTEN RECOMMENDED PROCEDURE. THE ANCHOR BOLT, DOWEL OR ROD SDHALL CONFORM TO THE MANUFACTURERS RECOMMENDATION FOR EMBEDMENT DEPTH OR AS SHOWN ON THE DRAWINGS. NO REBAR SHALL BE CUT WITHOUT PRIOR CONTRACTOR APPROVAL WHEN DRILLING HOLES IN CONCRETE. SPECIAL INSPECTIONS, REQUIRED BY GOVERNING CODES, SHALL BE PERFORMED IN ORDER TO MAINTAIN MANUFACTURER'S MAXIMUM ALLOWABLE LOADS. ALL EXPANSION/WEDGE ANCHORS SHALL BE STAINLESS STEEL OR HOT DIPPED GALVANIZED. EXPANSION BOLTS SHALL BE PROVIDED BY SIMPSON OR APPROVED EQUAL.

7. CONCRETE CYLINDER TIES ARE NOT REQUIRED FOR SLAB ON GRADE WHEN CONCRETE IS LESS THAN 50 CUBIC YARDS (IBC1905.6.2.3) IN THAT EVENT THE FOLLOWING RECORDS SHALL BE PROVIDED BY THE CONCRETE SUPPLIER;
   (A) RESULTS OF CONCRETE CYLINDER TEST PERFORMED AT THE SUPPLIERS PLANT.
   (B) CERTIFICATION OF MINIMUM COMPRESSIVE STRENGTH FOR THE CONCRETE GRADE SUPPLIED.
FOR GREATER THAN 50 CUBIC YARDS THE GC SHALL PERFORM THE CONCRETE CYLINDER TEST.

8. AS AN ALTERNATIVE TO ITEM 7. TEST CYLINDERS SHALL BE TAKEN INITIALLY AND THEREAFTER FOR EVERY 50 YARDS OF CONCRETE FROM EACH DIFFERENT BATCH PLANT.

9. EQUIPMENT SHALL NOT BE PLACED ON NEW PADS FOR SEVEN DAYS AFTER PAD IS POURED, UNLESS IT IS VERIFIED BY CYLINDER TESTS THAT COMPRESSIVE STRENGTH HAS BEEN ATTAINED.

STRUCTURAL STEEL NOTES:

1. ALL STEEL WORK SHALL BE PAINTED OR GALVINIZED IN ACCORDANCE WITH THE DRAWINGS AND CLEARWIRE SPECIFICATIONS UNLESS OTHERWISE NOTED. STRUCTURAL STEEL SHALL BE ASTM-A-36 UNLESS OTHERWISE NOTED ON THE SITE SPECIFIC DRAWINGS. STEEL DESIGN, INSTALLATION AND BOLTING SHALL BE IN ACCORDANCE WITH THE AMERICAN INSTITUTE OF STEEL CONSTRUCTION (AISC) "MANUAL OF STEEL CONSTRUCTION".

2. ALL WELDING SHALL BE PERFORMED USING E70XX ELECTRODES AND WELDING SHALL CONFORM TO AISC AND AWS D1.1. WHERE FILLET WELD SIZES ARE NOT SHOWN, PROVIDE THE MINIMUM SIZE PER TABLE J2.4 IN THE AISC "MANUAL OF STEEL CONSTRUCTION", 9TH EDITION. PAINTED SURFACES SHALL BE TOUCHED UP.

3. BOLTED CONNECTIONS SHALL USE BEARING TYPE ASTM A325 BOLTS (¾"ø) AND SHALL HAVE MINIMUM OF TWO BOLTS UNLESS NOTED OTHERWISE. ALL BOLTS SHALL BE GALVANIZED OR STAINLESS STEEL.

4. NON-STRUCTURAL CONNECTIONS FOR STEEL GRATING MAY USE ⅝" DIA. ASTM A 307 BOLTS (GALV) UNLESS NOTED OTHERWISE.

5. CONTRACTOR SHALL SUBMIT SHOP DRAWINGS FOR ENGINEER REVIEW & APPROVAL ON PROJECTS REQUIRING STRUCTURAL STEEL

6. ALL STRUCTURAL STEEL WORK SHALL BE DONE IN ACCORDANCE WITH AISC SPECIFICATIONS.

SOIL COMPACTION NOTES FOR SLAB ON GRADE:

1. EXCAVATE AS REQUIRED TO REMOVE VEGETATION AND TOPSOIL TO EXPOSE NATURAL SUBGRADE AND PLACE CRUSHED STONE AS REQUIRED.

2. COMPACTION CERTIFICATION: AN INSPECTION AND WRITTEN CERTIFICATION BY A QUALIFIED GEOTECHNICAL TECHNICIAN OR ENGINEER IS ACCEPTABLE.

