

## LICENSE AGREEMENT

**THIS LICENSE AGREEMENT** (“Agreement”) is made, effective as of the date set forth in section 2.01(a) below (“Effective Date”), by and between the **CITY AND COUNTY OF DENVER, a municipal corporation** (“City”), and **NEW CINGULAR WIRELESS PCS, LLC**, a Delaware Limited Liability Company authorized to conduct business in Colorado, with its principal office located at 1025 Lenox Park Boulevard NE, Atlanta, Georgia 30319 (“Licensee”).

### DEFINITIONS

All capitalized terms or phrases in this Agreement, except for proper names, shall have the meanings as set forth below:

**A.** Agreement means this License Agreement during the Term or Term Extension of the Agreement.

**B.** ADA means federal Americans with Disabilities Act and any other federal or state laws requiring access for the disabled to public accommodations.

**C.** Applicable Law means all federal, state, and local laws applicable in the context of the specific matter addressed in this Agreement, including but not limited to: 1) the constitutions, laws, and rules and regulations of the United States of America and the State of Colorado; 2) the City Charter, the Denver Revised Municipal Code, and building, fire, electrical, plumbing and other applicable codes, as they may be amended from time to time; 3) rules and regulations, including any standards and specifications, promulgated or amended by the Denver Department of Safety and the Denver Fire Department; 4) any rules and regulations promulgated or amended by other City departments and agencies applicable to this Agreement; 5) executive orders issued by the Mayor; 6) any court order, judgment, or decree or any appellate decision applicable to this Agreement; 7) any federal, state, or local administrative decision or order applicable to this Agreement; 8) any anti-discrimination laws; and 9) the requirements of the ADA.

**D.** Cancellation means the revocation of the License and the termination or cancellation of the Agreement, including mutual termination by the parties, in the manner specified in this Agreement.

**E.** City means the City and County of Denver as represented by the Denver Fire Department and its Fire Chief.

**F.** City Representative means the Fire Chief’s designee(s) who will oversee and direct all activities of Licensee under this Agreement. The City Representative(s) may be employees or contractors of the Denver Fire Department, Denver’s Technology Services, the Electronic Engineering Bureau of the Department of Safety, and/or Denver’s Division of Real Estate. Contact information for the City Representative and the assigned responsibilities, if there is more than one City Representative, shall be provided to Licensee upon execution of this Agreement. The City may identify, change, add or delete City Representative(s) by written notice to Licensee.

**G.** City System means all existing and future communication and other electronic facilities,

equipment and instrumentation and related infrastructure and utility connections that the City requires for the operation of the Fire Station or the provision of emergency services from the Fire Station, including, but not limited to, public safety channels, radio system or other electronic means of sending, receiving, processing and recording information and data for public safety purposes.

**H.** DRMC means the Denver Revised Municipal Code as it may be amended from time to time.

**I.** Effective Date means the date this Agreement goes into effect, as specified in section 2.01(a) below.

**J.** Emergency means an occurrence or incident that presents an imminent threat of widespread or severe damage, injury, or loss of life or property resulting from any natural cause or cause of human origin, including but not limited to fire, explosion, flood, earthquake, wind, storm, structural failure, hazardous substance, environmental contamination, civil disturbance, vandalism, or breach of security.

**K.** FCC means the Federal Communications Commission.

**L.** Fire Chief means the head of the Denver Fire Department.

**M.** Fire Station means the specific fire station operated by the Denver Fire Department to which this Agreement applies, as specified in section 1.01(a).

**N.** Interference Study means a site and technical interference study, **Exhibit C**, field tests or other activities or investigations related to the resolution of RF Interference that may be associated with the Licensed System as specified in section 5.02.

**O.** License means the license granted as specified in section 1.01(a) which is exclusive only to the extent specified in this Agreement and which is restricted and revocable as specified in this Agreement. No property or leasehold interest or right is granted by the License.

**P.** Licensed Area means the location at the Fire Station where Licensee is authorized to install and operate the Licensed System, as specified in section 1.01(a).

**Q.** Licensed System means the radio frequency equipment and wireless communication facility, and related equipment, infrastructure and utility communications authorized by the City and installed and operated by Licensee within the Licensed Area of the Fire Station, as specified in section 1.01(a).

**R.** Licensee means the legal entity to which the License is granted under and in accordance with this Agreement, as identified in opening paragraph of this Agreement. To the extent that Licensee retains contractors or consultants to perform any of Licensee's rights and obligations under the Agreement, Licensee shall also mean those contractors and consultants.

**S.** License Fee means the compensation to be paid by Licensee to the City for the use of the Licensed Area and the operation of the Licensed System at the Fire Station as specified in section 3.01.

**T.** Minimum Technical Standards mean those standards set forth in **Exhibit B** as these Minimum Technical Standards may be updated from time-to-time, as needed, to address the state-of-the-art.

**U.** Party means either the City or Licensee, as appropriate in the context, and Parties means both the City and Licensee.

**V.** Permitted Use means the uses (subject to restrictions) as specified in section 1.02, which Licensee may make of the Licensed Area in the installation and operation of the Licensed System.

**W.** RF (Radio Frequency) Interference means any emission, radiation or induction from or associated with the Licensed System that affects the functioning of or degrades, obstructs, or interrupts radio or other wireless communications being made by the City or other authorized parties to or from the Fire Station or the operation of any communication system located at the Fire Station.

**X.** Point of Contact means the Chief Deputy for the Technical Services Division of the Denver Fire Department, or the Chief Deputy's designated representative, during regular business hours of the Denver Fire Department and the Denver Fire Department's non-emergency Dispatch for Licensee's urgent need for access after regular business hours of the Denver Fire Department.

**Y.** Term means the duration of the Agreement running from the Effective Date of the Agreement, as specified in section 2.01 including any Term Extensions as specified in section 2.02.

**Z.** Term Extension means any approved amendment to the Agreement allowing the duration of the Agreement for another five or ten-year period subject to any new or changed terms or conditions, as specified in section 2.02.

**AA.** Tower means the communication structure or structures authorized by the City on which the Licensed System and the City System are located, as specified in 1.01(b).

## **SECTION 1 LICENSE; PERMITTED USE; and ACCESS**

### **1.01 Grant of License.**

(a) City owns property located within the City and County of Denver, State of Colorado, known as Fire Station #26, located at 7934 Martin Luther King Boulevard, Denver, Colorado 80207 ("Fire Station"). City hereby grants a License to Licensee for the use of certain designated areas at the Fire Station as depicted on **Exhibit A** (the "Licensed Area") for the installation and operation by Licensee of the Licensed System, as the Licensed System is technically described, also in **Exhibit A**. The Licensed System shall be situated within the Licensed Area, which will include a limited space for an equipment cabinet, and shall be located in relation to the City System, if any, as depicted in **Exhibit A**. The Licensed Area shall not include the City System. Any proposed change to the Licensed Area depicted in **Exhibit A** shall require an amendment to this Agreement.

(b) As a condition of the grant of the License, Licensee shall construct and install, at its sole cost and expense, an extension to the existing Tower and Licensee shall relocate the City System on the Tower, all as described and more fully specified in **Exhibit A**. Upon completion of the extension, the extension will become part of the Tower owned by the City and shall not be part of the Licensed System. Licensee shall provide a bill of sale or other evidence of transfer of ownership to the City. A form of bill of sale is attached hereto as **Exhibit D**, and shall be executed by the Parties upon completion by Licensee and acceptance by the City of the extension.

## **1.02 Permitted Use/Restrictions.**

(a) The Licensed Area at the Fire Station shall be used for the installation, maintenance, alteration, repair, replacement, operation, and removal of the Licensed System within the Licensed Area, in accordance with this Agreement (“Permitted Use”). The Licensed System shall be owned by Licensee. Except as expressly provided in this Agreement, the City may not disturb or modify the Licensed System without the prior written permission of Licensee.

(b) Licensee may access the Fire Station site, use the Licensed Area, and install and operate the Licensed System only as set forth in this Agreement. The Permitted Use does not authorize any activity that would conflict or interfere with the public health, safety or welfare purpose or operation of the Fire Station or City System. Such prohibited conflict or interference includes RF Interference as set forth in this Agreement and **Exhibit C**. Licensee shall likewise take every reasonable measure to promptly and effectively avoid or remedy any emergency situation within its control that could adversely impact the Fire Station, the City System, the Licensed Area, or the Licensed System.

## **1.03 Access.**

(a) Provided that Licensee gives at least forty-eight (48) hours prior notice to the Point of Contact, Licensee has the reasonable right of access, ingress to and egress from the Licensed Area during regular business hours for Licensee’s employees, contractors and agents, including suppliers of materials and furnishers of service (collectively “Licensee’s Personnel”).

(b) In the event of an urgent situation where Licensee needs prompt access to the Licensed System during or outside of regular business hours, which shall be deemed to include any failure of Licensed System or any portion thereof, Licensee shall communicate with the Point of Contact to arrange for access by Licensee’s Personnel.

(c) With respect to all access to the Fire Station, Licensee’s Personnel must present legally sufficient identification, preferably in the form of a badge with picture ID issued by Licensee; will be subject to escort by Fire Department staff and search and inspection of items brought onto the Fire Station site; and will comply with all restrictions and security protocols set by the Fire Chief and the direction of the City Representative. All equipment, vehicles, machinery and other materials brought onto the Fire Station site must be necessary for the work authorized to be performed.

(d) Should Licensee require access into a secure area of the Fire Station which may require prior approval or escort, then the permission of the City Representative must be obtained and

any security protocols must be strictly observed by Licensee.

(e) The exercise of access by Licensee or Licensee's personnel shall not conflict or interfere with the operations of the Fire Station or the City System and may not block access at or the use of the Fire Station nor be in violation of the ADA. In addition, the exercise of access shall not conflict or interfere with the City System unless prior written permission is obtained from the City Representative.

(f) Any particular access on the Fire Station site may, at any time, temporarily or permanently, be closed, so long as an alternative means of access is made available to Licensee within a reasonable time. During the duration of any state of Emergency declared by the President of the United States, the Governor of the State of Colorado, or the Mayor of the City and County of Denver, access may be denied for security and public safety reasons. Licensee hereby releases and discharges the City from any and all claims, demands or causes of action which Licensee may now, or at any time hereafter, have against the City, arising or alleged to arise out of the closing of any point of access on the Fire Station site or the temporary unavailability of access to a Fire Station site.

## **SECTION 2 TERM and TERM EXTENSION**

### **2.01 Term.**

The Term of this Agreement shall be effective as of August 1, 2021 (the "Effective Date"), and shall expire on July 31, 2031, unless Licensee terminates the Agreement upon sixty (60) days written notice.

### **2.02 Term Extension.**

Licensee may exercise one (1) option to renew the License for one additional ten-year period with a 3% increase over the most recent lease rate at the end of the Term; and an additional option to renew the License for an additional five-year term at the market rate for comparable cell tower locations. Licensee shall provide notice to the City of its intent to exercise the renewal option by no later than sixty (60) days before the end of a Term. All terms and conditions shall remain in effect in accordance with this Agreement during the renewal period, including the percentage fee increase under Section 3.01, unless otherwise modified by mutual written agreement. Modifications, if any, must be set forth in an amendment to this Agreement and processed for approval in the same manner as the Agreement.

## **SECTION 3 LICENSE FEE**

### **3.01 License Fee.**

(a) Licensee agrees to pay City a monthly License Fee of **Four Thousand Dollars and Zero Cents (\$4,000.00)**, payable in equal monthly installments beginning on the Effective Date and continuing on the first day of each month thereafter for the Term of the Agreement and any

Term renewal. The License Fee shall increase three percent (3%) each year, with the increased License Fee taking effect on the anniversary of the Effective Date of this Agreement each year.

(b) The License Fee includes payment for electrical service for the Licensed System. If the cost of electrical service for the Licensed System exceeds Seven Hundred Dollars and Zero Cents (\$700.00) in any month then City shall be entitled to invoice Licensee for the amount in excess of \$700.00.

(c) Any License Fee paid to the City shall not be refundable in the event of Cancellation, as provided in this Agreement.

### **3.02 Place and Manner of Payments.**

All sums payable to City, including the License Fee and other costs and expenses incurred by the City and reimbursable by Licensee under this Agreement, shall be made payable, without notice, to the “Manager of Finance for the City and County of Denver” and delivered to:

City and County of Denver  
Division of Real Estate  
201 West Colfax Avenue, Dept. 1010  
Denver, Colorado 80202

All payments shall be made in legal tender of the United States. Any payment not made to City accrues interest at the lesser of (i) 18% per annum, or (ii) the maximum interest rate allowed under law, commencing on the fifth (5<sup>th</sup>) calendar day after the date such amount is due and owing until paid to City. Licensee agrees to pay any charges, fees, or costs incurred by the City for collection of unpaid License Fees or other unpaid costs and expenses of Licensee specified in this Agreement, including reasonable attorney’s fees.

## **SECTION 4 DESIGN, CONSTRUCTION AND INSTALLATION**

### **4.01 General.**

(a) On or after the Effective Date of this Agreement, Licensee shall, at its sole cost and expense, construct and install within the Licensed Area the Licensed System in accordance with **Exhibit A** (unless changes are authorized under section 4.02), and in accordance with the terms and conditions of this Agreement.

(b) The Licensed System shall in all respects be designed and installed in accordance with Applicable Law, and pursuant to any required building permit and zoning permit to be obtained by Licensee from the City, and according to requirements or design guidelines of the Denver’s Technology Services division, the Denver Department of Safety and the Denver Fire Department.

(c) Licensee shall also at its sole cost and expense perform the work necessary to extend that existing tower height, subject to City review and approval of the design. The implementation of the design and installation of the Licensed System, as described and depicted in **Exhibit A**, as well as

any changes, modifications or additions to the design, construction and installation of the Licensed System beyond those described and depicted in **Exhibit A** shall be subject to the oversight and approval of the City Representative as well as any other approvals required in this Agreement.

#### **4.02 Plans and Specifications.**

(a) Prior to any installation of any portion of the Licensed System, four (4) copies of complete and accurate plans and specifications for the Licensed System must be submitted to the City Representative for review. These plans and specifications must include complete specifications of transmitter power, operating frequencies, filter passband and rejection characteristics, antenna model numbers and radiation patterns (both horizontal and vertical plane patterns), antenna height and location, and placement of utilities servicing the Licensed System.

(b) Licensee shall cooperate with the City Representative in the review of the plans and specifications and shall make any reasonable modifications required by the City Representative. Upon completion of the review and any required modifications, the City Representative, in consultation with the Fire Chief, will approve the plans and specifications.

(c) To the extent that the approved plans and specifications are different from the information contained in **Exhibit A**, Licensee shall prepare, to the reasonable satisfaction of the City Representative and without modifying the Licensed Area depicted in **Exhibit A**, new exhibits reflecting such changes, and the changed exhibits will replace and supersede the corresponding exhibits attached to this Agreement.

(d) Installation work shall not commence, nor shall continue, until Licensee has established to the City Representative's reasonable satisfaction that the work will proceed in conformance with the approved plans and specifications and that all Applicable Law has been or will be fully and appropriately satisfied.

#### **4.03 Installation.**

(a) Licensee is responsible for undertaking all measures necessary and appropriate under Applicable Law to protect the health and safety of the public, City employees, and Licensee's employees and contractors and to lawfully conduct the work associated with the installation. Prior to the commencement of installation, Licensee or its contractor shall obtain and pay for all required permits, licenses and approvals. Good and workmanlike standards of design, construction and installation shall be required in connection with all such work.

(b) To the extent that building codes or other City requirements mandate that modifications be made to the roof or other infrastructure of the Fire Station as part of the installation, Licensee shall be required to include those modifications in its **Exhibit A** plans (unless changes are authorized under section 4.02) and to make such modifications, at its sole cost and expense and subject to prior written approval of such modifications by the City Representative and the City Representative's oversight of the modifications as they are being made. The City is not obligated to make any modifications to the Fire Station, including the Licensed Area, to support the installation.

(c) Licensee shall include in Licensee's contract(s) with its consultants and contractors

provisions whereby such consultants and contractors shall defend and hold harmless the City from all costs, liens, damages and expenses related to the design, construction and installation work.

(d) Licensee shall be responsible for obtaining utility locates prior to starting any authorized digging on City property. If damage should occur to any existing underground utilities or other underground facilities on City property, whether or not a utility locate was obtained, Licensee shall immediately report the damage to the City Representative and shall take all actions and incur all costs and expenses necessary to repair the damage in a manner satisfactory to the City Representative.

(e) Upon completion of the installation, Licensee shall timely furnish to the City Representative with documented evidence of payment, contractor's affidavits and full and final waivers of all liens for labor, services, or materials.

(f) Equipment shall be located in designated locations as depicted on **Exhibit A** within the Licensed Area. The temporary placement of any equipment or materials outside of the Licensed Area shall require the prior written approval of the City Representative. No equipment or materials shall be placed so as to block access at or use of the Fire Station or in violation of the ADA.

(g) Licensee is responsible for acquiring land lines required for the installation and operation of the Licensed System. The installation of land lines at the Fire Station shall be subject to the prior written approval of the City Representative. Licensee shall be solely responsible for paying any fees, charges, surcharges, taxes, assessments, and similar costs and expenses associated with the land lines.

(h) With respect to utilities, Licensee shall comply with section 5.07 and the installation requirements of this section 4.03.

(i) The City is not responsible for the Licensed System or Licensee's other authorized installations. Licensee shall be responsible for securing the Licensed System and Licensee's other authorized installations and keeping them in good working order.

## **SECTION 5 USE AND OPERATION**

### **5.01 Authorized Frequencies.**

In the operation of the Licensed System, Licensee may only operate Licensee's System in the radio bands and frequencies (and no others) which Licensee or FirstNet are authorized by the FCC to use. Operation in any radio band used by a City System is prohibited. Addition or change in radio bands or frequencies is prohibited unless Licensee first provides prior written notice to DFD or first provides an intermodulation report to DFD.

### **5.02 RF (Radio Frequency) Interference.**

(a) Licensee acknowledges that City's unimpeded use and operation of the Fire Station is critical to the health, safety and welfare of the City and County of Denver and its inhabitants. Licensee shall use its best efforts, at all times, to avoid any RF Interference or interference of any kind with the

operation or use of the Fire Station and the City System as set forth in this Agreement and **Exhibit C**. Licensee shall diligently work to prevent and, in the event of failure to do so, immediately correct radio frequency interference to the City System and any component elements, including the City's WiFi system, and to cooperate with, and comply with the directions from, the City Representative assigned to deal with RF Interference matters. To help achieve this goal, Licensee shall comply with the following:

(a) Licensee agrees to comply with all federal, state, local, or other government regulations applicable to Licensee and its activities operating or using the Licensed System, including, but not limited to, regulations and standards published by the FCC.

(b) Upon written request by the City Representative, Licensee agrees to conduct an Interference Study prior to commencing operations and/or during the entire Term or Term Extension of this Agreement, and to furnish the City Representative with the results of the Site Study and to include it as part of Licensee's System Plans and Specifications. If Licensee should fail within a period specified by the City Representative to undertake or complete an Interference Study, the City may arrange for such an Interference Study and Licensee shall reimburse the City for the cost and expense of conducting and preparing the Interference Study.

(c) Licensee agrees to comply with the current Minimum Technical Standards attached hereto as **Exhibit B**.

(d) In order to prevent interference, Licensee shall maintain and repair, at no cost to the City, the Licensed System, in order to comply with FCC rules and the reasonable requirements of the City Representative. If this maintenance should necessitate changing out or replacing existing antennas, the requirements of section 5.04 shall be applicable.

(e) If authorized to make changes, Licensee shall notify the City Representative of the specific changes to associated RF equipment, transmit and receive frequencies, transmitter output power, antenna configurations, and effective radiated power before making the changes. An Interference Study shall be conducted by Licensee, as directed by the City Representative and at Licensee's sole cost and expense, prior to any proposed frequency changes. The requirements of section 5.04 shall be applicable to the changes addressed herein.

(f) To extent there are more than one licensee operating at the Fire Station, Licensees are encouraged to resolve potential or real interference problems amongst themselves. Licensee agrees to cooperate fully with City and other licensees to diagnose and correct interference problems. Such cooperation may require Licensee to temporarily reduce or shut down transmit power to help diagnose problems.

(g) When the City Representative, based on inquiry and evaluation, becomes aware of a potential or existing interference problem caused directly or indirectly, wholly or partially, by the Licensed System, the City may require Licensee to reimburse City for the cost of an Interference Study to include radio frequency measurements. The purpose of this Interference Study is to identify the problem and determine if the problem is caused directly or indirectly, wholly or partially, by the Licensed System. This Interference Study shall be conducted by a consulting engineer selected by

the Fire Chief after consultation with Licensee and the City Representative. In the event there are additional licensees operating at the Fire Station, Licensee shall pay for a pro rata share of the costs of the Interference Study, unless Licensee is determined to be solely responsible for the interference, in which case Licensee shall pay all costs and expenses. Pro rata share shall be determined by dividing the costs by the number of non-City licensees operating at the Fire Station.

(h) When necessary to correct interference problems, as determined by the Chief in the Chief's reasonable discretion, Licensee agrees, at its sole cost and expense, to install cavity-type bandpass filters, notch filters, isolators, or other state-of-the-art equipment. These equipment items are in addition to the minimum equipment of the Minimum Technical Standards. The minimum equipment items shall be installed regardless.

(i) Licensee shall ensure that its frequencies used for the operation of the Licensed System do not interfere with any operation of the Fire Station, including without limitation interference with public safety or the City System. Licensee shall provide documentation of the frequencies that it is authorized to use and is using for the Licensed System. Licensee shall not occupy any frequencies that they are not using for the purposes of blocking other licensees from operating. Licensee shall be responsible for conducting an RF scan to verify there will be no interference with other systems. This shall occur prior to Licensee turning on the Licensed System and shall be documented by a third-party vendor and submitted to the City Representative. Once City Representative has reviewed this documentation, the City Representative will give notice to Licensee that it can turn on its Licensed System. If the City Representative is not satisfied with the details of the study, the City Representative will give notification to Licensee as to what needs to be remedied before notice to proceed will be given.

(j) If Licensee's equipment or operations cause RF Interference, as determined by the Fire Chief in the Fire Chief's reasonable discretion, including without limitation interference with the City System, and if the interference is not eliminated within ten (10) days after written notice from the Fire Chief, then City may, at Licensee's sole cost and expense, temporarily turn off the power to the Licensed System. The City Representative shall contact Licensee at the time the Licensed System needs to be deactivated so Licensee can facilitate the effort to deactivate the Licensed System, isolate any interference, and turn the Licensed System back on with minimal interruption. Licensee, at its sole cost and expense and subject to the requirements of section 5.06, shall (i) have the right to make such repairs, maintenance, replacements or adjustments to the Licensed System as may be reasonably necessary to prevent such interference, and (ii) have the right to conduct intermittent tests of the Licensed System at times mutually agreeable to the City Representative to determine if the Licensed System will continue to cause such interference.

(k) The City requires that Licensee operate its Licensed System with no interference to other licensees' systems. Any unresolved disputes regarding the cause or resolution of specific interference problems or complaints must be evaluated by an independent third party selected by the Fire Chief who is competent to evaluate the potential causes of the interference and the measures required for its resolution. If it is determined that interference to the equipment, frequencies or channels of Licensee or other licensees operating at the Fire Station is a result of the non-compliance of those facilities with the Minimum Technical Standards, it shall be the responsibility of Licensee or other licensees to resolve the interference in accordance with the Minimum Technical Standards. If the interference continues when these facilities are brought into compliance with the Minimum

Technical Standards, then it shall be Licensee's responsibility to take whatever measures are necessary to resolve the interference promptly and effectively or disengage the operation of the Licensed System until the interference is resolved to the satisfaction of the City Representative.

### **5.03 Operational Test Procedures.**

The following test procedures shall be approved by City prior to or during, whichever is applicable, Licensee's operation of the Licensed System.

- (a) Perform a desktop interference study to include all frequencies to be used by Licensee to ensure no interference is likely from intermodulation products or out-of-band emissions.
- (b) Verify the results of the Interference Study by conducting appropriate measurements of the installed systems.
- (c) If problems are found, make recommendations for additional filtering, channel changes, greater antenna separation, or other fixes, as necessary.

### **5.04 Changes to Licensed System.**

(a) Licensee shall provide prior written notice to the Fire Chief of any proposed change in radio cabinets, transmitter power, frequencies, filters, number of antennae, antenna locations, antenna height, antenna orientation, or related aspects of the Licensed System. Any proposed new, or proposed changes to, antennae, antenna mounts or mounting hardware, or structural changes to the Fire Station or tower, require that Professional Engineer stamped structural drawings be provided for review and approval. All reviews of proposed changes shall be subject to such process as prescribed by the Fire Chief and undertaken by the City Representative.

(b) Any proposed changes which are significant (as determined by the Fire Chief) will require a review of the current lease rate and may result in an additional License Fee being charged to Licensee and possible other changes to the terms and conditions of the Agreement. These changes, along with any addition, relocation or replacement of antennae or other equipment outside the Licensed Property, shall require an amendment to the Agreement which must be approved in the same manner as this Agreement. Changes or occupation or use of areas outside of the Licensed Property which are not authorized as provided herein will be considered to be in breach of this Agreement.

(c) All such changes shall be subject to the Minimum Technical Standards and the installation and operational conditions set forth in this Agreement. The approval form must be attached to the scope of work and stamped structural drawings sheets (not separate). All contractors, subcontractors and vendors must have a copy of the signed approval sheets to present to the officer in charge of the Fire Station, before any work may begin.

### **5.05 Repairs and Maintenance; Removal.**

(a) The maintenance, care, repair, alteration, enhancement or replacement of the Licensed System or infrastructure within the Licensed Area shall be made by Licensee at its sole cost and

expense. Licensee covenants and agrees during the Term or Term Extension of this Agreement, after the installation of the Licensed System and occupancy of the Licensed Area, that Licensee:

(1) shall keep the Licensed System in good order and condition, and will make all necessary and appropriate repairs or changes thereof if approved as required in section 5.04 above;

(2) shall not permit rubbish, debris, waste materials or anything unsightly or detrimental to health, or likely to create a fire or explosion hazard, or conducive to deterioration, to remain in any part of the Licensed Area or the Fire Station or to be disposed of improperly;

(3) shall at all times maintain the Licensed System in accordance with Applicable Law, the Minimum Technical Standards, FCC requirements, and manufacturer's specifications;

(4) shall promptly repair any and all damage to, among other things, the structures, equipment and surrounding property at the Fire Station which result from Licensee's installation and operation of its Licensed System including, but not limited to, any leaks or physical damage as a result of roof penetrations or other physical penetrations or structural damage to the building or structures, including the significant reduction in the useful life of buildings or structures or any parts thereof, caused by the Licensed System or its operation and/or other workmen and maintenance and repair activities involving the Licensed System;

(5) shall store tools, test equipment and work materials only in areas at the Fire Station approved by the City Representative; and

(6) shall restore any damage resulting from roof or other building penetrations and actions or omissions of the License in the Licensed Area or at the Fire Station so that the damaged property is restored to original condition.

(b) All portions of the Licensed System brought onto the Fire Station by Licensee will be and remain Licensee's personal property and, at Licensee's option, may be removed by Licensee at any time during or after the Term. City waives any and all lien rights it may have, statutory or otherwise, concerning the Licensed System or any portion thereof. Removal or other modifications are subject to Section 1.03 regarding access to the premises. The Licensed System shall be deemed personal property for purposes of this Agreement, regardless of whether any portion is deemed real or personal property under applicable law; City consents to Licensee's right to remove all or any portion of the Licensed System from time to time in Licensee's sole discretion subject to Section 1.03.

(c) If Licensee should be of the opinion that repair, alteration or replacement of the tower is needed ("Alteration"), Licensee shall submit in writing a request to the Fire Chief explaining the perceived need for the Alteration. City will maintain and repair the Tower, and all areas of the Licensed Area where Licensee does not have exclusive control, in reasonably good condition, subject to reasonable wear and tear and damage from the elements. Any obligation of the City to perform the work shall be strictly contingent upon approvals, including contracts, required by Applicable Law and obtaining all funding needed for the Alteration. If Licensee proposes to make and pay for the Alterations, it should provide plans and a budget with the request submitted to the Fire Chief.

## **5.06 Right to Enter, Inspect and Make Repairs and Improvements.**

(a) The City and its authorized officers, employees, agents, contractors, subcontractors and other representatives shall have the right (at such times as may be reasonable under the circumstances to avoid unreasonable interruption of Licensee's operations) to access the Licensed Area for the following purposes:

(1) to inspect such equipment at reasonable intervals during regular business hours (or at any time in case of Emergency or urgent need to protect the City System) to determine whether Licensee has complied and is complying with the terms and conditions of this Agreement;

(2) to perform maintenance and make repairs and replacements in cases where Licensee is obligated but has failed to do so, after the City has given Licensee reasonable notice so to do, in which event Licensee shall reimburse the City for the reasonable cost thereof within thirty (30) days of Licensee's receipt of City's invoice accompanied by reasonable substantiation of the costs incurred. The City shall have the right to seek recovery of the cost of the maintenance or repair by any judicial remedy available should Licensee fail to pay the cost of the repair. Under no circumstances will City attempt to repair or alter in any way Licensee's operational equipment such as base station radios, other electronic equipment, alarm systems, antennas, coaxial cable, DAS, UPS, etc.; however, this restriction shall not limit the City in performing inspections and repairs and protecting the City System and the Fire Station as provided in this Agreement.

(b) The City reserves the right at all times to take any action it deems necessary, in its sole discretion, to repair, maintain, alter, expand, or improve the City System and the Fire Station and the improvements thereon in connection with their use and operation. The City agrees to give reasonable advance notice of any such activities to Licensee and to reasonably cooperate with Licensee to carry out such activities with a minimum amount of interference to Licensee's use of the Licensed Area. Licensee agrees to cooperate with the City with respect to such repairs, maintenance, alterations, expansions, or improvements and to accommodate such work to the extent the City deems necessary and at Licensee's sole expense.

#### **5.07 Utilities.**

(a) Licensee may utilize electrical power provided by the City. Licensee may access power from the Station for the operation of the Licensed System, subject to use and payment under Section 3..

(b) Licensee shall be responsible for providing and properly maintaining and replacing, subject to the requirements of section 5.04 above and the installation requirements of section 4.03 above, an independent ventilation, heating and air conditioning system for those portions of the Licensed System, if any, that are expressly required by the manufacturer of the System to maintain manufacturer's warranties based upon Licensee's installation of the Licensed System at the Fire Station.

(c) City shall also allow Licensee use of the City's electrical generator located on the Fire Station site for the Licensee's System but limited to only when there is a power outage to the Licensee's System. City shall operate and maintain the generator consistent with DFD's standard

operating procedures, this License, and subject to appropriation. City makes no warranty or representation regarding the function, operation or suitability of the generator for the intended use.

#### **5.08 Interruption of Utility Services.**

(a) Licensee agrees that City shall not be liable for failure of any utility services to be supplied to the Licensed System, or for a failure of the electrical generator, or for any interruption of utility services to the Licensed System caused by third parties.

(b) The City reserves the right to temporarily interrupt utility services at such time as may be necessary by reason of accident, unavailability of employees, repairs, alterations or improvements or whenever by reason of *force majeure*, including any state of Emergency declared by the President of the United States, the Governor of the State of Colorado, or the Mayor of the City and County of Denver for which such interruption is reasonable for security and public safety reasons. The City shall not be liable for operational or business losses or for damages to persons or property due to such interruptions. Nor shall such interruptions in any way be construed as cause for abatement of the License Fee, unless caused by the demonstrated gross negligence or intentional misconduct of the City or its agents, contractors or employees.

(c) No backup power supplies shall be placed within the Licensed Area or elsewhere on City property without the prior, written approval of the City Representative and after obtaining any required permits, licenses or approvals for such backup power supplies.

### **SECTION 6**

#### **INSURANCE; INDEMNITY and DEFENSE; GOVERNMENTAL IMMUNITY; LIMITS ON LIABILITY; and TAXES, LICENSES, LIENS AND FEES**

#### **6.01 Insurance.**

(a) **General Conditions:** Licensee agrees to secure, at or before the time of execution of this Agreement, the following insurance covering all operations, goods or services provided pursuant to this Agreement. Licensee shall keep the required insurance coverage in force at all times during the Term of the Agreement, or any extension thereof, during any warranty period, and for three (3) years after termination of the Agreement. The required insurance shall be underwritten by an insurer eligible to do business in Colorado and rated by A.M. Best Company as "A-VII" or better. Each policy shall contain a valid provision or endorsement requiring thirty (30) days advanced notification to the City of any of the required policies that are canceled or non-renewed and not replaced. Such written notice shall be sent to the parties identified in the Notices section of this Agreement and to Denver Risk Management, 201 West Colfax Avenue, Dept. 1105, Denver, Colorado 80202. Licensee shall be responsible for the payment of any deductible or self-insured retention. The insurance coverages specified in this Agreement are the minimum requirements, and these requirements do not lessen or limit the liability of Licensee. Licensee shall maintain, at its own expense, any additional kinds or amounts of insurance that it may deem necessary to cover its obligations and liabilities under this Agreement.

(b) **Proof of Insurance:** Lessee may not commence services or work relating to this Agreement prior to placement of coverages required under this Agreement. Lessee certifies that

the certificate of insurance attached as Exhibit E, preferably an ACORD form, complies with all insurance requirements of this Agreement. The City requests that the City's contract number be referenced on the certificate of insurance. The City's acceptance of a certificate of insurance or other proof of insurance that does not comply with all insurance requirements set forth in this Agreement shall not act as a waiver of Lessee's breach of this Agreement or of any of the City's rights or remedies under this Agreement. The City's Risk Management Office may require additional proof of insurance, including but not limited to policies and endorsements.

(c) Additional Insureds: For Commercial General Liability and Business Auto Liability, Licensee, shall include the City and County of Denver, its elected and appointed officials, employees and volunteers as additional insured.

(d) Waiver of Subrogation: For all required coverages, Licensee's insurer shall waive subrogation rights against the City.

(e) Subcontractors: All subcontractors and subconsultants (including independent contractors, suppliers or other entities providing goods or services under this Agreement) shall be subject to all of the requirements herein and shall procure and maintain the same coverages required of Licensee. Licensee shall ensure that all such subcontractors and subconsultants maintain the required coverages. Licensee agrees to provide proof of insurance for all such subcontractors and subconsultants upon request by City.

(f) Workers' Compensation/Employer's Liability Insurance: Licensee shall maintain the coverage as required by statute for each work location and shall maintain Employer's Liability insurance with limits of \$100,000 per accident for each bodily injury claim, \$100,000 per accident for each bodily injury caused by disease claim, and \$500,000 aggregate for all bodily injuries caused by disease claims.

(g) Commercial General Liability: Licensee shall maintain a Commercial General Liability insurance policy with combined single limits of \$1,000,000 per occurrence for bodily injury and property damage including contractual liability, \$2,000,000 for each personal and advertising injury claim, \$2,000,000 products and completed operations aggregate, and \$2,000,000 general aggregate.

(h) Business Automobile Liability: Licensee shall maintain limits of \$1,000,000 combined single limit for bodily injury and property damage applicable to all owned, nonowned and hired vehicles operating on City property and elsewhere for work under this Agreement.

(i) Additional Provisions:

(1) For Commercial General Liability, the policy must provide the following:

- (i) That this Agreement is an Insured Contract under the policy;
- (ii) A severability of interests or separation of insureds (insured v. insured exclusion); and
- (iii) A provision that coverage is primary and non-contributory with other coverage or self-insurance maintained by the City.

(2) For claims-made coverage, if any, the retroactive date must be on or before the contract date or the first date when any goods or services were provided to the City, whichever is earlier.

(j) Failure to comply with the requirements of this section 6.01 shall be legal grounds under this Agreement for work by Licensee at the Fire Station to be ordered to cease or to be restricted, as deemed appropriate by the Fire Chief or the Denver Risk Management Office, until compliance is achieved and any unpaid claims are resolved to the reasonable satisfaction of the City Representative and the Denver Risk Management Office. These insurance obligations shall survive the expiration of the Agreement and Cancellation for three (3) years.

## **6.02 Indemnification & Defense.**

(a) Licensee hereby agrees to defend, indemnify, and hold harmless City, its appointed and elected officials, agents and employees against all liabilities, claims, judgments, suits or demands for damages to persons or property arising out of, resulting from, or relating to regarding the use and occupancy of, and activities and operations on, the Fire Station site by Licensee (including its officers, employees, representatives, suppliers, contractors, subcontractors and agents) under this Agreement (“Claims”), unless such Claims have been specifically determined by the trier of fact to be the sole negligence or willful misconduct of City. This indemnity shall be interpreted in the broadest possible manner to indemnify City for any acts or omissions of Licensee (including its officers, employees, representatives, suppliers, contractors, subcontractors and agents) either passive or active, irrespective of fault, including City’s concurrent negligence whether active or passive, except for the sole negligence or willful misconduct of City.

(b) Licensee’s duty to defend and indemnify City shall arise at the time written notice of the Claim is first provided to City regardless of whether an action has been filed in court on the Claim. Licensee’s duty to defend and indemnify the City shall arise even if City is the only party sued and/or it is alleged that City’s negligence or willful misconduct was the sole cause of the alleged damages.

(c) Licensee will defend any and all Claims which may be brought or threatened against City and will pay on behalf of City any expenses incurred by reason of such Claims including, but not limited to, court costs and attorney fees incurred in defending and investigating such Claims or seeking to enforce this indemnity obligation. Such payments on behalf of City shall be in addition to any other legal remedies available to City and shall not be considered City’s exclusive remedy.

(d) Insurance coverage requirements specified in this Agreement shall in no way lessen or limit the liability of Licensee under the terms of this indemnification obligation. Licensee shall obtain, at its own expense, any additional insurance that it deems necessary for City’s protection.

(e) This indemnification and defense obligation shall survive the expiration of this Agreement and Cancellation.

## **6.03 Colorado Governmental Immunity Act.**

Licensee understands and agrees that City is relying upon, and has not waived, the monetary limitations and all other rights, immunities and protection provided by the Colorado Governmental Act, § 24-10-101 *et seq.*, C.R.S., and any related statutory protections against liability.

#### **6.04 Limitation on Liability.**

Licensee agrees that no liability shall attach to the City for any damages or losses incurred or claimed by Licensee or any other person or party on account of the installation, construction or operation of the Licensed System by Licensee. Licensee agrees that it shall not in any way seek damages or make any claims against the City for any interference or delay caused by construction in adjacent areas, other businesses or operations, including without limitation damages or losses in the nature of delay damages, lost labor productivity, and impact damages.

#### **6.05 Environmental Requirements.**

(a) Licensee and its contractor(s) and subcontractor(s) shall obtain all federal, state, and local environmental permits necessary for the work to be performed and shall comply with all applicable federal, state, and local environmental permit requirements applicable to the work. Licensee and its contractor(s) and subcontractor(s) shall comply with all applicable local, state, and federal environmental guidelines, rules, regulations, statutes, laws, and orders applicable to the work (collectively, “Environmental Requirements”), including but not limited to Environmental Requirements regarding the storage, use, transportation, and disposal of Hazardous Materials and regarding releases or threatened releases of Hazardous Materials to the environment.

(b) The term “Hazardous Materials” shall mean asbestos, asbestos-contaminated soils, and asbestos-containing materials, special wastes, polychlorinated biphenyls (PCBs), any petroleum products, natural gas, radioactive source material, pesticides, any hazardous waste as defined at 42 U.S.C. § 6903(5) of the Solid Waste Disposal Act, any hazardous substance as defined at 42 U.S.C. § 9601(14) of the Comprehensive Environmental Response, Compensation and Liability Act, and chemical substance as defined at 15 U.S.C. § 2602(2) of the Toxic Substances Control Act, and any guidelines issued and rules or regulations promulgated pursuant to such statutes, or any other applicable federal or state statute.

(c) No Hazardous Materials shall be brought onto, or stored on, the Fire Station site without the prior, written approval of the City Representative and, if required by the City Representative, the prior, written approval of the Denver Department of Environmental Health and/or the Colorado Department of Public Health and Environment.

(d) The obligations of Licensee set out in this section 6.04 shall survive the expiration of the Agreement and Cancellation.

#### **6.06 Taxes, Licenses, Liens and Fees.**

(a) Licensee agrees to promptly pay all taxes, excises, license fees and permit fees of whatever nature applicable to its operations hereunder and to take out and keep current all municipal, state or federal licenses required for the conduct of its business or operations under this Agreement

and further agrees not to permit any of said taxes, excises, license fees or permit fees to become delinquent.

(b) Licensee also agrees not to permit any mechanic's or materialman's or any other lien to become attached or be foreclosed upon the Fire Station or the tower, or improvements thereto, or any part or parcel thereof, by reason of any work or labor performed or materials furnished by any mechanic or materialman for Licensee, as contractors or subcontractors.

(c) Licensee further agrees to promptly pay when due all bills, debts and obligations incurred by it in connection with its operations hereunder, and not to permit the same to become delinquent and to suffer no lien, mortgage, judgment or execution to be filed against the Fire Station, the Tower, the City System, the Licensed System, or related improvements, which may in any way impair the rights of the City under this Agreement or to the City's property.

(d) The obligations of Licensee set out in this section 6.05 shall survive the expiration of the Agreement and Cancellation.

#### **6.07 No Waiver.**

No failure of either Party to insist upon the strict performance of a term, covenant or agreement contained in this Agreement shall be deemed or taken to be a waiver by such Party of any succeeding failure to perform or any breach or default.

## **SECTION 7 CITY RIGHTS**

#### **7.01 City's Rights.**

(a) City shall retain all the rights to the use, occupancy and ownership of the Tower; and such use, occupancy and ownership by the City shall be the primary use of the Fire Station and shall not be interfered with by the exercise of the rights granted hereunder during the Term or Term Extension of the Agreement, except to the extent interference shall be a result of Licensee's reasonable uses and actions in the installation, inspection, maintenance, alteration, repair, replacement, operation and removal of the Licensed System as authorized under this Agreement; provided, however, that Licensee shall be liable to the City for any damage to improvements that may result from such installation, inspection, maintenance, alteration, repair, replacement, operation and removal.

(b) If the City desires Licensee to leave in place any modifications made by Licensee to the Tower and so states in a written notice to Licensee, then Licensee shall leave such modifications in place without compensation from or to the City. If Licensee is required to remove the modifications and does not restore damage resulting from said removal and thereby causing the City to have to undertake the restoration, then Licensee shall promptly reimburse the City for the work.

(c) The City specifically reserves for itself, other lessees, licensees and assignees of City, all rights which do not materially and adversely interfere with Licensee's exercise of its License under this Agreement; provided, however, the City will not materially and adversely interfere with, and will not knowingly permit or allow other licensees to materially and adversely interfere with, the rights of Licensee under the terms of this Agreement except to the extent expressly provided in this Agreement.

(d) Upon expiration of the Agreement or Cancellation or on the date specified in any demand for possession by the City after any default by Licensee (after any applicable notice and cure periods), Licensee covenants and agrees to surrender possession of the Licensed Area and all other parts of the Fire Station site to the City in the same condition as when first occupied, ordinary wear and tear excepted but subject to the repair and restoration requirements provided in this Agreement.

(e) Licensee shall remove, at its sole cost, upon expiration of the Agreement or Cancellation, the Licensed System and all of Licensee's personal property within thirty (30) calendar days after expiration or Cancellation, as applicable. If such removal should damage the Tower, Licensee agrees, at its sole cost, to immediately repair such damage in a good and workmanlike manner and to put the property in the same condition as it would have been if the Licensed System had not been installed, reasonable wear and tear excepted but subject to the repair and restoration requirements provided in this Agreement. If Licensee fails to remove the Licensed System and Licensee's personal property within thirty (30) calendar days after the expiration of this Agreement or Cancellation, as applicable, the City, at its option, may remove, store and/or dispose of same and retain any proceeds therefrom, and further is entitled to recover any cost incurred by the City in removing same and in restoring the Tower.

(f) If Licensee holds over after the expiration of this Agreement or Cancellation, and so long as the Licensed System is still situated on the Fire Station site (even if it has been disconnected), Licensee shall pay to City a holdover fee equal to 250% of the then total License Fee prorated from the effective expiration or Cancellation date, whichever is applicable, to the date the Licensed System is properly and completely removed from the property. Nothing herein shall be construed to give Licensee the right to hold over at any time, and the City may exercise any and all remedies at law or in equity to recover possession of the Property, as well as any damages caused by Licensee.

**SECTION 8  
LOSS OF AND LIABILITIES  
PERTAINING TO THE LICENSED SYSTEM**

**8.01 Damage or Destruction and Restoration.**

In case of damage or loss of all or any portion of the Licensed System or the Tower, Licensee will give prompt notice thereof to the City; and, except as otherwise provided herein, Licensee shall promptly commence and complete with due diligence (subject to delays beyond its control), the restoration of the Licensed System as nearly as reasonably practicable to the value and condition thereof immediately prior to such damage or destruction. In the event of such damage or destruction, Licensee shall be entitled to use or receive reimbursement from the proceeds of all property insurance policy or policies held by Licensee for the Licensed System. The License Fee payable under section

3.01 shall continue to be due and owing.

### **8.02 Licensee's Election Not to Restore Damaged Licensed System.**

In case of the damage or destruction of all or any part of the Licensed System, Licensee, within ninety (90) days thereafter, may elect not to restore or replace the Licensed System, and this Agreement shall be terminated. Licensee must notify the City within said 90 days of the damage or destruction to all or any part of the Licensed System of its intentions not to restore or replace the Licensed System and shall pay the City, in full, six (6) months of payments for the License Fee under section 3.01 from the date that the notice not to restore or replace is provided to the City. Licensee shall promptly proceed to remove the Licensed System from the Licensed Area and to repair and restore the Tower in accordance with Section 4 and section 7.01 and as otherwise provided in this Agreement within thirty (30) days after Licensee elects not to restore or replace the Licensed System. The obligations of Licensee under this section 8.02 shall survive the expiration of this Agreement and Cancellation.

## **SECTION 9 DEFAULT; REMEDIES; and DISPUTES**

### **9.01 Licensee Default.**

Licensee shall be in substantial default under this Agreement if Licensee:

(a) Fails to timely pay to the City on the fifth (5<sup>th</sup>) calendar day after the date License Fee or any other payments are due and owing under this Agreement; provided, however, default shall not occur until the tenth (10<sup>th</sup>) calendar day after written notice is provided by the City to Licensee; or

(b) Becomes insolvent, or takes the benefit of any present or future insolvency or bankruptcy statute, or makes a general assignment for the benefit of creditors, or consents to the appointment of a receiver, trustee or liquidator of any or substantially all of its property; or

(c) Transfers its interest under this Agreement, unless such transfer is specifically authorized pursuant to section 10.01; or

(d) Fails to submit or fails to timely submit complete and accurate plans and specifications, bonds, proof of insurance and other submittals as required by the express terms of this Agreement, and such failure continues for a period of thirty (30) calendar days after Licensee has received written notice from the City of such failure; or

(e) Abandons, deserts or vacates the Licensed System or Licensed Area; or

(f) Suffers any materialmen's or mechanic's lien or attachment to be filed against the Licensed System, the City System, the Tower, or the Fire Station because of any act or omission of Licensee, and such lien or attachment is not discharged or contested by Licensee in good faith by proper legal proceedings within thirty (30) calendar days after Licensee's receipt of written notice

thereof from City; or

(g) Fails to keep, perform and observe any other promise, covenant or agreement set forth in this Agreement and such failure continues for a period of more than thirty (30) calendar days after delivery by City of a written notice of such breach or default, except where a shorter period is specified herein, or where fulfillment of its obligation requires activity over a period of time and Licensee within thirty (30) days of Licensee notice Licensee commences in good faith to perform whatever may be required to correct its failure to perform and continues such performance without interruption except for causes beyond its control (which must be documented in a written notice to the City); or

(h) Gives its permission to any person to use for any illegal or unauthorized purpose any portion of the City's property made available to Licensee for its use under this Agreement; or

(i) Or any of its officers or employees are convicted, plead nolo contendere, enter into a formal agreement in which they admit guilt, enter a plea of guilty, or otherwise admit culpability to criminal offenses of bribery, kickbacks, collusive bidding, bid-rigging, antitrust, fraud, undue influence, theft, racketeering, extortion or any offense of a similar nature, in connection with the Licensee's business or operations in the State of Colorado.

## **9.02 Remedies.**

If Licensee substantially defaults in any of the covenants, terms and conditions herein and such default is not cured within any applicable notice and cure periods, the City may exercise any one or more of the following remedies:

(a) The City may elect to allow this Agreement to continue in full force and effect and to enforce all of City's rights and remedies hereunder, including without limitation the right to collect compensation as it becomes due together with interest or recover any damages or losses resulting from the action or inaction of Licensee.

(b) The City may engage in Cancellation and repossess the Licensed Area, without liability for so doing and without having to comply with any eviction process under state law, upon giving thirty (30) calendar days written notice to Licensee of the intended Cancellation, at the end of which time all the rights hereunder of Licensee shall terminate, unless the default shall have been cured as prescribed in section 9.01 or elsewhere in this Agreement. Licensee shall be liable to the City for all amounts owing to the City or any other party with respect to Licensee's operations at the Fire Station or under this Agreement.

(c) The remedies provided in this Agreement shall be cumulative and shall in no way affect any other remedy available to the City under law or equity. The obligations of Licensee under this section 9.02 shall survive the expiration of the Agreement and Cancellation.

## **9.03 City Default.**

City's failure to perform any term or condition under this Agreement within thirty (30) days after written notice from Licensee specifying the failure will be deemed a default by City and

a breach of this Agreement. No such failure, however, will be deemed to exist if City has commenced to cure the default within such period and provided such efforts are prosecuted to completion with reasonable diligence. Delay in curing a default will be excused if due to causes beyond the reasonable control of City. If City remains in default beyond any applicable cure period, Licensee will have: (i) the right to cure City's default and to deduct the costs of such cure from any monies due to City from Licensee, and (ii) any and all other rights available to it under law and equity. The Parties agree to work diligently together and in good faith, using reasonable efforts to resolve any unforeseen issues and disputes and to expeditiously take such actions as are necessary and appropriate to perform the duties and obligations of this Agreement. Any dispute between the City and Licensee, including whether a default by Licensee is substantial or has been timely and effectively cured, shall be taken to administrative hearing, pursuant to the procedure established by Section 56-106, DRMC. For the purpose of that procedure, the City official rendering a final determination shall be the Executive Director of the Denver Department of Safety.

## **SECTION 10 MISCELLANEOUS PROVISIONS**

### **10.01 Assignments.**

(a) Licensee shall not assign or otherwise transfer its interest in this Agreement, in whole or in part, or otherwise transfer any rights or interest in or to the License granted under this Agreement, without the prior written consent of the Fire Chief, which consent can be given or denied in Fire Chief's sole discretion, and subject to approval, under section 10.16 below, of an amendment to this Agreement authorizing the assignment. The Fire Chief may require any proposed assignee to demonstrate that it is appropriately licensed and authorized to provide the same services as Licensee and has the ability to perform the terms and conditions of this Agreement including any financial obligations under this Agreement.

(b) Notwithstanding the foregoing, Licensee may assign this Agreement, and the License granted herein, in whole, to any business entity which is parent, subsidiary, affiliate of Licensee, or to any party that acquires all or substantially all of Licensee's radio spectrum assets in the Denver market area, by reason of a merger, acquisition or other business reorganization. The burden shall be on Licensee to demonstrate, to the satisfaction of the Fire Chief, that any proposed assignment qualifies under this sub-section 10.01(b).

(c) The License granted under this Agreement may not be sold under any circumstances. Any contract entered by Licensee to sell or convey the License granted herein shall not be binding on the City and shall be grounds for terminating the Agreement, at the discretion of the Fire Chief.

(d) Under no circumstances shall Licensee be authorized to allow any other licensee or sub-licensee to co-locate or operate any system at the Fire Station or the Tower.

### **10.02 Fair Dealing; Further Assurances.**

(a) In all cases where the consent or approval of one Party is required before the other may act, or where the agreement or cooperation of the Parties is separately or mutually required as a

legal or practical matter, then in that event the Parties agree that each will act in a fair and reasonable manner with a view to carrying out the intents and goals of this Agreement as the same are set forth herein, subject to the terms hereof.

(b) From time to time, upon the request of a Party, the other Party agrees to make, execute and deliver or cause to be made, executed and delivered to the requesting Party any and all further instruments, certificates and documents consistent with the provisions of this Agreement as may, in the reasonable opinion of the requesting Party, be necessary or desirable in order to effectuate, complete or perfect the rights of said Party under this Agreement, provided said requesting Party is currently in full compliance with the provisions of this Agreement and has tendered or offered to tender any reciprocal instruments, certificates and documents to which the other Party is entitled under the Agreement.

### **10.03 Bond Ordinance.**

This Agreement and the rights granted or conveyed hereby are in all respects subject and subordinate to any and all City bond ordinances related to the Fire Station and to any other bond ordinances which should amend, supplement or replace such bond ordinances.

### **10.04 Financial Interests.**

Except for financial interests authorized by the City in accordance with the City Charter and ordinances, any financial interests created in, or used to secure financing and payment for the costs of, any work performed or improvements made under this Agreement, including but not limited to any bonds, certificates of participation, purchase agreements, and Uniform Commercial Code filings, shall expressly exclude from such debt or financial security contained in such financial instrument(s) any title, rights and interests held by the City in the property subject to this Agreement. The terms and conditions of this Agreement must be expressly recognized in any such financial instrument(s) created or entered by or on behalf of Licensee, which must specifically acknowledge and affirm that any financial interests created by the financial instrument(s) are subordinate to this Agreement and may not encumber the City's title, rights and interests in the subject property or under this Agreement.

### **10.05 Appropriation.**

Notwithstanding any provision of this Agreement to the contrary, the rights and obligations of the City under this Agreement are contingent upon all funds necessary for work or expenditures contemplated under this Agreement being budgeted, appropriated and otherwise made available by the City. The Parties acknowledge that this Agreement is not intended to create a multiple-fiscal year direct or indirect debt or financial obligation of the City, except to the extent that capital improvement funds that are lawfully appropriated can be lawfully carried over to subsequent years.

### **10.06 Contracting or Subcontracting.**

Any work that is allowed to be contracted or subcontracted under this Agreement shall be subject, by the terms of the contract or subcontract, to every provision of this Agreement. Compliance with this provision shall be the responsibility of the Party who arranged the contract or authorized the

subcontract. Except as otherwise expressly stated in this Agreement, no Party shall be liable or have a financial obligation to or for any contractor, subcontractor, supplier, or other person or entity with which the other Party contracts or has a contractual arrangement.

#### **10.07 Third Parties.**

This Agreement does not, and shall not be deemed or construed to, confer upon or grant to any third party or parties any right to claim damages or to bring any suit, action or other proceeding against either the City or Licensee because of any breach hereof or because of any of the terms, covenants, agreements and conditions herein.

#### **10.08 Force Majeure.**

Neither Party hereto shall be liable to the other for any failure, delay or interruption in the performance of any of the terms, covenants or conditions of this Agreement due to causes beyond the reasonable control of that Party, including without limitation strikes, boycotts, labor disputes, embargoes, shortages of materials, acts of God, acts of the public enemy, acts of superior governmental authority, severe weather conditions, fire, floods, riots, rebellion, sabotage or any other circumstance for which such Party is not responsible or which is not in its power to control, but in no event shall this section be construed so as to allow Licensee to reduce or abate its obligation to pay the License Fee prescribed in this Agreement.

#### **10.09 No Discrimination in Employment.**

In connection with the performance of this Agreement, the Parties agree not to refuse to hire, discharge, promote or demote, or to discriminate in matters of compensation against any person otherwise qualified, solely because of race, color, religion, national origin, gender, gender identity or gender expression, age, military status, sexual orientation, gender variance, marital status, or physical or mental disability; and the Parties further agree to insert the foregoing provision in all approved contracts and subcontracts hereunder.

#### **10.10 Conflict of Interest.**

The Parties agree that no official, officer or employee of the City shall have any personal or beneficial interest whatsoever in the services or property described herein, and Licensee further agrees not to hire or contract for services any official, officer or employee of the City or any other person which would be in violation of the Denver Revised Municipal Code Chapter 2, Article IV, Code of Ethics, or Denver City Charter provisions 1.2.9 and 1.2.12.

#### **10.11 Applicable Law; Authority; Venue; Enforcement; and Claims.**

(a) The Parties agree to comply with all Applicable Law in existence as of the Effective Date of this Agreement or as may be subsequently enacted or adopted and become applicable.

(b) This Agreement shall be construed and enforced in accordance with the laws of the United States, the State of Colorado, and the applicable provisions of the Charter and Revised

Municipal Code of the City and County of Denver.

(c) Venue for any legal action relating to this Agreement shall lie in the District Court in and for the City and County of Denver.

(d) The Parties agree that this Agreement may be enforced in law or in equity for specific performance, injunctive, or other appropriate relief, including actual damages (notwithstanding Cancellation), as may be available according to the laws and statutes of the State of Colorado; provided, however, the Parties agree to and hereby release any claims for incidental, consequential, or punitive damages; provided, further, no provision of this Agreement may be enforced by the creation or recording of any type of lien against real property owned by the City, nor may any foreclosure process be utilized to recover any moneys owed by the City to Licensee. It is specifically understood that, by executing this Agreement, each Party commits itself to perform pursuant to these terms and conditions contained in this Agreement, and that any failure to comply which results in any recoverable damages shall not cause, by itself, the revocation or termination of any rights or obligations under this Agreement.

(e) Nothing in this section 10.11 shall be construed as a waiver, release, reduction or modification of any insurance, bond, indemnification or other liability obligations of Licensee or Licensee's design professional, contractor or sub-contractor expressly provided for in this Agreement.

(f) No official, officer, director, agent, or employee of either Party shall be charged personally or held contractually liable to the other Party or its officials, officers, directors, agents, or employees under any term or condition of this Agreement or for any breach, default, or violation under this Agreement.

(g) In the event that any claim, demand, suit, or action is made or brought in writing by any person or entity against one of the Parties related in any way to this Agreement, the Party in receipt of same shall promptly notify and provide a copy of said claim, demand, suit, or action to the other Party.

#### **10.12 Use, Possession or Sale of Alcohol or Drugs; Smoking Policy.**

(a) Licensee and its officers, agents, employees, and contractors shall cooperate and comply with the provisions of the City and County of Denver's policy or order or any successor policy or order concerning the use, possession or sale of alcohol or drugs on City property.

(b) Licensee and its officers, agents, employees, and contractors shall cooperate and comply with the provisions of the City's policy or order prohibiting smoking in buildings and certain facilities, and Licensee agrees it will take reasonable action to prohibit smoking by its employees in the public areas of the Fire Station.

#### **10.13 Notices.**

All legal and administrative notices hereunder shall be given in writing to the following by hand

delivery or by certified mail, return receipt requested.

To the City:

Fire Chief of the Denver Fire Department  
City and County of Denver  
745 West Colfax Avenue  
Denver, CO 80204

City Attorney's Office  
City and County of Denver  
1437 Bannock Street, Room 353  
Denver, Colorado 80202

To Licensee:

New Cingular Wireless PCS, LLC  
Attn: Network Real Estate Administration  
Re: Cell Site #: COL01560; Cell Site Name: MLK and Trenton (CO)  
Fixed Asset #: 14799270  
1025 Lenox Park Blvd NE, 3rd Floor  
Atlanta, Georgia 30319

With a copy to:  
New Cingular Wireless PCS, LLC  
Attn.: Legal Dept – Network Operations  
Re: Cell Site #: COL01560; Cell Site Name: MLK and Trenton (CO)  
Fixed Asset #: 14799270  
208 S. Akard Street

Dallas, TX 75202-4206

All proposed amendments to the Agreement, letter approvals for proposed actions by Licensee, proposed changes to the exhibits, and any document or affidavit seeking the signature of the Fire Chief or the Executive Director of Safety, shall be provided to both the Fire Chief and the City Attorney's Office. Licensee and City shall designate local contact personnel for operational and otherwise day-to-day business communications which may be made by telephone or email. Any changes to this contact information shall be provided immediately once known.

#### **10.14 Examination of Records and Audit.**

Any authorized agent of the City, including the City Auditor or his or her representative, has the right to access, and the right to examine, copy and retain copies, at City's election in paper or electronic form, any pertinent books, documents, papers and records related to Licensee's performance pursuant to this Agreement, and any other transactions related to this Agreement. Licensee shall cooperate with City representatives and City representatives shall be granted access to the foregoing documents and information during reasonable business hours and

until the latter of three (3) years after the final payment under the Agreement or expiration of the applicable statute of limitations. When conducting an audit of this Agreement, the City Auditor shall be subject to government auditing standards issued by the United States Government Accountability Office by the Comptroller General of the United States, including with respect to disclosure of information acquired during the course of an audit. No examination of records and audits pursuant to this paragraph shall require Licensee to make disclosures in violation of state or federal privacy laws. Licensee shall at all times comply with D.R.M.C. 20-276.

#### **10.15 Parties' Obligation Regarding Confidential Information.**

The Parties agree that issues governing the use and disclosure of Confidential Information, as defined below, provided to or made available to the City by Licensee will be governed by the following provisions:

(a) As used herein, the term "Confidential Information" means all information, of any nature and in any form, regardless of when given, that (i) is disclosed or provided by or through Licensee to the City pursuant to performance of this Agreement; and (ii) has been clearly marked or indicated in writing as being confidential by Licensee; provided, that no part of this Agreement or the exhibits attached to this Agreement shall be deemed to contain Confidential Information. Information falling within this definition shall be treated by the City as confidential proprietary information of Licensee pursuant to the provisions of the Colorado Open Records Act and under any rule of court. Information not so marked or indicated will not be so considered.

(b) Except as expressly provided in this Agreement or as otherwise mandated by the Colorado Open Records Act or other applicable law, the City will not disclose Confidential Information to anyone other than individuals designated by the Fire Chief, including the City Representative, without the prior written consent of Licensee. The City will not use, or permit others to use, Confidential Information for any purpose other than actions incidental to the performance and enforcement of this Agreement between the City and Licensee, including but not limited to auditing of records of Licensee by the City Auditor and/or other representatives of the City. The City will take all reasonable measures to avoid disclosure, dissemination or unauthorized use of Confidential Information, including, at a minimum, those measures that it takes to protect its own Confidential Information of a similar nature.

(c) The Parties recognize that the mere marking of a document as "Confidential" does not render it conclusively confidential under the Colorado Open Records Act. Consequently, in the event that the City is served with an Open Records Request or subpoena from any third party requesting all or part of any Confidential Information as defined herein, the City shall give timely notice to Licensee of such request or subpoena within the time parameters of the Colorado Open Records Act or of any applicable court rule. In that event, Licensee agrees upon receipt of actual notice from the City of such Open Records Request or subpoena to immediately undertake, at its own cost and expense, to defend such Confidential Information from disclosure pursuant to the Colorado Open Records Act or applicable court rule and shall defend, save and hold harmless and indemnify the City and its agents and employees with respect to such issues.

(d) Licensee shall not at any time or in any manner, either directly or indirectly,

divulge, disclose or communicate to any person, firm or corporation in any manner whatsoever any information concerning any matters which are not subject to public disclosure, including without limitation the trade secrets of businesses or entities doing business with the City, security measures utilized by the City, and other privileged or confidential information.

#### **10.16 Entire Agreement; Amendment.**

The Parties acknowledge and agree that the provisions contained herein, including all exhibits attached hereto, constitute the entire agreement and that all representations made by any officer, agent or employee of the respective Parties unless included herein are null and void and of no effect. No alterations, amendments, changes or modifications, unless expressly reserved to the City herein, shall be valid unless executed by an instrument in writing by all the Parties with the same formality as this Agreement.

#### **10.17 Severability.**

If any term or provision of this Agreement is held by a court of law (following all legal rights of appeal or the expiration of time therefore) to be illegal or unenforceable or in conflict with any law of the State of Colorado or the City Charter or City ordinance, the validity of the remaining portions or provisions shall not be affected, and the rights and obligations of the Parties shall be construed and enforced as if the Agreement did not contain the particular term or provision held to be invalid; provided, however, if the invalidated term or provision was a critical or material consideration of either Party in entering this Agreement, the Parties shall work together, in good faith, to come up with an amendment to this Agreement that substantially satisfies the previously intended consideration while being in compliance with Applicable Law and the judgment of the court. Judicial invalidation of the License Fee, in whole or part, shall result in a failure of consideration and termination of this Agreement.

#### **10.18 Time of Essence.**

The Parties agree that in the performance of the terms and requirements of this Agreement by Licensee and the City, time is of the essence.

#### **10.19 Section Headings.**

The section headings herein are for convenience in reference only and are not intended to define or limit the scope of any provision of this Agreement.

#### **10.20 Approval and Execution of Agreement.**

This Agreement is expressly subject to and shall not be or become effective or binding on the City until City Council approval, if required by Charter, is obtained and the Agreement is fully executed by all required City signatories and all required Licensee signatories.

#### **10.21 Authority.**

Each Party represents and warrants that it has taken all actions that are necessary or that are required by its applicable law to legally authorize the undersigned signatories to execute this Agreement on behalf of the Party and to bind the Party to its terms. The person(s) executing this Agreement on behalf of each Party warrants that he/she/they have full authorization to execute this Agreement. The City shall have the right, in its discretion, to either temporarily suspend or permanently terminate the Agreement if there is any valid dispute as to the legal authority of Licensee or the person signing this Agreement on behalf of Licensee to enter into this Agreement.

#### **10.22 Electronic Signatures and Electronic Records.**

Licensee consents to the use of electronic signatures by the City. The Agreement, and any other documents requiring a signature hereunder, may be signed electronically by the City in the manner specified by the City. The Parties agree not to deny the legal effect or enforceability of the Agreement solely because it is in electronic form or because an electronic record was used in its formation. The Parties agree not to object to the admissibility of the Agreement in the form of an electronic record, or a paper copy of an electronic document, or a paper copy of a document bearing an electronic signature, on the ground that it is an electronic record or electronic signature or that it is not in its original form or is not an original.

**Contract Control Number:** FINAN-202056354-00  
**Contractor Name:** New Cingular Wireless PCS, LLC

IN WITNESS WHEREOF, the parties have set their hands and affixed their seals at Denver, Colorado as of:

**SEAL**

**CITY AND COUNTY OF DENVER:**

**ATTEST:**

By:

\_\_\_\_\_

\_\_\_\_\_

**APPROVED AS TO FORM:**

**REGISTERED AND COUNTERSIGNED:**

Attorney for the City and County of Denver

By:

By:

\_\_\_\_\_

\_\_\_\_\_

By:

\_\_\_\_\_

**Contract Control Number:**  
**Contractor Name:**

FINAN-202056354-00  
New Cingular Wireless PCS, LLC

By: AT&T MOBILITY LLC

By: *Please see next page for signature*

Name: \_\_\_\_\_  
(please print)

Title: \_\_\_\_\_  
(please print)

ATTEST: [if required]

By: \_\_\_\_\_

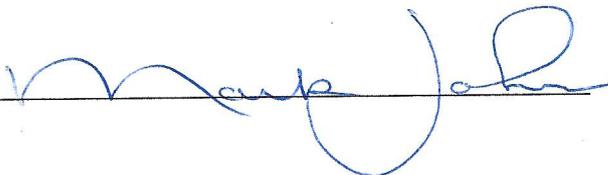
Name: \_\_\_\_\_  
(please print)

Title: \_\_\_\_\_  
(please print)

Contract Control Number:  
Contractor Name:

FINAN-202056354-00  
NEW CINGULAR WIRELESS PCS, LLC

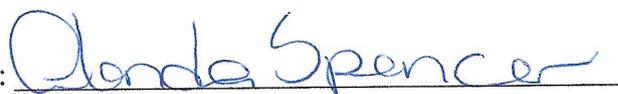
By: AT&T MOBILITY LLC

By: 

Name: MARK JOHNS  
(please print)

Title: AREA MANAGER  
(please print)

ATTEST: [if required]

By: 

Name: Alonda Spencer  
(please print)

Title: Finance Manager-RMR  
(please print)

# EXHIBIT A - PREMISES



FA NUMBER: 14799270 / SITE ID: COL01560/USID: 274673  
 PACE NUMBER: MRUTH031975  
 PROJECT TRACKING #:3755A0LGAB  
 PROJECT: NEW SITE BUILD  
 SITE NAME: NSB-CO.MLK\_AND\_TRENTON\_COL01560

SITE ADDRESS: 7934 MARTIN LUTHER KING BLVD  
 CITY, STATE, ZIP: DENVER, CO, 80238  
 COUNTY: DENVER

PLANS PREPARED FOR:  
**NEXIUS**  
 NEXIUS  
 7025 S FULTON ST SUITE 100  
 CENTENNIAL, CO 80112

PLANS PREPARED FOR:  
**at&t**  
**AT&T MOBILITY**  
 161 INVERNESS DRIVE WEST, 2ND FLOOR  
 ENGLEWOOD, CO 80112

PLANS PREPARED BY:  
**TOWER ENGINEERING PROFESSIONALS**  
 500 E. 84TH AVE, SUITE C10  
 THORNTON, CO 80229  
 OFFICE: (303) 566-9914  
 www.tepgroup.net

**SITE ADDRESS:** 7934 MARTIN LUTHER KING BLVD  
 DENVER, CO 80238  
 (DENVER COUNTY)

**LATITUDE (NAD83):** 39° 45' 33.42"  
 39.759282°

**LONGITUDE (NAD83):** 104° 53' 43.60"  
 -104.895445°

**GROUND ELEVATION (NADV88):** 5314.59' (AMSL)

**JURISDICTION:** CITY AND COUNTY OF DENVER  
**JURISDICTION CONTACT:** -

**BLOCK:** N/A  
**LOT:** N/A  
**ZONING:** C-MU-20 - URBAN CENTER MULTI UNIT 20 STORIES

**PARCEL / MAP NUMBER:** 0128326004000  
**PROPERTY OWNER:** CITY & COUNTY OF DENVER  
 201 W COLFAX AVE DEPT 401  
 DENVER, CO 80202

**TOWER OWNER:** DENVER FIRE DEPT  
**TOWER SITE NAME:** DFD #26

**STRUCTURE TYPE:** SELF SUPPORT TOWER  
**STRUCTURE HEIGHT:** 120'-0" (PROPOSED)  
 100'-0" (EXISTING)

**POWER PROVIDED:** DENVER FIRE DEPARTMENT  
 MIKE STUTZ  
 (720) 913-2404

**TELCO PROVIDER:** TBD

**GAS PROVIDER:** N/A



**LOCATION MAP**

**FROM AT&T OFFICE:**  
 1) GET ON I-25 N TOWARD FORT COLLINS  
 2) MERGE ONTO 225 N  
 3) MERGE ONTO I-70 W  
 4) TAKE EXIT 279B PROCEED SOUTH ON CENTRAL PARK BLVD  
 5) TAKE A RIGHT AT M.L.K. BLVD  
 6) TAKE A LEFT AT TRENTON ST  
 7) TAKE A LEFT AT E 29TH PL  
 7) REFER TO SITE PLAN FOR SITE LOCATION

CONSTRUCTION OF A TELECOMMUNICATION FACILITY, CONSISTING OF ANTENNAS & ASSOCIATED APPURTENANCES ON A PROPOSED TOWER EXTENSION, FENCED COMPOUND & SERVICE EQUIPMENT FOR FUTURE CARRIERS. NO WATER OR SEWER IS REQUIRED.

1. FACILITY DESIGNED IN ACCORDANCE WITH CITY AND COUNTY OF DENVER REGULATIONS.  
 2. THIS IS AN UNMANNED FACILITY WHICH WILL NOT REQUIRE ANY WATER OR SEWER FACILITIES.  
 3. TRAFFIC WILL CONSIST ONLY OF MAINTENANCE PERSONNEL, VISITING THE SITE APPROXIMATELY TWICE A MONTH.

SHEET	DESCRIPTION	REV
T1	TITLE SHEET	9
C1	SITE PLAN	9
C2	COMPOUND DETAIL	9
C3	TOWER ELEVATION	5
C4	ANTENNA MOUNTING DETAILS	6
C5	ICE BRIDGE DETAILS	6
C6	COAX MOUNTING DETAILS	5
C7	CABINET DETAILS	6
C8	EQUIPMENT DETAILS	5
C9	CONDUIT PENETRATION DETAILS	6
E1	ELECTRICAL NOTES	5
E2	ONE-LINE ELEVATION AND POWER PANEL SCHEDULE	7
E2A	EXISTING PANEL AND GENERATOR DETAILS	7
E3	POWER TELCO PLAN AND ONE-LINE DIAGRAM	9
E4	DC - FIBER SYSTEM DIAGRAM	5
E5	DC - WIRING DIAGRAM	5
E6	LOAD CENTER DETAILS	5
G1	GROUNDING PLAN AND DETAILS	5
G2	ANTENNA GROUND DETAILS	5
G3	GROUNDING DETAILS	5
N1	GENERAL NOTES	5
<b>STRUCTURAL DESIGN DRAWINGS</b>		
T-1	TITLE SHEET	0
N-1	MI CHECKLIST AND NOTES	0
N-2	PROJECT NOTES I	0
N-3	PROJECT NOTES II	0
S-1	TOWER ELEVATION AND MODIFICATION SCHEDULE	0
S-2	LEG REINFORCEMENT DETAILS I	0
S-3	LEG REINFORCEMENT DETAILS II	0
S-4	LEG SLEEVE WELD PROCEDURE	0

REV	DATE	ISSUED FOR:
9	04-28-21	CONSTRUCTION
8	04-19-21	CONSTRUCTION
7	10-22-20	CONSTRUCTION
6	10-13-20	CONSTRUCTION
5	10-02-20	PRELIMINARY
4	08-26-20	PRELIMINARY
3	06-15-20	PRELIMINARY
2	06-03-20	PRELIMINARY

**DRAWN BY:** KES **CHECKED BY:** NMC

**SITE INFORMATION**

**APPLICANT:** AT&T MOBILITY CORPORATION  
 161 INVERNESS DRIVE WEST, 2ND FLOOR  
 ENGLEWOOD, CO 80112

**PROJECT MANAGEMENT FIRM:** NEXIUS SOLUTIONS  
 JACLYN LEVINE  
 (773) 870-5221

**A&E FIRM:** TOWER ENGINEERING PROFESSIONALS  
 500 E 84TH AVE, SUITE C10  
 THORNTON, CO 80229

**ENGINEER:** NICHOLAS M. CONSTANTINE, P.E.  
 (303) 566-9914

**DIRECTIONS**

CALL FOR UNDERGROUND UTILITIES PRIOR TO DIGGING  
 (800) 424-5555  
**EMERGENCY:**  
 CALL 911

**Know what's below. Call before you dig.**

**PROJECT DESCRIPTION & NOTES**

ALL WORK AND MATERIALS SHALL BE PERFORMED AND INSTALLED IN ACCORDANCE WITH THE CURRENT EDITIONS OF THE FOLLOWING CODES AS ADOPTED BY THE LOCAL GOVERNING AUTHORITIES. NOTHING IN THESE PLANS IS TO BE CONSTRUED TO PERMIT WORK NOT CONFORMING TO THE LATEST EDITIONS OF THE FOLLOWING:

- INTERNATIONAL BUILDING CODE (2018 EDITION W/ AMENDMENTS)
- INTERNATIONAL CODE COUNCIL
- ANSI/TIA/EIA-222-G
- NATIONAL ELECTRIC CODE (2020 EDITION)
- CITY/COUNTY ORDINANCES
- CITY AND COUNTY OF DENVER COMMUNITY PLANNING AND DEVELOPMENT

**INDEX OF SHEETS**

THIS PROJECT CONSISTS OF:

- INSTALL (6) PANEL ANTENNAS
- INSTALL (12) RRHS
- INSTALL (3) SQUIDS
- INSTALL (3) FIBER CABLES
- INSTALL (6) DC TRUCKS
- INSTALL (1) 3-BAY WUC (WALK UPTO CABINETS)
- INSTALL (1) CONCRETE PAD
- INSTALL WAVEGUIDE
- INSTALL 30KW GENERATOR
- INSTALL 20'-0" EXTENSION TO TOWER
- RELOCATE FIRE DEPT ANTENNAS AND COAX
- INSTALL TOWER STRUCTURAL MODIFICATIONS

**SITE INFORMATION**

**CODE COMPLIANCE**

**SCOPE OF WORK**

SEAL:

**SHEET NUMBER:** T-1 **REVISION:** 9  
 TEP#: 240575.203552

**LEGEND**

- PARENT PROPERTY LINE
- - - - ADJACENT PROPERTY LINE
- EASEMENT/LEASE CORNER
- Ⓜ EXIST. METER
- Ⓣ EXIST. TRANSFORMER
- Ⓢ EXIST. UTILITY POLE
- Ⓣ EXIST. TELCO PEDESTAL
- ⊙ SECTION CORNER
- ⊙ PROPERTY CORNER
- - - 200 - - - EXIST. CONTOUR LINE
- ▨ EDGE OF PAVEMENT
- - - OHW - - - OVERHEAD WIRE
- - - BT - - - BURIED TELEPHONE LINE
- - - R/W - - - RIGHT-OF-WAY
- X — FENCE
- ⋈ EXISTING TREE LINE

**1A COORDINATES**

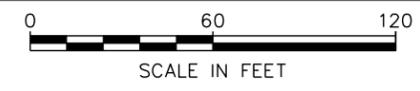
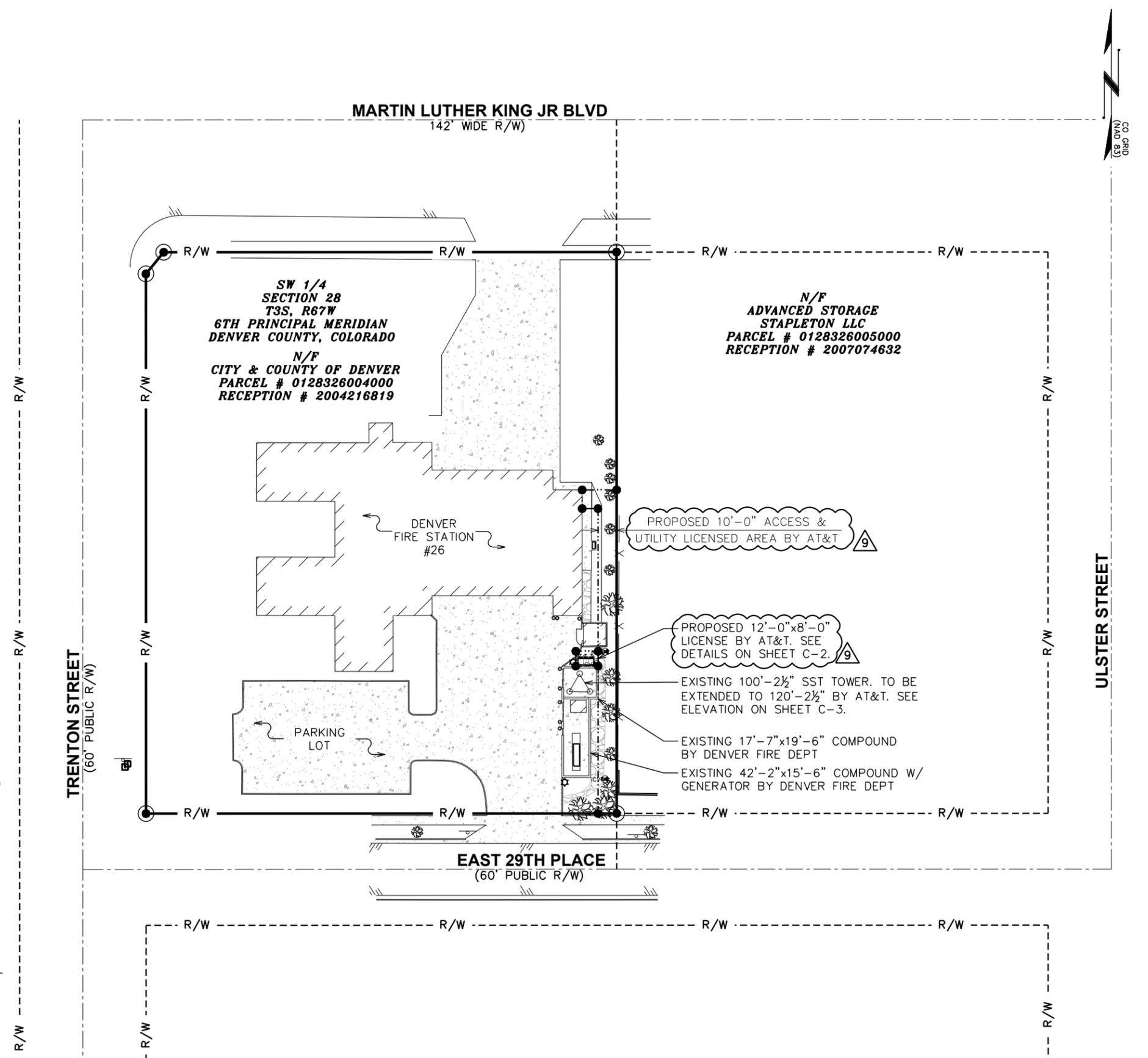
LATITUDE: N 39.759282° (NAD83)  
 LONGITUDE: W 104.895445° (NAD83)  
 GROUND ELEVATION: 5,314.59'± (NAVD88)

**NOTES:**

1. THE BASIS OF THE MERIDIANS AND COORDINATES FOR THIS PLAT IS THE COLORADO CENTRAL ZONE COORDINATE SYSTEM, NORTH AMERICAN DATUM 1983 (COCZCS NAD83).
2. VERTICAL INFORMATION SHOWN, BASED ON THE NORTH AMERICAN VERTICAL DATUM OF 1988 (NAVD 88).
3. ALL DISTANCES ARE GROUND UNLESS OTHERWISE NOTED.
4. PROPERTY LOCATED IN FLOOD ZONE "X", AN AREA DETERMINED TO BE OUTSIDE 0.2% ANNUAL FLOOD BASED UPON FEMA COMMUNITY PANEL# 0800460094H, EFFECTIVE NOVEMBER 20, 2013.

**SITE PLAN**

SCALE: 1" = 60'



PROJECT INFORMATION:  
**SITE NAME:**  
 NSB-CO.MLK AND TRENTON\_COL01560  
**FA NUMBER:** 14799270  
**PACE NUMBER:** MRUTH031975  
**PROJECT:** NEW SITE BUILD  
 7934 MARTIN KING BLVD  
 DENVER, CO 80238  
 (DENVER COUNTY)

PLANS PREPARED FOR:  
**nexius**  
 NEXIUS  
 7025 S FULTON ST SUITE 100  
 CENTENNIAL, CO 80112

PLANS PREPARED FOR:  
  
**AT&T MOBILITY**  
 161 INVERNESS DRIVE WEST, 2ND FLOOR  
 ENGLEWOOD, CO 80112

PLANS PREPARED BY:  
  
**TOWER ENGINEERING PROFESSIONALS**  
 500 E. 84TH AVE, SUITE C10  
 THORNTON, CO 80229  
 OFFICE: (303) 566-9914  
 www.tepgroup.net

SEAL:

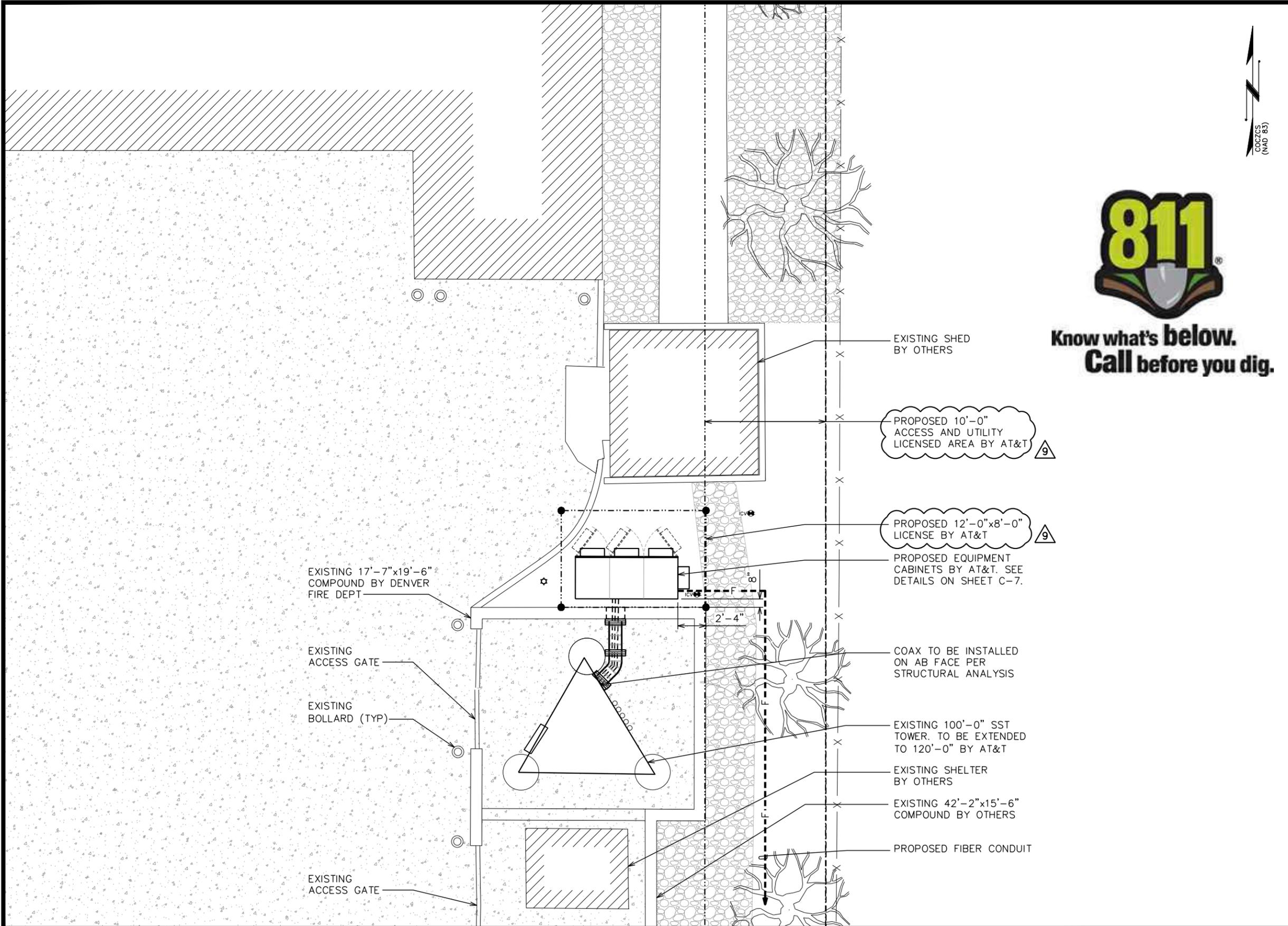
April 28, 2021

9	04-28-21	CONSTRUCTION
8	04-19-21	CONSTRUCTION
7	10-22-20	CONSTRUCTION
6	10-13-20	CONSTRUCTION
REV	DATE	ISSUED FOR:

DRAWN BY: KES | CHECKED BY: NMC

SHEET TITLE:  
**SITE PLAN**

SHEET NUMBER: **C-1** | REVISION: **9**  
 TEP#: 240575.203552



**Know what's below.  
Call before you dig.**

PROJECT INFORMATION:  
**SITE NAME:**  
 NSB-CO.MLK AND TRENTON\_COL01560  
**FA NUMBER:** 14799270  
**PACE NUMBER:** MRUTH031975  
**PROJECT:** NEW SITE BUILD  
 7934 MARTIN KING BLVD  
 DENVER, CO 80238  
 (DENVER COUNTY)

PLANS PREPARED FOR:  
**nexus**  
**NEXIUS**  
 7025 S FULTON ST SUITE 100  
 CENTENNIAL, CO 80112

PLANS PREPARED FOR:  
  
**AT&T MOBILITY**  
 161 INVERNESS DRIVE WEST, 2ND FLOOR  
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**TOWER ENGINEERING PROFESSIONALS**  
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 THORNTON, CO 80229  
 OFFICE: (303) 566-9914  
 www.tepgroup.net

SEAL:



9	04-28-21	CONSTRUCTION
8	04-19-21	CONSTRUCTION
7	10-22-20	CONSTRUCTION
6	10-13-20	CONSTRUCTION
REV	DATE	ISSUED FOR:

DRAWN BY: KES | CHECKED BY: NMC

SHEET TITLE:  
**COMPOUND DETAILS**

SHEET NUMBER: **C-2** | REVISION: **9**  
 TEP#: 240575.203552

**COMPOUND DETAILS**  
 SCALE: 1/8" = 1'-0"



110'-0"±  
T/LIGHTNING ROD

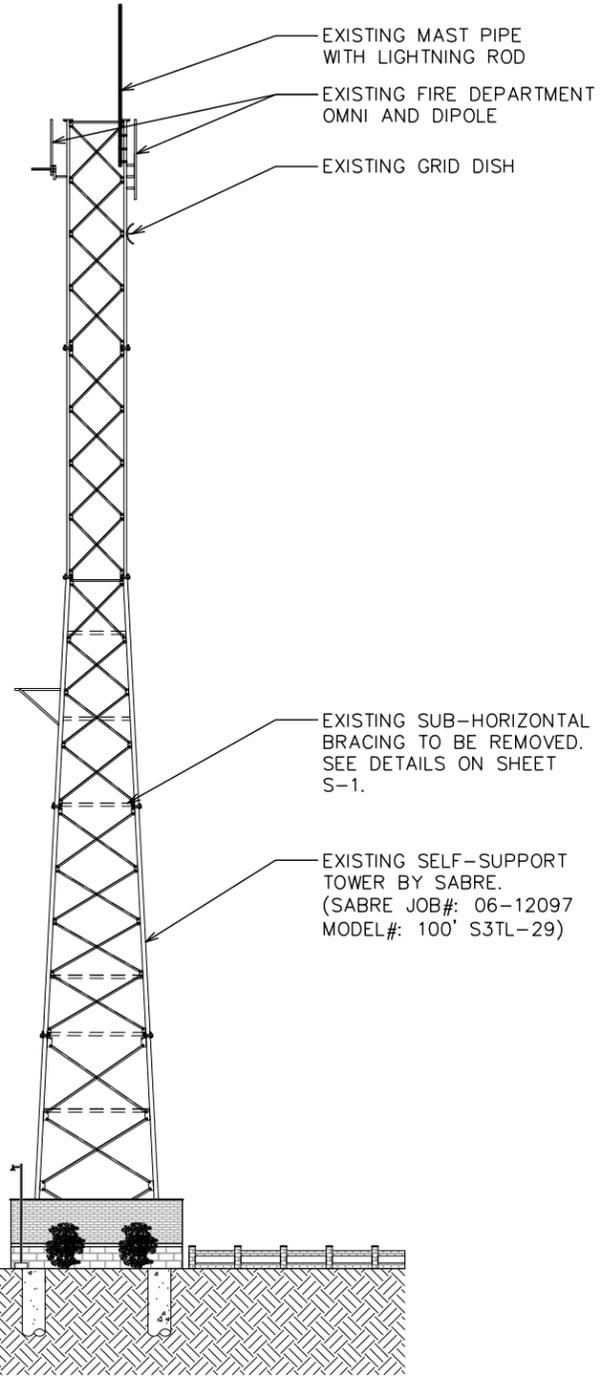
100'-2½"±  
T/TOWER & EXISTING ANTENNAS

95'-0"±  
CL/EXISTING ANTENNAS & MOUNT

90'-0"±  
CL/EXISTING GRID DISH

50'-0"±  
CL/EXISTING MOUNT

0'-0"  
T/CONCRETE



**TOWER NOTES:**

1. TOWER SHALL NOT BE LIT UNLESS REQUIRED BY THE FEDERAL AVIATION ADMINISTRATION.
2. PROPOSED COAX MOUNTED TO PROPOSED WAVEGUIDE LADDER SEE DETAILS ON THIS SHEET.
3. SEE STRUCTURAL MODIFICATION DRAWINGS BY TEP. DATED JANUARY 23, 2020.

EXISTING FIRE DEPT  
OMNI AND DIPOLE

TOP CENTERLINE RESERVED  
FOR FIRE DEPARTMENT

PROPOSED 20'-0" TALL  
TOWER EXTENSION BY AT&T

EXISTING GRID DISH

PROPOSED ANTENNAS BY  
AT&T (TYP OF 6). SEE  
DETAILS ON SHEET C-4.

EXISTING SELF-SUPPORT  
TOWER BY SABRE.  
(SABRE JOB#: 06-12097  
MODEL#: 100' S3TL-29)

130'-0"±  
T/LIGHTNING ROD

EXISTING MAST PIPE  
WITH LIGHTNING ROD

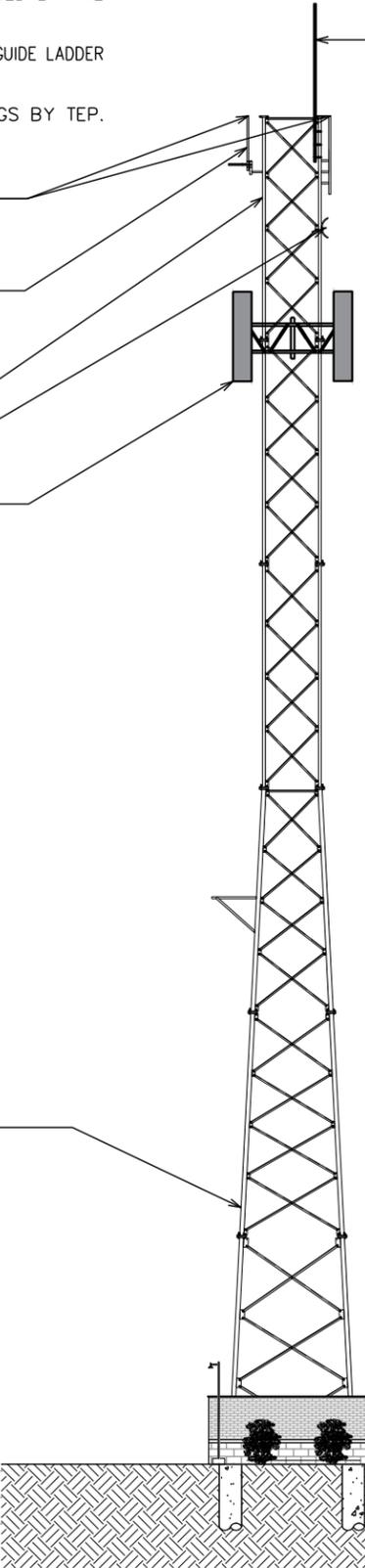
120'-2½"±  
T/TOWER

110'-0"±  
CL/EXISTING GRID DISH

104'-0"±  
T/PROPOSED ANTENNAS

50'-0"±  
CL/EXISTING MOUNT

0'-0"  
T/CONCRETE



**EXISTING SOUTH TOWER ELEVATION**

SCALE: 1/8" = 1'-0"



**PROPOSED SOUTH TOWER ELEVATION**

SCALE: 1/8" = 1'-0"



PROJECT INFORMATION:  
SITE NAME:  
**NSB-CO.MLK AND TRENTON\_COL01560**  
FA NUMBER: 14799270  
PACE NUMBER: MRUTH031975  
PROJECT: NEW SITE BUILD  
7934 MARTIN KING BLVD  
DENVER, CO 80238  
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PLANS PREPARED FOR:  
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ENGLEWOOD, CO 80112

PLANS PREPARED BY:  
  
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500 E. 84TH AVE, SUITE C10  
THORNTON, CO 80229  
OFFICE: (303) 566-9914  
www.tepgroup.net

SEAL:  
  
October 2, 2020

5	10-02-20	CONSTRUCTION
4	08-26-20	PRELIMINARY
3	06-15-20	PRELIMINARY
2	06-03-20	PRELIMINARY
REV	DATE	ISSUED FOR:

DRAWN BY: ADW | CHECKED BY: NMC

SHEET TITLE:  
**TOWER ELEVATION**

SHEET NUMBER: **C-3** | REVISION: **5**  
TEP#: 240575.203552

SECTOR	ANTENNA TYPE	TOP OF ANTENNA	ELECTRICAL TILT			TRANSMISSION CABLE		DC JUMPERS NEEDED	FIBER JUMPERS NEEDED	RRH			SQUID		
			PORT			QTY.	TYPE			POSITION	QTY.	TYPE	BAND	POSITION	QTY.
A1	NNH4-65C-R6-V3*	104'-0"	2°	-	-	-	-	-	-	SECTOR MOUNT	1	AIRSCALE RRH 4T4R B5 AHCA *	850	-	-
A2	-	-	-	-	-	-	-	-	-	SECTOR MOUNT	1	AHNA RRH	700	1	DC9-48-60-24-8C-EV *
A3	-	-	-	-	-	-	-	-	-	SECTOR MOUNT	1	RRH 4T4R B12/14 320W AHLBA *	700	-	-
A4	NNH4-65C-R6-V3*	104'-0"	2°	2°	-	2 / 1	SHARED DC/FIBER	YES	YES	SECTOR MOUNT	1	AIRSCALE RRH 4T4R B25/66 320W AHFIB *	1900	-	-
B1	NNH4-65C-R6-V3*	104'-0"	2°	-	-	-	-	-	-	SECTOR MOUNT	1	AIRSCALE RRH 4T4R B5 AHCA *	850	-	-
B2	-	-	-	-	-	-	-	-	-	SECTOR MOUNT	1	AHNA RRH	700	1	DC9-48-60-24-8C-EV *
B3	-	-	-	-	-	-	-	-	-	SECTOR MOUNT	1	RRH 4T4R B12/14 320W AHLBA *	700	-	-
B4	NNH4-65C-R6-V3*	104'-0"	2°	2°	-	2 / 1	SHARED DC/FIBER	YES	YES	SECTOR MOUNT	1	AIRSCALE RRH 4T4R B25/66 320W AHFIB *	1900	-	-
G1	NNH4-65C-R6-V3*	104'-0"	2°	-	-	-	-	-	-	SECTOR MOUNT	1	AIRSCALE RRH 4T4R B5 AHCA *	850	-	-
G2	-	-	-	-	-	-	-	-	-	SECTOR MOUNT	1	AHNA RRH	700	1	DC9-48-60-24-8C-EV *
G3	-	-	-	-	-	-	-	-	-	SECTOR MOUNT	1	RRH 4T4R B12/14 320W AHLBA *	700	-	-
G4	NNH4-65C-R6-V3*	104'-0"	2°	2°	-	2 / 1	SHARED DC/FIBER	YES	YES	SECTOR MOUNT	1	AIRSCALE RRH 4T4R B25/66 320W AHFIB *	1900	-	-

\* OR SIMILAR CONTRACTOR TO VERIFY MOST RECENT RFDS

PROJECT INFORMATION:  
**SITE NAME:**  
**NSB-CO.MLK AND TRENTON COL01560**  
**FA NUMBER: 14799270**  
**PACE NUMBER: MRUTH031975**  
**PROJECT: NEW SITE BUILD**  
 7934 MARTIN KING BLVD  
 DENVER, CO 80238  
 (DENVER COUNTY)

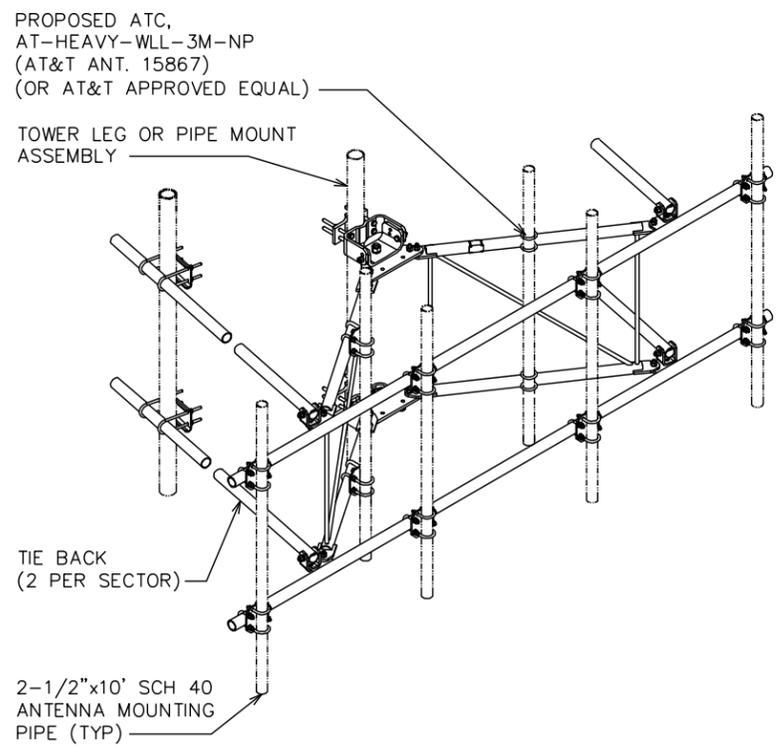
PLANS PREPARED FOR:  
**nexus**  
**NEXIUS**  
 7025 S FULTON ST SUITE 100  
 CENTENNIAL, CO 80112

PLANS PREPARED FOR:  
  
**AT&T MOBILITY**  
 161 INVERNESS DRIVE WEST, 2ND FLOOR  
 ENGLEWOOD, CO 80112

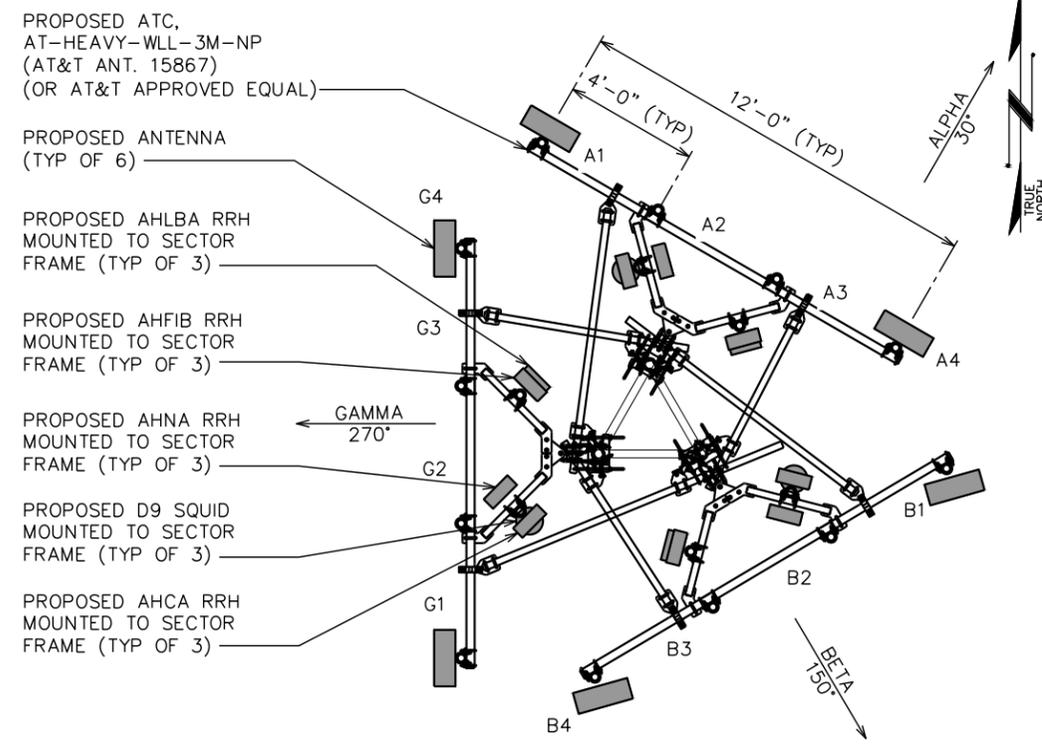
PLANS PREPARED BY:  
  
**TOWER ENGINEERING PROFESSIONALS**  
 500 E. 84TH AVE, SUITE C10  
 THORNTON, CO 80229  
 OFFICE: (303) 566-9914  
 www.tepgroup.net

**MOUNT DETAIL**

SCALE: N.T.S.