3. AS AN ALTERNATE TO INSPECTION AND WRITTEN CERTIFICATION, THE "UNDISTURBED SOIL" BASE SHALL BE COMPACTED WITH "COMPACTION EQUIPMENT", LISTED BELOW, TO AT LEAST 90% MODIFIED PROCTOR MAXIMUM DENSITY PER ASTM D 1557 METHOD C.

4. COMPACTED SUBBASE SHALL BE UNIFORM AND LEVELED. PROVIDE 6" MINIMUM CRUSHED STONE OR GRAVEL COMPACTED IN 3" LIFTS ABOVE COMPACTED SOIL. GRAVEL SHALL BE NATURAL OR CRUSHED WITH 100% PASSING #1 SIEVE.

5. AS AN ALTERNATE TO ITEMS 2 AND 3, THE SUBGRADE SOILS WITH 5 PASSES OR A MEDIUM SIZED VIBRATORY PLATE COMPACTOR (SUCH AS BOMAG BPR 30/38) OR HAND-OPERATED SINGLE DRUM VIBRATORY ROLLER (SUCH AS BOMAG BW 55E). AND SOFT AREAS THAT ARE ENCOUNTERED SHOULD BE REMOVED AND REPLACED WITH A WELL-GRADED GRANULAR FILL AND COMPACTED AS STATED ABOVE.

COMPACTION EQUIPMENT:

1. HAND OPERATED DOUBLE DRUM, VIBRATORY ROLLER, VIBRATORY PLATE COMPACTOR OR JUMPING JACK COMPACTOR.

CONSTRUCTION NOTES:

1. FIELD VERIFICATION:
SUBCONTRACTOR SHALL FIELD VERIFY SCOPE OF WORK, CLEARWIRE ANTENNA PLATFORM LOCATION AND UTILITY TRENCHWORK.

2. COORDINATION OF WORK:
SUBCONTRACTOR SHALL COORDINATE RF WORK AND PROCEDURES WITH CONTRACTOR.

3. CABLE LADDER RACK:
SUBCONTRACTOR SHALL FURNISH AND INSTALL CABLE LADDER RACK, CABLE TRAY AND/OR ICE BRIDGE, AND CONDUIT AS REQUIRED TO SUPPORT CABLES TO THE NEW BTS LOCATION.

ELECTRICAL INSTALLATION NOTES:

1. WIRING, RACEWAY, AND SUPPORT METHODS AND MATERIALS SHALL COMPLY WITH THE REQUIREMENTS OF THE NEC AND TELCORDIA.

2. SUBCONTRACTOR SHALL MODIFY OR INSTALL CABLE TRAY SYSTEM AS REQUIRED TO SUPPORT RF AND TRANSPORT CABLING TO THE NEW BTS EQUIPMENT. SUBCONTRACTOR SHALL SUBMIT MODIFICATIONS TO CONTRACTOR FOR APPROVAL.

3. ALL CIRCUITS SHALL BE SEGREGATED AND MAINTAIN MINIMUM CABLE SEPARATION AS REQUIRED BY THE NEC AND TELCORDIA.

4. CABLES SHALL NOT BE ROUTED THROUGH LADDER-STYLE CABLE TRAY RUNGS.

5. EACH END OF EVERY POWER, GROUNDING, AND T1 CONDUCTOR AND CABLE SHALL BE LABELED WITH COLOR-CODED INSULATION OR ELECTRICAL TAPE (3M BRAND, 1/2 INCH PLASTIC ELECTRICAL TAPE WITH UV PROTECTION, OR EQUAL). THE IDENTIFICATION METHOD SHALL CONFORM WITH NEC AND OSHA, AND MATCH INSTALLATION REQUIREMENTS.

6. POWER PHASE CONDUCTORS (I.E., HOTS) SHALL BE LABELED WITH COLOR-CODED INSULATION OR ELECTRICAL TAPE (3M BRAND, ½ INCH PLASTIC ELECTRICAL TAPE WITH UV PROTECTION, OR EQUAL). PHASE CONDUCTOR COLOR CODES SHALL CONFORM WITH THE NEC AND OSHA.