- NOTES:**
1. CONTRACTOR TO REFER TO FINAL RFDS FOR ALL RF DETAILS
  2. RET CABLE TO BE RUN TO 1ST CARRIER LTE RRH, AND DAISY CHAINED TO ALL ACTIVE SECTOR ANTENNAS
  3. REFER TO GENERAL NOTES FOR ANTENNA MOUNTING INFORMATION
  4. CONTRACTOR TO REFER TO RFDS FOR CROSS-SECTOR REDUNDANCY REQUIREMENTS
  5. DO NOT EXCEED 15' WIRE LENGTH FROM SURGE SUPPRESSOR TO RRH
  6. MAINTAIN MINIMUM SEPARATION BETWEEN ALL EQUIPMENT

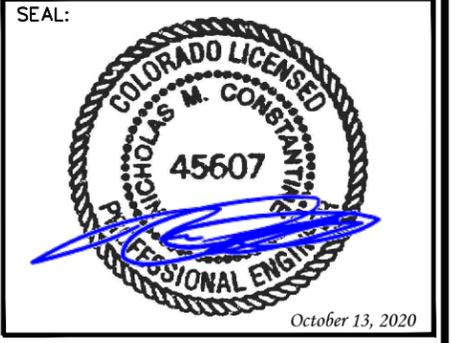
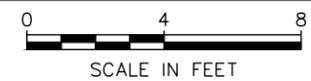


**ANTENNA MOUNT**

SCALE: N.T.S.

**ANTENNA PLAN**

SCALE: 3/16" = 1'-0"

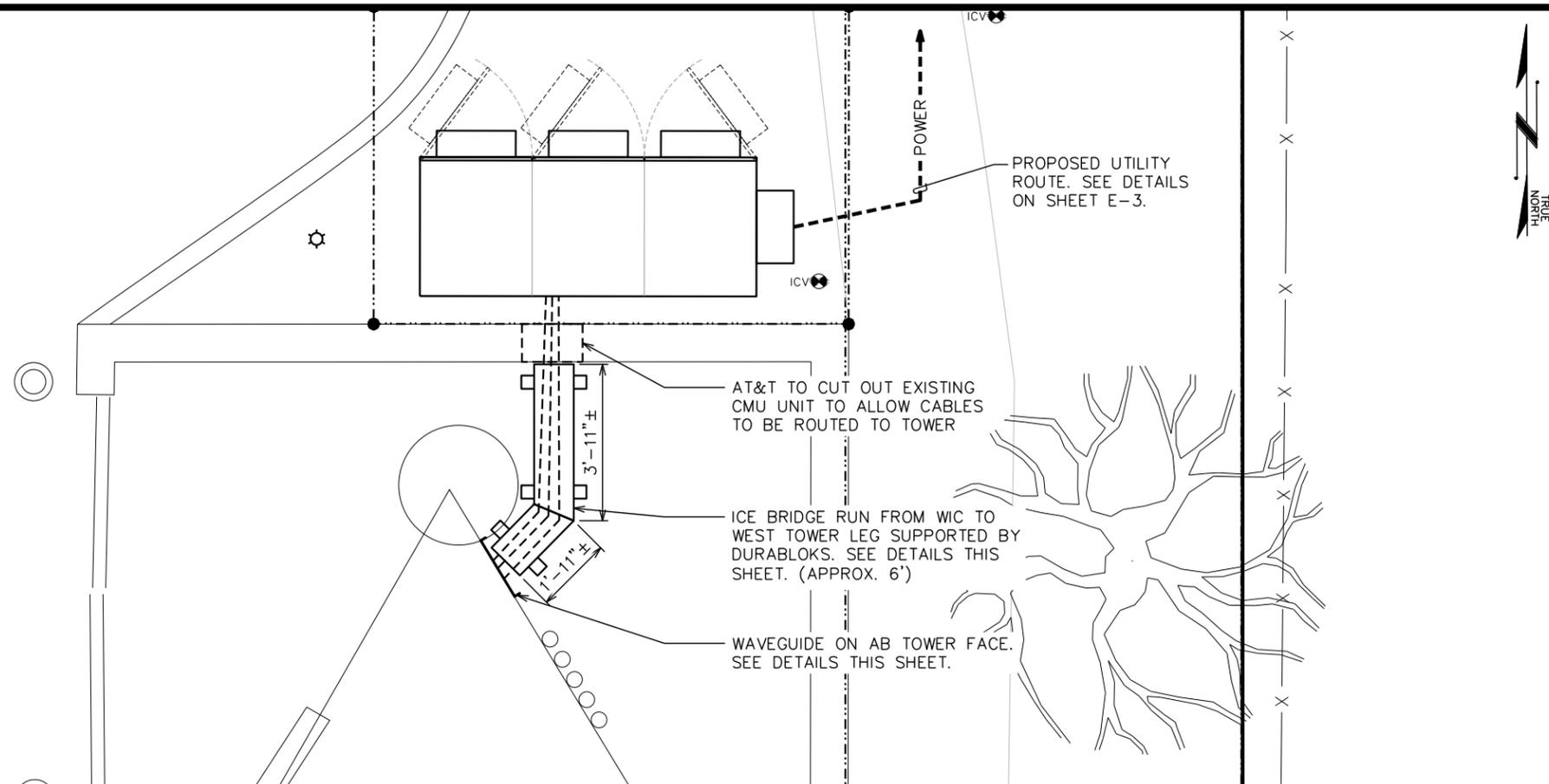


REV	DATE	ISSUED FOR:
6	10-13-20	CONSTRUCTION
5	10-02-20	CONSTRUCTION
4	08-26-20	PRELIMINARY
3	06-15-20	PRELIMINARY

DRAWN BY: KES CHECKED BY: NMC

SHEET TITLE:  
**ANTENNA MOUNTING DETAILS**

SHEET NUMBER: **C-4** REVISION: **6**  
 TEP#: 240575.203552



PROJECT INFORMATION:  
**SITE NAME:**  
 NSB-CO.MLK AND TRENTON COL01560  
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**PROJECT:** NEW SITE BUILD  
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 DENVER, CO 80238  
 (DENVER COUNTY)

PLANS PREPARED FOR:  
**nexius**  
 NEXIUS  
 7025 S FULTON ST SUITE 100  
 CENTENNIAL, CO 80112

PLANS PREPARED FOR:  
  
**AT&T MOBILITY**  
 161 INVERNESS DRIVE WEST, 2ND FLOOR  
 ENGLEWOOD, CO 80112

PLANS PREPARED BY:  
  
**TOWER ENGINEERING PROFESSIONALS**  
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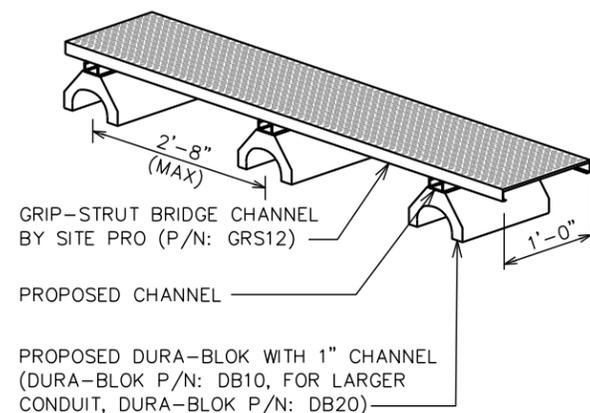
**ICE BRIDGE ROUTE**

SCALE: 1/4" = 1'-0"



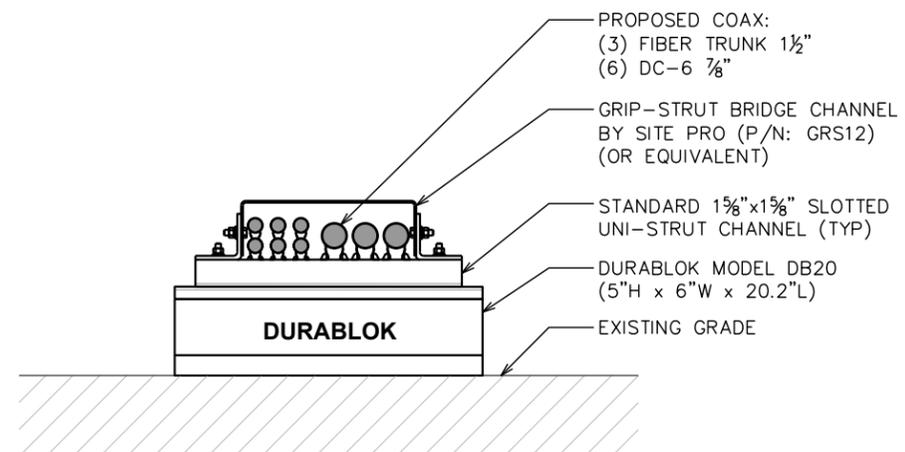
**NOTE:**

- COAX BRIDGE KITS AND SITE PRO PARTS REQUIRED:  
 (1) 10'x1' ICE BRIDGE SECTIONS - (P/N: GRS12)  
 (3) DURA-BLOKs FOR 8 RUNS OF COAX - (P/N: DB20)
- PROPOSED #2 AWG BARE COPPER GROUND (NOT SHOWN) TO BE ATTACHED TO THE SLEEPER (BOTH SIDES) AND CAD-WELDED TO THE CABLE TRAY.



**ICE BRIDGE DETAIL**

SCALE: N.T.S.



**DETAIL**

SCALE: 1" = 1'-0"



SEAL:



REV	DATE	ISSUED FOR:
7	10-22-20	CONSTRUCTION
6	10-13-20	CONSTRUCTION
5	10-02-20	CONSTRUCTION
4	08-26-20	PRELIMINARY

DRAWN BY: KES | CHECKED BY: NMC

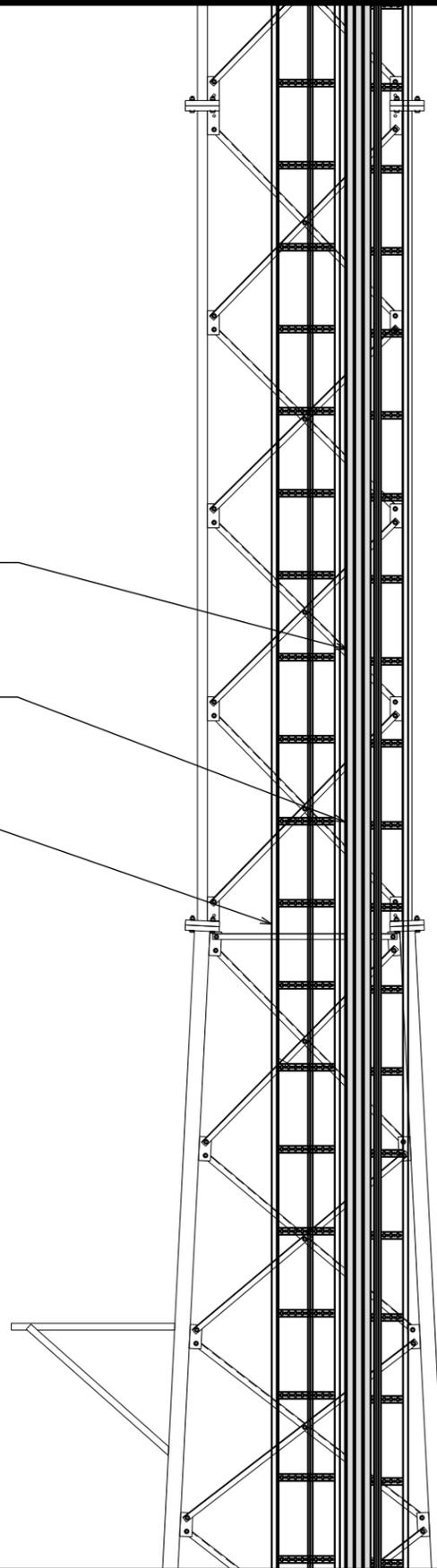
SHEET TITLE:  
**ICE BRIDGE DETAILS**

SHEET NUMBER: **C-5** | REVISION: **7**  
 TEP#: 240575.203552

PROPOSED COAXIAL CABLES MOUNTED ON PROPOSED WAVEGUIDE LADDER. SEE DETAIL ON THIS SHEET.

PROPOSED WAVEGUIDE 0'-100' BY AT&T. SEE DETAILS THIS SHEET.

EXISTING WAVEGUIDE 0'-100' BY FIRE DEPARTMENT. SEE DETAILS THIS SHEET.



**COAX ELEVATION (A-B ELEVATION)**

SCALE: 1/4" = 1'-0"

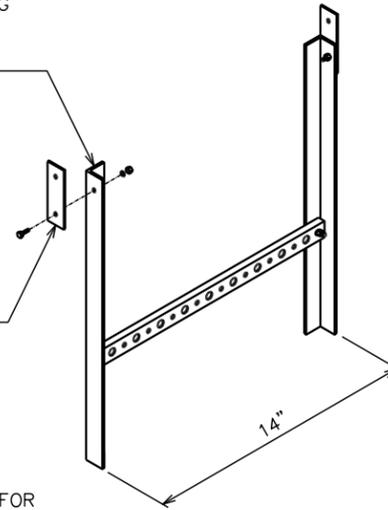


PROPOSED 20' LONG COAX LADDER BY SITEPRO. (P/N: WCL4)

SPLICE PLATE

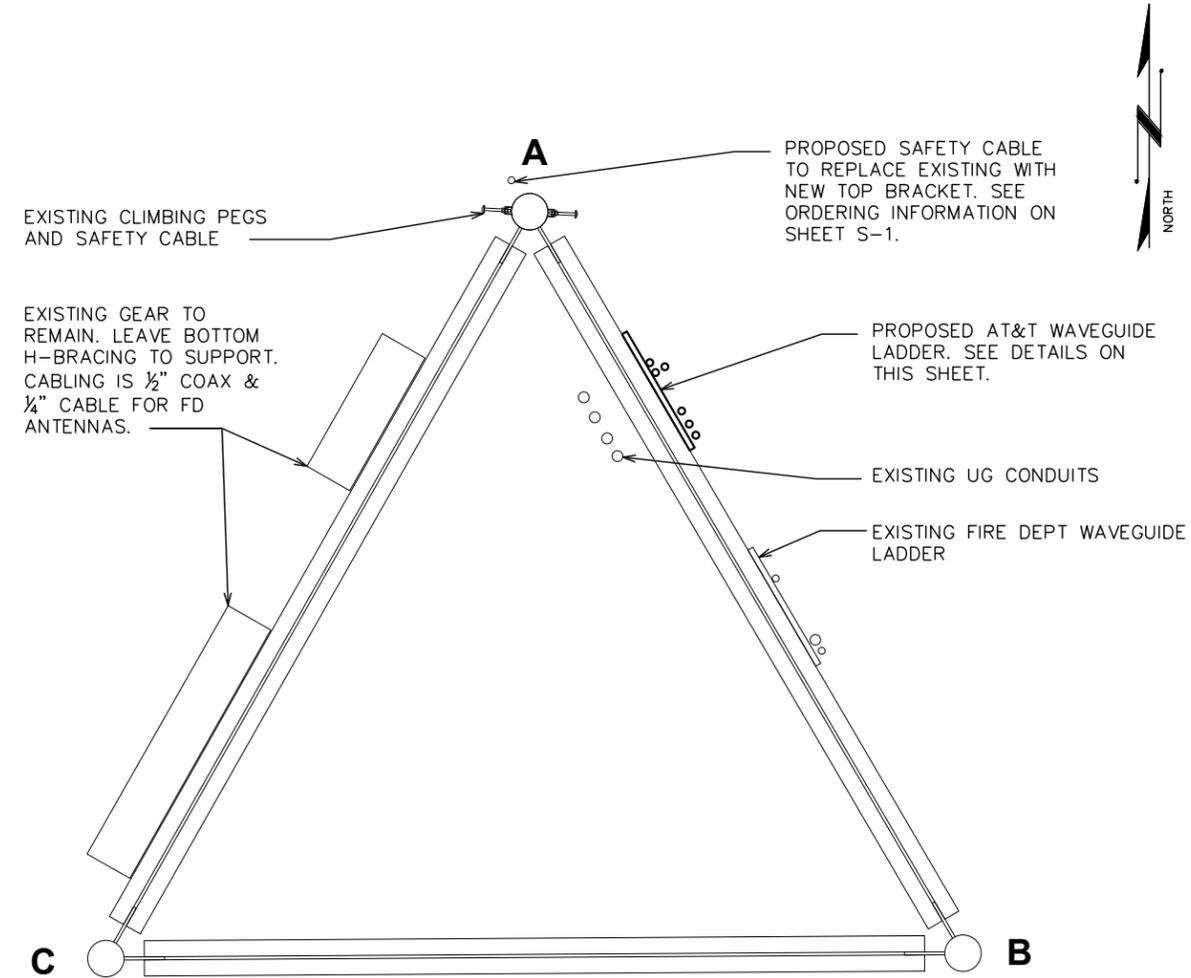
**NOTE:**

J-CLIPS INCLUDED FOR ATTACHMENT TO TOWER.



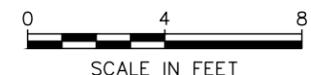
**WAVEGUIDE LADDER**

SCALE: N.T.S.



**COAX CONFIGURATION**

SCALE: 3/16" = 1'-0"



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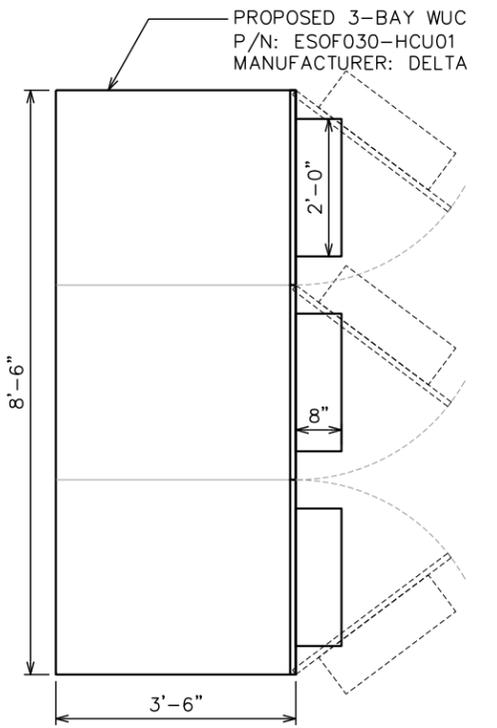
SEAL:  
  
 October 2, 2020

5	10-02-20	CONSTRUCTION
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REV	DATE	ISSUED FOR:

DRAWN BY: KES | CHECKED BY: NMC

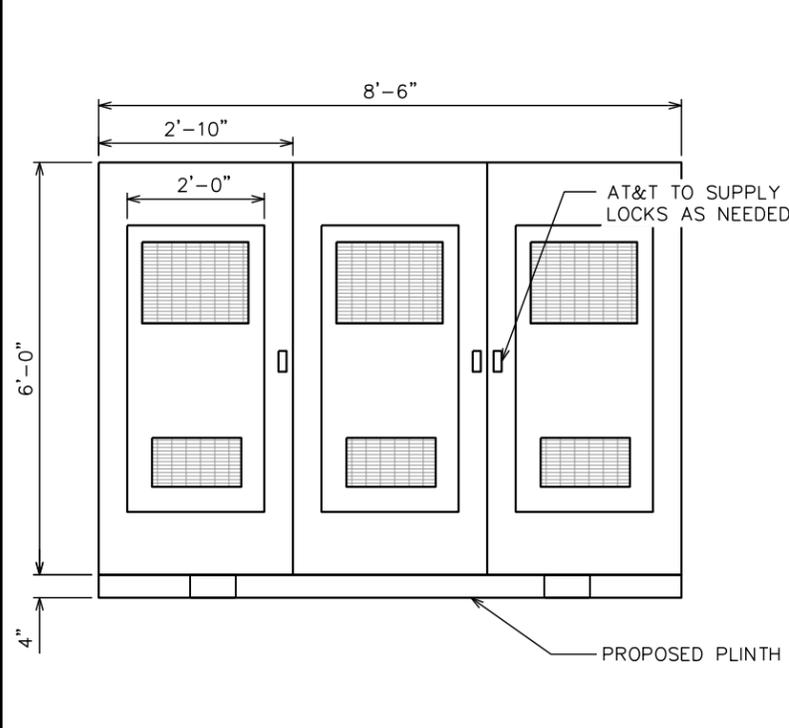
SHEET TITLE:  
**COAX MOUNTING DETAILS**

SHEET NUMBER: **C-6** | REVISION: **5**  
 TEP#: 240575.203552



**CABINET DETAIL TOP VIEW**

SCALE: N.T.S.

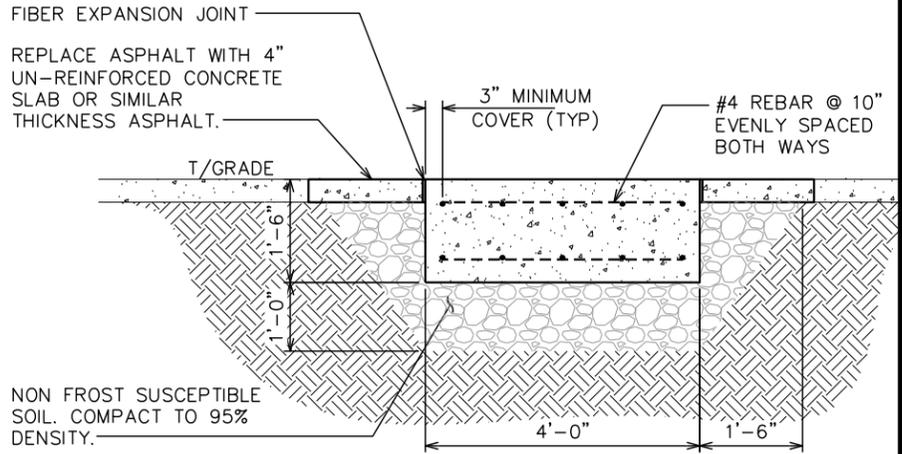
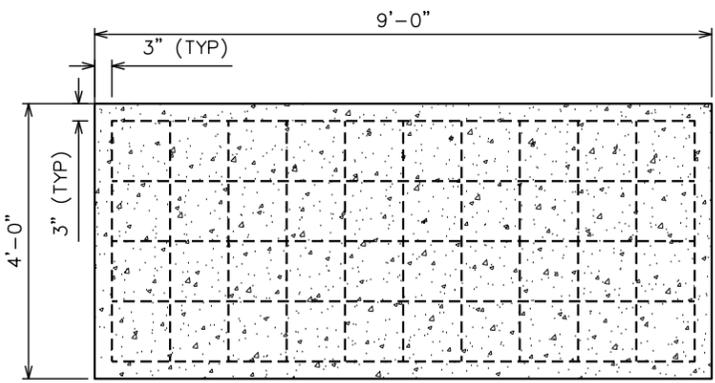


**CABINET DETAIL FRONT VIEW**

SCALE: N.T.S.

**NOTE:**

- DESIGN SHALL BE PER INTERNATIONAL BUILDING CODE, 2018 EDITION.
- CONCRETE WORK SHALL BE PERFORMED IN ACCORDANCE WITH LATEST EDITION OF THE ACI CODE.
- CONCRETE SHALL BE 3,000 PSI.
- REINFORCING STEEL SHALL BE PLACED IN ACCORDANCE WITH THE CONCRETE REINFORCING STEEL INSTITUTE (CRSI) "MANUAL OF STANDARD PRACTICE."
- REBAR  $F_y = 60,000$  PSI.
- ALL BACKFILL SHALL BE THOROUGHLY COMPACTED
- NON FROST SUSCEPTIBLE SOIL TO EXTEND TO COUNTY FROST LINE. DENVER COUNTY FROST DEPTH IS 50".



**CABINET FOUNDATION DETAILS**

SCALE: N.T.S.



**Specifications**

<b>Model</b>	<b>ESOF030-HCU01 Walk Upto Cabinet (WUC)</b>
<b>1. General</b>	
System cooling capacity	5.0kW Equip Heat Load with Equip Inlet <55C @ 46C ambient 2.6kW Equip Heat Load with Equip Inlet <55C @ 50C ambient
Dimensions (W x H x D)	102W" x 42"D (50" including HEX) x 72"H (add 4" plinth)
Protection class	NEMA4
Door latches	3 point latches (pad lock compatible)
Ground bar	3ea 10-positions
Lifting Mechanism	4 lifting brackets
Equipment Compartment	Bay 1 – 23", 14RU for DC Power System and PDU Bay 2 – 23", 39RU for equipment Bay 3 – 23", 39RU for equipment
Battery Compartment	Shelves for 3 strings batteries, designed for: GNB Marathon M12V180FT Energys SBS170F or SBS190F
Weight	2270 lbs (Batteries, Power System and Load Equipment excluded)
Materials:	Enclosure Aluminum AL5052, Inner frames Galvanized steel
Finish	Powder Paint RAL7032
Safety	cULus LISTED pending
<b>2. Environment</b>	
Operating temperature	-40°C to +50°C (-40°F to +122°F)
Storage temperature	-40°C to +75°C (-40°F to +158°F)
Acoustics	65 dBA @ 40C equipment inlet, 75 dBA @ 55C equipment inlet
Humidity (relative)	95%, non-condensing (Max.)
<b>3. Thermal management</b>	
Cooling system	Equipment compartment: 3 200W/K Thermosiphon HEX
Heating system	Equipment compartment: 3 1500W DC heaters Battery compartment: 1 1500W DC heater
<b>4. Equipment</b>	
Arranged for third-party equipment:	AC Load Center (not provided) DC Power System (not provided) Batteries (not provided)
Cable Entry:	
AC Cable	(2) Trade Size 2" ports
Bottom Cable	Arranged for (3) Roxtec EzEntry 24/24 multi-port (not provided) Arranged for (7) Roxtec EzEntry 16/16 multi-port (not provided)
Lower Rear	(8) Trade Size 3" ports
Upper Rear	Arranged for (2) Valmont E575 port kits (not provided)
<b>5. Optional Items</b>	
Optional items	NEQ.20115 – Dual GPS Antenna Mast Kit (Delta 3798100742-S) NEQ.20114 – Wave Guide Top Plate (Delta 3317789400) NEQ.20113 – Spare Thermosiphon Door (Delta EX-S04 A-S)
<b>6. Ordering information</b>	
System	NEQ.20111– Cabinet 3-Bay 3-HEX (Delta ESOF030-HCU01)
NOKIA Delta-Walk-Upto-Cabinet(WUC)	NODELTAWUCAB - Delta WUC Fully Configured at WWT (NSN RAN) - FSM4 ABAU Indoor w/ Ancillary 1 ASIA and 1 ABIA - SIAD
Ericsson Delta-Walk-Upto-Cabinet(WUC)	ERDELTAWUCAB-01 (ERICSSON DELTA-WUC LIGHTWEIGHT CAB) - Delta WUC Fully Configured at WWT (NSN RAN) - Ericsson RAN 5216 - SIAD

\*All specifications are subject to change without prior notice.

Delta Group Website:  
[www.deltaww.com](http://www.deltaww.com)

Product Website:  
[www.deltapowersolutions.com](http://www.deltapowersolutions.com)

United States of America & Canada  
Delta Electronics (USA) Inc.  
2925 E. Plano Parkway  
Plano, Texas 75074

Sales  
Bryan Kearse  
Office 919-767-3836  
Cell 919-800-7107  
[Bryan.Kearse@deltaww.com](mailto:Bryan.Kearse@deltaww.com)

Hari Subramanian  
Cell 214-415-4977  
[Hari.Subramanian@deltaww.com](mailto:Hari.Subramanian@deltaww.com)

Support  
Field Support  
1-877-DELTA-08 option 3  
(877-335-8208 option 3)  
[DEUSTPS.Support@deltaww.com](mailto:DEUSTPS.Support@deltaww.com)

Installation Services  
[DEUSTPS.Services@deltaww.com](mailto:DEUSTPS.Services@deltaww.com)

Orders  
[DEUSTPS.Orders@deltaww.com](mailto:DEUSTPS.Orders@deltaww.com)

Sales  
[DEUSTPS.Sales@deltaww.com](mailto:DEUSTPS.Sales@deltaww.com)

RMA  
[DEUSTPS.RMA@deltaww.com](mailto:DEUSTPS.RMA@deltaww.com)

EN\_V1.0 / VB 08082018

PROJECT INFORMATION:  
**SITE NAME:**  
NSB-CO.MLK AND TRENTON COL01560  
**FA NUMBER:** 14799270  
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OFFICE: (303) 566-9914  
[www.tepgroup.net](http://www.tepgroup.net)

SEAL:  
  
October 13, 2020

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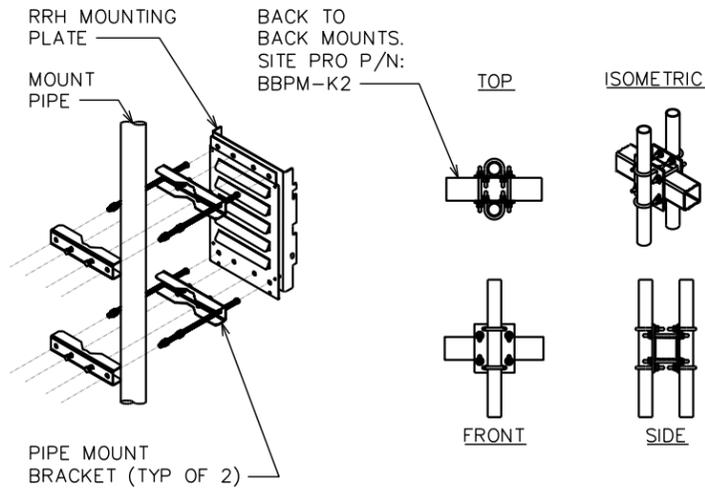
DRAWN BY: KES CHECKED BY: NMC

SHEET TITLE:  
**CABINET DETAILS**

SHEET NUMBER: **C-7** REVISION: **6**  
TEP#: 240575.203552

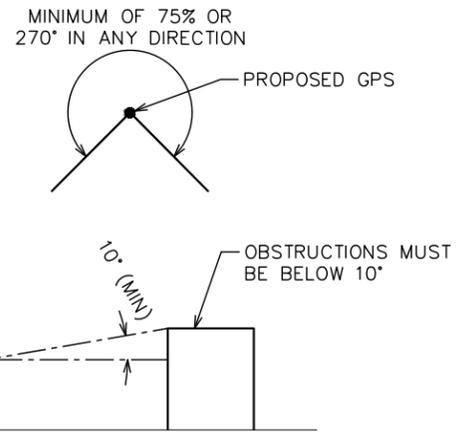
**3-BAY WALK UP TO CABINET SPEC SHEET**

SCALE: N.T.S.



**RRU MOUNTING DETAIL**

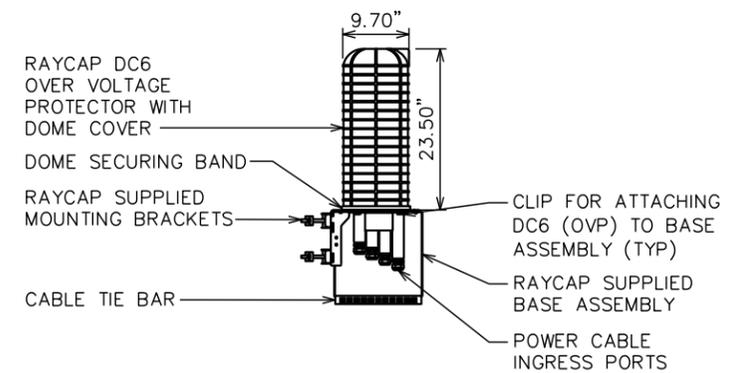
SCALE: N.T.S.



**GPS MINIMUM SKY VIEW REQUIREMENTS**

SCALE: N.T.S.

**RAYCAP DC9-48-60-24-8C-EV (SQUID)**  
DIMENSIONS, WxDxH: 9.7"x23.5"

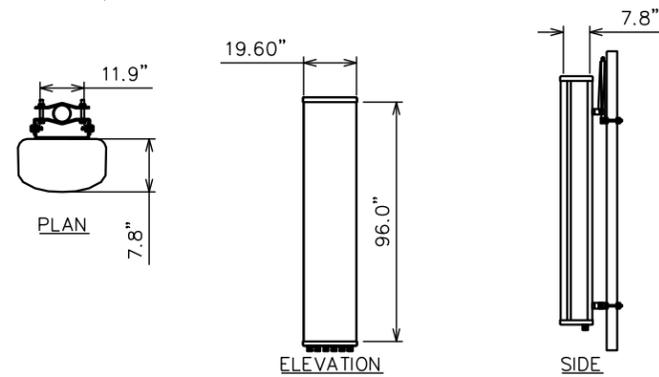


**SPD DETAIL**

SCALE: N.T.S.

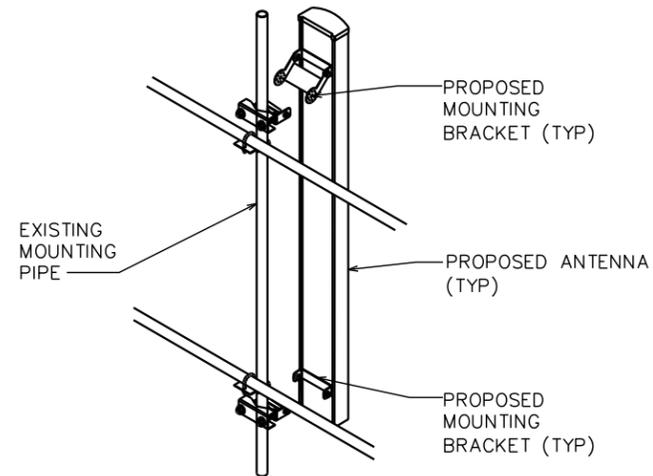
**COMMSCOPE NNH4-65C-R6-V3 (OR SIMILAR)**

DIMENSIONS, WxDxH: 96"x19.6"x7.8"  
WEIGHT, WITHOUT BRACKETS: 102.5 lbs



**ANTENNA DETAIL**

SCALE: N.T.S.



**ANTENNA MOUNTING DETAIL**

SCALE: N.T.S.

PROJECT INFORMATION:  
SITE NAME:  
**NSB-CO.MLK AND TRENTON COL01560**  
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www.tepgroup.net

SEAL:

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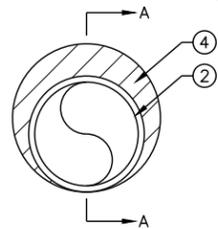
DRAWN BY: KES | CHECKED BY: NMC

SHEET TITLE:  
**EQUIPMENT DETAILS**

SHEET NUMBER: **C-8** | REVISION: **5**  
TEP#: 240575.203552

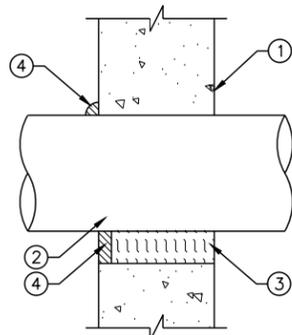
U.L. SYSTEM NO. C-AJ-1150  
CONDUIT THROUGH BEARING WALL SIMILAR TO U.L. DESIGN NO. U902

F RATING = 3-HR.  
T RATING = 0-HR.



- FLOOR OR WALL ASSEMBLY -- MINIMUM 4-1/2" THICK REINFORCED LIGHTWEIGHT OR NORMAL WEIGHT (100-150 PCF) CONCRETE. WALL MAY ALSO BE CONSTRUCTED OF ANY UL CLASSIFIED CONCRETE BLOCKS \*. MAXIMUM DIAMETER OF OPENING IS 8". SEE CONCRETE BLOCKS (CAZT) CATEGORY IN THE FIRE RESISTANCE DIRECTORY FOR NAMES OF MANUFACTURERS.
- THROUGH PENETRATIONS -- ONE METALLIC PIPE OR CONDUIT TO BE INSTALLED WITHIN THE FIRESTOP SYSTEM. PIPE OR CONDUIT TO BE RIGIDLY SUPPORTED ON BOTH SIDERS OF FLOOR OR WALL ASSEMBLY. THE ANNULAR SPACE SHALL BE MINIMUM 0". (POINT CONTACT) TO MAXIMUM 1-3/8". THE FOLLOWING TYPES AND SIZES OF METALLIC PIPES OR CONDUITS MAY BE USED:
  - STEEL PIPE -- NOMINAL 6" DIAMETER (OR SMALLER) SCHEDULE 40 (OR HEAVIER) STEEL PIPE.
  - IRON PIPE -- NOMINAL 6" DIAMETER (OR SMALLER) CAST OR DUCTILE IRON PIPE.
  - CONDUIT -- NOMINAL 4" DIAMETER (OR SMALLER) STEEL ELECTRICAL METALLIC TUBING OR NOMINAL 6" DIAMETER (OR SMALLER) STEEL CONDUIT.
- PACKING MATERIAL -- MINIMUM 4" THICKNESS OF MINIMUM 4.0 PCF MINERAL WOOL BATTING 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.
- FILL, VOID, OR CAVITY MATERIAL\* -- SEALANT -- MINIMUM 1/4" THICKNESS OF FILL MATERIAL APPLIED WITHIN THE ANNULUS, FLUSH WITH TOP SURFACE OF FLOOR AND WITH BOTH SURFACES OF WALL. AT THE POINT CONTACT LOCATION BETWEEN PIPE AND CONCRETE, A MINIMUM 1/2" DIAMETER BEAD OF FILL MATERIAL SHALL BE APPLIED AT THE CONCRETE/PIPE INTERFACE ON THE TOP SURFACE OF FLOOR AND ON BOTH SURFACES OF WALL. U.L. RATING APPLIES ONLY WHEN CP601S OR CP604 SEALANT IS USED. HILTI CONSTRUCTION CHEMICALS, DIV OF HILTI INC -- CP601S, CP604, CP606 OR FS-ONE SEALANT

\*BEARING THE UL CLASSIFICATION MARK

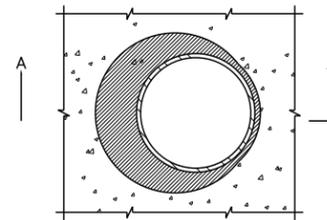


SECTION A-A

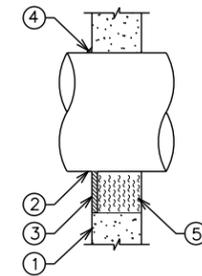
U.L. SYSTEM NO. C-AJ-1498  
METAL PIPE THROUGH CONCRETE FLOOR, WALL, OR BLOCK WALL

F RATING = 2-HR.  
T RATING = 0-HR.

TOP VIEW



SECTION A-A



NOTE:  
HILTI FS-ONE MATERIAL IS SUITABLE FOR USE IN CONCRETE, BRICK, TILE, GYPSUM, AND WOOD WALLS

- CONCRETE FLOOR OR WALL ASSEMBLY :
  - LIGHTWEIGHT OR NORMAL WEIGHT CONCRETE FLOOR (MINIMUM 4-1/2" THICK).
  - LIGHTWEIGHT OR NORMAL WEIGHT CONCRETE WALL (MINIMUM 4-1/2" THICK).
  - ANY U.L. CLASSIFIED CONCRETE BLOCK WALL.
- THROUGH PENETRATIONS TO INCLUDE ANY OF THE FOLLOWING:
  - MAXIMUM 8" NOMINAL DIAMETER STEEL PIPE.
  - MAXIMUM 4" NOMINAL DIAMETER COPPER PIPE.
  - MAXIMUM 4" NOMINAL DIAMETER EMT.
  - MAXIMUM 4" NOMINAL DIAMETER STEEL CONDUIT.
- MINIMUM 1/2" DEPTH HILTI FS-ONE HIGH PERFORMANCE INTUMESCENT 2-HR FIRESTOP SEALANT.
- MINIMUM 1/2" BEAD HILTI FS-ONE HIGH PERFORMANCE INTUMESCENT 2-HR FIRESTOP SEALANT. 5. MINIMUM 4" THICK MINERAL WOOL (MINIMUM 4 PCF DENSITY) (SEE NOTE NO. 4).

NOTES :  
1. USE GROUND PENETRATING RADAR PRIOR TO CORE DRILLING. NO CUTTING/DAMAGING OF EXISTING REBAR IS ALLOWED.  
2. MAXIMUM DIAMETER OF OPENING = 8".  
3. ANNULAR SPACE = MINIMUM 0", MAXIMUM 2".  
4. WALLS REQUIRE 1/2" DEPTH OF SEALANT FLUSH WITH BOTH SIDES.  
5. IF MAXIMUM PIPE SIZE IS 4" NOMINAL DIAMETER, A MINIMUM 3" THICKNESS OF MINERAL WOOL MAY BE USED.

SEE HILTI FIRESTOP INSTALLATION MANUAL FOR ADDITIONAL INSTRUCTIONS  
HILTI, INC. TULSA, OK 1-800-879-8000

PROJECT INFORMATION:  
SITE NAME:  
**NSB-CO.MLK AND TRENTON COL01560**  
FA NUMBER: 14799270  
PACE NUMBER: MRUTH031975  
PROJECT: NEW SITE BUILD  
7934 MARTIN KING BLVD  
DENVER, CO 80238  
(DENVER COUNTY)

PLANS PREPARED FOR:

**nexus**

NEXIUS  
7025 S FULTON ST SUITE 100  
CENTENNIAL, CO 80112

PLANS PREPARED FOR:



AT&T MOBILITY  
161 INVERNESS DRIVE WEST, 2ND FLOOR  
ENGLEWOOD, CO 80112

PLANS PREPARED BY:



TOWER ENGINEERING PROFESSIONALS  
500 E. 84TH AVE, SUITE C10  
THORNTON, CO 80229  
OFFICE: (303) 566-9914  
www.tepgroup.net

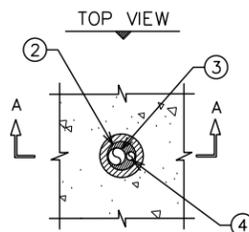
## OUTER WALL PENETRATION

SCALE: N.T.S.

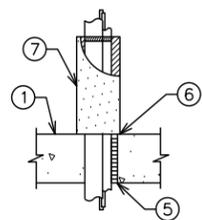
## FLOOR/WALL PENETRATION

SCALE: N.T.S.

U.L. SYSTEM NO. C-BJ-8020  
MULTIPLE PENETRANTS THROUGH CONCRETE FLOOR/WALL OR BLOCK WALL  
F RATING = 2-HR; T RATING = 0-HR OR 2-HR.

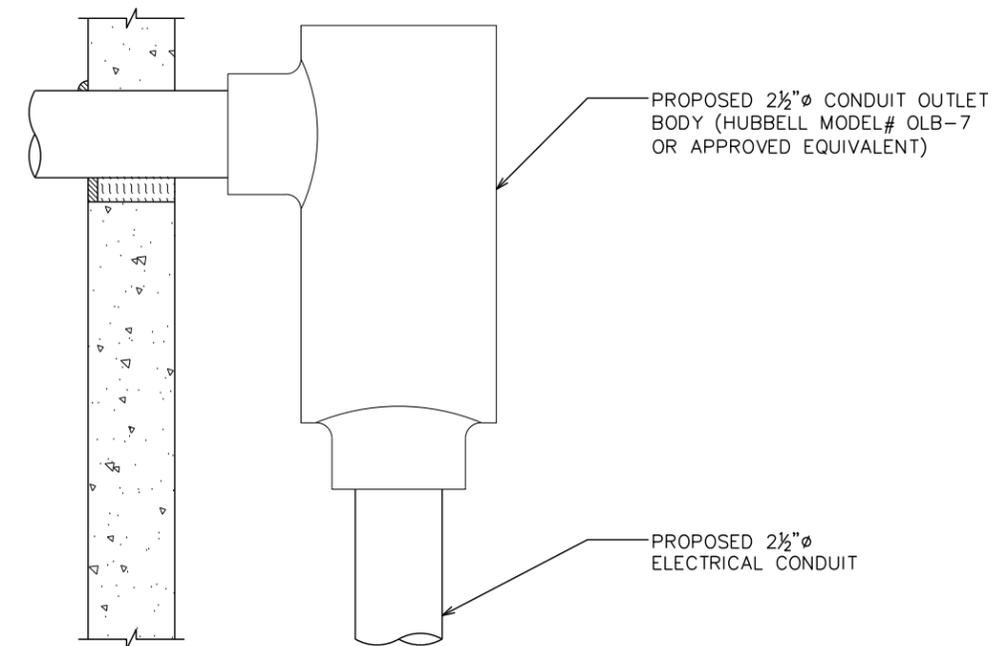


SECTION A-A



- CONCRETE FLOOR ASSEMBLY (2HR FIRE RATING):
  - LIGHTWEIGHT OR NORMAL WEIGHT CONCRETE FLOOR OR WALL (MINIMUM 6" THICK).
  - PRECAST (HOLLOW-CORE) CONCRETE FLOOR (MINIMUM 6" THICK).
  - ANY UL/cUL CLASSIFIED CONCRETE BLOCK WALL.
- ANY COMBINATION OF THE FOLLOWING METALLIC PENETRANTS MAY BE WITHIN GROUPING (ONLY 1 PIPE MAY EXCEED 1" NOMINAL DIAMETER):
  - MAXIMUM 2" NOMINAL DIAMETER STEEL PIPE (SCHEDULE 10 OR HEAVIER).
  - MAXIMUM 2" NOMINAL DIAMETER CAST OR DUCTILE IRON PIPE.
  - MAXIMUM 2" NOMINAL DIAMETER STEEL CONDUIT OR EMT.
- MAXIMUM 1/4" NOMINAL DIAMETER COPPER PIPE OR TUBING (MAX QTY. = 2) MAY BE WITHIN GROUPING.
- MAXIMUM 7/C NO.12 AWG POWER CABLE (MAX QTY. =3) MAYBE WITHIN GROUPING.
- MINIMUM 5-3/4" THICKNESS MINERAL WOOL (MIN. 4PCF DENSITY) TIGHTLY PACKED.
- MINIMUM 1/4" DEPTH HILTI FS-ONE INTUMESCENT FIRESTOP SEALANT.
- [OPTIONAL] NOMINAL 1" THICK GLASS-FIBER PIPE INSULATION (12" HIGH) INSTALLED AROUND GROUPING OF PENETRANTS, RESTING FLUSH WITH TOP SURFACE OF FLOOR.

NOTES :  
1. MAXIMUM DIAMETER OF OPENING = 4"  
2. ANNULAR SPACE = MINIMUM 0", MAXIMUM 2".  
3. ONE GROUPING OF ANY COMBINATION OF THE ABOVE LISTED PIPES, TUBING, CONDUITS AND CABLES TO BE INSTALLED WITHIN THE OPENING.  
4. WHEN PIPE IS USED , T-RATING = 2HR.  
5. WHEN PIPE INSULATION IS USED, APPLY A MINIMUM 1/2" DEPTH HILTI FS-ONE INTUMESCENT FIRESTOP SEALANT BETWEEN THE GROUPING OF PENETRANTS AND THE PIPE INSULATION, FLUSH WITH TOP END OF INSULATION.  
6. MINIMUM 1/4" DEPTH HILTI FS-ONE INTUMESCENT FIRESTOP SEALANT IS REQUIRED ON BOTH SIDERS OF A WALL.



PROPOSED 2 1/2" Ø CONDUIT OUTLET BODY (HUBBELL MODEL# OLB-7 OR APPROVED EQUIVALENT)

PROPOSED 2 1/2" Ø ELECTRICAL CONDUIT

SEAL:



REV	DATE	ISSUED FOR:
6	10-13-20	CONSTRUCTION
5	10-02-20	CONSTRUCTION
4	08-26-20	PRELIMINARY
3	06-15-20	PRELIMINARY

DRAWN BY: KES CHECKED BY: NMC

SHEET TITLE:  
**CONDUIT PENETRATION DETAILS**

SHEET NUMBER: **C-9** REVISION: **6**  
TEP#: 240575.203552

## MULTIPLE PENETRANTS THROUGH CONCRETE/BLOCK FLOOR/WALL

SCALE: N.T.S.

## CONDUIT OUTLET BODY

SCALE: N.T.S.

# ELECTRICAL NOTES:

## SCOPE:

- SHALL INCLUDE ALL LABOR, MATERIALS AND APPLIANCES REQUIRED FOR THE FURNISHING, INSTALLING AND TESTING, COMPLETE AND READY FOR OPERATION OF ALL WORK SHOWN ON THE DRAWING AS SPECIFIED HEREIN:
  - ELECTRIC SERVICE
  - CONDUIT AND RACEWAY
  - CONDUCTORS
  - MISCELLANEOUS MATERIALS
  - TELEPHONE CONDUITS
  - LIGHTNING ARRESTING SYSTEM

## CODES

- THE INSTALLATION SHALL COMPLY WITH ALL LAWS APPLYING TO ELECTRICAL INSTALLATION IN EFFECT WITH THE REGULATIONS OF THE LATEST EDITION OF THE NATIONAL ELECTRICAL SAFETY CODE AND THE ICC 2006, ADMINISTRATIVE RULES WITH THE NATIONAL ELECTRIC CODE, AND ALL LOCAL GOVERNING CODES AND ORDINANCES WITH THE REGULATION OF THE SERVING UTILITY COMPANY. ALL PERMITS REQUIRED SHALL BE OBTAINED AND, AFTER COMPLETION OF WORK, THE OWNER SHALL BE FURNISHED A CERTIFICATE OF FINAL INSPECTION AND APPROVAL.

## MATERIALS

- MATERIALS TO BE NEW. USE OF USED OR SUB STANDARD MATERIAL IS NOT ACCEPTABLE. IN THE CASE OF EXISTING METERING EQUIPMENT OR PANELS, REQUIRED COMPONENTS SHALL BE NEW.

## TESTING

- UPON COMPLETION OF THE INSTALLATION, OPERATE AND ADJUST ALL EQUIPMENT AND SYSTEMS TO MEET SPECIFIED PERFORMANCE REQUIREMENTS. ALL TESTING SHALL BE DONE BY QUALIFIED PERSONNEL.

## GUARANTEE

- IN ADDITION TO THE GUARANTEE OF THE EQUIPMENT BY THE MANUFACTURER, EACH PIECE OF EQUIPMENT SPECIFIED HEREIN SHALL ALSO BE GUARANTEED FOR DEFECTS OF MATERIAL OR WORKMANSHIP OCCURRING DURING A PERIOD OF ONE (1) YEAR FROM FINAL ACCEPTANCE OF THE WORK BY THE OWNER. WITHOUT EXPENSE TO THE OWNER ALL WARRANTY CERTIFICATES & GUARANTEES FURNISHED BY THE MANUFACTURERS SHALL BE TURNED OVER TO THE OWNER.

## CO-ORDINATION:

- CONTRACTOR SHALL COORDINATE ALL WORK WITH THE POWER AND TELEPHONE COMPANIES AND SHALL COMPLY WITH ALL SERVICE REQUIREMENTS OF EACH UTILITY COMPANY.

## EXAMINATION OF SITE

- PRIOR TO BEGINNING WORK, THE CONTRACTOR SHALL VISIT THE SITE OF THE JOB AND SHALL FAMILIARIZE HIMSELF WITH ALL CONDITIONS AFFECTING THE PROPOSED ELECTRICAL INSTALLATION AND SHALL MAKE PROVISIONS AS TO THE COST THEREOF. FAILURE TO COMPLY WITH THE INTENT OF THIS PARAGRAPH WILL IN NO WAY RELIEVE THE CONTRACTOR OF PERFORMING ALL WORK NECESSARY FOR A COMPLETE AND WORKING SYSTEM OR SYSTEMS.

## CUTTING, PATCHING AND EXCAVATION:

- COORDINATION OF ALL SLEEVES, CHASES, ETC., WILL BE REQUIRED PRIOR TO THE CONSTRUCTION OF ANY PORTION OF THE WORK. ALL CUTTING AND PATCHING OF WALLS, PARTITIONS, FLOORS, AND CHASES IN CONCRETE, WOOD, STEEL OR MASONRY SHALL BE DONE AS PROVIDED ON THE DRAWINGS.
- ALL NECESSARY EXCAVATIONS AND BACKFILLING INCIDENTAL TO THE WORK UNLESS SPECIFICALLY NOTED OTHERWISE ON THE DRAWING SHALL BE PROVIDED BY THIS CONTRACTOR.
- SEAL ALL PENETRATION THROUGH WALL AND FLOORS WITH APPROVED GROUT.

## EXTERIOR CONDUIT:

- ALL EXPOSED CONDUIT SHALL BE NEATLY INSTALLED AND RUN PARALLEL OR PERPENDICULAR TO STRUCTURAL ELEMENTS. SUPPORTS AND MOUNTING HARDWARE SHALL BE HOT DIPPED GALVANIZED STEEL.
- ALL EXTERIOR PVC CONDUITS SHALL BE INSTALLED WITH FROST SLEEVES (8" OVERLAP)

## RACEWAYS

- ALL CONDUCTORS SHALL BE INSTALLED IN CONDUIT. ALL CONDUIT SHALL BE RIGID STEEL EMT, OR SCH40 PVC. AS INDICATED ON THE DRAWINGS.
- WHERE INSTALLED ON EXTERIORS AND EXPOSED TO DAMAGE, ALL CONDUIT SHALL BE RIGID STEEL. ALUMINUM CONDUIT SHALL NOT BE ALLOWED.
- CONCEALED CONDUIT IN WALLS OR INTERIOR SPACES ABOVE GRADE MAY BE EMT OR PVC.
- UNDERGROUND CONDUITS SHALL BE RIGID STEEL OR SCHEDULE 40 PVC AS INDICATED ON THE DRAWINGS.
- ALL CONDUIT RUNS SHALL USE APPROVED COUPLINGS AND CONNECTORS. PROVIDE INSULATED BUSHINGS FOR ALL CONDUIT TERMINATIONS. ALL CONDUIT RUNS IN A WET LOCATION SHALL HAVE WATERPROOF FITTINGS.
- PROVIDE SUPPORTS FOR ALL CONDUITS IN ACCORDANCE WITH NEC REQUIREMENTS. ALL CONDUITS SHALL BE SIZED AS REQUIRED BY NEC.
- BURIAL DEPTH OF ALL CONDUITS SHALL BE AS REQUIRED BY CODE FOR EACH SPECIFIC CONDUIT TYPE AND APPLICATION.
- CONDUIT ROUTES ARE SCHEMATIC. CONTRACTOR SHALL FIELD VERIFY BEFORE BID. COORDINATE ROUTE WITH WIRELESS CARRIER AND BUILDING OWNER.

## EQUIPMENT:

- ALL DISCONNECT SWITCHES SHALL BE BREAKER TYPE.
- CIRCUIT BREAKERS SHALL BE RATED TO WITHSTAND THE MAXIMUM AVAILABLE FAULT CURRENT AS DETERMINED BY THE LOCAL UTILITY. CONTRACTOR SHALL VERIFY MAXIMUM AVAILABLE FAULT CURRENT, AND COORDINATE INSTALLATION WITH THE LOCAL UTILITY BEFORE STARTING WORK.

## CONDUCTORS

- FURNISH AND INSTALL CONDUCTORS CALLED FOR IN THE DRAWINGS. ALL CONDUCTORS SHALL HAVE TYPE THWN (MIN) (75 °C) INSULATION, RATED FOR 600 VOLTS.
- ALL CONDUCTORS SHALL BE COPPER, THE USE OF ALUMINUM CONDUCTORS SHALL NOT BE ALLOWED. ALL CONDUCTORS SHALL BE UL LISTED AND SHALL BE PROVIDED AND INSTALLED AS FOLLOWS:
  - MINIMUM WIRE SIZE SHALL BE #12 AWG.
  - ALL CONDUCTORS SIZE #8 AND LARGER SHALL BE STRANDED. CONDUCTORS SIZED #10 AND SMALLER MAY BE SOLID OR STRANDED.
  - CONNECTION FOR #10 AWG AND SMALLER SHALL BE BY TWISTING TIGHT AND INSTALLING INSULATED PRESSURE OR WIRE NUT CONNECTIONS.
  - CONNECTION FOR #8 AWG AND LARGER SHALL BE BY USE OF STEEL CRIMP-ON SLEEVES WITH NYLON INSULATOR.
- ALL CONDUCTORS SHALL BE COLOR CODED IN ACCORDANCE WITH NEC STANDARDS.
- THE RACEWAY SYSTEM SHALL BE COMPLETE BEFORE INSTALLING CONDUCTORS

## PENETRATIONS:

- CONTRACTOR SHALL COMPLY WITH UL PENETRATION DETAILS FOR PENETRATIONS OF ALL RATED WALLS, ROOF, ETC.

## GROUNDING

- ALL ELECTRICAL NEUTRALS, RACEWAYS AND NON-CURRENT CARRYING PARTS OF ELECTRICAL EQUIPMENT AND ASSOCIATED ENCLOSURES SHALL BE GROUNDED IN ACCORDANCE WITH NEC ARTICLE 250. THIS SHALL INCLUDE NEUTRAL CONDUCTORS, CONDUITS, SUPPORTS, CABINETS, BOXES, GROUND BUSSES, ETC. THE NEUTRAL CONDUCTOR FOR EACH SYSTEM SHALL BE GROUNDED BY ONE POINT ONLY.
- PROVIDE GROUND CONDUCTOR IN ALL RACEWAYS.
- PROVIDE BONDING AND GROUND TO MEET NFPA 780 – LIGHTNING PROTECTION AS A MINIMUM.
- PROVIDE GROUNDING SYSTEM AS INDICATED ON THE DRAWINGS, AS REQUIRED BY THE NATIONAL ELECTRIC CODE AND RADIO EQUIPMENT MANUFACTURER.

## ABBREVIATIONS AND LEGEND

A	– AMPERE	PVC	– SCH40 RIGID NON-METALLIC CONDUIT
AFG	– ABOVE FINISHED GRADE	RGS	– RIGID GALVANIZED STEEL CONDUIT
ATS	– AUTOMATIC TRANSFER SWITCH	SW	– SWITCH
AWG	– AMERICAN WIRE GAUGE	TGB	– TOWER GROUND BAR
BCW	– BARE COPPER WIRE	UL	– UNDERWRITERS LABORATORIES
BFG	– BELOW FINISHED GRADE	V	– VOLTAGE
BKR	– BREAKER	W	– WATTS
C	– CONDUIT	XFMR	– TRANSFORMER
CKT	– CIRCUIT	XMTR	– TRANSMITTER
DISC	– DISCONNECT		
EGR	– EXTERNAL GROUND RING		
EMT	– ELECTRIC METALLIC TUBING		
FSC	– FLEXIBLE STEEL CONDUIT		
GEN	– GENERATOR		
GPS	– GLOBAL POSITIONING SYSTEM		
GRD	– GROUND		
IGB	– ISOLATED GROUND BAR		
IGR	– INTERIOR GROUND RING (HALO)		
KW	– KILOWATTS		
NEC	– NATIONAL ELECTRIC CODE		
PCS	– PERSONAL COMMUNICATION SYSTEM		
PH	– PHASE		
PNL	– PANEL		
PNLBD	– PANELBOARD		

----	<b>A</b> ----	UNDERGROUND ALARM CONDUIT
----	<b>E</b> ----	UNDERGROUND ELECTRICAL CONDUIT
----	<b>T</b> ----	UNDERGROUND TELEPHONE CONDUIT
		KILOWATT-HOUR METER
-----		UNDERGROUND BONDING AND GROUNDING CONDUCTOR.
		GROUND ROD
		CADWELD
		GROUND ROD WITH INSPECTION WELL

PROJECT INFORMATION:  
**SITE NAME:**  
**NSB-CO.MLK AND TRENTON COL01560**  
**FA NUMBER: 14799270**  
**PACE NUMBER: MRUTH031975**  
**PROJECT: NEW SITE BUILD**  
 7934 MARTIN KING BLVD  
 DENVER, CO 80238  
 (DENVER COUNTY)

PLANS PREPARED FOR:

**n e x i u s**

**NEXIUS**  
 7025 S FULTON ST SUITE 100  
 CENTENNIAL, CO 80112

PLANS PREPARED FOR:

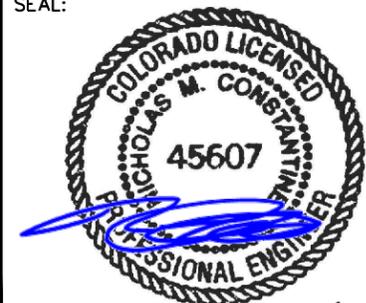


**AT&T MOBILITY**  
 161 INVERNESS DRIVE WEST, 2ND FLOOR  
 ENGLEWOOD, CO 80112

PLANS PREPARED BY:

  
**TOWER ENGINEERING PROFESSIONALS**  
 500 E. 84TH AVE, SUITE C10  
 THORNTON, CO 80229  
 OFFICE: (303) 566-9914  
 www.tepgroup.net

SEAL:



5	10-02-20	CONSTRUCTION
4	08-26-20	PRELIMINARY
3	06-15-20	PRELIMINARY
2	06-03-20	PRELIMINARY
REV	DATE	ISSUED FOR:

DRAWN BY: KES | CHECKED BY: NMC

SHEET TITLE:

**ELECTRICAL NOTES**

SHEET NUMBER: **E-1** | REVISION: **5**  
 TEP#: 240575.203552

# POWER PANEL SCHEDULE 200A, 120/208V, 1Ø, 3W

LOAD SERVED	VOLT AMPERES (WATTS)		WIRE	BREAKER		CKT #	PHASE	CKT #	BREAKER		WIRE	VOLT AMPERES (WATTS)		LOAD SERVED
	L1	L2		P	TRIP				TRIP	P		L1	L2	
RECTIFIER #1	1400		8	2P	40	1	A	2	40	2P	8	1400		RECTIFIER #5
		1400				3	B	4					1400	
RECTIFIER #2	1400		8	2P	40	5	A	6	40	2P	8	1400		RECTIFIER #6
		1400				7	B	8					1400	
RECTIFIER #3	1400		8	2P	40	9	A	10	40	2P	8	1400		RECTIFIER #7
		1400				11	B	12					1400	
RECTIFIER #4	1400		8	2P	40	13	A	14	40	2P	8	1400		RECTIFIER #8
		1400				15	B	16					1400	
SPACE	-	-	-	-	-	17	A	18	-	-	-	-	-	SPACE
SPACE	-	-	-	-	-	19	B	20	-	-	-	-	-	SPACE
GFCI RECEPTACLES	360		12	2P	20	21	A	22	-	-	-	-	-	SPACE
FIBER BOX RECEPTACLE		180	12	2P	20	23	B	24	-	-	-	-	-	SPACE
BATTERY CHARGER	240		12	2P	20	25	A	26	-	-	-	-	-	SPACE
-	-	-	-	-	-	27	B	28	-	-	-	-	-	SPACE
-	-	-	-	-	-	29	A	30	-	-	-	-	-	SPACE
VOLT AMPS	6,200	5,780										5,600	5,600	VOLT AMPS
L1 VOLT AMPERES						11,800		11,380	L2 VOLT AMPERES					
						11,800			MAX VOLT AMPERES					
						98.33			MAX AMPS					
						122.92			AMPS X 125%					
						135.2			X 110% FOR MAIN					

## NOTES:

1. AT&T SERVICE SHALL BE 200A, 120/208V, 1Ø, 3 WIRE.
2. FOR COMPLETE INTERNAL WIRING AND ARRANGEMENT, REFER TO VENDOR PRINTS PROVIDED BY EQUIPMENT CABINET MANUFACTURER.
3. POWER PANEL SCHEDULE FOR REFERENCE ONLY. CONTRACTOR TO REFER TO CABINET SPECIFICATIONS FOR EXACT POWER LOADING.
4. CONTRACTOR TO VERIFY ALL PROPOSED AT&T EQUIPMENT IS ABLE TO RUN OFF OF 120/208V, 1Ø SERVICE AND 120/240V, 1Ø SERVICE.

PROJECT INFORMATION:  
 SITE NAME:  
**NSB-CO.MLK AND TRENTON COL01560**  
 FA NUMBER: 14799270  
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 PROJECT: NEW SITE BUILD  
 7934 MARTIN KING BLVD  
 DENVER, CO 80238  
 (DENVER COUNTY)

PLANS PREPARED FOR:  
  
**NEXIUS**  
 7025 S FULTON ST SUITE 100  
 CENTENNIAL, CO 80112

PLANS PREPARED FOR:  
  
**AT&T MOBILITY**  
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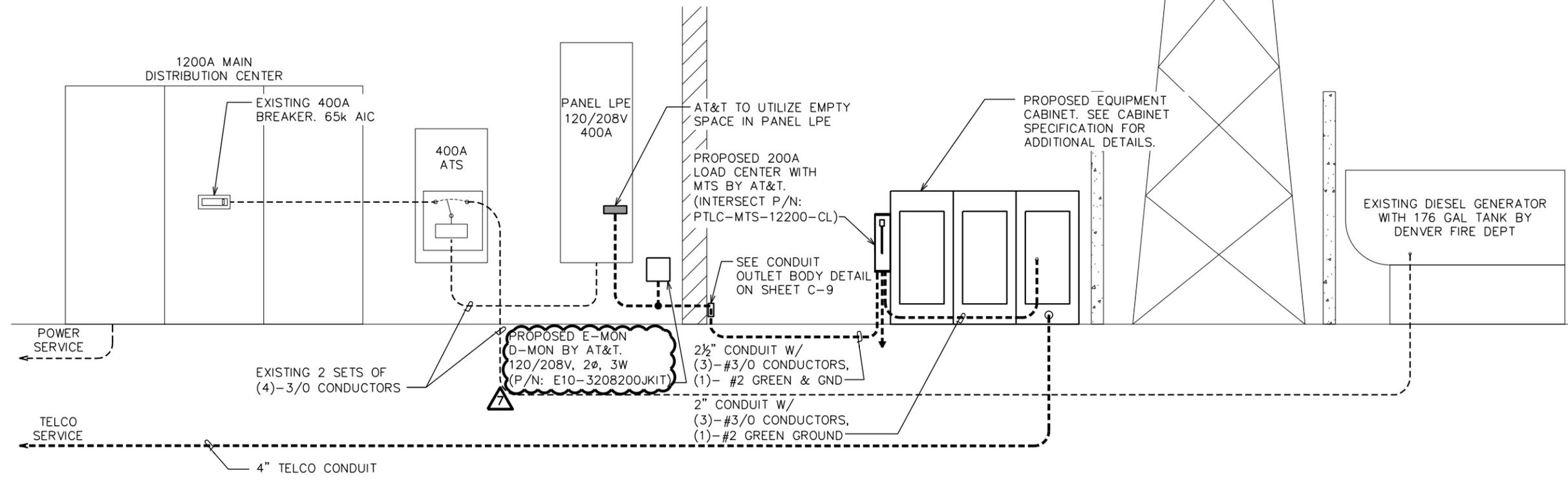
SEAL:  
  
 October 22, 2020

REV	DATE	ISSUED FOR:
7	10-22-20	CONSTRUCTION
6	10-13-20	CONSTRUCTION
5	10-02-20	CONSTRUCTION
4	08-26-20	PRELIMINARY

DRAWN BY: KES    CHECKED BY: NMC

SHEET TITLE:  
**ONE-LINE ELEVATION AND POWER PANEL SCHEDULE**

SHEET NUMBER: **E-2**    REVISION: **7**  
 TEP#: 240575.203552



**ONE-LINE ELEVATION**  
 SCALE: N.T.S.

## EXISTING PANEL "LPE" 400A, 120Y/208V, 3Ø, 4W

DESCRIPTION	VA (WATTS)	TRIP	CKT #	PHASE	CKT #	TRIP	VA (WATTS)	DESCRIPTION
WATCH #116	-	20A	1	A	2	20A	-	APP BAY #135 N OVERHEAD MOTOR
WATCH #116	-	20A	3	B	4	20A	-	APP BAY #135 N OVERHEAD MOTOR
WATCH #116	-	20A	5	C	6	20A	-	APP BAY #135 N OVERHEAD MOTOR
STOR #115, BAY #135	-	20A	7	A	8	20A	-	APP BAY #135 N CORD DROP
APP BAY #135 NORTH DOORS	-	20A	9	B	10	20A	-	APP BAY #135 N CORD DROP
ELEC #137, CHIL #137, APP BAY #135	-	20A	11	C	12	20A	-	APP BAY #135 N CORD DROP
APP BAY #135 EAST WALL	-	20A	13	A	14	20A	-	APP BAY #135 S OVERHEAD MOTOR
APP BAY #135 SOUTH WALL	-	20A	15	B	16	20A	-	APP BAY #135 S OVERHEAD MOTOR
EF-1, EF-7	-	20A	17	C	18	20A	-	APP BAY #135 S OVERHEAD MOTOR
L-RM #115 - 119	-	20A	19	A	20	20A	-	XFMR FEED
L-HOSE TOWER #114	-	20A	21	B	22	20A	-	SPARE
L-APP BAY #135	-	20A	23	C	24			
L-APP BAY #135	-	20A	25	A	26	15A		RF-3
L-APP BAY #135	-	20A	27	B	28			
L-APP BAY #135	-	20A	29	C	30			
L-APP BAY #135	-	20A	31	A	32	15A		RF-4
L-APP BAY #135	-	20A	33	B	34			
IR-1, IR-2	-	20A	35	C	36	20A		IR-3, IR-4
PANEL LPEB	-	200A	37	A	38			PANEL LRE POLICE RADIO ROOM SUBPANEL
	-		39	B	40	100A		
	-		41	C	42			
PANEL MEB	-	150A	43	A	44	200A	11800	PROPOSED AT&T EQUIPMENT
	-		45	B	46			
	-		47	C	48		11380	

	L1	L2	L3	
	28214	19021	25157	VOLT AMPERES
	235.12	158.51	209.64	AMPS
	235.12			MAX AMPS
	293.9			MAX AMPS x125%

## GENERATOR RUNTIME CALCULATIONS

FUEL CONSUMPTION AT 75% LOAD	6.847 GALLONS/HOUR
DIESEL TANK	176 GALLONS
DIESEL TANK AT 80% CAPACITY	140.8 GALLONS
MAX EXISTING LOAD	134.3, 154.1, 111.9 AT 122.5V
ADDED LOAD	98.3, 94.8 AT 120V
TOTAL LOAD	232.6, 154.1, 206.7
TOTAL POWER	85480.5
GEN LOAD PERCENTAGE	59.777%
GENERATOR RUN TIME AT 75% GEN LOAD & 80% CAPACITY	20.564 HOURS
kVA BASE RATE (BR)	178.8
kW BASE RATE (BR)	143
HZ	60

PROJECT INFORMATION:  
 SITE NAME:  
 NSB-CO.MLK AND TRENTON\_COLO1560  
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PLANS PREPARED FOR:

# NEXIUS

NEXIUS  
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REV	DATE	ISSUED FOR:

DRAWN BY: KES      CHECKED BY: NMC

SHEET TITLE:

## EXISTING PANEL & GENERATOR DETAILS

SHEET NUMBER:      REVISION:

# E-2A

7

TEP#: 240575.203552

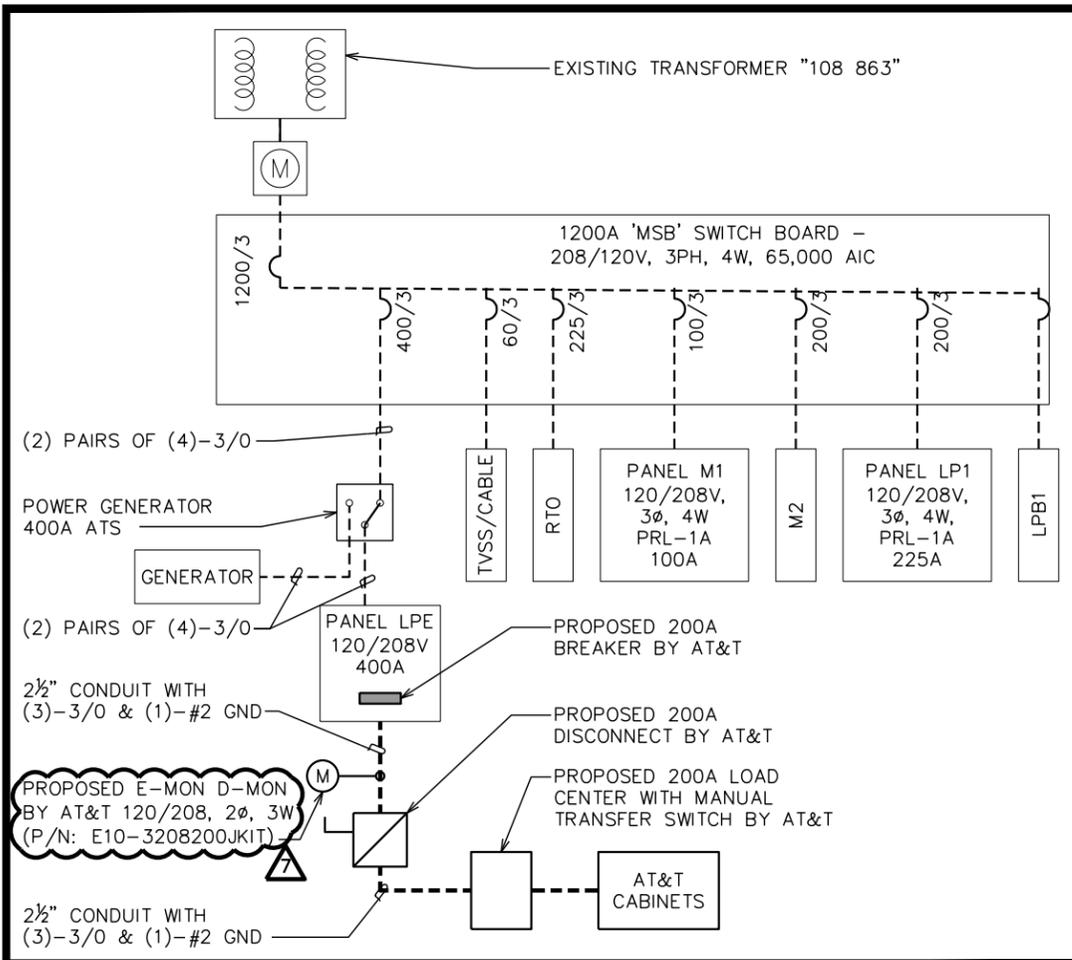


PROPOSED E-MON D-MON  
 BY AT&T. 120/208V, 2Ø, 3W  
 (P/N: E10-3208200JKIT)

PROPOSED BREAKER SPACE  
 TO BE USED BY AT&T

PROPOSED WALL PENETRATION  
 FOR 2½" CONDUIT BY AT&T

**EXISTING PANEL "LPE" PHOTO**

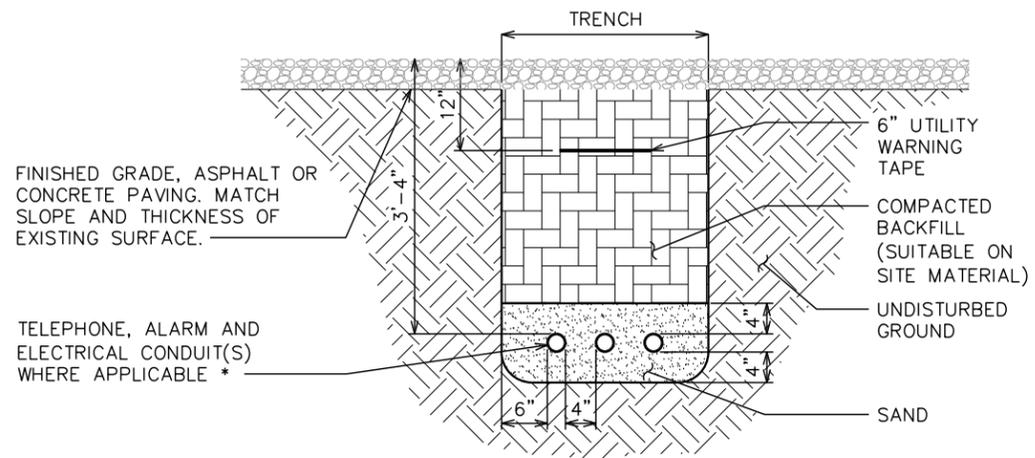


**ONE-LINE DETAIL**

SCALE: N.T.S.

**NOTES:**

1. ACTUAL SEPARATION OF CONDUITS TO BE DETERMINED BY SITE SPECIFIC REQUIREMENTS.
2. PROVIDE PVD CONDUIT BELOW GRADE EXCEPT AS NOTED BELOW.
3. PROVIDE CONDUIT AND ELBOWS AT STUB UP LOCATIONS (I.E. SERVICE POLES, EQUIPMENT, ETC.)
4. PROVIDE RGS CONDUIT FOR INSTALLATIONS BELOW PARKING LOTS AND ROADWAYS.



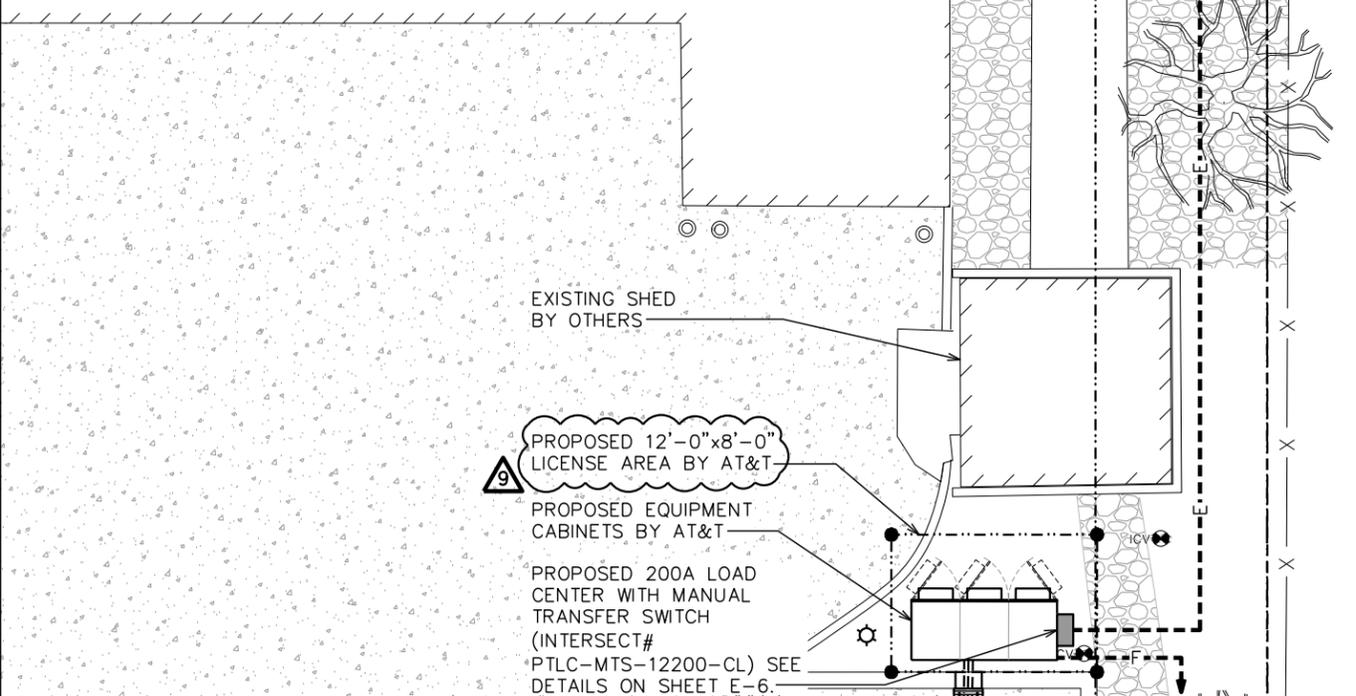
\* SEPARATION DIMENSIONS TO BE VERIFIED WITH LOCAL UTILITY COMPANY REQUIREMENTS.

**UNDERGROUND CONDUIT(S) TRENCH DETAIL**

SCALE: N.T.S.

**NOTES:**

1. ALL TELCO CONDUITS ARE TO BE STUBBED IN D-MARC LOCATION.
2. ALL POWER CONDUITS ARE TO BE TERMINATED AT THE METER CENTER.
3. THE CONTRACTOR SHALL LOCATE ALL EXISTING UTILITIES PRIOR TO TRENCHING. ANY DAMAGE CAUSED TO THE EXISTING UTILITIES SHALL BE REPAIRED AT THE CONTRACTOR'S EXPENSE.
4. ALL CONDUITS SHALL BE INSTALLED PRIOR TO FINISH GRADING, GEOFABRIC, AND STONE INSTALLATION.
5. CONTRACTOR SHALL INSTALL SWEEPS AT ALL CONDUIT DIRECTION CHANGES.



**POWER AND TELCO PLAN**

SCALE: 1/8" = 1'-0"

PROJECT INFORMATION:  
**SITE NAME:**  
 NSB-CO.MLK AND TRENTON COL01560  
**FA NUMBER:** 14799270  
**PACE NUMBER:** MRUTH031975  
**PROJECT:** NEW SITE BUILD  
 7934 MARTIN KING BLVD  
 DENVER, CO 80238  
 (DENVER COUNTY)

PLANS PREPARED FOR:  
**nexus**  
 NEXIUS  
 7025 S FULTON ST SUITE 100  
 CENTENNIAL, CO 80112

PLANS PREPARED FOR:  
  
**AT&T MOBILITY**  
 161 INVERNESS DRIVE WEST, 2ND FLOOR  
 ENGLEWOOD, CO 80112

PLANS PREPARED BY:  
  
**TOWER ENGINEERING PROFESSIONALS**  
 500 E. 84TH AVE, SUITE C10  
 THORNTON, CO 80229  
 OFFICE: (303) 566-9914  
 www.tepgroup.net

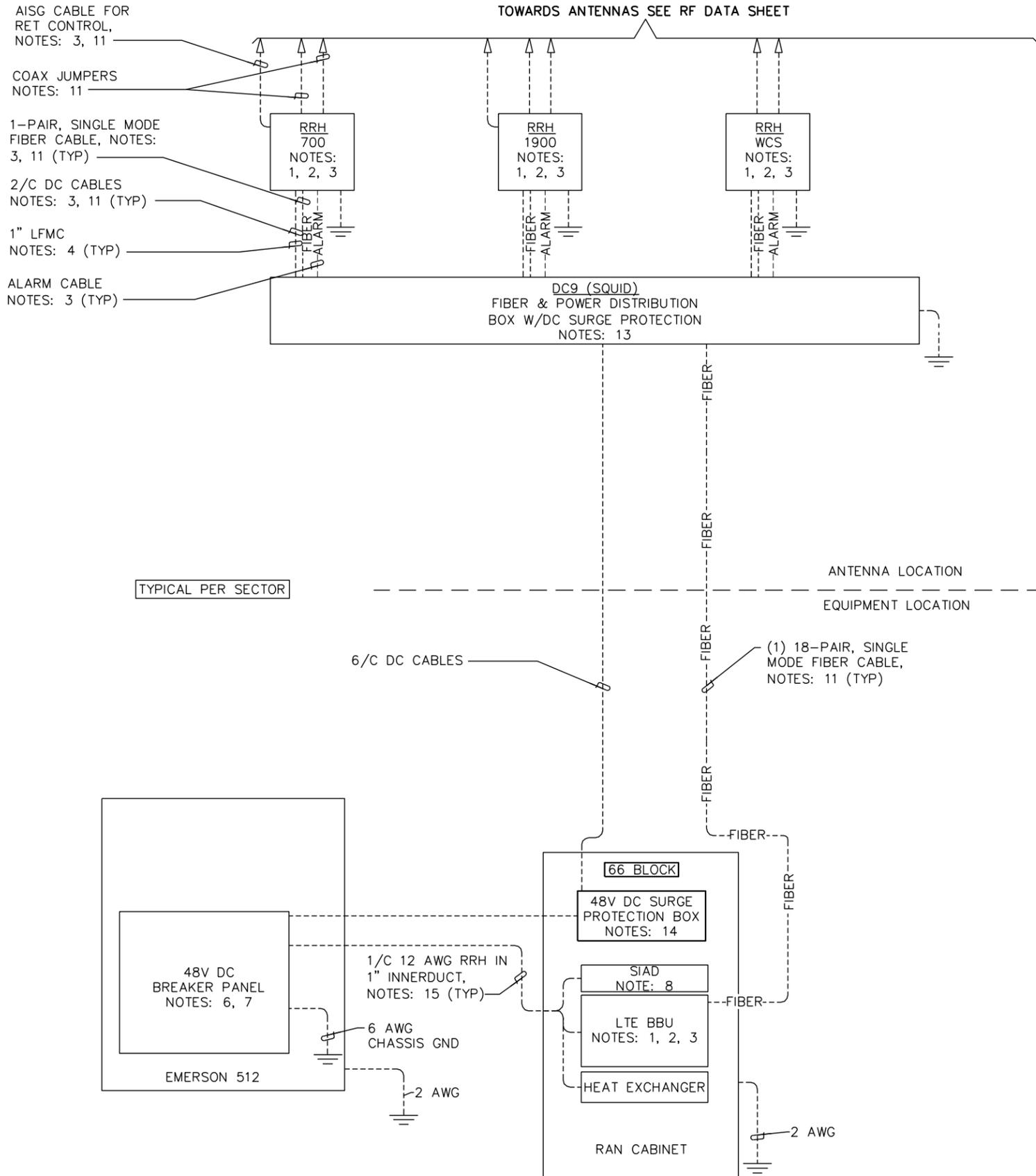
SEAL:  
  
 April 28, 2021

REV	DATE	ISSUED FOR:
9	04-28-21	CONSTRUCTION
8	04-19-21	CONSTRUCTION
7	10-22-20	CONSTRUCTION
6	10-13-20	CONSTRUCTION

DRAWN BY: KES CHECKED BY: NMC

SHEET TITLE:  
**POWER/TELCO PLAN AND ONE-LINE DIAGRAM**

SHEET NUMBER: **E-3** REVISION: **9**  
 TEP#: 240575.203552



**NOTES:**

1. FURNISHED BY OEM/AT&T.
2. INSTALLED BY OEM OR AS SCOPED BY MARKET.
3. FINAL CONNECTION BY OEM OR AS SCOPED BY MARKET.
4. OPEN END OF LFMC TO BE LEFT WEATHERPROOFED UNTIL TERMINATED.
5. DELETED.
6. BREAKERS SPECIFIED SOLD SEPERATELY.
7. BREAKERS TO BE TAGGED AND LOCKED OUT.
8. SIAD IS FURNISHED AND INSTALLED BY OTHERS AND INCLUDES POWER CONNECTIONS AND FIBER TO THE UNIT OR AS SCOPED BY MARKET. INSTALL 10 AWG CHASSIS GROUND, PROVIDE (2) 10A BREAKERS FROM A 24V DC POWER SOURCE OF (2) 5A BREAKERS FROM A 48V DC POWER SOURCE AND CONNECT USING MFR POWER CABLE WITH SPECIAL CONNECTOR.
9. FIBER MANAGEMENT BOX IS J-SOURCE MODEL 12126FM4SEC.
10. LEC TO FURNISH AND INSTALL NETWORK INTERFACE DEVICE.
11. LEAVE COILED AND PROTECTED UNTIL TERMINATED.
12. SEE DETAIL 1408 FOR DC CABLES SIZES
13. FIBER AND POWER DISTRIBUTION BOX 4/48V SURGE SHALL BE RAYCAP MODEL DC9-48-60-18-8F
14. POWER DISTRIBUTION W/DC SURGE PROTECTION BOX SHALL BE RAYCAP MODEL DC9-48-60-0-18.
15. SINGLE-CONDUCTOR DC POWER CABLES SHALL BE TELCOFLEX OR KS24194, COPPER,UL LISTED RHH NON-HALOGEN, LOW SMOKE WITH BRAIDED COVER, TYPE TC (1/8" AND LARGER). UNLESS OTHERWISE NOTES, STANDING SHALL BE CLASS 1 (TYPE IV) FOR SIZES 8 AWG AND LARGER, CABLES SHALL BE COLOR CODED RED FOR +24V, BLUE FOR -48V AND GRAY FOR 24V AND 48V RETURN CONDUCTORS, MULTI-CONDUCTOR DC POWER CABLES SHALL BE COPPER, CLASS BE STRANDED WITH FLAME RETARDANT PVC JACKET, TYPE TC, UL LISTED FOR 90°C DRY/75°C WET INSTALLATION.
16. 10A FUSE FOR HEAT EXCHANGER FURNISHED AND INSTALLED BY OTHERS
17. DELETED.
18. GROUNDING WIRES SHALL BE COPPER, GREEN THHN/THWN UL LISTED FOR 90°C DRY/75°C WET INSTALLATION, MINIMUM SIZE IS 6 AWG UNLESS NOTED OTHERWISE.
19. RET CONTROL FROM THE RRH IS AN OPTIONAL METHOD OF CONNECTION. REFER TO RF DATA SHEET FOR APPLICABILITY.
20. DELETED.
21. FIBER AND POWER DISTRIBUTION BOX 4/48V SURGE SHALL BE RAYCAP MODEL DC6-48-60-0-1E.
22. FIBER MANAGEMENT BOX IS COMMSCOPE MODEL FB 18188.
23. FIBER AND POWER DISTRIBUTION BOX 4/48V SURGE SHALL BE RAYCAP MODEL DC12-48-60-0-25E.

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 7934 MARTIN KING BLVD  
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PLANS PREPARED FOR:  
**nexius**  
 NEXIUS  
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PLANS PREPARED FOR:  
  
**AT&T MOBILITY**  
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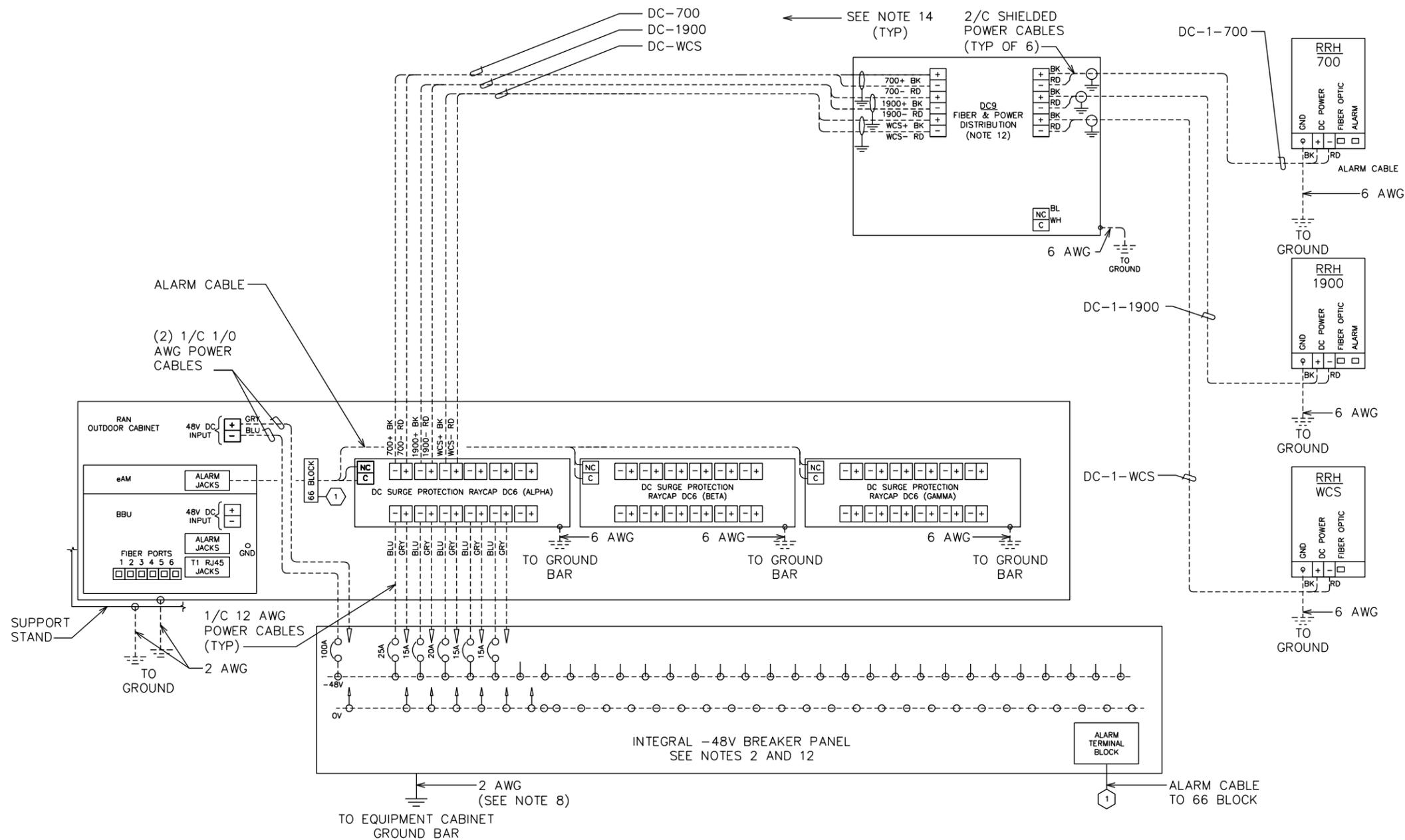
SEAL:  
  
 October 2, 2020

5	10-02-20	CONSTRUCTION
4	08-26-20	PRELIMINARY
3	06-15-20	PRELIMINARY
2	06-03-20	PRELIMINARY
REV	DATE	ISSUED FOR:

DRAWN BY: ADW CHECKED BY: NMC

SHEET TITLE:  
**DC/FIBER SYSTEM DIAGRAM**

SHEET NUMBER: **E-4** REVISION: **5**  
 TEP#: 240575.203552



**NOTES:**

1. LABEL THE DC POWER CABLES AT BOTH ENDS OF EVERY WIRE AND IN ANY PULL BOX IF USED. LABEL SHALL BE DURABLE, SELF ADHESIVE, WRAPPED LONGITUDINALLY ALONG THE CABLE AND STATE THE SECTOR, FREQUENCY BAND AND POLARITY; I.E. A-AWS+.
2. INSTALL ON IN AUXILIARY EQUIPMENT CABINET.
3. CABLE TERMINALS FOR +24V INPUT FEED A, AND FEED B AND REFERENCE GROUND SHALL BE 2-HOLE: 3/8" ON 1" CENTER.
4. INSTALL CABLE TERMINALS FOR FEED A AND FEED B RETURN BACK TO BACK ON OPPOSITE SIDES OF PAD USING 1-HOLE 3/8" TERMINALS.
5. CABLE TERMINALS FOR CHASSIS GROUND SHALL BE 2-HOLE, 1/4" ON 5/8" CENTER.
6. WHEN DISTRIBUTION BOX IS NOT USED, INSTALL 3 RUNS OF (2) 2/C CABLES IN CONDUIT, 1 EACH FROM DC SURGE SHELF TO DC6s.
7. A JUNCTION BOX IS REQUIRED WHEN FIBER OPTIC CABLES ARE INSTALLED IN CONDUIT AS SCOPED BY MARKET.
8. CONVERTER REFERENCE GROUND IS NOT REQUIRED WHEN CONVERTER AND 24V DC POWER PLANT ARE ON THE SAME RACK OF ENCLOSURE
9. THE BARE GROUND WIRE OF EACH MULTI-CONDUCTOR CABLE AND DRAIN WIRE WHEN A SHIELDED CABLE IS USED, SHALL BE CONNECTED TO THE EQUIPMENT CABINET GROUND BAR.
10. SEE ALARM BLOCK ASSIGNMENT DETAIL FOR ALARM CABLE CONNECTIONS.
11. PROVIDE A JUNCTION BOX, AS SCOPED BY MARKET, TO COIL EXCESS DC POWER AND OPTICAL FIBER CABLES (FIBER CABLES NOT SHOWN FOR CLARITY).
12. NOTED EQUIPMENT MAY BE COMMON TO LTE AN UMTS SYSTEMS.
13. CABLE GROUND WIRE AND SHIELD DRAIN WIRE TO BE LEFT UN-TERMINATED AT RRH
14. WHEN AN RRH IS USED INSTEAD OF AN AWS RRH CABLE, LABELS SHOULD REFLECT CORRECT FREQUENCY BAND.

**DC/FIBER SYSTEM DIAGRAM**

SCALE: N.T.S.

PROJECT INFORMATION:  
**SITE NAME:**  
**NSB-CO.MLK AND TRENTON\_COL01560**  
**FA NUMBER: 14799270**  
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PLANS PREPARED FOR:  
  
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 www.tepgroup.net

SEAL:

October 2, 2020

5	10-02-20	CONSTRUCTION
4	08-26-20	PRELIMINARY
3	06-15-20	PRELIMINARY
2	06-03-20	PRELIMINARY
REV	DATE	ISSUED FOR:

DRAWN BY: ADW | CHECKED BY: NMC

SHEET TITLE:  
**DC WIRING DIAGRAM**

SHEET NUMBER: **E-5** | REVISION: **5**  
 TEP#: 240575.203552

# PTLC-MTS-12200-CL

Service Entrance Solution for Walk-In Cabinets and Small Cell Sites



The PTLC-MTS-12200-CL is a power transfer load center with a manual transfer switch that is designed for small AC service entrance spaces. This compact enclosure measures 32" H x 22" W x 11.25" D. With CamLoks, which provide universal engine generator set connections, the width is 27". A mechanically-interlocked manual transfer switch, Strike-sorb® surge protection modules, a Square D 30-position load center, an alarm for utility power loss, an external outlet with GFCI receptacle, and CamLok connectors all are integrated within the NEMA 3R enclosure.

### AC Service Entrance Rated

- Single phase, 120/240 V, 200 A, rated 22kAIC
- Rugged NEMA 3R-compliant enclosure for outdoor or indoor use
- Aluminum construction is lightweight and corrosion-resistant
- Pad-lockable door prevents unauthorized access to PTLC, while pad-lockable tab prevents unauthorized access—with or without generator cables connected—to the CamLok connectors

### Powerful Integrated Performance

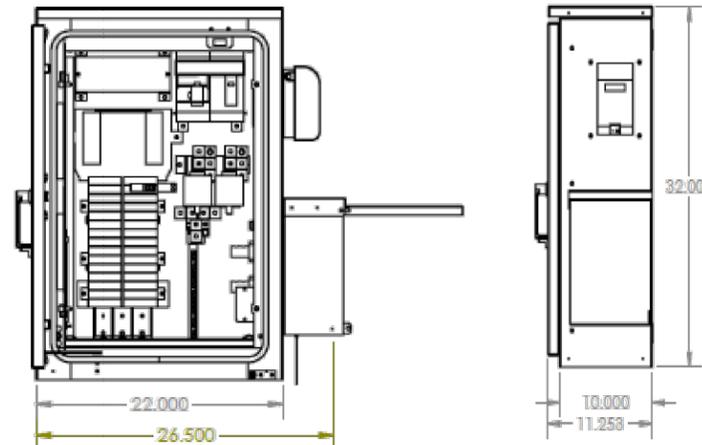
- Mechanically-interlocked transfer switch constructed of two main circuit breakers, preventing both circuits (utility and generator power sources) from being closed at the same time
- Safeguards critical loads from transients and load transfer spikes using Strikesorb surge suppression
  - Protection characteristics remain unchanged throughout service life due
  - Withstands repeated surges, providing cost-effective and maintenance-free operation in demanding environments
  - Critical loads are never left unprotected, as Strikesorb operates to a short circuit and trips main disconnect breaker in the event of a long duration, potentially catastrophic over-voltage event
  - Loads and personnel are safe from over-voltage damage until a qualified technician or electrician replaces modules
- Square D, QO Series panel board supports 30 circuits

For more information contact Intersect at [solutions@intersectinc.com](mailto:solutions@intersectinc.com).

**Intersect, Inc.**

Quality products. Premium customer care. Integrated solutions.

Product No	Description
PTLC-MTS-12200-CL	240/120 V; 1Ø; 200 A; Strikesorb; utility alarm monitor; 30-position load center; NEMA 3R; with CamLok style connector enclosure.

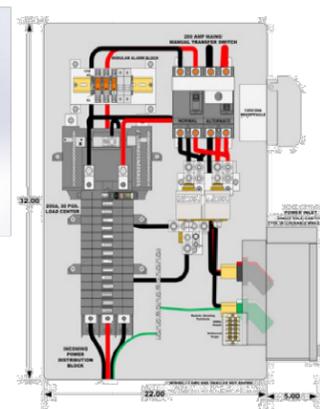


Front view.