7. ALL ELECTRICAL COMPONENTS SHALL BE CLEARLY LABELED WITH ENGRAVED LAMACOID PLASTIC LABELS. ALL EQUIPMENT SHALL BE LABELED WITH THEIR VOLTAGE RATING, PHASE CONFIGURATION, WIRE CONFIGURATION, POWER OR AMPACITY RATING, AND BRANCH CIRCUIT ID NUMBERS (I.E., PANELBOARD AND CIRCUIT ID'S).

8. PANELBOARDS (ID NUMBERS) AND INTERNAL CIRCUIT BREAKERS (CIRCUIT ID NUMBERS) SHALL BE CLEARLY LABELED WITH ENGRAVED LAMACOID PLASTIC LABELS.

9. ALL TIE WRAPS SHALL BE CUT FLUSH WITH APPROVED CUTTING TOOL TO REMOVE SHARP EDGES.

10. POWER, CONTROL, AND EQUIPMENT GROUND WIRING IN TUBING OR CONDUIT SHALL BE SINGLE CONDUCTOR (#34 AWG OR LARGER), 600 V, OIL RESISTANT THHN OR THWN-2, CLASS B STRANDED COPPER CABLE RATED FOR 90 °C (WET AND DRY) OPERATION; LISTED OR LABELED FOR THE LOCATION AND RACEWAY SYSTEM USED, UNLESS OTHERWISE SPECIFIED.

11. SUPPLEMENTAL EQUIPMENT GROUND WIRING LOCATED INDOORS SHALL BE SINGLE CONDUCTOR (#6 AWG OR LARGER), 600 V, OIL RESISTANT THHN OR THWN-2 GREEN INSULATION, CLASS B STRANDED COPPER CABLE RATED FOR 90 °C (WET AND DRY) OPERATION; LISTED OR LABELED FOR THE LOCATION AND RACEWAY SYSTEM USED, UNLESS OTHERWISE SPECIFIED.

12. SUPPLEMENTAL EQUIPMENT GROUND WIRING LOCATED OUTDOORS, OR BELOW GRADE, SHALL BE SINGLE CONDUCTOR #2 AWG SOLID TINNED COPPER CABLE, UNLESS OTHERWISE SPECIFIED.

13. POWER AND CONTROL WIRING, NOT IN TUBING OR CONDUIT, SHALL BE MULTI-CONDUCTOR, TYPE TC CABLE (#34 AWG OR LARGER), 600 V, OIL RESISTANT THHN OR THWN-2, CLASS B STRANDED COPPER CABLE RATED FOR 90 °C (WET AND DRY) OPERATION; WITH OUTER JACKET; LISTED OR LABELED FOR THE LOCATION USED, UNLESS OTHERWISE SPECIFIED.

14. ALL POWER AND GROUNDING CONNECTIONS SHALL BE CRIMP-STYLE, COMPRESSION WIRE LUGS AND WIRENUTS BY HARGER (OR EQUAL). LUGS AND WIRENUTS SHALL BE RATED FOR OPERATION AT NO LESS THAN 75°C (90°C IF AVAILABLE).

15. RACEWAY AND CABLE TRAY SHALL BE LISTED OR LABELED FOR ELECTRICAL USE IN ACCORDANCE WITH NEMA, UL, ANSI/IEEE AND NEC.

16. NEW RACEWAY OR CABLE TRAY WILL MATCH THE EXISTING INSTALLATION WHERE POSSIBLE.

17. ELECTRICAL METALLIC TUBING (EMT) OR RIGID NONMETALLIC CONDUIT (I.E., RIGID PVC SCHEDULE 40 OR RIGID PVC SCHEDULE 80 FOR LOCATIONS SUBJECT TO PHYSICAL DAMAGE) SHALL BE USED FOR EXPOSED INDOOR LOCATIONS.

18. ELECTRICAL METALLIC TUBING (EMT), ELECTRICAL NONMETALLIC TUBING (ENT), OR RIGID NONMETALLIC CONDUIT (RIGID PVC, SCHEDULE 40) SHALL BE USED FOR CONCEALED INDOOR LOCATIONS.