Side view.



CamLok connector panel enclosure.



PTLC-MTS-12200-CL panels measure 32"H x 22"W x 11.25"D

### General Data

Enclosure Dimensions (H x W x D)  
32" x 22" x 11.25"  
127" with CamLok enclosure

### Weight

<100 lbs

### UL Certification

- UL 891 - Dead front switch boards
- Suitable for use as Service Entrance
- File #E488098

### Electrical Specifications

- 120/240 V
- Single phase
- 200 A maximum
- SCCR: 22,000A RMS

### Enclosure

#### Rating

NEMA 3R

#### Composition

Aluminum

#### Powder Coat Paint

UL Pantone (Cod Gray)<sup>1</sup>

<sup>1</sup>Other Pantone colors may be requested

#### Door

- 3-point pad-lockable latch on PTLC
- Pad-lockable tab closure on CamLok panel

#### Convenience Receptacle

External 20-A outlet for GFCI receptacle

### Load Center

#### Panelboard Type

Square D, QO Series

#### Circuit Breaker Positions

30 circuits

### Suppression Technology

#### Technology Type

Strikesorb 40-A, 120 V modules

#### Listings

UL 1449 3rd Ed (or current), CE, VDE

PROJECT INFORMATION:  
SITE NAME:  
**NSB-CO.MLK AND TRENTON\_COL01560**  
FA NUMBER: 14799270  
PACE NUMBER: MRUTH031975  
PROJECT: NEW SITE BUILD  
7934 MARTIN KING BLVD  
DENVER, CO 80238  
(DENVER COUNTY)

PLANS PREPARED FOR:

**NEXIUS**

**NEXIUS**  
7025 S FULTON ST SUITE 100  
CENTENNIAL, CO 80112

PLANS PREPARED FOR:



**AT&T MOBILITY**  
161 INVERNESS DRIVE WEST, 2ND FLOOR  
ENGLEWOOD, CO 80112

PLANS PREPARED BY:



**TOWER ENGINEERING PROFESSIONALS**  
500 E. 84TH AVE, SUITE C10  
THORNTON, CO 80229  
OFFICE: (303) 566-9914  
[www.tepgroup.net](http://www.tepgroup.net)

SEAL:



October 2, 2020

5	10-02-20	CONSTRUCTION
4	08-26-20	PRELIMINARY
3	06-15-20	PRELIMINARY
2	06-03-20	PRELIMINARY
REV	DATE	ISSUED FOR:

DRAWN BY: KES | CHECKED BY: NMC

SHEET TITLE:

**LOAD CENTER  
DETAILS**

SHEET NUMBER:

**E-6**

REVISION:

**5**

TEP#: 240575.203552

All specifications subject to change without notice.  
Strikesorb® is a registered trademark of Raycap Corporation.  
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P.O. Box 753 – Liberty Lake WA 99019 – USA  
Phone: 509.255.9570 or 800.910.3735 – Fax: 509.255.6034  
[www.intersectinc.com](http://www.intersectinc.com)

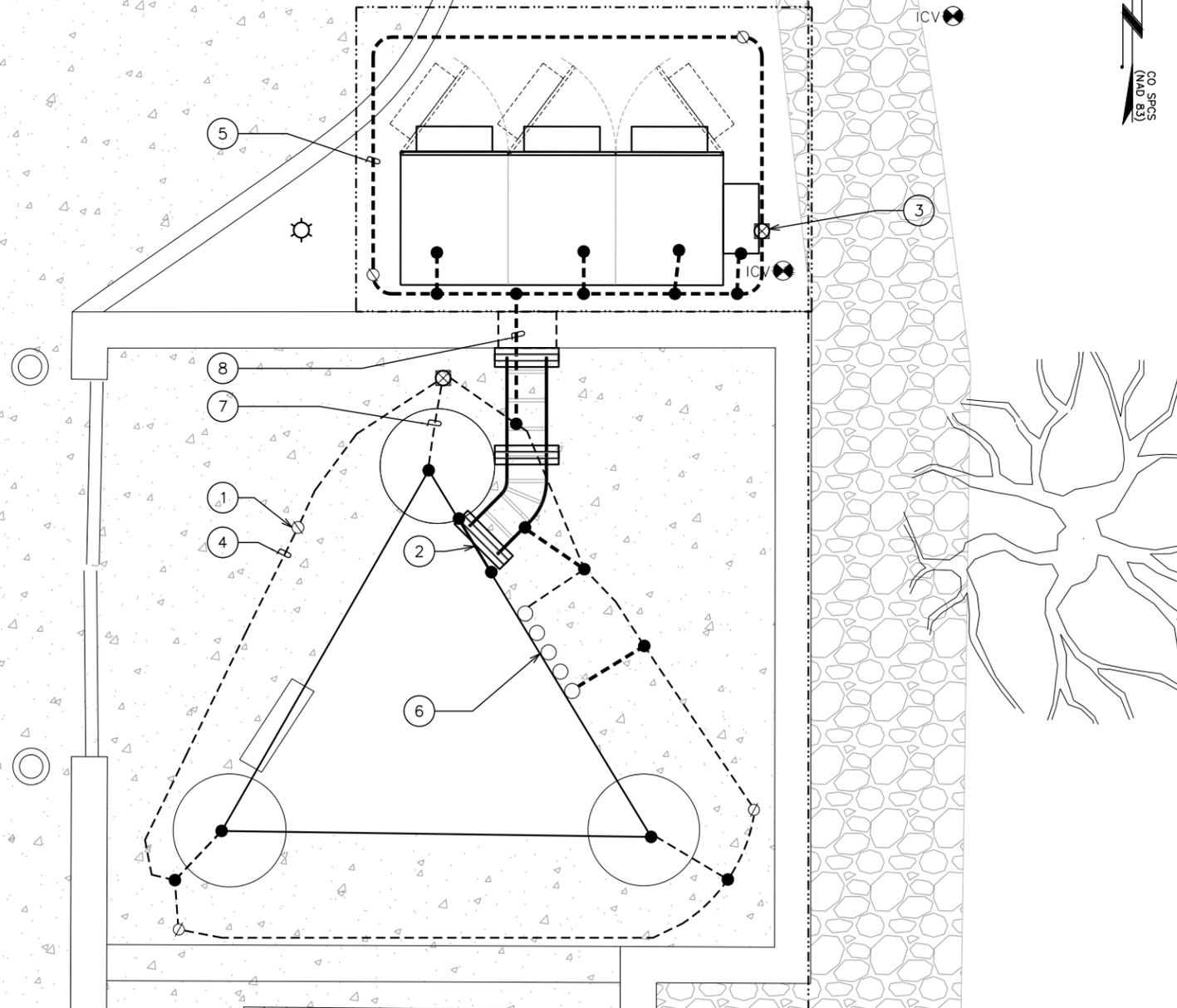
**Intersect, Inc.**

**DRAWING NOTES:**

- ① 5/8"x8' COPPER GROUND ROD (TYP).
- ② CIGBE GROUND BAR.
- ③ PROPOSED INSPECTION WELL. SEE DETAIL ON THIS SHEET.
- ④ EXISTING TOWER GROUND RING
- ⑤ PROPOSED GROUND RING. #2 COPPER CONDUCTOR-BARE TINNED BURIED 50" BFG.
- ⑥ EXISTING MAIN TOWER GROUND BAR
- ⑦ EXISTING #2 GND FROM TOWER LEG PENETRATING CONCRETE PAD TO EXISTING GROUND RING
- ⑧ PROPOSED EQUIPMENT GROUND RING TO BE TIED INTO EXISTING GROUND RING

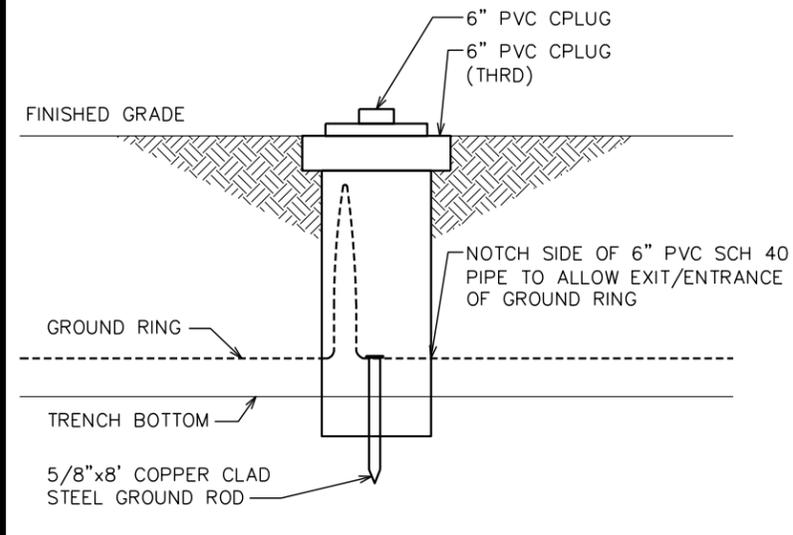
**GROUNDING NOTES**

- 1. GROUNDING ELECTRODES SHALL BE CONNECTED IN A RING USING #2 SOLID CONDUCTOR. THE TOP OF THE GROUND RODS AND THE RING CONDUCTOR SHALL BE 50" (MIN) BELOW FINISHED GRADE. GROUNDING ELECTRODES SHALL BE DRIVEN 10'-0" CENTERS. (6'-0" MINIMUM; 16'-0" MAXIMUM)
- 2. BONDING OF THE GROUNDED CONDUCTOR (NEUTRAL) AND THE GROUNDING CONDUCTOR SHALL BE AT THE SERVICE DISCONNECTING MEANS. BONDING JUMPER SHALL BE INSTALLED PER N.E.C. ARTICLE 250.30.
- 3. INTERIOR GROUND BARS ARE TO BE BARE COPPER. EXTERIOR GROUND BARS ARE TO BE TINNED OR GALVANIZED COPPER.



**TYPICAL GROUNDING PLAN**

SCALE: N.T.S.

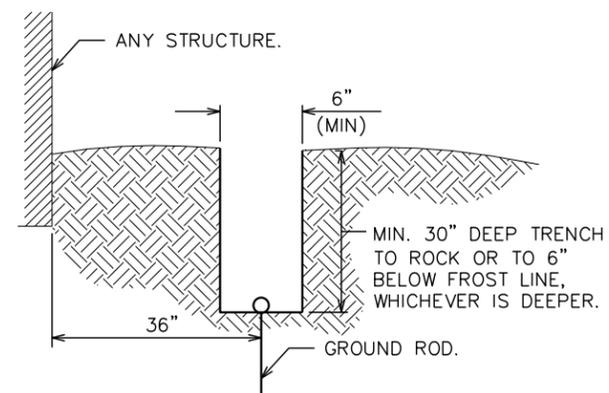


**INSPECTION WELL DETAIL**

SCALE: N.T.S.

**NOTES:**

PER TIA-22-G DENVER COUNTY FROST DEPTH IS 44".



**TRENCH DETAIL**

SCALE: N.T.S.

PROJECT INFORMATION:  
**SITE NAME:**  
**NSB-CO.MLK AND TRENTON\_COL01560**  
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 7934 MARTIN KING BLVD  
 DENVER, CO 80238  
 (DENVER COUNTY)

PLANS PREPARED FOR:

**nexius**

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 CENTENNIAL, CO 80112

PLANS PREPARED FOR:



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2	06-03-20	PRELIMINARY

DRAWN BY: KES | CHECKED BY: NMC

SHEET TITLE:

**GROUNDING PLAN AND DETAILS**

SHEET NUMBER: | REVISION:

**G-1**

**5**

TEP#: 240575.203552

**GROUNDING NOTES:**

1. GROUNDING SHALL COMPLY WITH ARTICLE 250 OF THE NATIONAL ELECTRIC CODE.
2. ALL GROUNDING DEVICES SHALL BE U.L. APPROVED OR LISTED FOR THEIR INTENDED USE
3. ALL WIRES SHALL BE AWG THHN/THWN COPPER UNLESS NOTED OTHERWISE
4. GROUNDING CONNECTION TO GROUND RODS, GROUND RING WIRE, TOWER BASE, AND FENCE POSTS SHALL BE EXOTHERMIC (CADWELDS). UNLESS NOTED OTHERWISE. CLEAN SURFACES TO SHINY METAL. WHERE GROUND WIRES ARE CADWELDED TO GALVANIZED SURFACES, SPRAY CADWELD WITH GALVANIZING PAINT.
5. GROUNDING CONNECTIONS TO GROUND BARS ARE TO BE TWO HOLE BRASS MECHANICAL CONNECTORS WITH STAINLESS STEEL HARDWARE (INCLUDING SCREW SET) CLEAN GROUND BAR TO SHINY METAL. AFTER MECHANICAL CONNECTION, TREAT WITH PROTECTIVE ANTIOXIDANT COATING.
6. GROUND COAXIAL CABLE SHIELDS AT BOTH ENDS WITH MANUFACTURER'S GROUNDING KITS
7. ROUTE GROUNDING CONDUCTORS THE SHORTEST AND STRAIGHTEST PATH POSSIBLE. BEND GROUNDING LEADS WITH A MINIMUM 12" RADIUS
8. INSTALL #2 AWG GREEN-INSULATED STRANDED WIRE FOR ABOVE GRADE GROUNDING AND #2 BARE TINNED COPPER WIRE FOR BELOW GRADE GROUNDING UNLESS OTHERWISE NOTED
9. REFER TO GROUNDING PLAN FOR GROUND BAR LOCATIONS. GROUNDING CONNECTIONS SHALL BE EXOTHERMIC TYPE (CADWELDS) TO ANTENNA MOUNTS AND GROUND TRAIN, REMAINING GROUNDING CONNECTIONS SHALL BE COMPRESSION FITTINGS. CONNECTIONS TO GROUND BARS SHALL BE MADE WITH TWO-HOLE LUGS.
10. THE GROUND ELECTRODE SYSTEM SHALL CONSIST OF DRIVEN GROUND RODS POSITION ACCORDING TO GROUND PLAN THE GROUND RODS SHALL BE 5/8"x10'-0" COPPER CLAD STEEL INTERCONNECTION WITH #2 BARE TINNED COPPER WIRE BURIED 36" BELOW GRAD. BURY GROUND RODS A MAXIMUM OF 15' APART, AND A MINIMUM OF 8' APART.
11. IF ROCK IS ENCOUNTERED GROUND RODS SHALL BE PLACED AT AN OBLIQUE ANGLE NOT TO EXCEED 45 DEG.
12. EXOTHERMIC WELDS SHALL BE MADE IN ACCORDANCE WITH ERICO PRODUCTS BULLETIN A-AT.
13. CONSTRUCTION OF GROUND RING AND CONNECTIONS TO EXISTING GROUND RING SYSTEM SHALL BE DOCUMENTED WITH PHOTOGRAPHS PRIOR TO BACKFILLING SITE, PROVIDE PHOTOS TO THE CONSTRUCTION MANAGER
14. ALL GROUND LEAD EXCEPT THOSE TO THE EQUIPMENT ARE TO BE #2 BARE TINNED COPPER WIRE. ALL EXTERIOR GROUND BARS TINNED COPPER.
15. PRIOR TO INSTALLING LUGS ON GROUND WIRES, APPLY THOMAS & BETTS KOPR-SHIELD (TM OF JET LUBE INC.). PRIOR TO BOLTING GROUND WIRE LUGS TO GROUND BARS, APPLY KOPR-SHIELD OR EQUAL.
16. ENGAGE AN INDEPENDENT ELECTRICAL TESTING FIRM TO TEST AND VERIFY THAT IMPEDANCE DOES NOT EXCEED FIVE OHMS TO GROUND BY MEANS OF "FALL OF POTENTIAL TEST". TEST SHALL BE WITNESSED BY A METROPCS REPRESENTATIVE, AND RECORDED ON THE "GROUND RESISTANCE TEST" FORM.
17. WHERE BARE COPPER GROUND WIRES ARE ROUTED FROM ANY CONNECTION ABOVE GRADE TO GROUND RING, INSTALL WIRE IN 3/4" PVC SLEEVE, FROM 1" BELOW GRADE AND SEAL TOP WITH SILICONE MATERIAL
18. PREPARE ALL BONDING SURFACES FOR GROUNDING CONNECTIONS BY REMOVING ALL PAINT AND CORROSION DOWN TO SHINY METAL. FOLLOWING CONNECTION, APPLY APPROPRIATE ANTI-OXIDATION PAINT.
19. ANY SITE WHERE THE EQUIPMENT (BTS, CABLE BRIDGE, PPC, GENERATOR, ETC.) IS LOCATED WITHIN 6 FEET OF METAL FENCING, THE GROUND RING SHALL BE BONDED TO THE NEAREST FENCE POST USING (3) RUNS OF #2 BARE TINNED COPPER WIRE.

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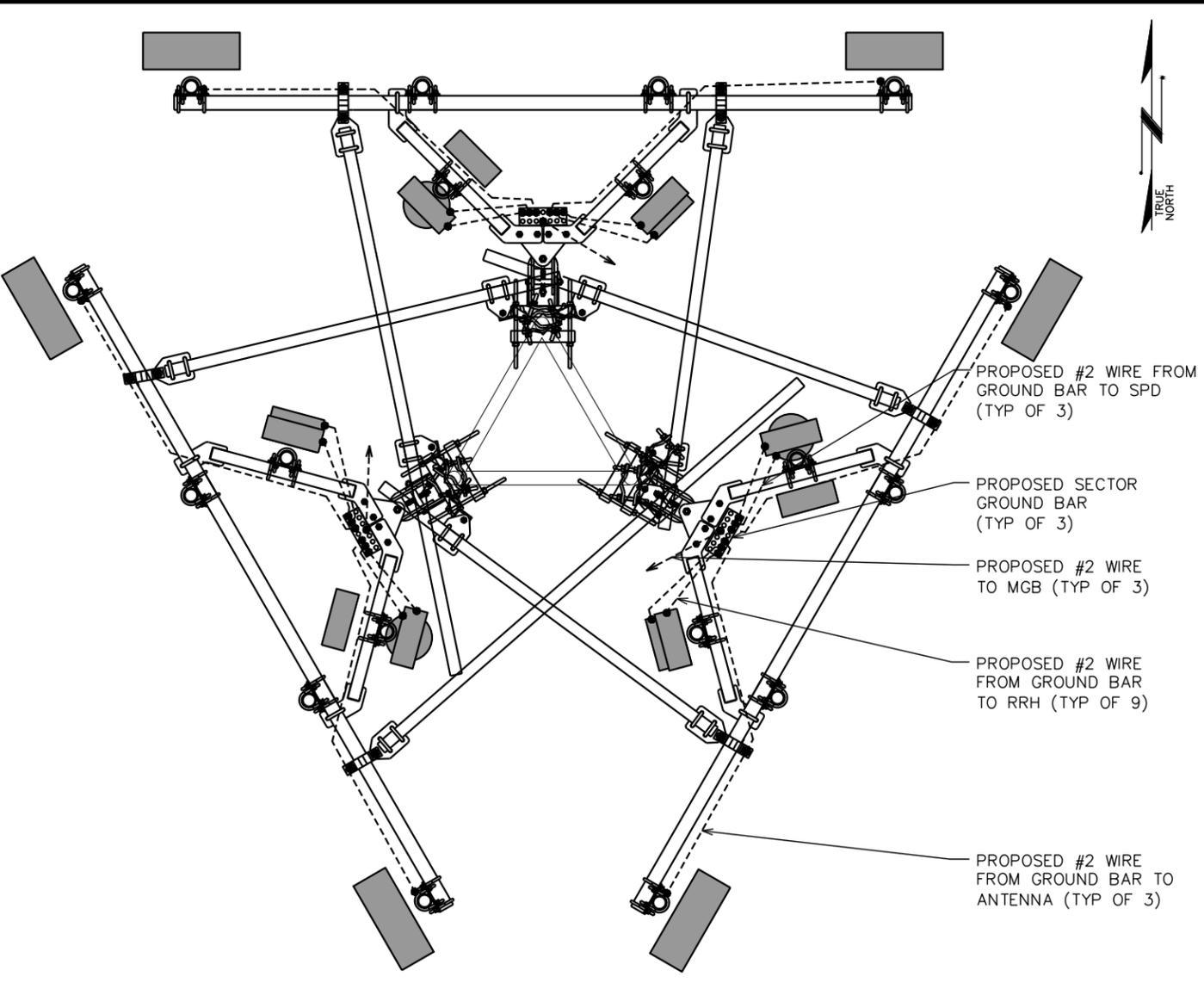
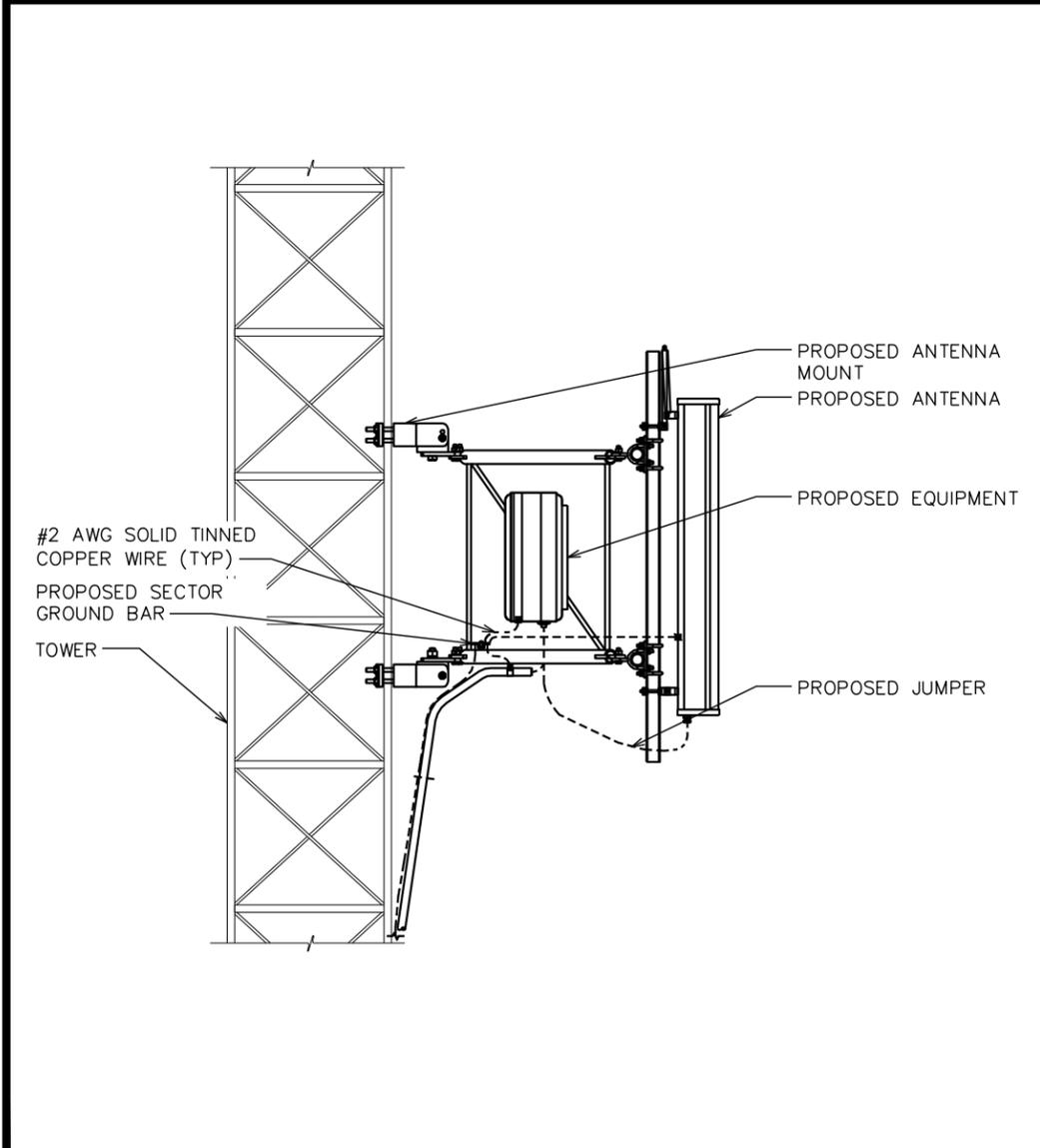
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SHEET TITLE:  
**ANTENNA GROUNDING DETAILS**

SHEET NUMBER: **G-2** | REVISION: **5**  
 TEP#: 240575.203552

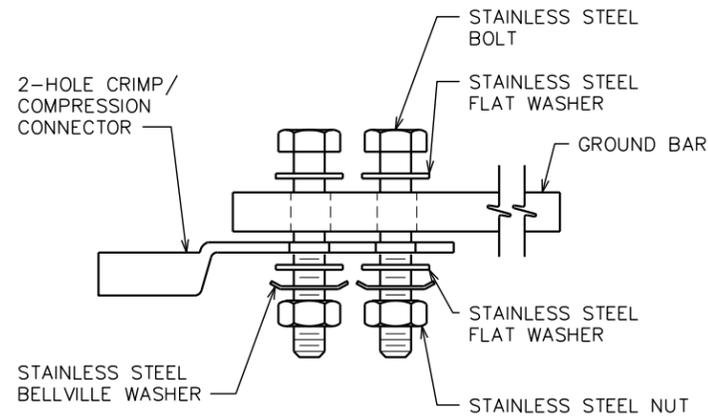


**TYPICAL ANTENNA & EQUIPMENT GROUNDING DETAIL**

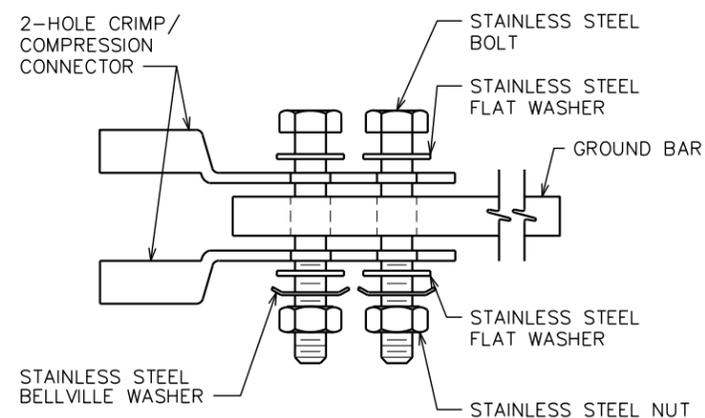
SCALE: N.T.S.

**TYPICAL ANTENNA MOUNT**

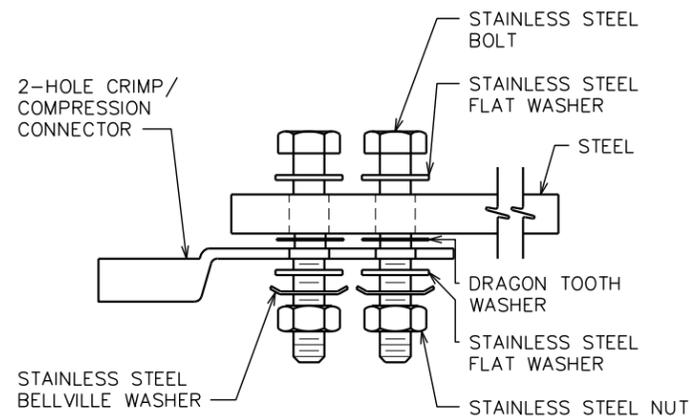
SCALE: N.T.S.



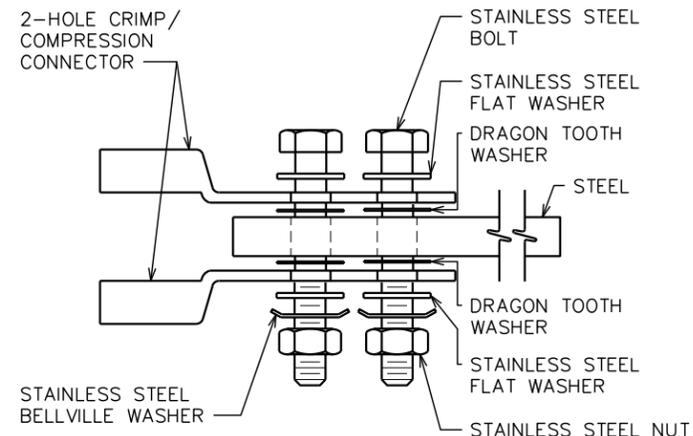
**SINGLE CONNECTOR AT GROUND BARS**



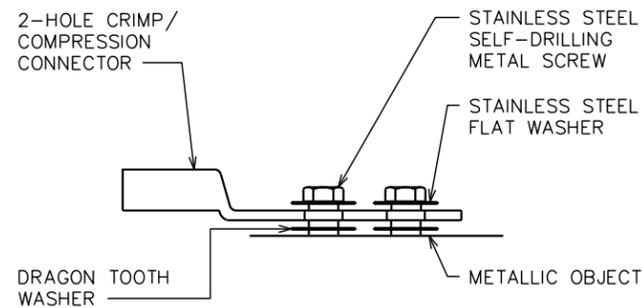
**BACK TO BACK CONNECTOR AT GROUND BARS**



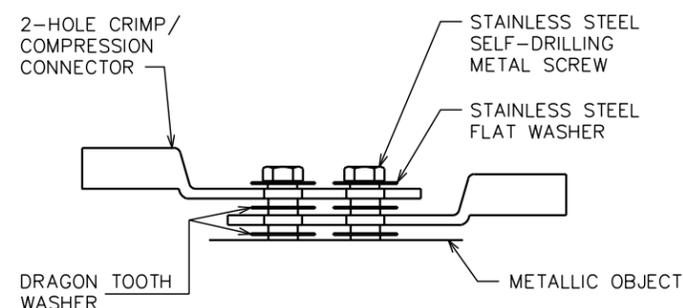
**SINGLE CONNECTOR AT STEEL OBJECTS**



**BACK TO BACK CONNECTOR AT STEEL OBJECTS**



**SINGLE CONNECTOR AT METALLIC/STEEL OBJECTS**



**BACK TO BACK CONNECTOR AT METALLIC/STEEL OBJECTS**

**NOTES:**

1. CHOOSE BOLT LENGTH TO ALLOW A MIN. OF THREE THREADS EXPOSED.
2. BURNISH MOUNTING SURFACE TO REMOVE PAINT IN THE AREA OF THE CONNECTOR.
3. APPLY ANTI-OXIDANT COMPOUND TO MATING SURFACE OF CONNECTOR AND WIPE OFF EXCESS COMPOUND.
4. APPLY CLEAR HEAT SHRINK OVER ENTIRE LENGTH OF LABEL FOR PROTECTION. (REFER TO CONDUCTOR LABELS SECTION.)
5. INTERIOR GROUND BARS ARE TO BE BARE COPPER. EXTERIOR GROUND BARS ARE TO BE TINNED OR GALVANIZED COPPER.

PROJECT INFORMATION:  
**SITE NAME:**  
**NSB-CO.MLK AND TRENTON\_COL01560**  
**FA NUMBER: 14799270**  
**PACE NUMBER: MRUTH031975**  
**PROJECT: NEW SITE BUILD**  
 7934 MARTIN KING BLVD  
 DENVER, CO 80238  
 (DENVER COUNTY)

PLANS PREPARED FOR:  
**nexus**  
**NEXIUS**  
 7025 S FULTON ST SUITE 100  
 CENTENNIAL, CO 80112

PLANS PREPARED FOR:  
  
**AT&T MOBILITY**  
 161 INVERNESS DRIVE WEST, 2ND FLOOR  
 ENGLEWOOD, CO 80112

PLANS PREPARED BY:  
  
**TOWER ENGINEERING PROFESSIONALS**  
 500 E. 84TH AVE, SUITE C10  
 THORNTON, CO 80229  
 OFFICE: (303) 566-9914  
 www.tepgroup.net

SEAL:  
  
 October 2, 2020

5	10-02-20	CONSTRUCTION
4	08-26-20	PRELIMINARY
3	06-15-20	PRELIMINARY
2	06-03-20	PRELIMINARY
REV	DATE	ISSUED FOR:

DRAWN BY: BRC | CHECKED BY: NMC

SHEET TITLE:  
**GROUNDING DETAILS**

SHEET NUMBER: **G-3** | REVISION: **5**  
 TEP#: 240575.203552

**CONNECTOR AND HARDWARE DETAIL**

SCALE: N.T.S.

## GENERAL NOTES:

- ALL REFERENCES TO OWNER IN THESE DOCUMENTS SHALL BE CONSIDERED AT&T MOBILITY, OR ITS DESIGNATED REPRESENTATIVE.
- ALL WORK PRESENTED ON THESE DRAWINGS MUST BE COMPLETED BY THE CONTRACTOR UNLESS NOTED OTHERWISE. THE CONTRACTOR MUST HAVE CONSIDERABLE EXPERIENCE IN PERFORMANCE OF WORK SIMILAR TO THAT DESCRIBED HEREIN. BY ACCEPTANCE OF THIS ASSIGNMENT, THE CONTRACTOR IS ATTESTING THAT HE DOES HAVE SUFFICIENT EXPERIENCE AND ABILITY, THAT HE IS KNOWLEDGABLE OF THE WORK TO BE PERFORMED AND THAT HE IS PROPERLY LICENSED AND PROPERLY REGISTERED TO DO THIS WORK IN THE STATE OF COLORADO.
- STRUCTURE IS DESIGNED IN ACCORDANCE WITH ANSI/TIA/EIA-222-H, FOR A 120 MPH 3-SECOND RISK CATEGORY III GUST WIND LOAD. THIS CONFORMS TO THE REQUIREMENTS OF THE INTERNATIONAL BUILDING CODE, 2018 EDITION.
- WORK SHALL BE COMPLETED IN ACCORDANCE WITH THE INTERNATIONAL BUILDING CODE, 2018 EDITION.
- UNLESS SHOWN OR NOTED OTHERWISE ON THE CONTRACT DRAWINGS, OR IN THE SPECIFICATIONS, THE FOLLOWING NOTES SHALL APPLY TO THE MATERIALS LISTED HEREIN, AND TO THE PROCEDURES TO BE USED ON THIS PROJECT.
- ALL HARDWARE ASSEMBLY MANUFACTURER'S INSTRUCTIONS SHALL BE FOLLOWED EXACTLY AND SHALL SUPERCEDE ANY CONFLICTING NOTES ENCLOSED HEREIN.
- IT IS THE CONTRACTOR'S SOLE RESPONSIBILITY TO DETERMINE ERECTION PROCEDURE AND SEQUENCE TO ENSURE THE SAFETY OF THE STRUCTURE AND IT'S COMPONENT PARTS DURING ERECTION AND/OR FIELD MODIFICATIONS. THIS INCLUDES, BUT IS NOT LIMITED TO, THE ADDITION OF TEMPORARY BRACING, GUYS OR TIE DOWNS THAT MAY BE NECESSARY. SUCH MATERIAL SHALL BE REMOVED AND SHALL REMAIN THE PROPERTY OF THE CONTRACTOR AFTER THE COMPLETION OF THE PROJECT.
- ALL DIMENSIONS, ELEVATIONS, AND EXISTING CONDITIONS SHOWN ON THE DRAWINGS SHALL BE FIELD VERIFIED BY THE CONTRACTOR PRIOR TO BEGINNING ANY MATERIALS ORDERING, FABRICATION OR CONSTRUCTION WORK ON THIS PROJECT. CONTRACTOR SHALL NOT SCALE CONTRACT DRAWINGS IN LIEU OF FIELD VERIFICATIONS. ANY DISCREPANCIES SHALL BE IMMEDIATELY BROUGHT TO THE ATTENTION OF THE OWNER AND THE OWNER'S ENGINEER. THE DISCREPANCIES MUST BE RESOLVED BEFORE THE CONTRACTOR IS TO PROCEED WITH THE WORK. THE CONTRACT DOCUMENTS DO NOT INDICATE THE METHOD OF CONSTRUCTION. THE CONTRACTOR SHALL SUPERVISE AND DIRECT THE WORK AND SHALL BE SOLELY RESPONSIBLE FOR ALL CONSTRUCTION MEANS, METHODS, TECHNIQUES, SEQUENCES, AND PROCEDURES. OBSERVATION VISITS TO THE SITE BY THE OWNER AND/OR THE ENGINEER SHALL NOT INCLUDE INSPECTION OF THE PROTECTIVE MEASURES OR THE PROCEDURES.
- ALL MATERIALS AND EQUIPMENT FURNISHED SHALL BE NEW AND OF GOOD QUALITY, FREE FROM FAULTS AND DEFECTS AND IN CONFORMANCE WITH THE CONTRACT DOCUMENTS. ANY AND ALL SUBSTITUTIONS MUST BE PROPERLY APPROVED AND AUTHORIZED IN WRITING BY THE OWNER AND ENGINEER PRIOR TO INSTALLATION. THE CONTRACTOR SHALL FURNISH SATISFACTORY EVIDENCE AS TO THE KIND AND QUALITY OF THE MATERIALS AND EQUIPMENT BEING SUBSTITUTED.
- THE CONTRACTOR SHALL BE RESPONSIBLE FOR INITIATING, MAINTAINING, AND SUPERVISING ALL SAFETY PRECAUTIONS AND PROGRAMS IN CONNECTION WITH THE WORK. THE CONTRACTOR IS RESPONSIBLE FOR ENSURING THAT THIS PROJECT AND RELATED WORK COMPLIES WITH ALL APPLICABLE LOCAL, STATE, AND FEDERAL SAFETY CODES AND REGULATIONS GOVERNING THIS WORK.
- ACCESS TO THE PROPOSED WORK SITE MAY BE RESTRICTED. THE CONTRACTOR SHALL COORDINATE INTENDED CONSTRUCTION ACTIVITY, INCLUDING WORK SCHEDULE AND MATERIALS ACCESS, WITH THE RESIDENT LEASING AGENT FOR APPROVAL.
- BILL OF MATERIALS AND PART NUMBERS LISTED ON CONSTRUCTION DRAWINGS ARE INTENDED TO AID CONTRACTOR. CONTRACTOR SHALL VERIFY PARTS AND QUANTITIES WITH MANUFACTURER PRIOR TO BIDDING AND/OR ORDERING MATERIALS.
- ALL PERMITS THAT MUST BE OBTAINED ARE THE RESPONSIBILITY OF THE CONTRACTOR. THE CONTRACTOR WILL BE RESPONSIBLE FOR ABIDING BY ALL CONDITIONS AND REQUIREMENTS OF THE PERMITS.
- 24 HOURS PRIOR TO THE BEGINNING OF ANY CONSTRUCTION, THE CONTRACTOR MUST NOTIFY THE APPLICABLE JURISDICTIONAL (STATE, COUNTY OR CITY) ENGINEER.
- THE CONTRACTOR SHALL REWORK (DRY, SCARIFY, ETC.) ALL MATERIAL NOT SUITABLE FOR SUBGRADE IN ITS PRESENT STATE. AFTER REWORKING, IF THE MATERIAL REMAINS UNSUITABLE, THE CONTRACTOR SHALL UNDERCUT THIS MATERIAL AND REPLACE WITH APPROVED MATERIAL. ALL SUBGRADES SHALL BE PROOFROLLED WITH A FULLY LOADED TANDEM AXLE DUMP TRUCK PRIOR TO PAVING. ANY SOFTER MATERIAL SHALL BE REWORKED OR REPLACED.
- THE CONTRACTOR IS REQUIRED TO MAINTAIN ALL PIPES, DITCHES, AND OTHER DRAINAGE STRUCTURES FREE FROM OBSTRUCTION UNTIL WORK IS ACCEPTED BY THE OWNER. THE CONTRACTOR IS RESPONSIBLE FOR ANY DAMAGES CAUSED BY FAILURE TO MAINTAIN DRAINAGE STRUCTURE IN OPERABLE CONDITION.
- ALL MATERIALS AND WORKMANSHIP SHALL BE WARRANTED FOR ONE YEAR FROM ACCEPTANCE DATE.
- ALL BUILDING DIMENSIONS SHALL BE VERIFIED WITH THE PLANS (LATEST REVISION) PRIOR TO COMMENCING CONSTRUCTION. NOTIFY THE ENGINEER IMMEDIATELY IF ANY DISCREPANCIES ARE DISCOVERED. THE OWNER SHALL HAVE A SET OF APPROVED PLANS AVAILABLE AT THE SITE AT ALL TIMES WHILE WORK IS BEING PERFORMED. A DESIGNATED RESPONSIBLE EMPLOYEE SHALL BE AVAILABLE FOR CONTACT BY GOVERNING AGENCY INSPECTORS.

## STRUCTURAL STEEL NOTES:

- THE FABRICATION AND ERECTION OF STRUCTURAL STEEL SHALL CONFORM TO THE AISC SPECIFICATIONS AND MANUAL OF STEEL CONSTRUCTION, 14TH EDITION.
- UNLESS OTHERWISE NOTED, ALL STRUCTURAL ELEMENTS SHALL CONFORM TO THE FOLLOWING REQUIREMENTS:
  - STRUCTURAL STEEL, ASTM DESIGNATION A36 OR A992 GR50.
  - ALL BOLTS, ASTM A325 TYPE 1 GALVANIZED HIGH STRENGTH BOLTS.
  - ALL NUTS, ASTM A563 CARBON AND ALLOY STEEL NUTS.
  - ALL WASHERS, ASTM F436 HARDENED STEEL WASHERS.
- ALL CONNECTIONS NOT FULLY DETAILED ON THESE PLANS SHALL BE DETAILED BY THE STEEL FABRICATOR IN ACCORDANCE WITH AISC SPECIFICATIONS AND MANUAL OF STEEL CONSTRUCTION, 14TH EDITION.
- HOLES SHALL NOT BE FLAME CUT THRU STEEL UNLESS APPROVED BY THE ENGINEER.
- HOT-DIP GALVANIZE ALL ITEMS UNLESS OTHERWISE NOTED, AFTER FABRICATION WHERE PRACTICABLE. GALVANIZING: ASTM A123, ASTM A153/A153M OR ASTM A653/A653M, G90, AS APPLICABLE.
- REPAIR DAMAGED SURFACES WITH GALVANIZING REPAIR METHOD AND PAINT CONFORMING TO ASTM A780 OR BY APPLICATION OF STICK OR THICK PASTE MATERIAL SPECIFICALLY DESIGNED FOR REPAIR OF GALVANIZING. CLEAN AREAS TO BE REPAIRED AND REMOVE SLAG FROM WELDS. HEAT SURFACES TO WHICH STICK OR PASTE MATERIAL IS APPLIED, WITH A TORCH TO A TEMPERATURE SUFFICIENT TO MELT THE METALLICS IN STICK OR PASTED; SPREAD MOLTEN MATERIAL UNIFORMLY OVER SURFACES TO BE COATED AND WIPE OFF EXCESS MATERIAL.
- A NUT LOCKING DEVICE SHALL BE INSTALLED ON ALL PROPOSED AND/OR REPLACED BOLTS.
- ALL PROPOSED AND/OR REPLACED BOLTS SHALL BE OF SUFFICIENT LENGTH TO EXCLUDE THE THREADS FROM THE SHEAR PLANE.
- ALL PROPOSED AND/OR REPLACED BOLTS SHALL BE OF SUFFICIENT LENGTH SUCH THAT THE END OF THE BOLT BE AT LEAST FLUSH WITH THE FACE OF THE NUT. IT IS NOT PERMITTED FOR THE BOLT END TO BE BELOW THE FACE OF THE NUT AFTER TIGHTENING IS COMPLETED.
- ALL ASSEMBLY BOLTS ARE TO BE TIGHTENED TO A "SNUG TIGHT" CONDITION AS DEFINED IN SECTION 8.1 OF THE AISC, "SPECIFICATION FOR STRUCTURAL JOINTS USING ASTM A325 OR A490 BOLTS", DATED JUNE 30, 2004.
- FLAT WASHERS ARE TO BE INSTALLED WITH BOLTS OVER SLOTTED HOLES.
- DO NOT OVER TORQUE ASSEMBLY BOLTS. GALVANIZING ON BOLTS, NUTS, AND STEEL PARTS ;MAY ACT AS A LUBRICANT, THUS OVER TIGHTENING MAY OCCUR AND MAY CAUSE BOLTS TO CRACK AND SNAP OFF.
- PAL NUTS ARE TO BE INSTALLED AFTER NUTS ARE TIGHT AND WITH EDGE LIP OUT. PAL NUTS ARE NOT REQUIRED WHEN SELF-LOCKING NUTS ARE PROVIDED.
- GALVANIZED ASTM A325 BOLTS SHALL NOT BE REUSED.
- WELDING SHALL BE PERFORMED IN ACCORDANCE WITH AMERICAN WELDING SOCIETY (AWS) D1.1-2010 STRUCTURAL WELDING CODE - STEEL.

PROJECT INFORMATION:  
 SITE NAME:  
**NSB-CO.MLK AND TRENTON COL01560**  
 FA NUMBER: 14799270  
 PACE NUMBER: MRUTH031975  
 PROJECT: NEW SITE BUILD  
 7934 MARTIN KING BLVD  
 DENVER, CO 80238  
 (DENVER COUNTY)

PLANS PREPARED FOR:

**n e x i u s**

**NEXIUS**  
 7025 S FULTON ST SUITE 100  
 CENTENNIAL, CO 80112

PLANS PREPARED FOR:



**AT&T MOBILITY**  
 161 INVERNESS DRIVE WEST, 2ND FLOOR  
 ENGLEWOOD, CO 80112

PLANS PREPARED BY:

  
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 500 E. 84TH AVE, SUITE C10  
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SEAL:



REV	DATE	ISSUED FOR:
5	10-02-20	CONSTRUCTION
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2	06-03-20	PRELIMINARY

DRAWN BY: KES CHECKED BY: NMC

SHEET TITLE:

**GENERAL  
 NOTES**

SHEET NUMBER: **N-1** REVISION: **5**  
 TEP#: 240575.203552



MI CHECKLIST		
REQUIRED	REPORT ITEM	BRIEF DESCRIPTION
<b>PRE-CONSTRUCTION</b>		
X	MI CHECKLIST DRAWING	THIS CHECKLIST SERVES AS A GUIDELINE FOR THE REQUIRED CONSTRUCTION DOCUMENTS AND INSPECTIONS FOR THIS MODIFICATION.
NA	EOR APPROVED SHOP DRAWINGS	ONCE THE PRE-MODIFICATION MAPPING IS COMPLETE AND PRIOR TO FABRICATION, THE CONTRACTOR SHALL PROVIDE DETAILED ASSEMBLY DRAWINGS AND/OR SHOP DRAWINGS. THESE INCLUDE, BUT ARE NOT LIMITED TO, A VISUAL LAYOUT OF NEW REINFORCEMENT, EXISTING REINFORCEMENT CONFIGURATION, PORTHOLES, MOUNTS, STEP PEGS, SAFETY CLIMBS AND ANY OTHER MISCELLANEOUS ITEMS WHICH MAY AFFECT SUCCESSFUL INSTALLATION OF MODIFICATIONS ON THE TOWER. THESE DRAWINGS SHALL BE SUBMITTED TO THE EOR FOR APPROVAL. SHOP DRAWING SUBMISSION SHALL INCLUDE THE EOR RFI FORM DETAILING ANY CHANGES FROM THE ORIGINAL DESIGN.
NA	FABRICATION INSPECTION	A LETTER FROM THE FABRICATOR, STATING THAT THE WORK WAS PERFORMED IN ACCORDANCE WITH INDUSTRY STANDARDS AND THE CONTRACT DOCUMENTS, SHALL BE PROVIDED TO THE MI INSPECTOR FOR INCLUSION IN THE MI REPORT.
NA	FABRICATOR CERTIFIED WELD INSPECTION	A CWI SHALL INSPECT ALL WELDING PERFORMED ON STRUCTURAL MEMBERS DURING FABRICATION. A WRITTEN REPORT SHALL BE PROVIDED TO THE MI INSPECTOR FOR INCLUSION IN THE MI REPORT.
X	MATERIAL TEST REPORTS (MTR)	MATERIAL TEST REPORTS SHALL BE PROVIDED FOR MATERIAL USED. MTRS SHALL BE PROVIDED TO THE MI INSPECTOR FOR INCLUSION IN THE MI REPORT.
NA	FABRICATOR NDE INSPECTION REPORT	CRITICAL SHOP WELDS THAT REQUIRE TESTING ARE NOTED ON THESE CONTRACT DRAWINGS. A CERTIFIED NDT INSPECTOR SHALL PERFORM NON-DESTRUCTIVE EXAMINATION AND A REPORT SHALL BE PROVIDED TO THE MI INSPECTOR FOR INCLUSION IN THE MI REPORT.
NA	NDE OF MONOPOLE BASE PLATE	A NDE OF THE POLE TO BASE PLATE CONNECTION IS REQUIRED AND A WRITTEN REPORT SHALL BE PROVIDED TO THE MI INSPECTOR FOR INCLUSION IN THE MI REPORT.
X	PACKING SLIPS	PACKAGING/SHIPPING LIST FOR ALL MATERIAL THAT WAS USED DURING CONSTRUCTION OF THE MODIFICATION.
ADDITIONAL TESTING AND INSPECTIONS:		
NA		
<b>CONSTRUCTION</b>		
NA	FOUNDATION INSPECTIONS	A VISUAL OBSERVATION OF THE EXCAVATION AND REBAR SHALL BE PERFORMED BEFORE PLACING THE CONCRETE. A VISUAL OBSERVATION OF THE REBAR SHALL BE PERFORMED BEFORE PLACING THE EPOXY. A SEALED WRITTEN REPORT SHALL BE PROVIDED TO THE MI INSPECTOR FOR INCLUSION IN THE MI REPORT.
NA	CONCRETE COMP. STRENGTH AND SLUMP TESTS	THE CONCRETE MIX DESIGN, SLUMP TEST, AND COMPRESSIVE STRENGTH TESTS SHALL BE PROVIDED AS PART OF THE FOUNDATION REPORT.
NA	EARTHWORK	FOUNDATION SUB-GRADES SHALL BE INSPECTED AND APPROVED BY AN APPROVED FOUNDATION INSPECTOR AND RESULTS INCLUDED AS PART OF THE FOUNDATION REPORT.
NA	MICROPILE/ROCK ANCHOR	MICROPILES/ROCK ANCHORS SHALL BE INSPECTED BY THE FOUNDATION INSPECTION VENDOR AND SHALL BE INCLUDED AS PART OF THE FOUNDATION INSPECTION REPORT, ADDITIONAL TESTING AND/OR INSPECTION REQUIREMENTS ARE NOTED IN THESE CONTRACT DOCUMENTS.
NA	POST-INSTALLED ANCHOR ROD VERIFICATION	POST-INSTALLED ANCHOR ROD VERIFICATION SHALL BE PERFORMED AND A REPORT SHALL BE PROVIDED TO THE MI INSPECTOR FOR INCLUSION IN THE MI REPORT.
NA	BASE PLATE GROUT VERIFICATION	THE GENERAL CONTRACTOR SHALL PROVIDE DOCUMENTATION TO THE MI INSPECTOR THAT CERTIFIES THAT THE GROUT WAS REMOVED AND/OR INSTALLED IN ACCORDANCE WITH CONTRACTOR DOCUMENTS FOR INCLUSION IN THE MI REPORT.
X	FIELD CERTIFIED WELD INSPECTION	AN AWS CERTIFIED WELD INSPECTOR SHALL INSPECT AND TEST FIELD WELDS, IN ACCORDANCE WITH AWS D1.1/D1.1M: "STRUCTURAL WELDING CODE - STEEL". A REPORT SHALL BE PROVIDED. NDE OF FIELD WELDS SHALL BE PERFORMED AS REQUIRED PER CONTRACT DOCUMENTS. THE NDE REPORT SHALL BE INCLUDED IN THE CWI REPORT.
X	ON SITE COLD GALVANIZING VERIFICATION	THE GENERAL CONTRACTOR SHALL PROVIDE WRITTEN AND PHOTOGRAPHIC DOCUMENTATION TO THE MI INSPECTOR VERIFYING THAT ANY ON-SITE COLD GALVANIZING WAS APPLIED PER MANUFACTURER SPECIFICATIONS AND APPLICABLE STANDARDS.
NA	TENSION TWIST AND PLUMB	THE GENERAL CONTRACTOR SHALL PROVIDE A REPORT IN ACCORDANCE WITH APPLICABLE STANDARDS DOCUMENTING TENSION TWIST AND PLUMB.
X	GC AS-BUILT DOCUMENTS	THE GENERAL CONTRACTOR SHALL SUBMIT A LEGIBLE COPY OF THE ORIGINAL DESIGN DRAWINGS EITHER STATING "INSTALLED AS DESIGNED" OR NOTING ANY CHANGES THAT WERE REQUIRED AND APPROVED BY THE ENGINEER OF RECORD. EOR/RFI FORMS APPROVING ALL CHANGES SHALL BE SUBMITTED.
ADDITIONAL TESTING AND INSPECTIONS:		
NA		
<b>POST-CONSTRUCTION</b>		
X	CONSTRUCTION COMPLIANCE LETTER	A LETTER FROM THE GENERAL CONTRACTOR STATING THAT THE WORKMANSHIP WAS PERFORMED IN ACCORDANCE WITH INDUSTRY STANDARDS AND THESE CONTRACT DRAWINGS, INCLUDING LISTING ADDITIONAL PARTIES TO THE MODIFICATION PROCESS.
NA	POST-INSTALLED ANCHOR ROD PULL TESTS	POST-INSTALLED ANCHOR RODS SHALL BE TESTED IN ACCORDANCE WITH CONTRACT DOCUMENTS AND A REPORT SHALL BE PROVIDED INDICATING TESTING RESULTS.
X	PHOTOGRAPHS	PHOTOGRAPHS SHALL BE SUBMITTED TO THE MI. PHOTOS SHALL DOCUMENT ALL PHASES OF THE CONSTRUCTION. THE PHOTOS SHALL BE ORGANIZED IN A MANNER THAT EASILY IDENTIFIES THE EXACT LOCATION OF THE PHOTO.
NA	BOLT HOLE INSTALLATION AND VERIFICATION REPORT	THE MI INSPECTOR SHALL VERIFY THE INSTALLATION AND TIGHTNESS 10% OF ALL NON PRE-TENSIONED BOLTS INSTALLED AS PART OF THE MODIFICATION. THE MI INSPECTOR SHALL LOOSEN THE NUT AND VERIFY THE BOLT HOLE SIZE AND CONDITION. THE MI REPORT SHALL CONTAIN THE COMPLETED BOLT INSTALLATION VERIFICATION REPORT, INCLUDING THE SUPPORTING PHOTOGRAPHS.
X	PUNCHLIST DEVELOPMENT AND CORRECTION DOCUMENTATION	FINAL PUNCHLIST INDICATING ALL NONCONFORMANCE(S) IDENTIFIED AND THE FINAL RESOLUTION AND APPROVAL.
X	MI INSPECTOR REDLINE OR RECORD DRAWING(S)	THE MI INSPECTOR SHALL OBSERVE AND REPORT ANY DISCREPANCIES BETWEEN THE CONTRACTOR'S REDLINE DRAWING AND THE ACTUAL COMPLETED INSTALLATION.
ADDITIONAL TESTING AND INSPECTIONS:		
NA		

THE MI CHECKLIST SHALL BE REVIEWED PRIOR TO THE START OF CONSTRUCTION. ALL PARTIES TO THE MODIFICATION SHALL UNDERSTAND INSPECTION/DOCUMENTATION THAT IS APPLICABLE TO THE SCOPE OF WORK THEY ARE PERFORMING. ERRORS ON THE CHECKLIST SHALL NOT ABSOLVE THE GC OR MI INSPECTOR FROM PERFORMING/COLLECTING DOCUMENTATION.  
 NOTE: X DENOTES A DOCUMENT NEEDED FOR THE PMI REPORT  
 NA DENOTES A DOCUMENT THAT IS NOT REQUIRED FOR THE PMI REPORT

**MODIFICATION INSPECTION NOTES:**

**GENERAL**

THE MI IS AN ON-SITE VISUAL AND HANDS-ON INSPECTION OF TOWER MODIFICATIONS INCLUDING A REVIEW OF CONSTRUCTION REPORTS AND ADDITIONAL PERTINENT DOCUMENTATION PROVIDED BY THE GENERAL CONTRACTOR (GC), AS WELL AS ANY INSPECTION DOCUMENTS PROVIDED BY 3RD PARTY INSPECTORS. THE MI IS TO ENSURE THE INSTALLATION WAS CONSTRUCTED IN ACCORDANCE WITH THE CONTRACT DOCUMENTS, NAMELY THE MODIFICATION DRAWINGS AS DESIGNED BY THE ENGINEER OF RECORD (EOR).

NO DOCUMENT, CODE OR POLICY CAN ANTICIPATE EVERY SITUATION THAT MAY ARISE. ACCORDINGLY, THIS CHECKLIST IS INTENDED TO SERVE AS A SOURCE OF GUIDING PRINCIPLES IN ESTABLISHING GUIDELINES FOR MODIFICATION INSPECTION.

THE MI IS TO CONFIRM INSTALLATION CONFIGURATION AND WORKMANSHIP ONLY AND IS NOT A REVIEW OF THE MODIFICATION DESIGN ITSELF. OWNERSHIP OF THE STRUCTURAL MODIFICATION DESIGN EFFECTIVENESS AND INTEGRITY RESIDES WITH THE EOR AT ALL TIMES. THE MI INSPECTOR SHALL INSPECT AND NOTE CONFORMANCE/NONCONFORMANCE AND PROVIDE TO THE TOWER OWNER POINT OF CONTACT FOR EVALUATION.

TO ENSURE THAT THE REQUIREMENTS OF THE MI ARE MET, IT IS VITAL THAT THE GENERAL CONTRACTOR (GC) AND THE MI INSPECTOR BEGIN COMMUNICATING AND COORDINATING AS SOON AS A PURCHASE ORDER (PO) IS RECEIVED. IT IS EXPECTED THAT EACH PARTY WILL BE PROACTIVE IN REACHING OUT TO THE OTHER PARTY. IF CONTACT INFORMATION IS NOT KNOWN THE GC AND/OR INSPECTOR SHALL CONTACT THE TOWER OWNER POINT OF CONTACT.

**SERVICE LEVEL COMMITMENT**

THE FOLLOWING RECOMMENDATIONS AND SUGGESTIONS ARE OFFERED TO ENHANCE THE EFFICIENCY AND EFFECTIVENESS OF DELIVERING AN MI REPORT:

- THE GC SHALL PROVIDE A MINIMUM OF 5 BUSINESS DAYS NOTICE, PREFERABLY 10, TO THE MI INSPECTOR AS TO WHEN THE SITE WILL BE READY FOR THE MI TO BE CONDUCTED.
- THE GC AND MI INSPECTOR COORDINATE CLOSELY THROUGHOUT THE ENTIRE PROJECT.
- WHEN POSSIBLE, IT IS PREFERRED TO HAVE THE GC AND MI INSPECTOR ON-SITE SIMULTANEOUSLY FOR ANY GUY WIRE TENSIONING OR RE-TENSIONING OPERATIONS.
- WHEN POSSIBLE, IT IS PREFERRED TO HAVE THE GC AND MI INSPECTOR ON-SITE DURING THE MI TO HAVE ANY MINOR DEFICIENCIES CORRECTED DURING THE INITIAL MI. THEREFORE, THE GC MAY CHOOSE TO COORDINATE THE MI CAREFULLY TO ENSURE ALL CONSTRUCTION FACILITIES ARE AT THEIR DISPOSAL WHEN THE MI INSPECTOR IS ON SITE.

**REQUIRED PHOTOS**

BETWEEN THE GC AND THE MI INSPECTOR THE FOLLOWING PHOTOGRAPHS, AT A MINIMUM, ARE TO BE TAKEN AND INCLUDED IN THE MI REPORT:

- PRE-CONSTRUCTION GENERAL SITE CONDITION
- PHOTOGRAPHS DURING THE REINFORCEMENT MODIFICATION CONSTRUCTION / ERECTION AND INSPECTION
  - RAW MATERIALS
  - PHOTOS OF ALL CRITICAL DETAILS
  - FOUNDATION MODIFICATIONS
  - WELD PREPARATION
  - BOLT INSTALLATION
  - FINAL INSTALLED CONDITION
  - SURFACE COATING REPAIR
- POST CONSTRUCTION PHOTOGRAPHS
  - FINAL INFIELD CONDITION

PHOTOS OF ELEVATED MODIFICATIONS TAKEN ONLY FROM THE GROUND SHALL BE CONSIDERED INADEQUATE.

PLANS PREPARED FOR:

**nexus**

7025 S. FULTON ST. SUITE 100  
CENTENNIAL, CO 80112  
OFFICE: (352) 572-7297

PROJECT INFORMATION:

**NSB-CO.MLK\_AND\_TRENTON\_COLO1560 SITE #: MRUTH031975**

7934 MARTIN LUTHER KING BLVD.  
DENVER, CO 80238  
(DENVER COUNTY)

PLANS PREPARED BY:



**TOWER ENGINEERING PROFESSIONALS**

326 TRYON ROAD  
RALEIGH, NC 27603  
OFFICE: (919) 661-6351  
www.tepgroup.net

SEAL:



January 23, 2020

0	01-23-20	MODIFICATION DRAWINGS
REV	DATE	ISSUED FOR:

DRAWN BY: MJ CHECKED BY: BKO

SHEET TITLE:  
**MI CHECKLIST AND NOTES**

SHEET NUMBER: **N-1** REVISION: **0**  
TEP#:240575.361181

**GENERAL NOTES:**

- ALL REFERENCES TO THE OWNER IN THESE DOCUMENTS SHALL BE CONSIDERED NEXIUS SOLUTIONS OR ITS DESIGNATED REPRESENTATIVE.
- ALL WORK PRESENTED ON THESE DESIGN DRAWINGS MUST BE COMPLETED BY THE GENERAL CONTRACTOR (GC) UNLESS NOTED OTHERWISE. THE GC MUST HAVE CONSIDERABLE EXPERIENCE IN PERFORMANCE OF WORK SIMILAR TO THAT DESCRIBED HEREIN. BY ACCEPTANCE OF THIS ASSIGNMENT, THE GC IS ATTESTING THAT HE DOES HAVE SUFFICIENT EXPERIENCE AND ABILITY, THAT HE IS KNOWLEDGEABLE OF THE WORK TO BE PERFORMED AND THAT HE IS PROPERLY LICENSED AND PROPERLY REGISTERED TO DO THIS WORK IN THE STATE OF COLORADO.
- WORK SHALL BE COMPLETED IN ACCORDANCE WITH THE 2018 INTERNATIONAL BUILDING CODE.
- UNLESS SHOWN OR NOTED OTHERWISE ON THE DESIGN DRAWINGS, OR IN THE SPECIFICATIONS, THE FOLLOWING NOTES SHALL APPLY TO THE MATERIALS LISTED HEREIN, AND TO THE PROCEDURES TO BE USED ON THIS PROJECT.
- ALL HARDWARE ASSEMBLY MANUFACTURER'S INSTRUCTIONS SHALL BE FOLLOWED EXACTLY AND SHALL SUPERSEDE ANY CONFLICTING NOTES ENCLOSED HEREIN.
- ALL MATERIALS AND EQUIPMENT FURNISHED SHALL BE NEW AND OF GOOD QUALITY, FREE FROM FAULTS AND DEFECTS AND IN CONFORMANCE WITH THE DESIGN DRAWINGS. ANY AND ALL SUBSTITUTIONS MUST BE PROPERLY APPROVED AND AUTHORIZED IN WRITING BY THE OWNER AND ENGINEER OF RECORD (EOR) PRIOR TO INSTALLATION. THE GC SHALL FURNISH SATISFACTORY EVIDENCE AS TO THE KIND AND QUALITY OF THE MATERIALS AND EQUIPMENT BEING SUBSTITUTED.
- THE GC SHALL BE RESPONSIBLE FOR INITIATING, MAINTAINING, AND SUPERVISING ALL SAFETY PRECAUTIONS AND PROGRAMS IN CONNECTION WITH THE WORK. THE GC IS RESPONSIBLE FOR ENSURING THAT THIS PROJECT AND RELATED WORK COMPLIES WITH ALL APPLICABLE LOCAL, STATE, AND FEDERAL SAFETY CODES AND REGULATIONS GOVERNING THIS WORK.
- ACCESS TO THE PROPOSED WORK SITE MAY BE RESTRICTED. THE GC SHALL COORDINATE INTENDED CONSTRUCTION ACTIVITY, INCLUDING WORK SCHEDULE AND MATERIALS ACCESS, WITH THE RESIDENT LEASING AGENT FOR APPROVAL.
- ALL PERMITS THAT MUST BE OBTAINED ARE THE RESPONSIBILITY OF THE GC. THE GC WILL BE RESPONSIBLE FOR ABIDING BY ALL CONDITIONS AND REQUIREMENTS OF THE PERMITS.
- IF APPLICABLE, ALL CONCRETE WORK SHALL COMPLY TO LOCAL CODES AND THE ACI 318-14, "BUILDING REQUIREMENTS FOR STRUCTURAL CONCRETE".
- 24 HOURS PRIOR TO THE BEGINNING OF ANY CONSTRUCTION, THE GC MUST NOTIFY THE APPLICABLE JURISDICTIONAL (STATE, COUNTY OR CITY) ENGINEER.
- ALL MATERIALS AND WORKMANSHIP SHALL BE WARRANTED FOR ONE YEAR FROM ACCEPTANCE DATE.
- ALL DIMENSIONS SHALL BE VERIFIED WITH THE DESIGN DRAWINGS (LATEST REVISION) PRIOR TO COMMENCING CONSTRUCTION. NOTIFY THE EOR IMMEDIATELY IF ANY DISCREPANCIES ARE DISCOVERED. THE OWNER SHALL HAVE A SET OF APPROVED DESIGN DRAWINGS AVAILABLE AT THE SITE AT ALL TIMES WHILE WORK IS BEING PERFORMED. A DESIGNATED RESPONSIBLE EMPLOYEE SHALL BE AVAILABLE FOR CONTACT BY GOVERNING AGENCY INSPECTORS.
- THE CLIMBING FACILITIES, SAFETY CLIMB AND ALL PARTS THEREOF SHALL NOT BE IMPEDED, MODIFIED, OR ALTERED WITHOUT THE EXPRESS WRITTEN APPROVAL OF THE OWNER AND EOR. ALL ALTERATIONS TO A SAFETY CLIMB'S ORIGINAL MANUFACTURER'S CONFIGURATION MUST BE DESIGNED BY THE EOR. IF THE GC FINDS THAT THE CLIMBING FACILITIES ARE IMPEDED, EITHER DURING BIDDING, DURING PRE-FABRICATION MAPPING, OR WHILE ON-SITE, THE GC SHALL CONTACT THE OWNER AND EOR TO DETERMINE A METHOD OF RESOLUTION.
- ANY WORK PERFORMED WITHOUT A PREFABRICATION MAPPING IS DONE AT THE RISK OF THE GC AND/OR FABRICATOR.
- IF DURING THE COURSE OF A FOUNDATION MODIFICATION, THE GC ENCOUNTERS EXISTING CONDUIT LOCATED WITHIN THE CONFINES OF THE EXISTING OR PROPOSED FOUNDATION CONCRETE, AND THIS CONDUIT IS NOT IN A LOCATION THAT IS SPECIFIED WITHIN THESE DESIGN DRAWINGS, THE GC SHALL IMMEDIATELY CONTACT THE EOR FOR GUIDANCE BEFORE PROCEEDING WITH THE INSTALLATION OF THE PROPOSED FOUNDATION MODIFICATIONS. IF CONDUIT IS TO BE INSTALLED THROUGH THE EXISTING FOUNDATION OR PROPOSED FOUNDATION MODIFICATION AND HASN'T BEEN SPECIFIED WITHIN THESE DESIGN DRAWINGS THEN THE GC SHALL IMMEDIATELY CONTACT THE EOR FOR GUIDANCE PRIOR TO PROCEEDING WITH THE INSTALLATION OF THE PROPOSED FOUNDATION MODIFICATIONS.

**ATTENTION**

ALL CONSTRUCTION MEANS AND METHODS; INCLUDING BUT NOT LIMITED TO, ERECTION PLANS, RIGGING PLANS, CLIMBING PLANS, AND RESCUE PLANS SHALL BE THE RESPONSIBILITY OF THE GC RESPONSIBLE FOR THE EXECUTION OF THE WORK CONTAINED HEREIN AND SHALL MEET ANSI/ASSE A10.48 (LATEST EDITION), FEDERAL, STATE, AND LOCAL REGULATIONS; AND ANY APPLICABLE INDUSTRY CONSENSUS STANDARDS RELATED TO THE CONSTRUCTION ACTIVITIES BEING PERFORMED. ALL RIGGING PLANS SHALL ADHERE TO ANSI/ASSE A10.48 (LATEST EDITION) INCLUDING THE REQUIRED INVOLVEMENT OF A QUALIFIED ENGINEER FOR CLASS IV CONSTRUCTION TO CERTIFY THE SUPPORTING STRUCTURE(S) IN ACCORDANCE WITH THE ANSI/TIA-322 (LATEST EDITION).

**STRUCTURAL STEEL NOTES:**

- THE FABRICATION AND ERECTION OF STRUCTURAL STEEL SHALL CONFORM TO THE AISC STEEL CONSTRUCTION MANUAL, LOAD AND RESISTANCE FACTOR DESIGN (LRFD), 15TH EDITION.
  - UNLESS OTHERWISE NOTED, ALL STRUCTURAL ELEMENTS SHALL CONFORM TO THE FOLLOWING REQUIREMENTS: STRUCTURAL STEEL:
    - ANGLE: ASTM A36
    - PIPE/TUBE: ASTM A53 Gr.B
    - PLATE: ASTM A572-50
    - SOLID ROD: ASTM A36
    - W-SHAPES: ASTM A36
    - ALL BOLTS, ASTM A325 TYPE 1 GALVANIZED HIGH STRENGTH BOLTS.
    - ALL U-BOLTS, ASTM A193 GRADE B7
    - ALL NUTS, ASTM A563 CARBON AND ALLOY STEEL NUTS.
    - ALL WASHERS, ASTM F436 HARDENED STEEL WASHERS.
  - ALL CONNECTIONS NOT FULLY DETAILED ON THESE PLANS SHALL BE DETAILED BY THE STEEL FABRICATOR IN ACCORDANCE WITH AISC STEEL CONSTRUCTION MANUAL, LRFD, 15TH EDITION.
  - HOLES SHALL NOT BE FLAME CUT THROUGH STEEL UNLESS APPROVED BY THE ENGINEER.
  - HOT-DIP GALVANIZE ALL ITEMS UNLESS OTHERWISE NOTED, AFTER FABRICATION WHERE PRACTICABLE. GALVANIZING: ASTM A123, ASTM, A153/A153M OR ASTM A653/A653M, G90, AS APPLICABLE. ADDITIONALLY, ALL NEW STEEL SHALL BE PAINTED TO MATCH EXISTING STEEL. CONTRACTOR SHALL OBTAIN WRITTEN PERMISSION TO PROTECT STEEL BY ANY OTHER MEANS.
  - REPAIR DAMAGED SURFACES WITH GALVANIZING REPAIR METHOD AND PAINT CONFORMING TO ASTM A780 OR BY APPLICATION OF STICK OR THICK PASTED MATERIAL SPECIFICALLY DESIGNED FOR REPAIR OF GALVANIZING. CLEAN AREAS TO BE REPAIRED AND REMOVE SLAG FROM WELDS. HEAT SURFACES TO WHICH STICK OR PASTE MATERIAL IS APPLIED, WITH A TORCH TO A TEMPERATURE SUFFICIENT TO MELT THE METALLICS IN STICK OR PASTED; SPREAD MOLTEN MATERIAL UNIFORMLY OVER SURFACES TO BE COATED AND WIPE OFF EXCESS MATERIAL. AFTER REPAIR, STEEL SHALL BE REPAINTED TO MATCH EXISTING FINISH (IF APPLICABLE).
  - A NUT LOCKING DEVICE SHALL BE INSTALLED ON ALL PROPOSED AND/OR REPLACED BOLTS.
  - ALL PROPOSED AND/OR REPLACED BOLTS SHALL BE OF SUFFICIENT LENGTH TO EXCLUDE THE THREADS FROM THE SHEAR PLANE.
  - ALL PROPOSED AND/OR REPLACED BOLTS SHALL BE OF SUFFICIENT LENGTH SUCH THAT THE END OF THE BOLT BE AT LEAST FLUSH WITH THE FACE OF THE NUT. IT IS NOT PERMITTED FOR THE BOLT END TO BE BELOW THE FACE OF THE NUT AFTER TIGHTENING IS COMPLETED.
  - GALVANIZED ASTM A325 BOLTS SHALL NOT BE REUSED.
- WELDING NOTES:**
- ALL WELDING SHALL BE IN ACCORDANCE WITH THE AWS D1.1/D1.1M: 2015 "STRUCTURAL WELDING CODE-STEEL".
  - ALL WELDING SHALL BE PERFORMED BY AWS CERTIFIED WELDERS.
  - CONTRACTOR SHALL RETAIN AN AWS CERTIFIED WELD INSPECTOR TO PERFORM VISUAL INSPECTIONS ON FIELD WELDS. A LETTER AND REPORT SHALL BE ISSUED TO THE CONTRACTOR. CONTRACTOR SHALL SUBMIT LETTER AND REPORT TO TOWER ENGINEERING PROFESSIONALS.
  - GRIND THE SURFACE ADJACENT TO THE WELD FOR A DISTANCE OF 2" MINIMUM ALL AROUND. GRIND THE SURFACE OF THE ROD TO BE INSTALLED FOR A DISTANCE OF 2" MINIMUM ALL AROUND THE AREA TO BE WELDED. ENSURE BOTH AREAS ARE 100% FREE OF ALL GALVANIZING. SURFACES TO BE WELDED SHALL BE FREE FROM SCALE, SLAG, RUST, MOISTURE, GREASE OR ANY OTHER FOREIGN MATERIAL THAT WOULD PREVENT PROPER WELDING.
  - DO NOT WELD IF THE TEMPERATURE OF THE STEEL IN THE VICINITY OF THE WELD AREA IS BELOW 0°F. THE MINIMUM PREHEAT AND INTERPASS TEMPERATURE REQUIREMENTS SHALL COMPLY WITH SECTION 3.5.1 AND TABLE 3.2 OF THE AWS D1.1/D1.1M:2015.
  - DO NOT WELD ON WET OR FROST-COVERED SURFACES & PROVIDE ADEQUATE PROTECTION FROM HIGH WINDS.
  - FOR ALL WELDING, USE 70 KSI LOW HYDROGEN ELECTRODES. ELECTRODES SHALL BE APPROPRIATE FOR THE WELDING POSITION REQUIRED TO MAKE THE JOINT.
  - AFTER FINAL INSPECTION, THE AREA OF THE WELDS, THE INSTALLATION AND ALL SURFACES DAMAGED BY WELDING OF GRINDING SHALL RECEIVE A COLD-GALVANIZED COATING. THIS COATING SHALL BE APPLIED BY BRUSH. THE GALVANIZING COMPOUND SHALL CONTAIN A MINIMUM OF 95% ± PURE ZINC. THE FINISHED COATING SHALL BE A MINIMUM THICKNESS OF 3 MILS.
  - FOR MONOPOLE TOWERS FULL PENETRATION WELDS IN THE VICINITY OF THE BASE OF THE TOWER ARE REQUIRED TO BE 100% NDE INSPECTED BY ULTRASONIC TESTING (UT) IN ACCORDANCE WITH AWS D1.1.
  - FOR MONOPOLE TOWERS PARTIAL PENETRATION AND FILLET WELDS IN THE VICINITY OF THE BASE OF THE TOWER ARE REQUIRED TO BE 50% NDE INSPECTED BY MAGNETIC PARTICLE (MT) IN ACCORDANCE WITH AWS D1.1.
  - PROVIDE WELDS ALL AROUND OR ADD SEAL WELDS WHERE STRUCTURAL WELDS ARE NOT SPECIFIED.

PLANS PREPARED FOR:

**nexius**

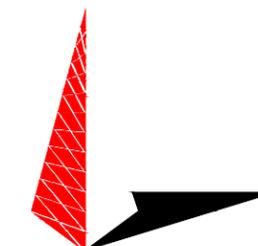
7025 S. FULTON ST. SUITE 100  
CENTENNIAL, CO 80112  
OFFICE: (352) 572-7297

PROJECT INFORMATION:

**NSB-CO.MLK\_AND\_TRENTON\_COLO1560  
SITE #: MRUTH031975**

7934 MARTIN LUTHER KING BLVD.  
DENVER, CO 80238  
(DENVER COUNTY)

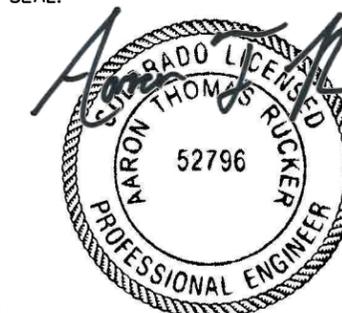
PLANS PREPARED BY:



**TOWER ENGINEERING PROFESSIONALS**

326 TRYON ROAD  
RALEIGH, NC 27603  
OFFICE: (919) 661-6351  
www.tepgroup.net

SEAL:



January 23, 2020

0	01-23-20	MODIFICATION DRAWINGS
REV	DATE	ISSUED FOR:

DRAWN BY: MJ CHECKED BY: BKO

SHEET TITLE:

**PROJECT NOTES I**

SHEET NUMBER: <b>N-2</b>	REVISION: <b>0</b>
TEP#:240575.361181	

## BOLT TIGHTENING PROCEDURE:

1. UNLESS OTHERWISE NOTED, ALL BOLTED CONNECTIONS SHALL BE BROUGHT TO A SNUG TIGHT CONDITION AS DEFINED IN SECTION 8.1 OF THE AISC SPECIFICATION FOR STRUCTURAL JOINTS USING A325 OR A490 BOLTS, LOCATED IN THE AISC MANUAL OF STEEL CONSTRUCTION. ALL SNUG TIGHT BOLTS SHALL BE INSTALLED WITH A NUT-LOCKING DEVICE OR MECHANISM SUCH AS, BUT NOT LIMITED TO, LOCK NUTS, LOCK WASHERS, OR PALNUTS, TO PREVENT LOOSENING.

2. WHEN SPECIFIED IN THE DRAWINGS, CONNECTION BOLTS SHALL BE INSTALLED AND TIGHTENED AS PER SECTION 8.2.1 OF THE AISC SPECIFICATION FOR STRUCTURAL JOINTS USING A325 OR A490 BOLTS, LOCATED IN THE AISC MANUAL OF STEEL CONSTRUCTION. THE INSTALLATION PROCEDURE IS PARAPHRASED AS FOLLOWS:

### 8.2.1 TURN-OF-THE-NUT TIGHTENING

BOLTS SHALL BE INSTALLED IN ALL HOLES OF THE CONNECTION AND BROUGHT TO A SNUG TIGHT CONDITION AS DEFINED IN SECTION 8.1, UNTIL ALL THE BOLTS ARE SIMULTANEOUSLY SNUG TIGHT AND THE CONNECTION IS FULLY COMPACTED. FOLLOWING THIS INITIAL OPERATION ALL BOLTS IN THE CONNECTION SHALL BE TIGHTENED FURTHER BY THE APPLICABLE AMOUNT OF ROTATION SPECIFIED BELOW. DURING THE TIGHTENING OPERATION THERE SHALL BE NO ROTATION OF THE PART NOT TURNED BY THE WRENCH. TIGHTENING SHALL PROGRESS SYSTEMATICALLY FROM THE MOST RIGID PART OF THE JOINT IN A MANNER THAT WILL MINIMIZE RELAXATION OF PREVIOUSLY PRETENSIONED BOLTS.

3. PRE-TENSIONED BOLTS AS SPECIFIED ON THE DRAWINGS SHALL BE TIGHTENED IN ACCORDANCE WITH AISC - "TURN OF THE NUT" METHOD, USING THE CHART BELOW.

### BOLT LENGTHS UP TO AND INCLUDING FOUR DIA.

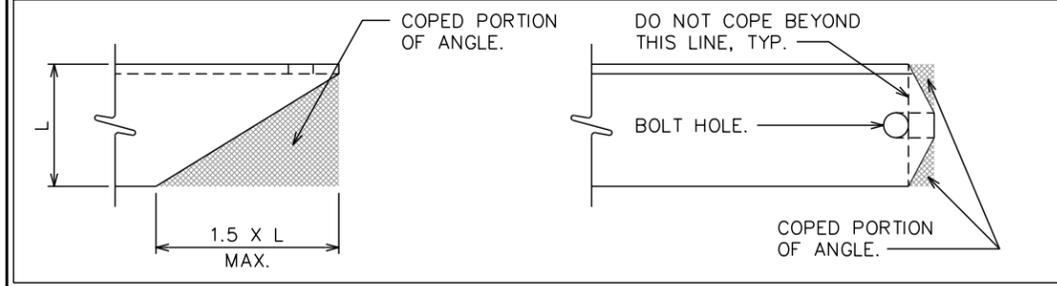
1/2"	BOLTS UP TO AND INCLUDING 2.0 INCH LENGTH	+1/2 TURN BEYOND SNUG TIGHT
5/8"	BOLTS UP TO AND INCLUDING 2.5 INCH LENGTH	+1/2 TURN BEYOND SNUG TIGHT
3/4"	BOLTS UP TO AND INCLUDING 3.0 INCH LENGTH	+1/2 TURN BEYOND SNUG TIGHT
7/8"	BOLTS UP TO AND INCLUDING 3.5 INCH LENGTH	+1/2 TURN BEYOND SNUG TIGHT
1"	BOLTS UP TO AND INCLUDING 4.0 INCH LENGTH	+1/2 TURN BEYOND SNUG TIGHT

### BOLT LENGTHS OVER FOUR DIA. BUT NOT EXCEEDING EIGHT DIA.

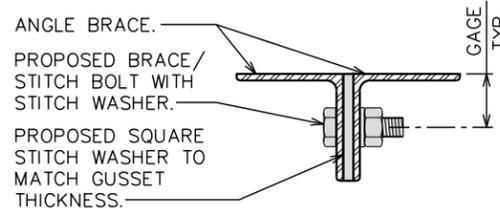
1/2"	BOLTS 2.25 TO 4.0 INCH LENGTH	+1/2 TURN BEYOND SNUG TIGHT
5/8"	BOLTS 2.75 TO 5.0 INCH LENGTH	+1/2 TURN BEYOND SNUG TIGHT
3/4"	BOLTS 3.25 TO 6.0 INCH LENGTH	+1/2 TURN BEYOND SNUG TIGHT
7/8"	BOLTS 3.75 TO 7.0 INCH LENGTH	+1/2 TURN BEYOND SNUG TIGHT
1"	BOLTS 4.25 TO 8.0 INCH LENGTH	+1/2 TURN BEYOND SNUG TIGHT

4. ALL ONE-SIDED BOLTS SHALL BE TIGHTENED IN ACCORDANCE WITH MANUFACTURER RECOMMENDATIONS.

## ALLOWABLE ANGLE COPE



## SECTION AT CENTER AND STITCH CONNECTION

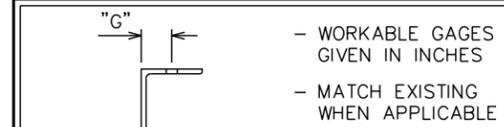


### NOTE:

ALL STITCH WASHERS ARE TO BE NEW ASTM A36 MATERIAL AND BE OF EQUAL SIZE TO THE ANGLE LEG HEIGHT. THICKNESS TO MATCH EXISTING GUSSET/LEG THICKNESS.

## WORKABLE GAGES

LEG	4	3 1/2	3	2 1/2	2	1 3/4
G	2	1 3/4	1 1/2	1 1/4	1	7/8



## NOMINAL HOLE DIMENSIONS

BOLT DIAMETER	STANDARD HOLE	SHORT SLOT
1/2	9/16	9/16 X 1 1/16
5/8	1 1/16	1 1/16 X 7/8
3/4	1 3/16	1 3/16 X 1
7/8	1 5/16	1 5/16 X 1 1/8
1	1 1/16	1 1/16 X 1 5/16

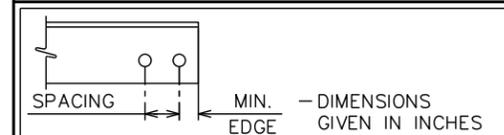
- DIMENSIONS GIVEN IN INCHES.
- ALL PROPOSED HOLES SHALL BE DRILLED OR PUNCHED.

## BOLT THREADS

BOLT DIAMETER	THREAD LENGTH
1/2"Ø	1"
5/8"Ø	1 1/4"
3/4"Ø	1 3/8"
7/8"Ø	1 1/2"
1"Ø	1 3/4"
1 1/8"Ø	2"
1 1/4"Ø	2"

## BOLT EDGE AND SPACING

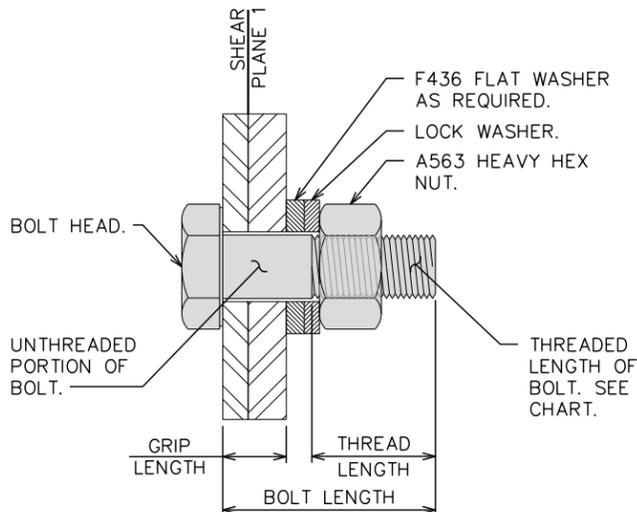
BOLT DIAMETER	MIN. EDGE	SPACING
1/2	7/8	1 1/2
5/8	1 1/8	1 7/8
3/4	1 1/4	2 1/4
7/8	1 1/2	2 5/8
1	1 3/4	3



## BOLT DETAILS

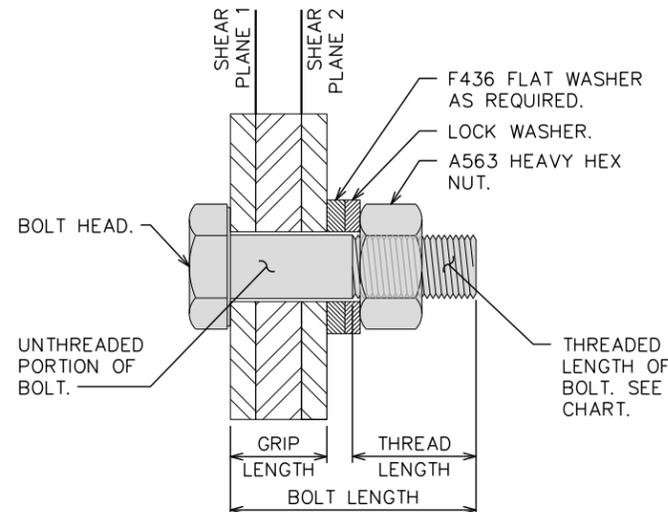
### SINGLE SHEAR CONNECTIONS:

A325-X BOLT:  
UNTHREADED LENGTH OF BOLT PASSES THROUGH SHEAR PLANE.



### DOUBLE SHEAR CONNECTIONS:

A325-X BOLT:  
UNTHREADED LENGTH OF BOLT PASSES THROUGH SHEAR PLANES.



PLANS PREPARED FOR:

**nexus**

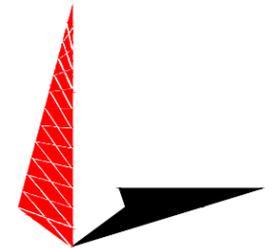
7025 S. FULTON ST. SUITE 100  
CENTENNIAL, CO 80112  
OFFICE: (352) 572-7297

PROJECT INFORMATION:

**NSB-CO.MLK\_AND\_TRENTON\_COLO1560**  
**SITE #: MRUTH031975**

7934 MARTIN LUTHER KING BLVD.  
DENVER, CO 80238  
(DENVER COUNTY)

PLANS PREPARED BY:



**TOWER ENGINEERING PROFESSIONALS**

326 TRYON ROAD  
RALEIGH, NC 27603  
OFFICE: (919) 661-6351  
www.tepgroup.net

SEAL:



January 23, 2020

REV	DATE	ISSUED FOR:
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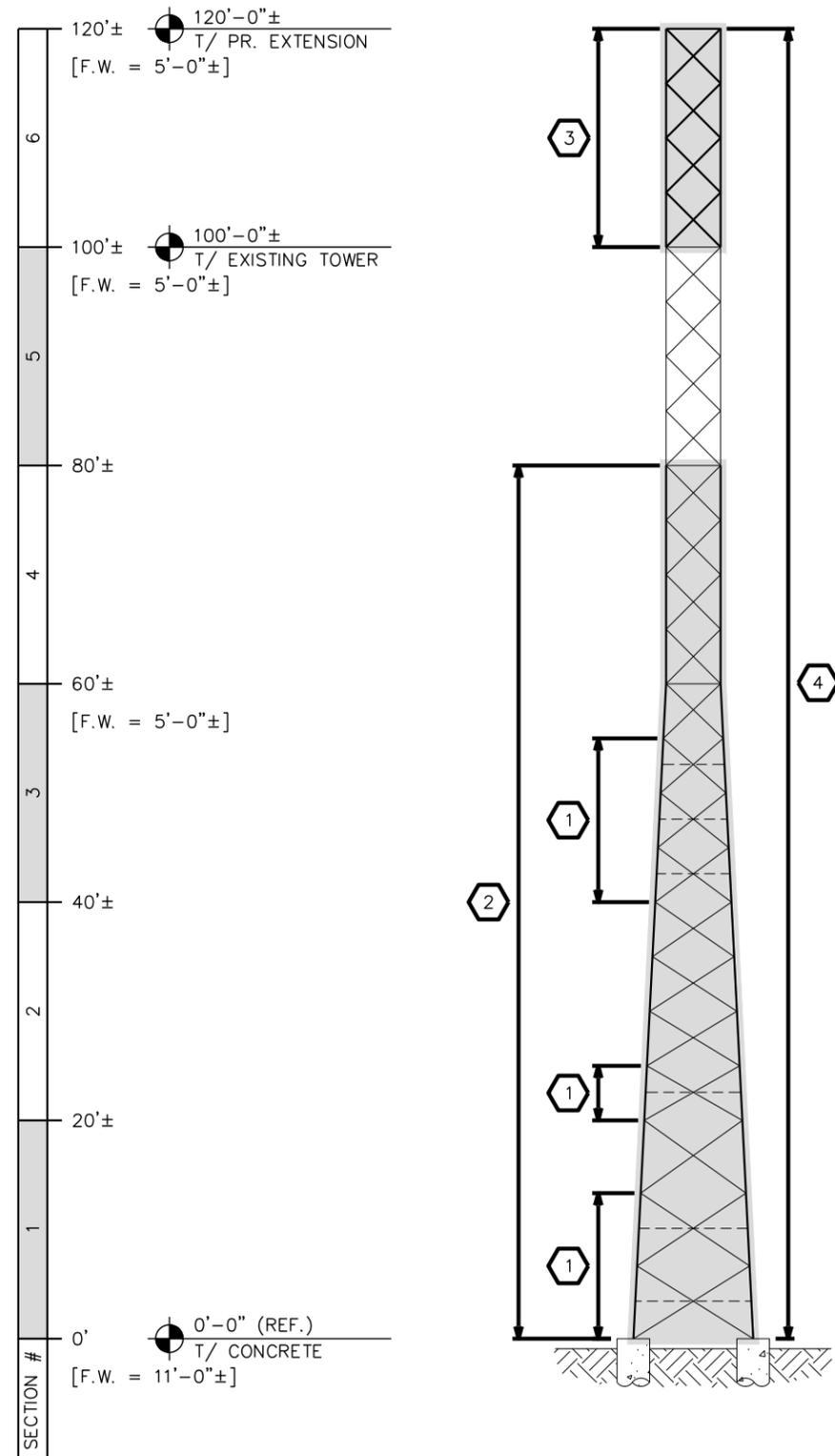
DRAWN BY: MJ CHECKED BY: BKO

SHEET TITLE:

**PROJECT NOTES II**

SHEET NUMBER: **N-3** REVISION: **0**

TEP#:240575.361 | 81



**TOWER ELEVATION**

SCALE: 1/16" = 1'-0"

**MODIFICATION SCHEDULE**

NO.	MODIFICATION DESCRIPTION	ELEVATION (FT.)	SHEET
1	REMOVE EXISTING SUB-HORIZONTAL BRACING.	0 - 13.3 20 - 25 40 - 55	S-1
2	INSTALL HALF PIPE LEG SLEEVES TO REINFORCE EXISTING TOWER LEGS.	0 - 80	S-2 THRU S-4
3	INSTALL PROPOSED TOWER EXTENSION BY SABRE (SECTION ASSEMBLY P/N : 06-12097-S06N). INSTALL PER MANUFACTURER'S SPECIFICATIONS.	100 - 120	S-1
4	REPLACE EXISTING SAFETY CLIMB. INSTALL PER MANUFACTURER'S SPECIFICATIONS.	0 - 120	S-1
5	MODIFICATION INSPECTION BY TEP. CONTACT TEP FOR FEE: PMI@TEPGROUP.NET.	-	N-1

**NOTES:**

- IT IS THE CONTRACTOR'S SOLE RESPONSIBILITY TO PROVIDE THE MODIFICATION INSPECTOR/ ENGINEER OF RECORD WITH A SEALED CERTIFIED WELD INSPECTION REPORT. THIS REPORT SHALL DOCUMENT THE ENTIRE WELDING PROCESS (PRE/DURING/POST) WITH PROPER PHOTOS. WELDING SHALL CONFORM TO AWS D1.1/D1.1M: 2015 "STRUCTURAL WELDING CODE-STEEL", FOR ADDITIONAL NOTES, SEE WELDING NOTES.
- PRIOR TO FABRICATION, CONTRACTOR SHALL FIELD VERIFY ALL LENGTHS AND QUANTITIES GIVEN. LENGTHS AND QUANTITIES PROVIDED ARE FOR QUOTING PURPOSES ONLY AND SHALL NOT BE USED FOR FABRICATION.
- ANTENNAS AND OTHER APPURTENANCES MAY NEED TO BE TEMPORARILY REMOVED OR MOVED DURING THE INSTALLATION OF THE MODIFICATIONS SHOWN ABOVE.
- ALL BOLTS ARE TO BE GRADE A325 WITH THREADS EXCLUDED FROM SHEAR PLANE (A325-X) UNLESS NOTED OTHERWISE. SEE SHEET N-3 FOR BOLT DETAILS.
- PROPOSED SAFE CLIMB SYSTEM BY TUF-TUG PRODUCTS (OR APPROVED EQUIVALENT) TO BE INSTALLED ON PROPOSED CLIMBING LADDER PER THE MANUFACTURE'S SPECIFICATIONS. FOR ORDERING PARTS, CONTACT TUF-TUG PRODUCTS AT (937) 299-1213.
- FOR ORDERING PARTS, CONTACT SABRE INDUSTRIES AT:  
 - JOSH SCHLESSER  
 - PHONE: (941) 747-7038  
 - EMAIL: JDSCHLESSER@SABREINDUSTRIES.COM

PLANS PREPARED FOR:

**nexus**

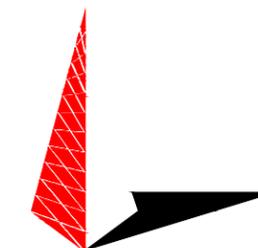
7025 S. FULTON ST. SUITE 100  
CENTENNIAL, CO 80112  
OFFICE: (352) 572-7297

PROJECT INFORMATION:

**NSB-CO.MLK\_AND\_TRENTON\_CO L01560**  
**SITE #: MRUTH031975**

7934 MARTIN LUTHER KING BLVD.  
DENVER, CO 80238  
(DENVER COUNTY)

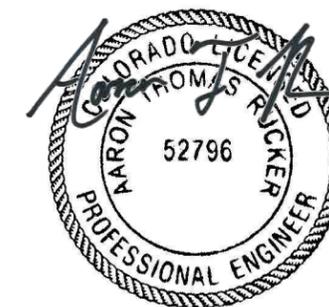
PLANS PREPARED BY:



**TOWER ENGINEERING PROFESSIONALS**

326 TRYON ROAD  
RALEIGH, NC 27603  
OFFICE: (919) 661-6351  
www.tepgroup.net

SEAL:



January 23, 2020

REV	DATE	ISSUED FOR:
0	01-23-20	MODIFICATION DRAWINGS

DRAWN BY: MJ | CHECKED BY: BKO

SHEET TITLE:  
**TOWER ELEVATION AND MODIFICATION SCHEDULE**

SHEET NUMBER: **S-1** | REVISION: **0**  
TEP#: 240575.361 | 81



**NOTES:**

1. CONTRACTOR SHALL NOT REUSE BOLTS THAT ARE REMOVED TO ALLOW FOR INSTALLATION OF HALF SLEEVE TERMINATION WELD.
2. REMOVE AND REPLACE EXISTING FLANGE STIFFENERS AS NEEDED TO FACILITATE THE HALF SLEEVE TERMINATION WELD.
3. FLANGE PLATES SHOWN ARE FOR REFERENCE ONLY. SIZE AND SHAPE MAY VARY.
4. THE GROOVE WELD SHALL BE CONTINUOUS AND EXTEND THE FULL PERIMETER OF THE SLEEVE AT THE CONNECTION TO THE FLANGE. THE FILLET COVER SHALL BE BROKEN AS DEPICTED TO AVOID INTERFERENCE WITH FLANGE BOLTS. SEE CHART ON SHEET S-4 FOR MINIMUM TOTAL FILLET LENGTH ( $L_1+L_2+L_3$ ).

PLANS PREPARED FOR:

**nexus**

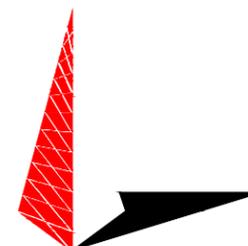
7025 S. FULTON ST. SUITE 100  
CENTENNIAL, CO 80112  
OFFICE: (352) 572-7297

PROJECT INFORMATION:

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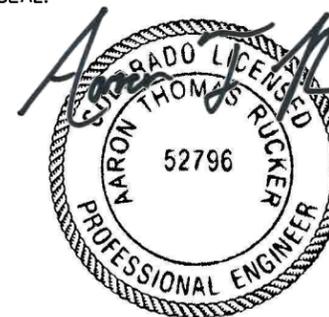
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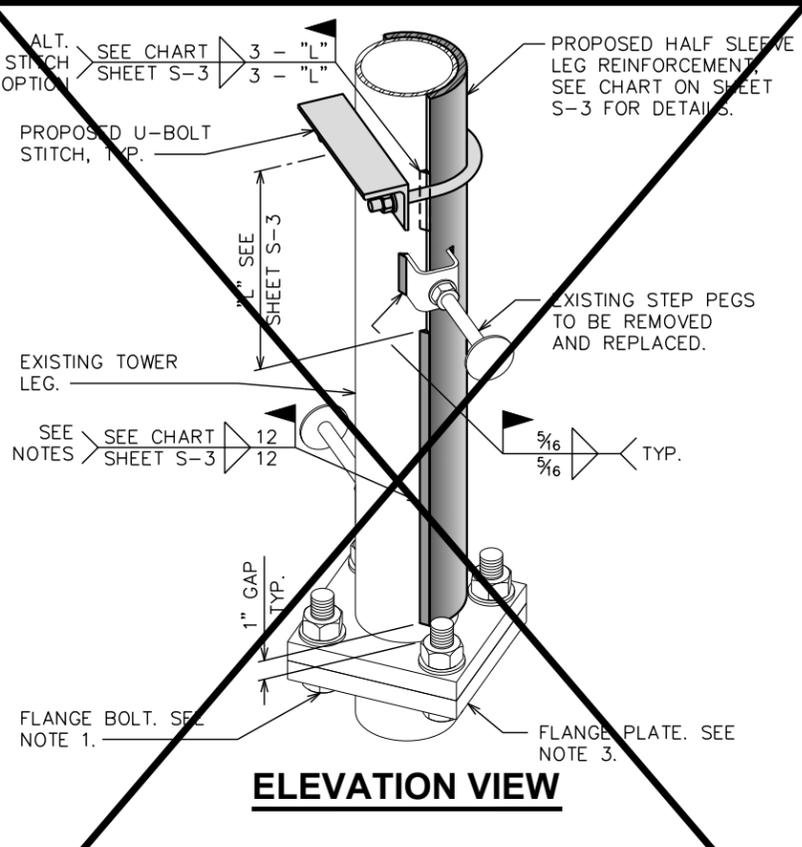
January 23, 2020

0	01-23-20	MODIFICATION DRAWINGS
REV	DATE	ISSUED FOR:

DRAWN BY: MJ CHECKED BY: BKO

SHEET TITLE:  
**LEG REINFORCEMENT DETAILS I**

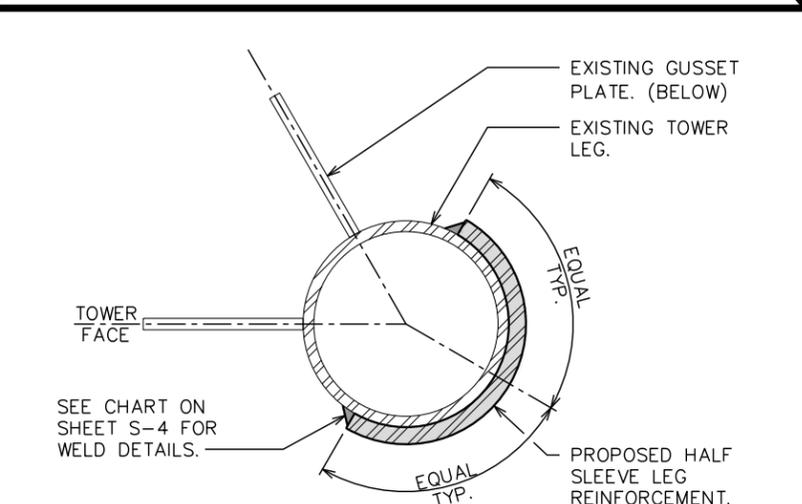
SHEET NUMBER: **S-2** REVISION: **0**  
TEP#:240575.361181



**ELEVATION VIEW**

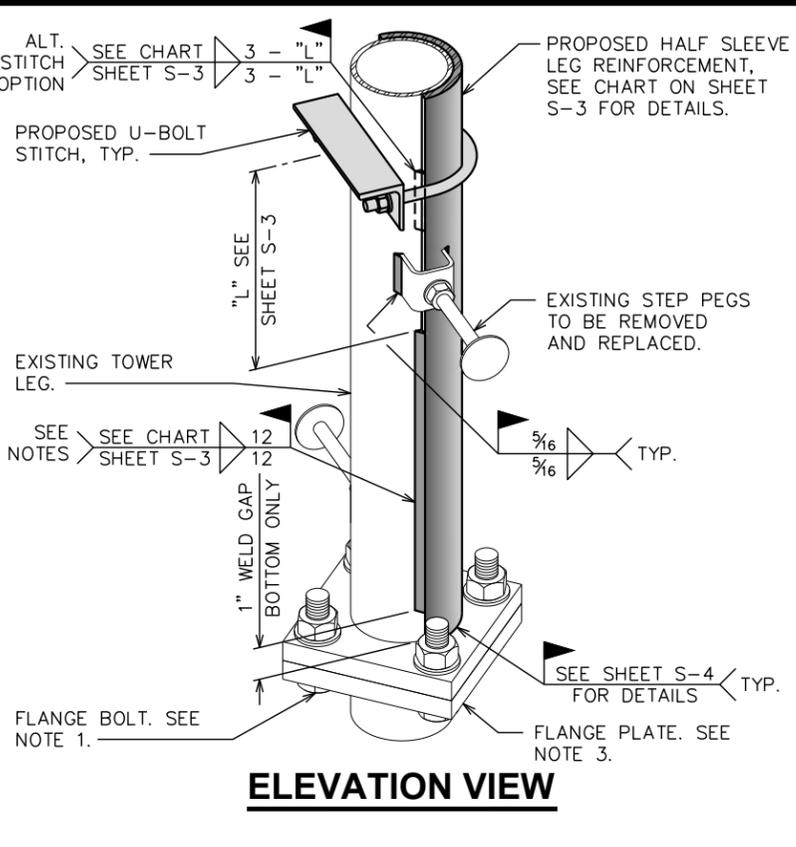
**TYP. SLEEVE TERMINATION**

SCALE: N.T.S.