19. GALVANIZED STEEL INTERMEDIATE METALLIC CONDUIT (IMC) SHALL BE USED FOR OUTDOOR LOCATIONS ABOVE GRADE.

20. RIGID NONMETALLIC CONDUIT (I.E., RIGID PVC SCHEDULE 40 OR RIGID PVC SCHEDULE 80) SHALL BE USED UNDERGROUND; DIRECT BURIED, IN AREAS OF OCCASIONAL LIGHT VEHICLE TRAFFIC OR ENCASED IN REINFORCED CONCRETE IN AREAS OF HEAVY VEHICLE TRAFFIC.

21. LIQUID-TIGHT FLEXIBLE METALLIC CONDUIT (LIQUID-TITE FLEX) SHALL BE USED INDOORS AND OUTDOORS, WHERE VIBRATION OCCURS OR FLEXIBILITY IS NEEDED.

22. CONDUIT AND TUBING FITTINGS SHALL BE THREADED OR COMPRESSION-TYPE AND APPROVED FOR THE LOCATION USED. SETSCREW FITTINGS ARE NOT ACCEPTABLE.

23. CABINETS, BOXES AND WIREWAYS SHALL BE LISTED OR LABELED FOR ELECTRICAL USE IN ACCORDANCE WITH NEMA, UL, ANSI/IEEE AND NEC.

24. CABINETS, BOXES AND WIREWAYS TO MATCH THE EXISTING INSTALLATION WHERE POSSIBLE.

25. WIREWAYS SHALL BE EPOXY-COATED (GRAY) AND INCLUDE A HINGED COVER, DESIGNED TO SWING OPEN DOWNWARD; SHALL BE PANDUIT TYPE E (OR EQUAL); AND RATED NEMA 1 (OR BETTER) INDOORS, OR NEMA 3R (OR BETTER) OUTDOORS.

26. EQUIPMENT CABINETS, TERMINAL BOXES, JUNCTION BOXES, AND PULL BOXES SHALL BE GALVANIZED OR EPOXY-COATED SHEET STEEL, SHALL MEET OR EXCEED UL 50, AND RATED NEMA 1 (OR BETTER) INDOORS, OR NEMA 3R (OR BETTER) OUTDOORS.

27. METAL RECEPTACLE, SWITCH, AND DEVICE BOXES SHALL BE GALVANIZED, EPOXY-COATED, OR NON-CORRODING; SHALL MEET OR EXCEED UL 514A AND NEMA OS 1; AND RATED NEMA 1 (OR BETTER) INDOORS, OR WEATHER PROTECTED (WP OR BETTER) OUTDOORS.

28. NONMETALLIC RECEPTACLE, SWITCH, AND DEVICE BOXES SHALL MEET OR EXCEED NEMA OS 2; AND RATED NEMA 1 (OR BETTER) INDOORS, OR WEATHER PROTECTED (WP OR BETTER) OUTDOORS.

29. THE SUBCONTRACTOR SHALL NOTIFY AND OBTAIN NECESSARY AUTHORIZATION FROM THE CONTRACTOR BEFORE COMMENCING WORK ON THE AC POWER DISTRIBUTION PANELS.

30. THE SUBCONTRACTOR SHALL PROVIDE NECESSARY TAGGING ON THE BREAKERS, CABLES AND DISTRIBUTION PANELS IN ACCORDANCE WITH THE APPLICABLE CODES AND STANDARDS TO SAFEGUARD AGAINST LIFE AND PROPERTY.

31. ALL ELECTRICAL WORK SHALL BE PERFORMED IN ACCORDANCE WITH THE PROJECT SPECIFICATIONS, NEC AND ALL APPLICABLE LOCAL CODES.

32. CONDUIT ROUTINGS ARE SCHEMATIC. SUBCONTRACTOR SHALL INSTALL CONDUITS SO THAT ACCESS TO EQUIPMENT IS NOT BLOCKED.

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Daniel P. Hamm

NO.	DATE	REVISIONS	BY	CHK	APP'D
0	08/31/10	ISSUED FOR CONSTRUCTION	DB	JX	DPH
A	06/01/10	ISSUED FOR CONSTRUCTION REVIEW	BR	JX	DPH

SCALE: AS SHOWN | DESIGNED BY: JX | DRAWN BY: BR

IF THE PLANS ARE PRINTED 24x36 THE SCALE IS 1:1
IF THE PLANS ARE PRINTED 11x17 THE SCALE IS 1:2

GENERAL NOTES

JOB NUMBER	DRAWING NUMBER	REV
MA-BOS7501B	GN-1	0