**TYP. SECTION THROUGH TERMINATION**

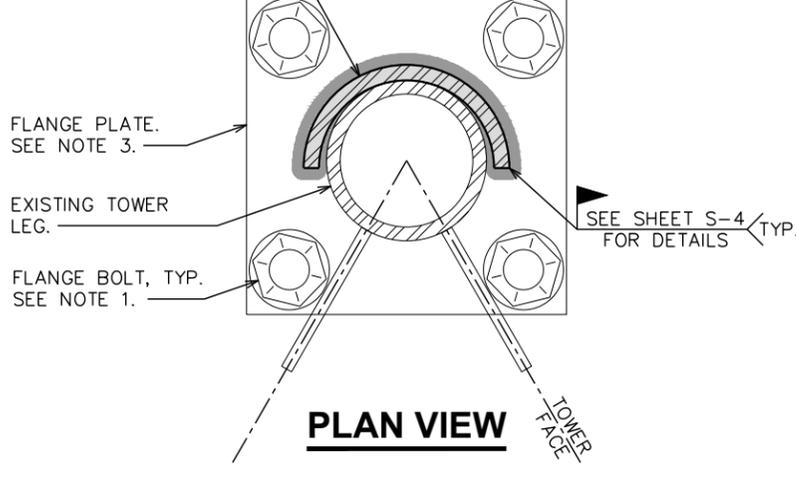
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**ELEVATION VIEW**

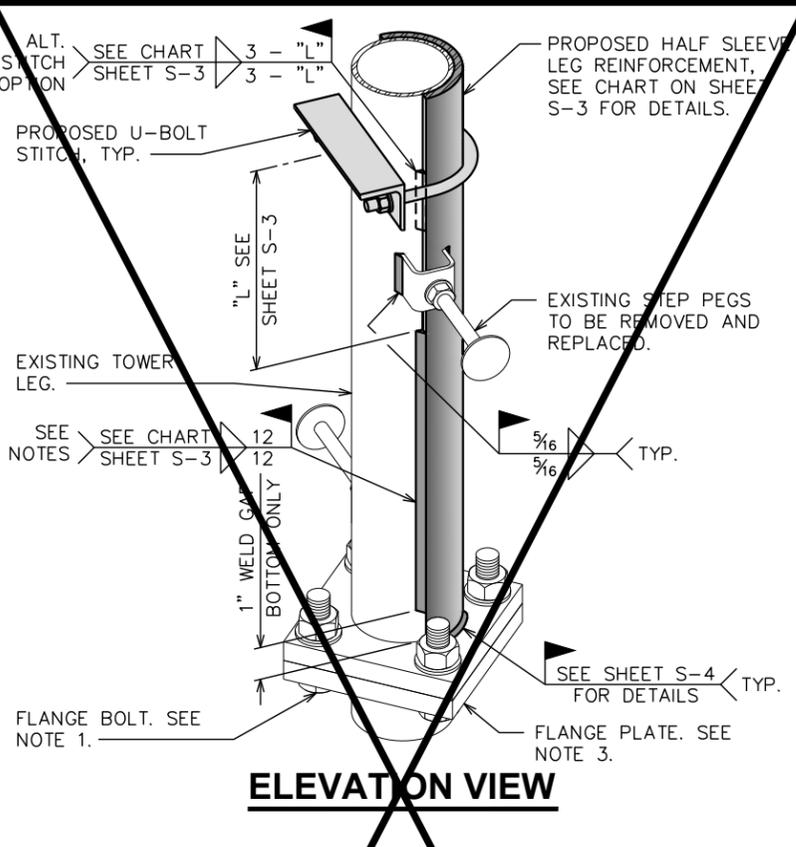
**TYP. FLANGE TERMINATION**

SCALE: N.T.S.



**TYP. FLANGE TERMINATION**

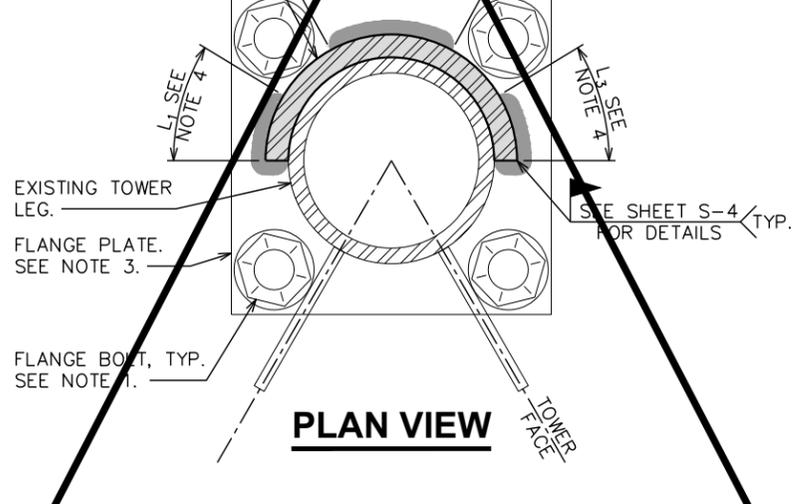
SCALE: N.T.S.



**ELEVATION VIEW**

**TYP. FLANGE TERMINATION**

SCALE: N.T.S.

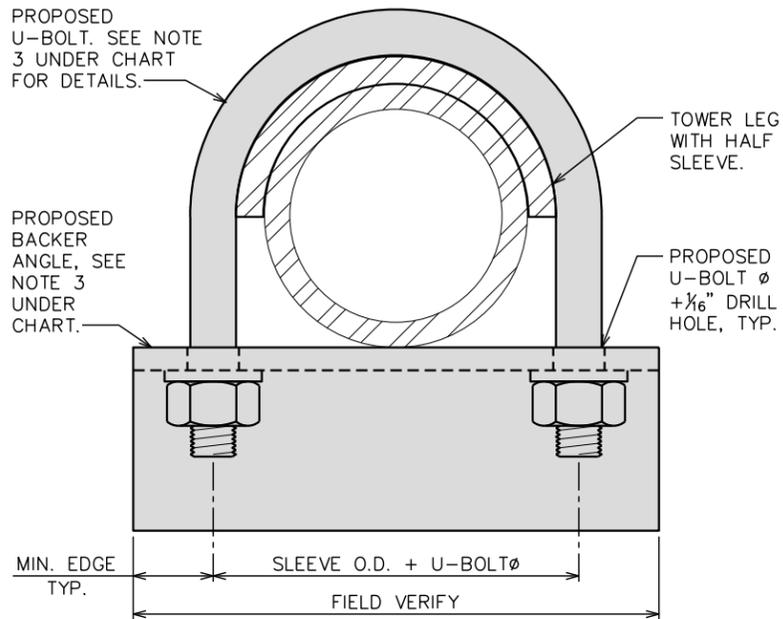


**TYP. FLANGE TERMINATION**

SCALE: N.T.S.

**NOTES:**

1. SEE SHEET N-3 FOR GAGE AND MINIMUM EDGE DISTANCE.
2. ALL CONNECTIONS NOT FULLY DETAILED ON THESE PLANS SHALL BE DETAILED BY THE STEEL FABRICATOR IN ACCORDANCE WITH THE AISC STEEL CONSTRUCTION MANUAL. SEE SHEET N-2 FOR DETAILS.
3. USE (1) U-BOLT PER ASSEMBLY COMPLETE WITH NUTS (ASTM A563), WASHERS (ASTM F436), AND LOCK WASHERS.
4. U-BOLTS SHALL BE SNUG TIGHT.

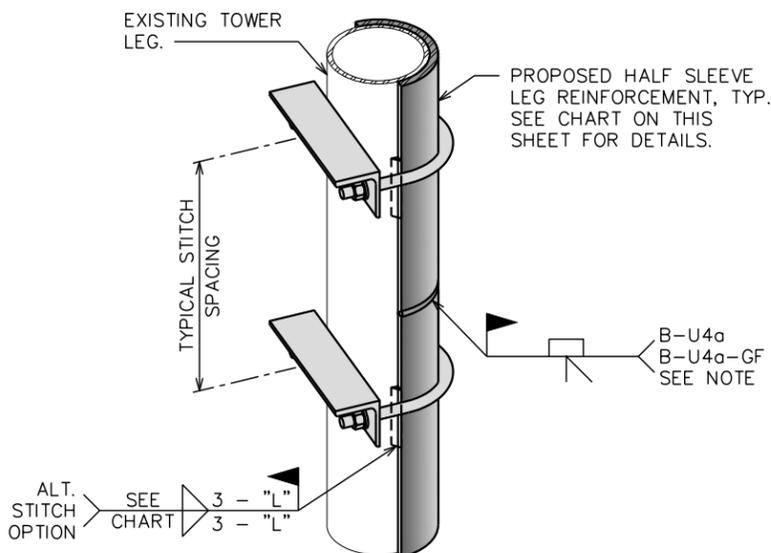


**TYP. SECTION THROUGH U-BOLT STITCH**

SCALE: N.T.S.

**NOTE:**

PERFORM CJP WELD USING EXISTING TOWER LEG AS BACKING BAR.



**TYP. SLEEVE SPLICE DETAIL**

SCALE: N.T.S.

**LEG REINFORCEMENT SCHEDULE**

SECTION	ELEVATION (FT.)	LEG REINFORCEMENT				MAX. STITCH SPACING "L"	WELD SIZE (IN.)	TERMINATION DETAIL		WELD LENGTH $L_1 + L_2 + L_3$
		TOWER LEG	HALF SLEEVE (ASTM A500-C-46)	AVERAGE LENGTH	QTY			BOTTOM	TOP	
1	0 - 20	3.5" STD. (4.000" O.D. x 0.226")	HSS 5.000" x 0.500"	20'±	3	12"	$\frac{5}{16}$			-
2	20 - 40	3.0" STD. (3.500" O.D. x 0.216")	HSS 4.500" x 0.375"	20'±	3	12"	$\frac{5}{16}$			-
3	40 - 60	2.5" STD. (2.875" O.D. x 0.203")	4.0" XXH (4.500" O.D. x 0.674")	20'±	3	12"	$\frac{5}{16}$			-
4	60 - 80	2.5" STD. (2.875" O.D. x 0.203")	4.0" XXH (4.500" O.D. x 0.674")	20'±	3	12"	$\frac{5}{16}$			-

1. PRIOR TO CONSTRUCTION THE CONTRACTOR SHALL VERIFY THAT THERE IS ADEQUATE CLEARANCE BETWEEN THE PROPOSED WELD AND THE EXISTING FLANGE BOLTS. IF INTERFERENCE OCCURS AN ALTERNATE SLEEVE TERMINATION DETAIL MAY BE REQUIRED AND ADDITIONAL DESIGN FEES MAY BE INCURRED.
2. WHEN WELDING OVER PRE-EXISTING WELDS, THE PRE-EXISTING WELDS SHALL BE INSPECTED BY A CERTIFIED WELDING INSPECTOR FOR DISCONTINUITIES BY VISUAL INSPECTION. IT IS RECOMMENDED THAT THE PRE-EXISTING WELDS ARE ALSO INSPECTED USING MAGNETIC PARTICLE TESTING BUT THIS OPTION MAY BE WAIVED BY THE TOWER OWNER IF THE VISUAL INSPECTION DOES NOT REVEAL ANY POTENTIAL ISSUES. THE PURPOSE OF THE INSPECTION IS TO ENSURE THAT THE PRE-EXISTING WELDS DO NOT CONTAIN DISCONTINUITIES THAT MAY IMPACT THE CONNECTION CAPACITY.
3. PROPOSED  $\frac{1}{2}$ " U-BOLTS WITH L2x2x $\frac{1}{4}$ " (A572-50) BACKER ANGLES FOR LEG SLEEVES UP TO 5.00" O.D. X 0.375" TH. OR L3x3x $\frac{1}{4}$ " (A572-50) BACKER ANGLES FOR LEG SLEEVES GREATER THAN 5.000" O.D. X 0.375" TH. SHALL BE USED. STITCH WELDS MAY BE SUBSTITUTED FOR THE U-BOLT STITCH ALONG THE LENGTH OF THE SPLIT PIPE. THERE IS NO SUBSTITUTION FOR THE TERMINATION WELD TO THE FLANGE.
4. U-BOLTS ARE TO BE 1/2" ASTM A307, SAE 429 GR. 2 AND SHALL MEET REQUIREMENTS OF ASME B18.31.5-2011 BENT BOLTS.
5. FULL ASSEMBLY TO BE HOT-DIPPED GALVANIZED PER ASTM A153/A153M OR A123, AS APPLICABLE.

PLANS PREPARED FOR:

**nexus**

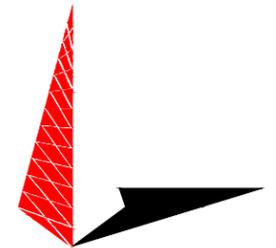
7025 S. FULTON ST. SUITE 100  
CENTENNIAL, CO 80112  
OFFICE: (352) 572-7297

PROJECT INFORMATION:

**NSB-CO.MLK\_AND\_TRENTON\_COLO1560**  
**SITE #: MRUTH031975**

7934 MARTIN LUTHER KING BLVD.  
DENVER, CO 80238  
(DENVER COUNTY)

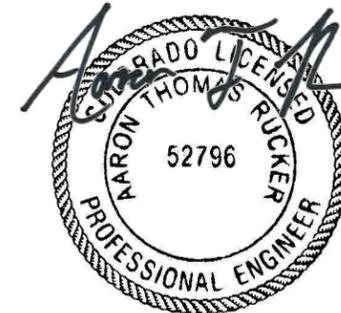
PLANS PREPARED BY:



**TOWER ENGINEERING PROFESSIONALS**

326 TRYON ROAD  
RALEIGH, NC 27603  
OFFICE: (919) 661-6351  
www.tepgroup.net

SEAL:



January 23, 2020

0	01-23-20	MODIFICATION DRAWINGS
REV	DATE	ISSUED FOR:

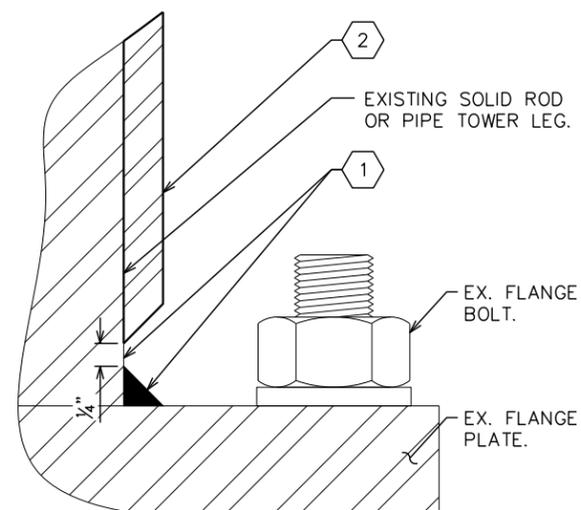
DRAWN BY: MJ CHECKED BY: BKO

SHEET TITLE:  
**LEG REINFORCEMENT DETAILS II**

SHEET NUMBER: **S-3** REVISION: **0**  
TEP#:240575.361181

**NOTES:**

- 1 CLEAN GALVANIZING FROM EXISTING WELD AND ALL WELD CONTACT SURFACES.
- 2 INSTALL PROPOSED LEG SLEEVE MODIFICATION.



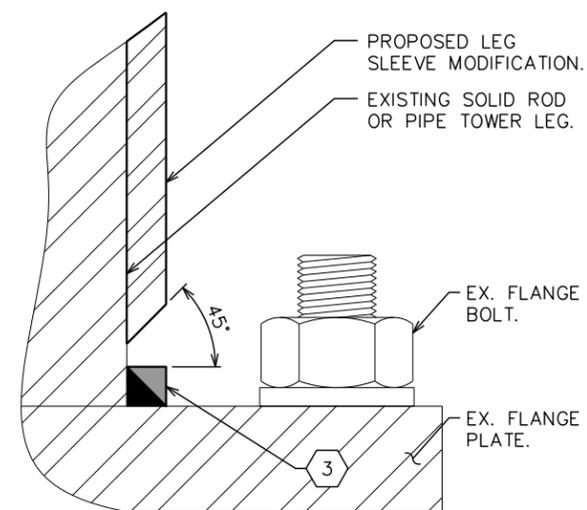
**DETAIL (ALT. 1)**

SCALE: N.T.S.

4A

**NOTES:**

- 3 BUILD PLATFORM WITH WELD (BUTTER) TO MATCH THE HEIGHT OF THE EXISTING FILLET WELD PER SECTION 5.22.4.3 OF AWS D1.1/D1.1M:2010. ENGINEERING APPROVAL IS PROVIDED FOR CORRECTING ROOT OPENINGS GREATER THAN THOSE PERMITTED IN SECTION 5.22.4.3 IN ACCORDANCE WITH SECTION 5.22.4.4.



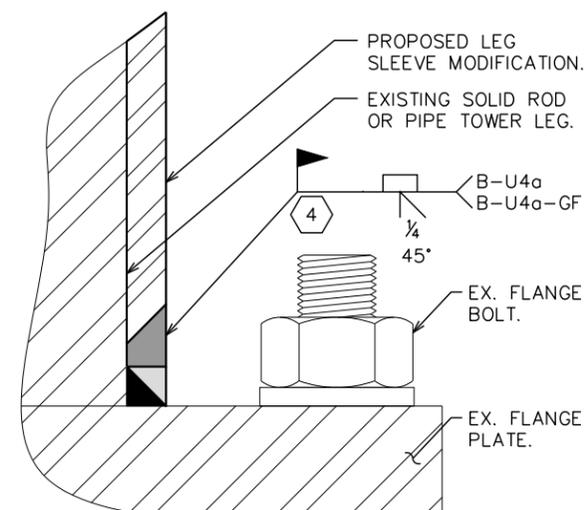
**DETAIL (ALT. 1)**

SCALE: N.T.S.

5A

**NOTES:**

- 4 PERFORM CJP WELD USING EXISTING TOWER LEG AS BACKING BAR.



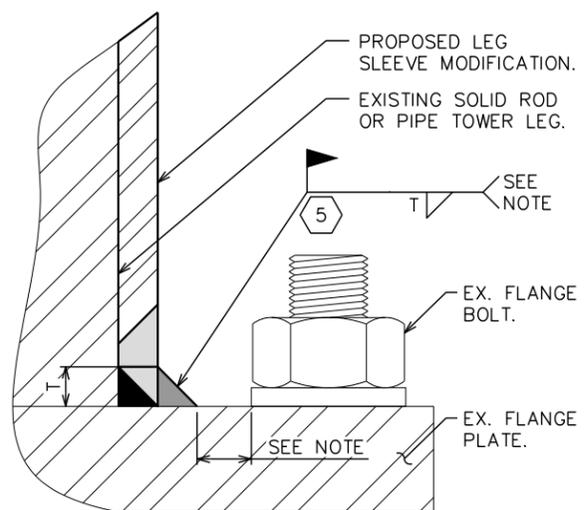
**DETAIL (ALT. 1)**

SCALE: N.T.S.

6A

**NOTES:**

- 5 REINFORCING FILLET WELD SIZED TO MATCH EXISTING FILLET WELD. PRIOR TO CONSTRUCTION CONTRACTOR SHALL VERIFY THAT THERE IS ADEQUATE CLEARANCE BETWEEN THE PROPOSED WELD AND THE EX. FLANGE BOLTS. IF INTERFERENCE OCCURS AN ALTERNATE SLEEVE TERMINATION DETAIL MAY BE REQUIRED AND ADDITIONAL DESIGN FEES MAY BE INCURRED.



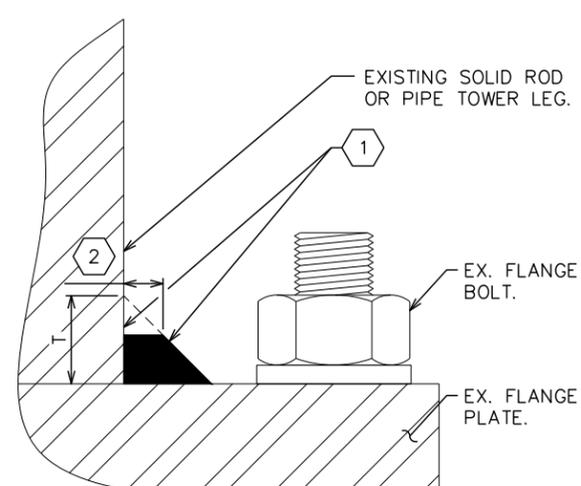
**DETAIL (ALT. 1)**

SCALE: N.T.S.

7A

**NOTES:**

- 1 CLEAN GALVANIZING FROM EXISTING WELD AND ALL WELD CONTACT SURFACES.
- 2 PARTIALLY GRIND THE HEIGHT OF THE EXISTING FILLET WELD TO FORM A PLATFORM WITH TOP WIDTH TO MATCH THE LEG SLEEVE THICKNESS.



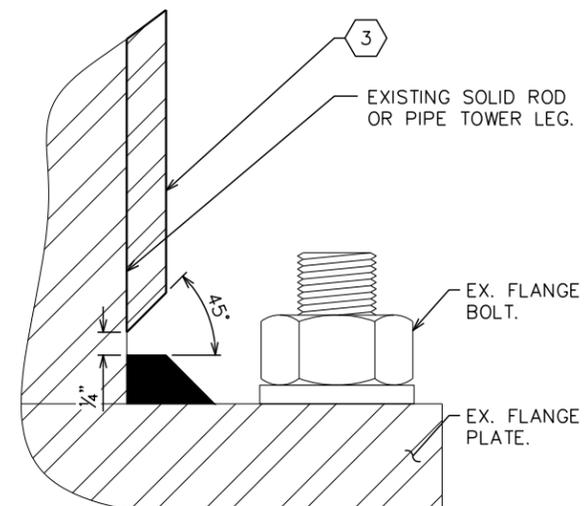
**DETAIL (ALT. 2)**

SCALE: N.T.S.

4B

**NOTES:**

- 3 INSTALL PROPOSED LEG SLEEVE MODIFICATION.



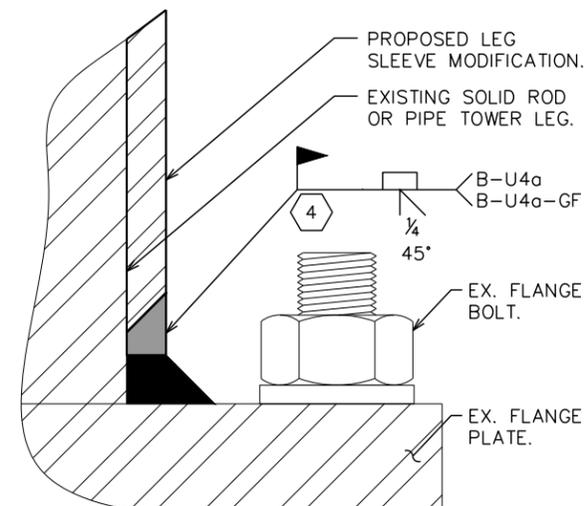
**DETAIL (ALT. 2)**

SCALE: N.T.S.

5B

**NOTES:**

- 4 PERFORM CJP WELD USING EXISTING TOWER LEG AS BACKING BAR.



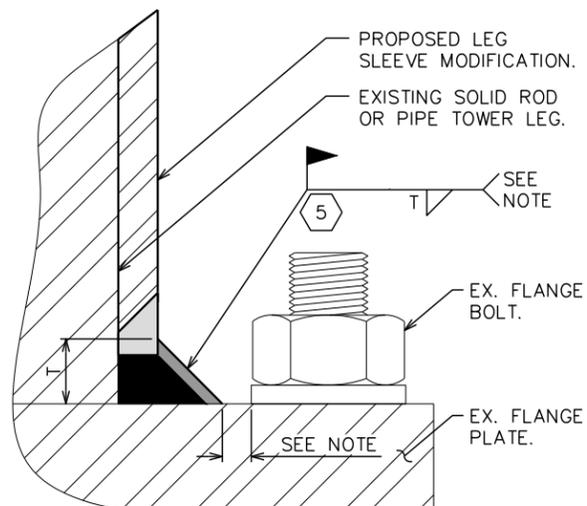
**DETAIL (ALT. 2)**

SCALE: N.T.S.

6B

**NOTES:**

- 5 BUILD UP FILLET WELD TO MATCH EXISTING FILLET WELD. PRIOR TO CONSTRUCTION CONTRACTOR, SHALL VERIFY THAT THERE IS ADEQUATE CLEARANCE BETWEEN THE PROPOSED WELD AND THE EX. FLANGE BOLTS. IF INTERFERENCE OCCURS AN ALTERNATE SLEEVE TERMINATION DETAIL MAY BE REQUIRED AND ADDITIONAL DESIGN FEES MAY BE INCURRED.



**DETAIL (ALT. 2)**

SCALE: N.T.S.

7B

PLANS PREPARED FOR:

**nexus**

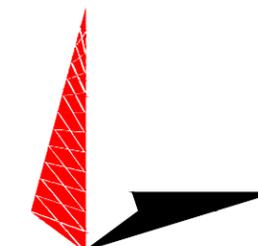
7025 S. FULTON ST. SUITE 100  
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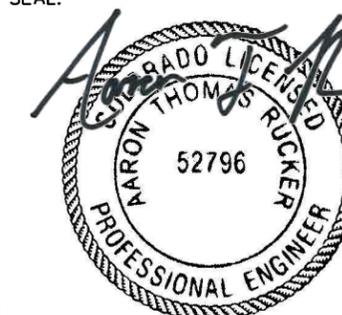
PLANS PREPARED BY:



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RALEIGH, NC 27603  
OFFICE: (919) 661-6351  
www.tepgroup.net

SEAL:



January 23, 2020

0	01-23-20	MODIFICATION DRAWINGS
REV	DATE	ISSUED FOR:

DRAWN BY: MJ CHECKED BY: BKO

SHEET TITLE:

**LEG SLEEVE WELD PROCEDURE**

SHEET NUMBER:	REVISION:
<b>S-4</b>	<b>0</b>
TEP#:240575.361181	

## **Exhibit B — City’s Minimum Technical Standards**

Note: Some standards may not apply to your facility due to frequency of operation or type of service.

### **1.0 General**

1.1 Posting of Information. The following information shall be posted on or near your cabinet:

Copy of FCC license (if applicable)

Equipment Identification Card with the following information:

Transmit and receive frequencies (or frequency bands in case of wireless operators)

Type of service

Authorized output power & ERP

Antenna model number

Transmission line model number and type

Name of licensee

Contact information for responsible person (name, phone, email)

Unidentified equipment shall be considered unauthorized and may be red tagged and removed after 30 days.

1.2 Installations at City Fire Stations. The City may require that the Tenant (Licensee) upgrade City radio equipment to ensure interference-free coexistence. Specifically, there is a problem with installing an isolator on the existing 900 MHz Alligator Model 1888 MAS transceiver used at most City fire stations. The isolator must be installed only on the transmit line, but the transceiver uses a duplexed (switched) output whereby both the transmitter and the receiver share the same antenna line. Similarly, separate cavity filters are required for the receiver and transmitter, but it is not possible to install both on a single duplexed line. For this reason, the City usually directs that the Alligator Model 1888 be replaced with a Model 1800 Master unit with separate transmit and receive antenna ports. A duplexer cavity filter should be used to combine transmit and receive into the existing antenna. Contact the City’s Technical Representative for recommended vendors for these components.

1.3 Changes. Notify the City’s Technical Representative immediately of any changes to frequencies, antennas or other equipment configuration. Obtain City’s approval prior to making those changes as required by the Lease (License). Approved changes shall be shown on an updated Equipment ID Card.

### **2.0 Mobile Wireless Services**

2.1 Land Mobile Radio Filter and Isolator Requirements. For land mobile radio (LMR), as a minimum, each transmitter shall employ a dual stage isolator followed by a single cavity

bandpass filter. All transmitters shall have built-in or external harmonic (low pass) filters. The low pass filter must be a true low pass filter, not a notch filter tuned to just one or two harmonic frequencies. Harmonic rejection shall be at least 60 dB at the second harmonic and at least 50 dB at the third harmonic. The following minimum isolator and bandpass cavity filter specifications apply:

30-50 MHz

Isolators - None required.

TX cavity - minimum of 20 dB rejection at + 0.5 MHz

72-76 MHz

Isolators - Minimum of 25 dB

TX cavity - minimum of 20 dB rejection at + 0.5 MHz

138-174, 216-222 MHz

Dual Stage Isolators - minimum of 60 dB

TX cavity - minimum of 20 dB rejection at + 1.5 MHz

406-512 MHz

Dual Stage Isolators - minimum of 60 dB

TX cavity - minimum of 20 dB rejection at + 3.5 MHz

698-941 MHz (excluding airphone)

Dual Stage Isolators - minimum of 60 dB

Tx cavity - minimum of 20 dB rejection at + 6 MHz

Explanation. The bandpass filter and lowpass filter must follow the isolator because ferrite isolators are nonlinear and can create harmonics. Please note that most bandpass cavity filters will pass odd harmonics of the tuned frequency, so an external lowpass filter following the isolator is also required. Transmitter combiners will be considered on a case-by-case basis. Please provide all combiner technical information to the City's Technical Representative.

2.2 Airphone (849-851 MHz transmit, 894-896 MHz receive)

Transmitter out-of-band emissions shall not cause harmful interference to cellular base station receivers (824-849 MHz). Tenant (Licensee) shall submit plans, including bandpass filter response curves, to the City's Technical Representative for approval prior to installation. Tenant (Licensee) shall install adequate receiver bandpass filtering to preclude receiver desensitization or receiver intermodulation caused indirectly by cellular base stations on the site.

2.3 LMR Duplexers. Notch duplexers are not adequate. The duplexer must also have a bandpass characteristic to ensure other transmit signals do not enter the transmitter or over drive the receiver. This is especially important for VHF repeaters which are vulnerable to FM broadcast signals and other closely-spaced VHF transmitters.

2.4 Personal Wireless Services. These services include, but are not limited to the 698-806, 806-

869, 1710-1755, 1850-2000, 2110-2155, 2500-2600 MHz bands (excluding 700 and 800 MHz public safety bands). Because the wireless provider is assumed to have exclusive use of a band of frequencies, out-of-band emissions are expected to be attenuated significantly by the manufacturer's standard combiners, duplexers and cross-band couplers. Ferrite isolators may not be required. Submit your plans to the City's Technical Representative for approval.

2.5 Unlicensed Band (License-Free) Radios. Unlicensed band radios and shared-band services, including, but not limited to those operating in the 902-928 MHz, 2.4-2.4835 GHz, 3.5 GHz, 4.9 GHz (public safety only) and 5 GHz bands are not allowed unless specifically authorized in the Tenant's (Licensee's) Lease (License). When authorized, Tenant (Licensee) shall not change operating frequencies without first getting approval from City. License-free radios are notorious for their poor quality in a harsh RF environment and specific make, model and technical specifications must be provided to the City's Technical Representative for approval. Additional protective devices, shielded CAT 6 cable and shielded NEMA cases may be required before such devices can be installed on the tower.

2.6 Receivers. The site may have relatively high radio frequency (RF) levels in all mobile radio bands. Your receiver amplifier must be robust to work in this environment. Ensure the receiver has good intermodulation (IM) rejection and high 1 dB compression point. If interference is encountered and we find the receiver is not performing up to the standards exhibited by state-of-the-art equipment, the City may require receiver improvements or upgrades before requiring changes to other tenant (licensee) equipment or configurations. This requirement applies to both new and existing tenants (licensees).

Filters are required for mobile radio receivers. Single receivers must employ a minimum of a single 7" diameter (or equivalent) cavity bandpass filter with a rejection curve corresponding to 1 dB insertion loss or better. Additional filter isolation may be required in special cases. Receiver multicouplers must use a bandpass filter (preselector) prior to the multicoupler amplifier.

2.7 Antennas. Select antennas designed to minimize passive intermodulation generation. Note that antennas that pass intermodulation tests at the factory may not provide good intermodulation rejection after years of exposure to heat, cold, vibration from wind, and humidity. Only new antennas are allowed for new installations. Select antennas specifically designed to reject intermodulation over the life of the antenna. Unless the antenna is a duplex configuration, transmit and receive antennas should be separated vertically on the tower. If the tower is owned by the City, the City will designate antenna locations. Antennas must be DC grounded to the tower for lightning protection.

2.8 Transmission Lines. Coaxial cable should be grounded at the top and the bottom of the run with an Andrew ground kit or equivalent. Ensure that ground conductors run straight down with no sharp bends because bends will increase the impedance of the grounding conductor. We also require that the line be marked so we can identify it later. We suggest bands of colored electrical tape at the bottom, middle and top of the run (similar to a resistor color code). Install a Huber-Suhner (or equivalent) coaxial surge arrestor at the bulkhead. All exterior transmission lines must be solid outer conductors. If possible, receive and transmit lines should be separated by at

least one foot from cabinet to antenna.

2.9 Connectors. Connectors are often sources of RF leakage and passive intermodulation. UHF connectors (PL259) are not allowed on connections external to the radio cabinet. Type “N” connectors are allowed below 512 MHz. 7/16 DIN connectors should be used at 698 MHz and above and are required above 1.7 GHz. Connectors using dissimilar metal contacts or ferrous materials (e.g., nickel plating) are not allowed. The preferred connector uses a silver plated body with gold plated inner conductor. Brass bodies and silver or brass inner conductors are also allowed.

2.10 Additional Protective Devices May Be Required. The specifications above are minimum requirements. Additional protective devices may be required based upon evaluation of the following information:

- Theoretical TX mixes, particularly second and third order
- Antenna location and type
- Combiner/multicoupler configurations
- Transmitter specifications
- Receiver specifications
- Historical problems
- Transmitter to transmitter isolation
- Transmitter to antenna isolation
- Transmitter to receiver isolation
- Calculated and measured level of IM products
- Transmitter output power
- Transmitter ERP
- Spectrum analyzer measurements
- VSWR measurements
- Existing cavity selectivity
- Antenna to antenna proximity

### **3.0 FM & IBOC Broadcast (Part 73, ERP > 1 kW)**

3.1 FM Broadcast Transmitters. FM and IBOC Broadcast transmitters will be either combined with other stations into a common antenna or stand-alone. If combined, the combiner design shall be approved by the City's Technical Representative. If stand-alone, the transmitter shall employ a bandpass cavity filter with the following minimum performance specifications:

3.1.1. Rejection. The bandpass filter shall provide the following minimum rejection for Class C, C0 and C1 stations:

From Center +/-	Minimum Rejection
800 kHz	22 dB
1 MHz	28 dB
1.2 MHz	32 dB

- 1.4 MHz 38 dB
- 1.6 MHz 43 dB

Note that four cavities are required to meet this specification. Class C2 and C3 stations may use three-cavity filters. These filter requirements also apply to stations with FM & IBOC combined outputs. A stand alone IBOC transmitter and antenna shall comply with the following requirements: IBOC ERP greater than 5,000 Watts: 4 cavity filter (see rejection above), IBOC ERP less than or equal to 5,000 Watts: 3 cavity filter.

3.1.2 Gain Flatness. +/-0.5 dB from +/-200 kHz from center frequency.

3.1.3. Group Delay Flatness. No greater than +/- 150 nanoseconds (symmetrical) in +/- 200 kHz (I.e., minimum to maximum delay difference shall be no greater than 300 nanoseconds in the band  $f_c - 200$  kHz to  $f_c + 200$  kHz).

3.1.4. VSWR. No greater than 1.1:1 in +/- 200 kHz (assuming filter is terminated in perfect 50 ohm load).

3.1.5. Insertion Loss. No greater than 0.3 dB in +/- 200 kHz.

The transmitter should comply with current FCC rules regarding out-of-band emissions at transmitter output (before the bandpass cavity filter). The external filter is required to provide further rejection of out-of-band emissions to ensure electromagnetic compatibility with other users on the site.

3.2 FM Broadcast Antennas. FM Broadcast antennas mounted below 250' AGL (center of radiation) shall employ short element spacing to reduce downward radiation and ensure compliance with CFR 47, Parts 1.1307-1.1310. This requirement does not apply to stations that employ a single element antenna. Examples of short element spacing are a 6 bay antenna with half-wavelength spacing or an 8 bay antenna with 3/4 wavelength spacing. Submit a plot of predicted power density versus distance at ground level for City's Technical Representative approval.

## **4.0 Full-Power Television**

4.1 Full-power television transmitters shall include band pass and low pass filters.

4.2 For television transmitters, measured out-of-band emissions (including harmonics) greater than 3 MHz from the respective channel edge shall be more than 80 dB below the measured power over the entire channel. Both measurements shall use a 6 MHz measurement bandwidth.

## **5.0 Low Power Television (analog and digital)**

5.1 Low Power Television (LPTV) transmitters and television translators must have low pass filters that attenuate all harmonics and spurious products at least 80 dB below the power

measured at the carrier frequency. To facilitate measurements of spurious products, each LPTV and translator transmitter shall have installed a line section and appropriate directional coupler element. For routine use, the line section may employ a standard DC element and be connected to a wattmeter capable of measuring forward and reflected power. In addition, the Tenant (Licensee) shall own or have access to an RF load capable of dissipating the full power of the transmitter for troubleshooting purposes.

## **6.0 Grounding, Bonding and Shielding**

6.1 Shielding. RF interference can get directly into the electronics of a receiver or transmitter. Cabinet shielding must be in place and maintained to the manufacturer's specifications. Do not leave cabinet doors open because open cabinet doors defeat the shielding.

6.2 Grounding. Equipment grounding and bonding should be accomplished in accordance with Mil Std 188-124, Military Handbook 419 and Motorola R56. Contact the City's Technical Representative for guidance on grounding and bonding at your particular facility.

## **7.0 Site Work**

7.1 Tower Work Insurance and Experience Requirements. All tower riggers or installers of antennas, transmission lines, cabinets, wiring or similar hardware or apparatus must meet the minimum basic requirements of the City. These will include, but not be limited to, the following:

- The rigging company must have a current Certificate of Insurance on file with the City. The certificate will include, but not be limited to the following:

1. General Comprehensive & Liability: \$5,000,000
2. Vehicle Liability: \$1,000,000
3. Workman's Compensation Insurance (By Statute)

- Demonstrated experience on similar tower types and similar work activity on similar towers within the past two years with a list of at least two recent clients or professional references with actual knowledge of experience and necessary qualifications, or in lieu thereof; previous working relationship with the City and known by the City's personnel.

City reserves the right, at its sole discretion, to reject the use of any person or tower rigging company on City-owned towers or properties.

7.2 Work Standards. The installation of any and all materials on the tower and in the accompanying shelter must be pre-authorized and approved by the City's Technical Representative. The following guidelines will be strictly enforced:

7.2.1 Equipment or cabinets mounted on platforms will be constructed of galvanized or stainless steel and will be securely attached to the tower members or platforms with J-bolts, U-

bolts or similar clamping devices which do not penetrate tower members or any part of the galvanized coating. All mounting hardware must be hot-dipped galvanized or stainless steel (NOT PLATED). All mounting nuts, bolts, washers or similar must be Grade 5 or better.

7.2.2 Antennas and the mounting thereof must be approved in advance of installation. Data in reference to antenna type, weight, wind loading, gain, bandwidth and mounting details must be provided to the City's Technical Representative and may not be modified or replaced without expressed written permission of City. Installation of antennas on City-owned towers may require a new structural study at the Tenant (Licensee)'s expense.

7.2.3 Transmission lines and hardware must be approved in advance of installation by the City's Technical Representative and must be specified as to manufacturer, size and type and shown on the City's New Tenant Questionnaire. All the mounting hardware must be of appropriate type and design to support the transmission lines with strain-reliefs installed at the manufacturer's recommended intervals. Under no circumstances will stainless steel automotive-type hose clamps be used to secure transmission lines or cables to tower members. Where not previously designated, all lines will be positioned on the tower to minimize wind loading and provide a minimum of obstruction to climbing or removal/replacement of other lines. Each line will be mounted independently of other lines on the tower. Cable trays, waveguide entrances, tower ladders, elevator rails and other similar members are to be kept clear of all cables on the tower. Stainless steel lashing ties are acceptable for use on the tower but are not to be used as strain reliefs.

7.2.4 Antenna jumper cables or cables to/from crossband couplers or similar devices on the tower will be kept to minimum required lengths and will be made of solid shield outer conductor cables with outer jackets capable of withstanding severe weather and ultraviolet rays. All such cable types must be pre-approved by the City.

7.2.5 UNDER NO CIRCUMSTANCES –

- will welding or drilling of tower members be allowed;
- will modifications to the tower, bridge, building entrance fittings or similar be permitted;
- will transmission line splices (a pair of connectors at other than the top or bottom of the run on the tower) be permitted except by prior approval or necessitated by damage only repairable by splicing;
- will any tampering, retuning, rerouting or other modifications be permitted to equipment owned by City or other tenants.

7.2.6 All installations will be performed in accordance with good engineering practice and within the guidelines of this document. Any deviation from these minimum requirements and technical standards must be approved in writing prior to installation or modification.

7.3 Removal of Unused Antennas and Lines. Tenant (Licensee) shall remove all unused antennas, transmission lines and associated mounting hardware from City's tower within 90 days of the date an antenna is no longer in service.

7.4 NO PRESENT INSTALLATION WILL BE "GRANDFATHERED" and must conform to these work standards within a reasonable time period to be determined by the City's Technical Representative. Periodic inspections may be performed to ensure that all installations meet technical standards.

## **8.0 Shelters**

8.1 Cable Dressing Inside Building or Shelter. All wiring and cables within a given rack will be properly dressed and/or bundled with cable ties with excess cut close to the barbs. Twisted wire, tape, rope, twine, phone wire and similar bits of debris usually available on site ARE NOT ACCEPTABLE substitutes for proper securing hardware. All inter-rack cables and wiring must be properly routed and utilize the cable trays provided even if between adjacent racks. Overhead cables and RF lines must be easily removed or reworked within the cable trays. Proper care must be taken to ensure that new cables added to the trays are not stressed or intertwined with existing cables. OVERHEAD CABLES MAY NOT CROSS PERPENDICULARS OR BE SUSPENDED IN MID AIR WITHOUT SUPPORTS. NO SUPPORTS MAY BE INSTALLED WITHOUT PRIOR APPROVAL. All long cable runs must be properly identified at each end indicating the opposite cable end address. All cabling within the building must be cut to proper length except phasing harnesses, where required.

## **9.0 Towers**

9.1 Tenant (Licensee) may not erect new towers without the City's prior written consent, which may be granted or denied in City's sole discretion, and towers that are approved may only be constructed after plans for the tower have been approved by the City and by the zoning authority.

9.2 New towers shall comply with TIA-222-G or the most recent edition adopted by the local zoning authority. Changes to an existing tower, including addition or replacement of antennas requires that TIA-222-G or the most recent edition be used. Tenant (Licensee)-owned towers that present an immediate safety hazard shall be corrected by Tenant (Licensee) regardless of the status of the current lease or the particular edition of TIA-222 in use at the time of tower construction. Installation of antennas on City-owned towers may require a new structural study at the Tenant (Licensee)'s expense.

## **10.0 Permits**

10.1 Tenant (Licensee) shall comply with all local and Federal regulations. Tenant (Licensee) is responsible for acquiring all applicable permits, including, but not limited to FCC construction permits and building permits. Tenant (Licensee) is also responsible for performing any required studies, including RF exposure and RF interference studies required by the FCC, local government, and City. Tenant (Licensee) shall furnish all applicable permits, studies, and

approvals to the City for approval before starting any construction, including antenna installation.

## **11.0 Radio Frequency Safety**

11.1 The engineering, design, configuration, installation, and maintenance of high power (> 1 kW ERP) radio facilities on the site shall be accomplished in a manner that minimizes downward radiation. Changes to proposed systems may be directed by City to comply with this objective.

11.2 Everyone on the site shall follow these guidelines:

- All personnel entering the site must be authorized
- Obey all posted signs
- Assume all antennas are active unless proven otherwise
- Before working on an antenna, notify the owner and disable the transmitter
- Use a radio frequency (RF) personal monitor when working near antennas
- Never operate transmitters without shields

11.3 Power densities on towers can be much higher than at ground level. For this reason, tower climbers should request power reductions from high-power tenants and carry RF personal monitors when climbing towers. The City's Technical Representative can tell you which transmitters should be turned down before climbing the tower.

11.4 Federal Government guidelines regarding human exposure to radio frequency energy are found in the Code of Federal Regulations (CFR) Title 47, Parts 1.1307-1.1310.



Figure 1 - Warning Sign to be Posted at Base of Tower  
(Available from Tessco, Holaday, Narda and other Sources)



## CO-LOCATION INTERFERENCE ANALYSIS REPORT

**AT&T COL01560**  
**NSB-CO.MLK\_AND\_TRENTON\_COL01560**  
**7934 Martin Luther King Blvd**  
**Denver, CO 80238**

**Delivered: November 20, 2020**

**EBI Project Number: 6220005965**



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Prepared by:  
**EBI Consulting**  
21 B Street  
Burlington, MA 01803



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## 1.0 Executive Summary

This report presents a radio frequency interference (RFI) analysis which was performed on the **AT&T COL01560 - NSB-CO.MLK\_AND\_TRENTON\_COL01560** site. The RFI analysis consists of transmitter noise, receiver desensitization, intermodulation, harmonic and transmitter spurious output interference. The report consists of Sections that provide details of the communications site, antenna systems, operational frequencies and each interference analysis mode.

A summary of the interference analysis results is depicted in the following Table.

<b>Interference Analysis Mode</b>	<b>Type Mix</b>	<b>Status</b>	<b>Summary</b>	<b>Worst-Case Margin (dB)</b>
Transmitter Noise	N/A	Passed	No Interference was predicted	<b>14.1</b>
Receiver Desensitization	N/A	Passed	No Interference was predicted	<b>16.9</b>
Transmitter Intermodulation	1 Tx	Passed	No Interference was predicted	N/A
Transmitter Intermodulation	2 Tx	Passed	No Interference was predicted	N/A
Transmitter Intermodulation	3 Tx	Passed	No Interference was predicted	N/A
Transmitter Intermodulation	4 Tx	Passed	No Interference was predicted	N/A
Transmitter Intermodulation	5 Tx	Passed	No Interference was predicted	N/A
Receiver Intermodulation	1 Tx	Passed	No Interference was predicted	N/A
Receiver Intermodulation	2 Tx	Passed	No Interference was predicted	N/A
Receiver Intermodulation	3 Tx	Passed	No Interference was predicted	N/A
Receiver Intermodulation	4 Tx	Passed	No Interference was predicted	N/A
Receiver Intermodulation	5 Tx	Passed	No Interference was predicted	N/A
Transmitter Harmonics	N/A	Passed	No Interference was predicted	N/A
Transmitter Spurious Output	N/A	Passed	No Interference was predicted	N/A

The analysis was performed with the setup options depicted in the Table below.

<b>Analysis</b>	<b>Description</b>
Receiver Performance	Receiver Sensitivity Threshold
Receiver Bandwidth	Receiver Dependent
Antenna Patterns Considered	Yes
Measured Antenna Isolation Data	No
Filters/Multicouplers Considered	Yes
Number of Simultaneous Transmitters Mixed	5
Highest Intermodulation Order Tested	7
Condense Intermodulation Hit Quantity	Yes - 10000/Order
TX IM Bandwidth Multiplication	No
Tx/Rx Systems Excluded	None
Site File Name	AT&T COL01560 - MLK and Trenton.dta
Report File Name	AT&T COL01560 - MLK and Trenton.docx
WirelessSiteRFI Software Version	10.0.12

## 2.0 Site Description

The communication systems located at this site are described in this section as well as the configuration of the antenna systems.

The site parameters are:

**Site Name:** AT&T COL01560 - MLK and Trenton  
**Owner:** City of Denver  
**Site Description:** Self Support Tower  
**Address:** 7934 Martin Luther King Blvd, Denver, CO 80238  
**Latitude:** 39.759282 N  
**Longitude:** -104.895445 W  
**Elevation:** 5314 feet AMSL

**Notes:** This analysis was performed solely between the proposed AT&T radio equipment at this facility and existing municipal radio systems per the radio data supplied by the city. For the City radio equipment, we assumed that all radio systems were located at this facility at 7934 Martin Luther King Blvd to create a worst case scenario.

## 2.1 Communications Systems

System	Provider	Technology	Frequency Band
1	AT&T	5G NR	850 MHz Cellular
2	AT&T	LTE	2300 MHz WCS
3	AT&T	LTE	700 MHz Band
4	AT&T	LTE / Band 14	700 MHz Band (Band 14)
5	AT&T	LTE	1900 MHz PCS
6	AT&T	LTE	2100 MHz AWS
7	Denver RMRS	FM Land Mobile	806 - 896 MHz - Land Mobile
8	Denver - DataRadio	FM Land Mobile	806 - 896 MHz - Land Mobile
9	Denver - P25	FM Land Mobile	896 - 960 MHz - Land Mobile
10	Denver - Conventional_850 MHz	FM Land Mobile	806 - 896 MHz - Land Mobile
11	Denver - (CONV) CLEER	FM Land Mobile	420 - 470 MHz - Land Mobile
12	Denver - VLAW31(NLEEC)	FM Land Mobile	150 - 174 MHz - Land Mobile
13	Denver - VMED28(HEAR)	FM Land Mobile	150 - 174 MHz - Land Mobile
14	Denver - R.A.C.E.S.	FM Land Mobile	144 - 148 MHz - Land Mobile
15	Denver - METRO RPTR 1	FM Land Mobile	806 - 896 MHz - Land Mobile
16	Denver - Jail (Control_General_SPL USE_BLDG 22)	FM Land Mobile	420 - 470 MHz - Land Mobile
17	Denver - Jail (SPL Use_Tactical)	FM Land Mobile	420 - 470 MHz - Land Mobile
18	Denver - P25 ASR	FM Land Mobile	806 - 896 MHz - Land Mobile
19	Denver - P25 Simulcast	800 MHz Trunking	806 - 896 MHz - Land Mobile
20	Denver - Fire Repeaters	800 MHz Trunking	806 - 896 MHz - Land Mobile

2.2 Antenna Systems

Ant #	Mfg	Antenna Model	Gain (dBd)	Hgt (ft)	Orient (deg)	Sector	Ant Use	Transmission Line Type	Line Loss (/100')	Line Length (ft)
1	Commscope	NNH4-65C-R6-V3	13.59	100	30	A	Dplx	1/2 in. Foam	0.5	10
2	Commscope	NNH4-65C-R6-V3	13.59	100	150	B	Dplx	1/2 in. Foam	0.5	10
3	Commscope	NNH4-65C-R6-V3	13.59	100	270	C	Dplx	1/2 in. Foam	0.5	10
4	Commscope	NNH4-65C-R6-V3	15.77	100	30	A	Dplx	1/2 in. Foam	0.5	10
5	Commscope	NNH4-65C-R6-V3	15.77	100	150	B	Dplx	1/2 in. Foam	0.5	10
6	Commscope	NNH4-65C-R6-V3	15.77	100	270	C	Dplx	1/2 in. Foam	0.5	10
7	Decibel	DB806D	6	117	0	A	Dplx	1-5/8 in. Foam	0.72	147
8	Decibel	DB806	6	117	0	A	Dplx	1-5/8 in. Foam	0.72	147
9	Decibel	DB806	6	117	0	A	Dplx	1-5/8 in. Foam	0.72	147
10	Decibel	DB806	6	117	0	A	Dplx	1-5/8 in. Foam	0.72	147
11	Celwave	PD201-1 (413 MHz)	5.53	117	0	A	Tx	1-5/8 in. Foam	0.54	147
12	Celwave	PD201-1 (413 MHz)	5.53	117	0	A	Tx/Rx	1-5/8 in. Foam	0.54	147
13	Celwave	PD200 (158.0 MHz)	5.6	107	0	A	Tx/Rx	1-5/8 in. Foam	0.28	137
14	Celwave	PD200 (158.0 MHz)	5.6	107	0	A	Tx/Rx	1-5/8 in. Foam	0.28	137
15	Decibel	DB806	6	107	0	A	Dplx	1-5/8 in. Foam	0.72	137
16	Celwave	PD201-1 (413 MHz)	5.53	107	0	A	Dplx	1-5/8 in. Foam	0.54	137
17	Celwave	PD201-1 (413 MHz)	5.53	107	0	A	Tx/Rx	1-5/8 in. Foam	0.54	137
18	Decibel	DB806	6	127	0	A	Dplx	1-5/8 in. Foam	0.72	157
19	Decibel	DB806	6	127	0	A	Dplx	1-5/8 in. Foam	0.72	157
20	Sinclair	SRL 441-2R60	9.5	127	0	A	Dplx	1-5/8 in. Foam	0.82	157

### 3.0 Transmitter Frequencies

Freq #	Ant #	Provider	Model	Technology	Channel Label	ID	Frequency (MHz)	Power (Watts)	BW (KHz)
1	1	AT&T	Ericsson	5G NR	1	A	875.000000	80	10000
2	2	AT&T	Ericsson	5G NR	1	B	875.000000	80	10000
3	3	AT&T	Ericsson	5G NR	1	C	875.000000	80	10000
4	1	AT&T	Ericsson	LTE	1	D	2355.000000	120	10000
5	2	AT&T	Ericsson	LTE	1	E	2355.000000	120	10000
6	3	AT&T	Ericsson	LTE	1	F	2355.000000	120	10000
7	4	AT&T	Ericsson	LTE	1	G	740.000000	80	10000
8	5	AT&T	Ericsson	LTE	1	H	740.000000	80	10000
9	6	AT&T	Ericsson	LTE	1	I	740.000000	80	10000
10	4	AT&T	Ericsson	LTE	1	J	763.000000	80	10000
11	5	AT&T	Ericsson	LTE	1	K	763.000000	80	10000
12	6	AT&T	Ericsson	LTE	1	L	763.000000	80	10000
13	4	AT&T	Ericsson	LTE	1	M	1940.000000	120	20000
14	5	AT&T	Ericsson	LTE	1	N	1940.000000	120	20000
15	6	AT&T	Ericsson	LTE	1	O	1940.000000	120	20000
16	4	AT&T	Ericsson	LTE	1	P	2140.000000	120	20000
17	5	AT&T	Ericsson	LTE	1	Q	2140.000000	120	20000
18	6	AT&T	Ericsson	LTE	1	R	2140.000000	120	20000
19	7	Denver RMRS	Motorola	FM Land Mobile	1	S	858.087500	100	16
20	7	Denver RMRS	Motorola	FM Land Mobile	2	T	858.337500	100	16
21	7	Denver RMRS	Motorola	FM Land Mobile	3	U	859.087500	100	16
22	7	Denver RMRS	Motorola	FM Land Mobile	4	V	859.637500	100	16
23	8	Denver - DataRadio	Motorola	FM Land Mobile	MM	W	855.912500	100	16
24	8	Denver - DataRadio	Motorola	FM Land Mobile	STN 2	X	856.787500	100	16
25	8	Denver - DataRadio	Motorola	FM Land Mobile	STN 26	Y	855.687500	100	16
26	8	Denver - DataRadio	Motorola	FM Land Mobile	STN 28	Z	851.187500	100	16
27	8	Denver - DataRadio	Motorola	FM Land Mobile	DHA	AA	854.237500	100	16
28	8	Denver - DataRadio	Motorola	FM Land Mobile	BRDWY	AB	771.800000	100	16
29	9	Denver - P25	Motorola	FM Land Mobile	P25 1	AC	852.375000	100	16
30	9	Denver - P25	Motorola	FM Land Mobile	P25 3	AD	853.275000	100	16
31	9	Denver - P25	Motorola	FM Land Mobile	P25 4	AE	853.725000	100	16
32	9	Denver - P25	Motorola	FM Land Mobile	P25 5	AF	851.562500	100	16
33	9	Denver - P25	Motorola	FM Land Mobile	P25 6	AG	853.150000	100	16
34	9	Denver - P25	Motorola	FM Land Mobile	P25 7	AH	853.425000	100	16
35	9	Denver - P25	Motorola	FM Land Mobile	P25 12	AI	852.125000	100	16
36	10	Denver - Conventional 850 MHz	Motorola	FM Land Mobile	8CALL90	AJ	851.012500	100	16
37	10	Denver - Conventional 850 MHz	Motorola	FM Land Mobile	8TAC91	AK	851.512500	100	16
38	10	Denver - Conventional 850 MHz	Motorola	FM Land Mobile	8TAC92	AL	852.012500	100	16
39	10	Denver - Conventional 850 MHz	Motorola	FM Land Mobile	8TAC93	AM	852.512500	100	16
40	10	Denver - Conventional 850 MHz	Motorola	FM Land Mobile	8TAC94	AN	853.012500	100	16
41	10	Denver - Conventional 850 MHz	Motorola	FM Land Mobile	STAC	AO	853.787500	100	16
42	11	Denver - (CONV) CLEER	Motorola	FM Land Mobile	(CONV) CLEER	AP	460.425000	100	16
43	12	Denver - VLA31(NLEEC)	Motorola	FM Land Mobile	VLA31(NLEEC)	AQ	155.475000	100	16
44	13	Denver - VMED28(HEAR)	Motorola	FM Land Mobile	VMED28(HEAR)	AR	155.340000	100	16
45	14	Denver - R.A.C.E.S.	Motorola	FM Land Mobile	R.A.C.E.S.	AS	147.300000	100	16
46	15	Denver - METRO RPTR 1	Motorola	FM Land Mobile	METRO RPTR 1	AT	851.887500	100	16
47	16	Denver - Jail (Control_General_SPL USE_BLDG 22)	Motorola	FM Land Mobile	1	AU	460.037500	100	16

**AT&T COL01560 - NSB-CO.MLK\_AND\_TRENTON\_COL01560**

48	17	Denver - Jail (SPL Use_Tactical)	Motorola	FM Land Mobile	TACTICAL 1	AV	453.412500	100	16
49	17	Denver - Jail (SPL Use_Tactical)	Motorola	FM Land Mobile	TACTICAL 2	AW	460.662500	100	16
50	17	Denver - Jail (SPL Use_Tactical)	Motorola	FM Land Mobile	TACTICAL 3	AX	453.787500	100	16
51	18	Denver - P25 ASR	Motorola	FM Land Mobile	1	AY	859.262500	100	16
52	18	Denver - P25 ASR	Motorola	FM Land Mobile	2	AZ	858.712500	100	16
53	18	Denver - P25 ASR	Motorola	FM Land Mobile	3	BA	857.137500	100	16
54	18	Denver - P25 ASR	Motorola	FM Land Mobile	4	BB	856.737500	100	16
55	18	Denver - P25 ASR	Motorola	FM Land Mobile	5	BC	856.212500	100	16
56	18	Denver - P25 ASR	Motorola	FM Land Mobile	6	BD	855.987500	100	16
57	18	Denver - P25 ASR	Motorola	FM Land Mobile	7	BE	855.487500	100	16
58	18	Denver - P25 ASR	Motorola	FM Land Mobile	8	BF	855.237500	100	16
59	18	Denver - P25 ASR	Motorola	FM Land Mobile	9	BG	854.437500	100	16
60	18	Denver - P25 ASR	Motorola	FM Land Mobile	10	BH	853.862500	100	16
61	18	Denver - P25 ASR	Motorola	FM Land Mobile	11	BI	853.325000	100	16
62	18	Denver - P25 ASR	Motorola	FM Land Mobile	12	BJ	852.775000	100	16
63	19	Denver - P25 Simulcast	Motorola	FM Land Mobile	1	BK	859.712500	100	16
64	19	Denver - P25 Simulcast	Motorola	FM Land Mobile	2	BL	859.612500	100	16
65	19	Denver - P25 Simulcast	Motorola	FM Land Mobile	3	BM	859.212500	100	16
66	19	Denver - P25 Simulcast	Motorola	FM Land Mobile	4	BN	856.137500	100	16
67	19	Denver - P25 Simulcast	Motorola	FM Land Mobile	5	BO	858.212500	100	16
68	19	Denver - P25 Simulcast	Motorola	FM Land Mobile	6	BP	857.737500	100	16
69	19	Denver - P25 Simulcast	Motorola	FM Land Mobile	7	BQ	858.137500	100	16
70	19	Denver - P25 Simulcast	Motorola	FM Land Mobile	8	BR	857.462500	100	16
71	19	Denver - P25 Simulcast	Motorola	FM Land Mobile	9	BS	857.062500	100	16
72	19	Denver - P25 Simulcast	Motorola	FM Land Mobile	10	BT	856.712500	100	16
73	19	Denver - P25 Simulcast	Motorola	FM Land Mobile	11	BU	856.637500	100	16
74	19	Denver - P25 Simulcast	Motorola	FM Land Mobile	12	BV	856.237500	100	16
75	19	Denver - P25 Simulcast	Motorola	FM Land Mobile	13	BW	858.737500	100	16
76	19	Denver - P25 Simulcast	Motorola	FM Land Mobile	14	BX	855.737500	100	16
77	19	Denver - P25 Simulcast	Motorola	FM Land Mobile	15	BY	855.462500	100	16
78	19	Denver - P25 Simulcast	Motorola	FM Land Mobile	16	BZ	854.562500	100	16
79	19	Denver - P25 Simulcast	Motorola	FM Land Mobile	17	CA	854.062500	100	16
80	20	Denver - Fire Repeaters	Motorola	FM Land Mobile	1	CB	799.318750	100	16
81	20	Denver - Fire Repeaters	Motorola	FM Land Mobile	2	CC	799.856250	100	16
82	20	Denver - Fire Repeaters	Motorola	FM Land Mobile	3	CD	800.506250	100	16
83	20	Denver - Fire Repeaters	Motorola	FM Land Mobile	4	CE	800.756250	100	16
84	20	Denver - Fire Repeaters	Motorola	FM Land Mobile	5	CF	801.181250	100	16
85	20	Denver - Fire Repeaters	Motorola	FM Land Mobile	6	CG	801.431250	100	16
86	20	Denver - Fire Repeaters	Motorola	FM Land Mobile	7	CH	802.431250	100	16
87	20	Denver - Fire Repeaters	Motorola	FM Land Mobile	8	CI	802.681250	100	16

### 4.0 Receiver Frequencies

Freq #	Ant #	Provider	Model	Technology	Channel Label	ID	Frequency (MHz)	Sen (dBm)	BW (KHz)
1	1	AT&T	Ericsson	5G NR	1	A	830.000000	-110	10000
2	2	AT&T	Ericsson	5G NR	1	B	830.000000	-110	10000
3	3	AT&T	Ericsson	5G NR	1	C	830.000000	-110	10000
4	4	AT&T	Ericsson	LTE	1	D	2310.000000	-110	10000
5	5	AT&T	Ericsson	LTE	1	E	2310.000000	-110	10000
6	6	AT&T	Ericsson	LTE	1	F	2310.000000	-110	10000
7	7	AT&T	Ericsson	LTE	1	G	710.000000	-110	10000
8	8	AT&T	Ericsson	LTE	1	H	710.000000	-110	10000
9	9	AT&T	Ericsson	LTE	1	I	710.000000	-110	10000
10	10	AT&T	Ericsson	LTE	1	J	793.000000	-110	10000
11	11	AT&T	Ericsson	LTE	1	K	793.000000	-110	10000
12	12	AT&T	Ericsson	LTE	1	L	793.000000	-110	10000
13	13	AT&T	Ericsson	LTE	1	M	1860.000000	-110	20000
14	14	AT&T	Ericsson	LTE	1	N	1860.000000	-110	20000
15	15	AT&T	Ericsson	LTE	1	O	1860.000000	-110	20000
16	16	AT&T	Ericsson	LTE	1	P	1740.000000	-110	20000
17	17	AT&T	Ericsson	LTE	1	Q	1740.000000	-110	20000
18	18	AT&T	Ericsson	LTE	1	R	1740.000000	-110	20000
19	7	Denver RMRS	Motorola	FM Land Mobile	1	S	813.087500	-116	25
20	7	Denver RMRS	Motorola	FM Land Mobile	2	T	813.337500	-116	25
21	7	Denver RMRS	Motorola	FM Land Mobile	3	U	814.087500	-116	25
22	7	Denver RMRS	Motorola	FM Land Mobile	4	V	814.637500	-116	25
23	8	Denver - DataRadio	Motorola	FM Land Mobile	MM	W	810.912500	-116	25
24	8	Denver - DataRadio	Motorola	FM Land Mobile	STN 2	X	811.787500	-116	25
25	8	Denver - DataRadio	Motorola	FM Land Mobile	STN 26	Y	810.687500	-116	25
26	8	Denver - DataRadio	Motorola	FM Land Mobile	STN 28	Z	806.187500	-116	25
27	8	Denver - DataRadio	Motorola	FM Land Mobile	DHA	AA	809.237500	-116	25
28	8	Denver - DataRadio	Motorola	FM Land Mobile	BRDWY	AB	801.800000	-116	25
29	9	Denver - P25	Motorola	FM Land Mobile	P25 1	AC	807.375000	-116	25
30	9	Denver - P25	Motorola	FM Land Mobile	P25 3	AD	808.275000	-116	25
31	9	Denver - P25	Motorola	FM Land Mobile	P25 4	AE	808.725000	-116	25
32	9	Denver - P25	Motorola	FM Land Mobile	P25 5	AF	806.562500	-116	25
33	9	Denver - P25	Motorola	FM Land Mobile	P25 6	AG	808.150000	-116	25
34	9	Denver - P25	Motorola	FM Land Mobile	P25 7	AH	808.425000	-116	25
35	9	Denver - P25	Motorola	FM Land Mobile	P25 12	AI	807.125000	-116	25
36	10	Denver - Conventional 850 MHz	Motorola	FM Land Mobile	8CALL90	AJ	806.012500	-116	25
37	10	Denver - Conventional 850 MHz	Motorola	FM Land Mobile	8TAC91	AK	806.512500	-116	25
38	10	Denver - Conventional 850 MHz	Motorola	FM Land Mobile	8TAC92	AL	807.012500	-116	25
39	10	Denver - Conventional 850 MHz	Motorola	FM Land Mobile	8TAC93	AM	807.512500	-116	25
40	10	Denver - Conventional 850 MHz	Motorola	FM Land Mobile	8TAC94	AN	808.012500	-116	25
41	10	Denver - Conventional 850 MHz	Motorola	FM Land Mobile	STAC	AO	808.787500	-116	25
42	12	Denver - VLAW31(NLEEC)	Motorola	FM Land Mobile	VLAW31(NLEEC)	AQ	155.475000	-116	25
43	13	Denver - VMED28(HEAR)	Motorola	FM Land Mobile	VMED28(HEAR)	AR	155.340000	-116	25
44	14	Denver - R.A.C.E.S.	Motorola	FM Land Mobile	R.A.C.E.S.	AS	147.300000	-116	25
45	15	Denver - METRO RPTR 1	Motorola	FM Land Mobile	METRO RPTR 1	AT	806.887500	-116	25
46	16	Denver - Jail (Control_General_SPL USE_BLDG 22)	Motorola	FM Land Mobile	1	AU	465.037500	-116	25
47	17	Denver - Jail (SPL Use_Tactical)	Motorola	FM Land Mobile	TACTICAL 1	AV	453.412500	-116	25

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48	17	Denver - Jail (SPL Use Tactical)	Motorola	FM Land Mobile	TACTICAL 2	AW	465.662500	-116	25
49	17	Denver - Jail (SPL Use Tactical)	Motorola	FM Land Mobile	TACTICAL 3	AX	453.787500	-116	25
50	18	Denver - P25 ASR	Motorola	FM Land Mobile	1	AY	814.262500	-116	25
51	18	Denver - P25 ASR	Motorola	FM Land Mobile	2	AZ	813.712500	-116	25
52	18	Denver - P25 ASR	Motorola	FM Land Mobile	3	BA	812.137500	-116	25
53	18	Denver - P25 ASR	Motorola	FM Land Mobile	4	BB	811.737500	-116	25
54	18	Denver - P25 ASR	Motorola	FM Land Mobile	5	BC	811.212500	-116	25
55	18	Denver - P25 ASR	Motorola	FM Land Mobile	6	BD	810.987500	-116	25
56	18	Denver - P25 ASR	Motorola	FM Land Mobile	7	BE	810.487500	-116	25
57	18	Denver - P25 ASR	Motorola	FM Land Mobile	8	BF	810.237500	-116	25
58	18	Denver - P25 ASR	Motorola	FM Land Mobile	9	BG	809.437500	-116	25
59	18	Denver - P25 ASR	Motorola	FM Land Mobile	10	BH	808.862500	-116	25
60	18	Denver - P25 ASR	Motorola	FM Land Mobile	11	BI	808.325000	-116	25
61	18	Denver - P25 ASR	Motorola	FM Land Mobile	12	BJ	807.775000	-116	25
62	19	Denver - P25 Simulcast	Motorola	FM Land Mobile	1	BK	814.712500	-116	25
63	19	Denver - P25 Simulcast	Motorola	FM Land Mobile	2	BL	814.612500	-116	25
64	19	Denver - P25 Simulcast	Motorola	FM Land Mobile	3	BM	814.212500	-116	25
65	19	Denver - P25 Simulcast	Motorola	FM Land Mobile	4	BN	811.137500	-116	25
66	19	Denver - P25 Simulcast	Motorola	FM Land Mobile	5	BO	813.212500	-116	25
67	19	Denver - P25 Simulcast	Motorola	FM Land Mobile	6	BP	812.737500	-116	25
68	19	Denver - P25 Simulcast	Motorola	FM Land Mobile	7	BQ	813.137500	-116	25
69	19	Denver - P25 Simulcast	Motorola	FM Land Mobile	8	BR	812.462500	-116	25
70	19	Denver - P25 Simulcast	Motorola	FM Land Mobile	9	BS	812.062500	-116	25
71	19	Denver - P25 Simulcast	Motorola	FM Land Mobile	10	BT	811.712500	-116	25
72	19	Denver - P25 Simulcast	Motorola	FM Land Mobile	11	BU	811.637500	-116	25
73	19	Denver - P25 Simulcast	Motorola	FM Land Mobile	12	BV	811.237500	-116	25
74	19	Denver - P25 Simulcast	Motorola	FM Land Mobile	13	BW	813.737500	-116	25
75	19	Denver - P25 Simulcast	Motorola	FM Land Mobile	14	BX	810.737500	-116	25
76	19	Denver - P25 Simulcast	Motorola	FM Land Mobile	15	BY	810.462500	-116	25
77	19	Denver - P25 Simulcast	Motorola	FM Land Mobile	16	BZ	809.562500	-116	25
78	19	Denver - P25 Simulcast	Motorola	FM Land Mobile	17	CA	809.062500	-116	25
79	20	Denver - Fire Repeaters	Motorola	FM Land Mobile	1	CB	769.318750	-116	25
80	20	Denver - Fire Repeaters	Motorola	FM Land Mobile	2	CC	769.856250	-116	25
81	20	Denver - Fire Repeaters	Motorola	FM Land Mobile	3	CD	770.506250	-116	25
82	20	Denver - Fire Repeaters	Motorola	FM Land Mobile	4	CE	770.756250	-116	25
83	20	Denver - Fire Repeaters	Motorola	FM Land Mobile	5	CF	771.181250	-116	25
84	20	Denver - Fire Repeaters	Motorola	FM Land Mobile	6	CG	771.431250	-116	25
85	20	Denver - Fire Repeaters	Motorola	FM Land Mobile	7	CH	772.431250	-116	25
86	20	Denver - Fire Repeaters	Motorola	FM Land Mobile	8	CI	772.681250	-116	25

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### 5.0 Transmitter Noise Analysis

Transmitter noise interference occurs because a transmitter radiates energy on its operating frequency as well as frequencies above and below the assigned frequency. The energy that is radiated above and below the assigned frequency is known as sideband noise energy and extends for several megahertz on either side of the operating frequency. This undesired noise energy can fall within the passband of a nearby receiver even if the receiver's operating frequency is several megahertz away. The transmitter noise appears as "on-channel" noise interference and cannot be filtered out at the receiver. It is on the receiver's operating frequency and competes with the desired signal, which in effect, degrades the operational performance.

The analysis predicts each transmitter's noise signal level present at the input of each receiver. It takes into account the transmitter's noise characteristics, frequency separation, power output, transmission line losses, filters, duplexers, combiners, isolators, multi-couplers and other RF devices that are present in both systems. Additionally, the analysis considers the antenna separation space loss, horizontal and vertical gain components of the antennas as well as how they are mounted on the structure. The gain components are derived from antenna pattern data published by each manufacturer.

The analysis determines how much isolation is required, if any, to prevent receiver performance degradation caused by transmitter noise interference. The Table below depicts the results of this analysis. For each receiver, the transmitter that has the worst-case impact is displayed. The Signal Margin represents the margin in dB, before the receiver's performance is degraded. A negative number indicates that the performance is degraded and the value indicates how much additional isolation is required to prevent receiver performance degradation.

Receiver Provider	Receive Channel	Receive Frequency (MHz)	Transmitter Provider	Transmit Channel	Transmit Frequency (MHz)	Attn Required (dB)	Attn Provided (dB)	Signal Margin (dB)
AT&T	1	830.000000	AT&T	1	875.000000	48.6	79.5	30.9
AT&T	1	830.000000	AT&T	1	875.000000	48.6	79.5	30.9
AT&T	1	830.000000	AT&T	1	875.000000	48.6	79.5	30.9
AT&T	1	2310.000000	AT&T	1	2355.000000	53.4	87.4	34
AT&T	1	2310.000000	AT&T	1	2355.000000	53.4	87.4	34
AT&T	1	2310.000000	AT&T	1	2355.000000	53.4	87.4	34
AT&T	1	710.000000	AT&T	1	740.000000	45	79.5	34.5
AT&T	1	710.000000	AT&T	1	740.000000	45	79.5	34.5
AT&T	1	710.000000	AT&T	1	740.000000	45	79.5	34.5
AT&T	1	793.000000	AT&T	1	763.000000	55.3	72.6	17.3
AT&T	1	793.000000	AT&T	1	763.000000	55.3	72.6	17.3
AT&T	1	793.000000	AT&T	1	763.000000	55.3	72.6	17.3
AT&T	1	1860.000000	AT&T	1	1940.000000	53.4	91.6	38.2
AT&T	1	1860.000000	AT&T	1	1940.000000	53.4	91.6	38.2
AT&T	1	1860.000000	AT&T	1	1940.000000	53.4	91.6	38.2
AT&T	1	1740.000000	AT&T	1	2140.000000	53.4	91.6	38.2
AT&T	1	1740.000000	AT&T	1	2140.000000	53.4	91.6	38.2
AT&T	1	1740.000000	AT&T	1	2140.000000	53.4	91.6	38.2
Denver RMRS	1	813.087500	Denver - (CONV) CLEER	(CONV) CLEER	460.425000	55.6	88.2	32.6
Denver RMRS	2	813.337500	Denver - (CONV) CLEER	(CONV) CLEER	460.425000	55.6	88.2	32.6

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Denver RMRS	3	814.087500	Denver - (CONV) CLEER	(CONV) CLEER	460.425000	55.6	88	32.4
Denver RMRS	4	814.637500	Denver - (CONV) CLEER	(CONV) CLEER	460.425000	55.6	87.9	32.3
Denver - DataRadio	MM	810.912500	Denver - (CONV) CLEER	(CONV) CLEER	460.425000	55.6	82.3	26.7
Denver - DataRadio	STN 2	811.787500	Denver - (CONV) CLEER	(CONV) CLEER	460.425000	55.6	82.3	26.7
Denver - DataRadio	STN 26	810.687500	Denver - (CONV) CLEER	(CONV) CLEER	460.425000	55.6	82.2	26.6
Denver - DataRadio	STN 28	806.187500	Denver - (CONV) CLEER	(CONV) CLEER	460.425000	55.6	83.5	27.9
Denver - DataRadio	DHA	809.237500	Denver - (CONV) CLEER	(CONV) CLEER	460.425000	55.6	81.7	26.1
Denver - DataRadio	BRDWW	801.800000	Denver - (CONV) CLEER	(CONV) CLEER	460.425000	58.6	104.8	46.2
Denver - P25	P25 1	807.375000	Denver - (CONV) CLEER	(CONV) CLEER	460.425000	55.6	81.4	25.8
Denver - P25	P25 3	808.275000	Denver - (CONV) CLEER	(CONV) CLEER	460.425000	55.6	81.3	25.7
Denver - P25	P25 4	808.725000	Denver - (CONV) CLEER	(CONV) CLEER	460.425000	55.6	81.4	25.8
Denver - P25	P25 5	806.562500	Denver - (CONV) CLEER	(CONV) CLEER	460.425000	55.6	82.5	26.9
Denver - P25	P25 6	808.150000	Denver - (CONV) CLEER	(CONV) CLEER	460.425000	55.6	81.2	25.6
Denver - P25	P25 7	808.425000	Denver - (CONV) CLEER	(CONV) CLEER	460.425000	55.6	81.3	25.7
Denver - P25	P25 12	807.125000	Denver - (CONV) CLEER	(CONV) CLEER	460.425000	55.6	81.7	26.1
Denver - Conventional_85 0 MHz	8CALL90	806.012500	Denver - (CONV) CLEER	(CONV) CLEER	460.425000	55.6	88.3	32.7
Denver - Conventional_85 0 MHz	8TAC91	806.512500	Denver - (CONV) CLEER	(CONV) CLEER	460.425000	55.6	86.8	31.2
Denver - Conventional_85 0 MHz	8TAC92	807.012500	Denver - (CONV) CLEER	(CONV) CLEER	460.425000	55.6	86	30.4
Denver - Conventional_85 0 MHz	8TAC93	807.512500	Denver - (CONV) CLEER	(CONV) CLEER	460.425000	55.6	85.5	29.9
Denver - Conventional_85 0 MHz	8TAC94	808.012500	Denver - (CONV) CLEER	(CONV) CLEER	460.425000	55.6	85.4	29.8
Denver - Conventional_85 0 MHz	STAC	808.787500	Denver - (CONV) CLEER	(CONV) CLEER	460.425000	55.6	85.6	30
Denver - VLAW31(NLEEC )	VLAW31(NLE EC)	155.475000	Denver - (CONV) CLEER	(CONV) CLEER	460.425000	42.5	70.2	27.7
Denver - VLAW31(NLEEC )	VLAW31(NLE EC)	155.475000	Denver - VLAW31(NLEEC )	VLAW31(NLEE C)	155.475000	87.5	101.6	14.1
Denver - VLAW31(NLEEC )	VLAW31(NLE EC)	155.475000	Denver - VMED28(HEAR)	VMED28(HEA R)	155.340000	85.4	102.5	17.1
Denver - VLAW31(NLEEC )	VLAW31(NLE EC)	155.475000	Denver - Jail (Control_General _SPL USE_BLDG 22)	1	460.037500	42.5	67.1	24.6
Denver - VMED28(HEAR)	VMED28(HE AR)	155.340000	Denver - (CONV) CLEER	(CONV) CLEER	460.425000	42.5	72.6	30.1
Denver - VMED28(HEAR)	VMED28(HE AR)	155.340000	Denver - VLAW31(NLEEC )	VLAW31(NLEE C)	155.475000	85.4	107.8	22.4
Denver - VMED28(HEAR)	VMED28(HE AR)	155.340000	Denver - VMED28(HEAR)	VMED28(HEA R)	155.340000	87.5	112.5	25

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Denver - R.A.C.E.S.	R.A.C.E.S.	147.300000	Denver - (CONV) CLEER	(CONV) CLEER	460.425000	42.5	74.7	32.2
Denver - R.A.C.E.S.	R.A.C.E.S.	147.300000	Denver - R.A.C.E.S.	R.A.C.E.S.	147.300000	87.5	114.6	27.1
Denver - R.A.C.E.S.	R.A.C.E.S.	147.300000	Denver - Jail (Control_General_SPL USE_BLDG 22)	1	460.037500	42.5	71.8	29.3
Denver - METRO RPTR 1	METRO RPTR 1	806.887500	Denver - Jail (Control_General_SPL USE_BLDG 22)	1	460.037500	55.6	81.1	25.5
Denver - Jail (Control_General_SPL USE_BLDG 22)	1	465.037500	Denver - R.A.C.E.S.	R.A.C.E.S.	147.300000	52	94.1	42.1
Denver - Jail (SPL Use_Tactical)	TACTICAL 1	453.412500	Denver - Jail (Control_General_SPL USE_BLDG 22)	1	460.037500	54.6	71.1	16.5
Denver - Jail (SPL Use_Tactical)	TACTICAL 1	453.412500	Denver - Jail (SPL Use_Tactical)	TACTICAL 1	453.412500	97	112.4	15.4
Denver - Jail (SPL Use_Tactical)	TACTICAL 1	453.412500	Denver - Jail (SPL Use_Tactical)	TACTICAL 3	453.787500	94.7	114.6	19.9
Denver - Jail (SPL Use_Tactical)	TACTICAL 2	465.662500	Denver - VMED28(HEAR)	VMED28(HEAR)	155.340000	52	95.3	43.3
Denver - Jail (SPL Use_Tactical)	TACTICAL 3	453.787500	Denver - Jail (Control_General_SPL USE_BLDG 22)	1	460.037500	55.1	70.4	15.3
Denver - Jail (SPL Use_Tactical)	TACTICAL 3	453.787500	Denver - Jail (SPL Use_Tactical)	TACTICAL 1	453.412500	94.7	113.6	18.9
Denver - Jail (SPL Use_Tactical)	TACTICAL 3	453.787500	Denver - Jail (SPL Use_Tactical)	TACTICAL 3	453.787500	97	112.4	15.4
Denver - P25 ASR	1	814.262500	Denver - (CONV) CLEER	(CONV) CLEER	460.425000	55.6	95.3	39.7
Denver - P25 ASR	2	813.712500	Denver - (CONV) CLEER	(CONV) CLEER	460.425000	55.6	95.5	39.9
Denver - P25 ASR	3	812.137500	Denver - (CONV) CLEER	(CONV) CLEER	460.425000	55.6	95.7	40.1
Denver - P25 ASR	4	811.737500	Denver - (CONV) CLEER	(CONV) CLEER	460.425000	55.6	95.7	40.1
Denver - P25 ASR	5	811.212500	Denver - (CONV) CLEER	(CONV) CLEER	460.425000	55.6	95.6	40
Denver - P25 ASR	6	810.987500	Denver - (CONV) CLEER	(CONV) CLEER	460.425000	55.6	95.6	40
Denver - P25 ASR	7	810.487500	Denver - (CONV) CLEER	(CONV) CLEER	460.425000	55.6	95.5	39.9
Denver - P25 ASR	8	810.237500	Denver - (CONV) CLEER	(CONV) CLEER	460.425000	55.6	95.4	39.8
Denver - P25 ASR	9	809.437500	Denver - (CONV) CLEER	(CONV) CLEER	460.425000	55.6	95.1	39.5
Denver - P25 ASR	10	808.862500	Denver - (CONV) CLEER	(CONV) CLEER	460.425000	55.6	94.8	39.2
Denver - P25 ASR	11	808.325000	Denver - (CONV) CLEER	(CONV) CLEER	460.425000	55.6	94.6	39
Denver - P25 ASR	12	807.775000	Denver - (CONV) CLEER	(CONV) CLEER	460.425000	55.6	94.6	39
Denver - P25 Simulcast	1	814.712500	Denver - Jail (Control_General_SPL USE_BLDG 22)	1	460.037500	55.6	104.7	49.1

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Denver - P25 Simulcast	2	814.612500	Denver - Jail (Control_General _SPL USE_BLDG 22)	1	460.037500	55.6	104.8	49.2
Denver - P25 Simulcast	3	814.212500	Denver - Jail (Control_General _SPL USE_BLDG 22)	1	460.037500	55.6	104.9	49.3
Denver - P25 Simulcast	4	811.137500	Denver - Jail (Control_General _SPL USE_BLDG 22)	1	460.037500	55.6	105.2	49.6
Denver - P25 Simulcast	5	813.212500	Denver - Jail (Control_General _SPL USE_BLDG 22)	1	460.037500	55.6	105.1	49.5
Denver - P25 Simulcast	6	812.737500	Denver - Jail (Control_General _SPL USE_BLDG 22)	1	460.037500	55.6	105.2	49.6
Denver - P25 Simulcast	7	813.137500	Denver - Jail (Control_General _SPL USE_BLDG 22)	1	460.037500	55.6	105.1	49.5
Denver - P25 Simulcast	8	812.462500	Denver - Jail (Control_General _SPL USE_BLDG 22)	1	460.037500	55.6	105.2	49.6
Denver - P25 Simulcast	9	812.062500	Denver - Jail (Control_General _SPL USE_BLDG 22)	1	460.037500	55.6	105.2	49.6
Denver - P25 Simulcast	10	811.712500	Denver - Jail (Control_General _SPL USE_BLDG 22)	1	460.037500	55.6	105.2	49.6
Denver - P25 Simulcast	11	811.637500	Denver - Jail (Control_General _SPL USE_BLDG 22)	1	460.037500	55.6	105.2	49.6
Denver - P25 Simulcast	12	811.237500	Denver - Jail (Control_General _SPL USE_BLDG 22)	1	460.037500	55.6	105.2	49.6
Denver - P25 Simulcast	13	813.737500	Denver - Jail (Control_General _SPL USE_BLDG 22)	1	460.037500	55.6	105	49.4
Denver - P25 Simulcast	14	810.737500	Denver - Jail (Control_General _SPL USE_BLDG 22)	1	460.037500	55.6	105.1	49.5
Denver - P25 Simulcast	15	810.462500	Denver - Jail (Control_General _SPL USE_BLDG 22)	1	460.037500	55.6	105	49.4
Denver - P25 Simulcast	16	809.562500	Denver - Jail (Control_General _SPL USE_BLDG 22)	1	460.037500	55.6	104.7	49.1
Denver - P25 Simulcast	17	809.062500	Denver - Jail (Control_General _SPL USE_BLDG 22)	1	460.037500	55.6	104.4	48.8
Denver - Fire Repeaters	1	769.318750	AT&T	1	763.000000	68.6	129.1	60.5
Denver - Fire Repeaters	2	769.856250	AT&T	1	763.000000	68.6	129.2	60.6

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Denver - Fire Repeaters	3	770.506250	AT&T	1	763.000000	68.6	129.5	60.9
Denver - Fire Repeaters	4	770.756250	AT&T	1	763.000000	68.6	129.7	61.1
Denver - Fire Repeaters	5	771.181250	AT&T	1	763.000000	68.6	130.5	61.9
Denver - Fire Repeaters	6	771.431250	AT&T	1	763.000000	68.6	131.3	62.7
Denver - Fire Repeaters	7	772.431250	AT&T	1	763.000000	68.6	138.8	70.2
Denver - Fire Repeaters	8	772.681250	AT&T	1	763.000000	68.6	141.4	72.8

**Analysis Results:** No transmitter noise interference problems were predicted that were determined to be system performance limiting to any operators analyzed in this report. All calculations yielded results that determined, based upon the listed configurations, that there was adequate isolation between all analyzed transmitters and receivers either through physical separation, antenna broadcast pattern gain roll off or filtering and isolation devices considered to be part of the standard transmitter / receiver configuration deployed by the equipment manufacturers listed as part of this analysis.

## 6.0 Receiver Desensitization Analysis

Receiver desensitization interference occurs when an undesired signal from a nearby "off-frequency" transmitter is sufficiently close to a receiver's operating frequency. The signal may get through the RF selectivity of the receiver. If this undesired signal is of sufficient amplitude, the receiver's critical voltage and current levels are altered and the performance of the receiver is degraded at its operating frequency. The gain of the receiver is reduced, thereby reducing the performance of the receiver.

A transmitter can be operating several megahertz away from the receiver frequency and/or its antenna can be located several thousand feet from the receiver's antenna and still cause interference.

The analysis predicts each transmitter's signal level present at the input of each receiver. It takes into account the transmitter's power output, frequency separation, transmission line losses, filters, duplexers, combiners, isolators, multi-couplers and other RF devices that are present in both systems. Additionally, the analysis considers the antenna separation space loss, horizontal and vertical gain components of the antennas as well as how they are mounted on the structure. The gain components are derived from antenna pattern data published by each manufacturer.

The analysis determines how much isolation is required, if any, to prevent receiver performance degradation caused by receiver desensitization interference. The Table below depicts the results of this analysis. For each receiver, the transmitter that has the worst-case impact is displayed. The Signal Margin represents the margin in dB, before the receiver's performance is degraded. A negative number indicates that the performance is degraded and the value indicates how much additional isolation is required to prevent receiver performance degradation.

Receiver Provider	Receive Channel	Receive Frequency (MHz)	Transmitter Provider	Transmit Channel	Transmit Frequency (MHz)	Attn Required (dB)	Attn Provided (dB)	Signal Margin (dB)
AT&T	1	830.000000	AT&T	1	875.000000	20.6	72.6	52
AT&T	1	830.000000	AT&T	1	875.000000	20.6	72.6	52
AT&T	1	830.000000	AT&T	1	875.000000	20.6	72.6	52
AT&T	1	2310.000000	AT&T	1	2355.000000	17.8	85.2	67.4
AT&T	1	2310.000000	AT&T	1	2355.000000	17.8	85.2	67.4
AT&T	1	2310.000000	AT&T	1	2355.000000	17.8	85.2	67.4
AT&T	1	710.000000	AT&T	1	740.000000	13	72.6	59.6
AT&T	1	710.000000	AT&T	1	740.000000	13	72.6	59.6
AT&T	1	710.000000	AT&T	1	740.000000	13	72.6	59.6
AT&T	1	793.000000	AT&T	1	763.000000	19.3	79.5	60.2
AT&T	1	793.000000	AT&T	1	763.000000	19.3	79.5	60.2
AT&T	1	793.000000	AT&T	1	763.000000	19.3	79.5	60.2
AT&T	1	1860.000000	AT&T	1	1940.000000	17.8	89.2	71.4
AT&T	1	1860.000000	AT&T	1	1940.000000	17.8	89.2	71.4
AT&T	1	1860.000000	AT&T	1	1940.000000	17.8	89.2	71.4
AT&T	1	1740.000000	AT&T	1	2140.000000	17.8	89.2	71.4
AT&T	1	1740.000000	AT&T	1	2140.000000	17.8	89.2	71.4
AT&T	1	1740.000000	AT&T	1	2140.000000	17.8	89.2	71.4
Denver RMRS	1	813.087500	Denver - VLAW31(NLEEC)	VLAW31(NLEEC)	155.475000	27.6	132.2	104.6
Denver RMRS	2	813.337500	Denver - VLAW31(NLEEC)	VLAW31(NLEEC)	155.475000	27.6	132.2	104.6

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Denver RMRS	3	814.087500	Denver - VLAW31(NLEEC)	VLAW31(NL EEC)	155.475000	27.6	132.2	104.6
Denver RMRS	4	814.637500	Denver - VLAW31(NLEEC)	VLAW31(NL EEC)	155.475000	27.6	132.2	104.6
Denver - DataRadio	MM	810.912500	Denver - VLAW31(NLEEC)	VLAW31(NL EEC)	155.475000	27.6	138	110.4
Denver - DataRadio	STN 2	811.787500	Denver - VLAW31(NLEEC)	VLAW31(NL EEC)	155.475000	27.6	138	110.4
Denver - DataRadio	STN 26	810.687500	Denver - VLAW31(NLEEC)	VLAW31(NL EEC)	155.475000	27.6	138	110.4
Denver - DataRadio	STN 28	806.187500	Denver - VLAW31(NLEEC)	VLAW31(NL EEC)	155.475000	27.6	138	110.4
Denver - DataRadio	DHA	809.237500	Denver - VLAW31(NLEEC)	VLAW31(NL EEC)	155.475000	27.6	138	110.4
Denver - DataRadio	BRDWY	801.800000	Denver - VLAW31(NLEEC)	VLAW31(NL EEC)	155.475000	23	138	115
Denver - P25	P25 1	807.375000	Denver - VLAW31(NLEEC)	VLAW31(NL EEC)	155.475000	27.6	131.8	104.2
Denver - P25	P25 3	808.275000	Denver - VLAW31(NLEEC)	VLAW31(NL EEC)	155.475000	27.6	131.8	104.2
Denver - P25	P25 4	808.725000	Denver - VLAW31(NLEEC)	VLAW31(NL EEC)	155.475000	27.6	131.8	104.2
Denver - P25	P25 5	806.562500	Denver - VLAW31(NLEEC)	VLAW31(NL EEC)	155.475000	27.6	131.8	104.2
Denver - P25	P25 6	808.150000	Denver - VLAW31(NLEEC)	VLAW31(NL EEC)	155.475000	27.6	131.8	104.2
Denver - P25	P25 7	808.425000	Denver - VLAW31(NLEEC)	VLAW31(NL EEC)	155.475000	27.6	131.8	104.2
Denver - P25	P25 12	807.125000	Denver - VLAW31(NLEEC)	VLAW31(NL EEC)	155.475000	27.6	131.8	104.2
Denver - Conventional_85 0 MHz	8CALL90	806.012500	Denver - VLAW31(NLEEC)	VLAW31(NL EEC)	155.475000	27.6	136.4	108.8
Denver - Conventional_85 0 MHz	8TAC91	806.512500	Denver - VLAW31(NLEEC)	VLAW31(NL EEC)	155.475000	27.6	136.4	108.8
Denver - Conventional_85 0 MHz	8TAC92	807.012500	Denver - VLAW31(NLEEC)	VLAW31(NL EEC)	155.475000	27.6	136.4	108.8
Denver - Conventional_85 0 MHz	8TAC93	807.512500	Denver - VLAW31(NLEEC)	VLAW31(NL EEC)	155.475000	27.6	136.4	108.8
Denver - Conventional_85 0 MHz	8TAC94	808.012500	Denver - VLAW31(NLEEC)	VLAW31(NL EEC)	155.475000	27.6	136.4	108.8
Denver - Conventional_85 0 MHz	STAC	808.787500	Denver - VLAW31(NLEEC)	VLAW31(NL EEC)	155.475000	27.6	136.4	108.8
Denver - VLAW31(NLEEC )	VLAW31(NLEE C)	155.475000	Denver - (CONV) CLEER	(CONV) CLEER	460.425000	10.5	108.4	97.9
Denver - VLAW31(NLEEC )	VLAW31(NLEE C)	155.475000	Denver - VLAW31(NLEEC)	VLAW31(NL EEC)	155.475000	70.5	88.6	18.1
Denver - VLAW31(NLEEC )	VLAW31(NLEE C)	155.475000	Denver - VMED28(HEAR)	VMED28(HE AR)	155.340000	69.8	86.7	16.9
Denver - VLAW31(NLEEC )	VLAW31(NLEE C)	155.475000	Denver - R.A.C.E.S.	R.A.C.E.S.	147.300000	10.5	104.8	94.3
Denver - VMED28(HEAR)	VMED28(HEA R)	155.340000	AT&T	1	740.000000	9.5	107.5	98
Denver - VMED28(HEAR)	VMED28(HEA R)	155.340000	Denver - VLAW31(NLEEC)	VLAW31(NL EEC)	155.475000	69.8	92.7	22.9
Denver - VMED28(HEAR)	VMED28(HEA R)	155.340000	Denver - VMED28(HEAR)	VMED28(HE AR)	155.340000	70.5	103.8	33.3
Denver - VMED28(HEAR)	VMED28(HEA R)	155.340000	Denver - R.A.C.E.S.	R.A.C.E.S.	147.300000	10.5	104.8	94.3

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Denver - R.A.C.E.S.	R.A.C.E.S.	147.300000	AT&T	1	740.000000	9.5	104.1	94.6
Denver - R.A.C.E.S.	R.A.C.E.S.	147.300000	Denver - R.A.C.E.S.	R.A.C.E.S.	147.300000	70.5	103.8	33.3
Denver - METRO RPTR 1	METRO RPTR 1	806.887500	Denver - VMED28(HEAR)	VMED28(HEAR)	155.340000	27.6	83.3	55.7
Denver - Jail (Control_General_SPL USE_BLDG 22)	1	465.037500	AT&T	1	740.000000	19	72.6	53.6
Denver - Jail (SPL Use_Tactical)	TACTICAL 1	453.412500	Denver - Jail (Control_General_SPL USE_BLDG 22)	1	460.037500	20	114	94
Denver - Jail (SPL Use_Tactical)	TACTICAL 1	453.412500	Denver - Jail (SPL Use_Tactical)	TACTICAL 1	453.412500	78	108.2	30.2
Denver - Jail (SPL Use_Tactical)	TACTICAL 1	453.412500	Denver - Jail (SPL Use_Tactical)	TACTICAL 2	460.662500	20	98.2	78.2
Denver - Jail (SPL Use_Tactical)	TACTICAL 1	453.412500	Denver - Jail (SPL Use_Tactical)	TACTICAL 3	453.787500	78.2	107.9	29.7
Denver - Jail (SPL Use_Tactical)	TACTICAL 2	465.662500	Denver - METRO RPTR 1	METRO RPTR 1	851.887500	20	117.4	97.4
Denver - Jail (SPL Use_Tactical)	TACTICAL 3	453.787500	Denver - Jail (Control_General_SPL USE_BLDG 22)	1	460.037500	20	113.6	93.6
Denver - Jail (SPL Use_Tactical)	TACTICAL 3	453.787500	Denver - Jail (SPL Use_Tactical)	TACTICAL 1	453.412500	78.2	104.1	25.9
Denver - Jail (SPL Use_Tactical)	TACTICAL 3	453.787500	Denver - Jail (SPL Use_Tactical)	TACTICAL 2	460.662500	20	97.7	77.7
Denver - Jail (SPL Use_Tactical)	TACTICAL 3	453.787500	Denver - Jail (SPL Use_Tactical)	TACTICAL 3	453.787500	78	108.2	30.2
Denver - P25 ASR	1	814.262500	Denver - P25 ASR	9	854.437500	28.1	145	116.9
Denver - P25 ASR	2	813.712500	Denver - P25 ASR	9	854.437500	28	145	117
Denver - P25 ASR	3	812.137500	Denver - P25 ASR	9	854.437500	27.8	145	117.2
Denver - P25 ASR	4	811.737500	Denver - P25 ASR	9	854.437500	27.8	145	117.2
Denver - P25 ASR	5	811.212500	Denver - P25 ASR	9	854.437500	27.8	145	117.2
Denver - P25 ASR	6	810.987500	Denver - P25 ASR	9	854.437500	27.8	145	117.2
Denver - P25 ASR	7	810.487500	Denver - P25 ASR	9	854.437500	27.7	145	117.3
Denver - P25 ASR	8	810.237500	Denver - P25 ASR	9	854.437500	27.7	145	117.3
Denver - P25 ASR	9	809.437500	Denver - P25 ASR	9	854.437500	27.6	145	117.4
Denver - P25 ASR	10	808.862500	Denver - P25 ASR	9	854.437500	27.6	145	117.4
Denver - P25 ASR	11	808.325000	Denver - P25 ASR	9	854.437500	27.6	145	117.4
Denver - P25 ASR	12	807.775000	Denver - P25 ASR	9	854.437500	27.6	145	117.4
Denver - P25 Simulcast	1	814.712500	Denver - P25 Simulcast	17	854.062500	28.1	145	116.9
Denver - P25 Simulcast	2	814.612500	Denver - P25 Simulcast	17	854.062500	28.1	145	116.9

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Denver - P25 Simulcast	3	814.212500	Denver - P25 Simulcast	17	854.062500	28.1	145	116.9
Denver - P25 Simulcast	4	811.137500	Denver - P25 Simulcast	17	854.062500	27.8	145	117.2
Denver - P25 Simulcast	5	813.212500	Denver - P25 Simulcast	17	854.062500	28	145	117
Denver - P25 Simulcast	6	812.737500	Denver - P25 Simulcast	16	854.562500	27.9	145	117.1
Denver - P25 Simulcast	7	813.137500	Denver - P25 Simulcast	17	854.062500	28	145	117
Denver - P25 Simulcast	8	812.462500	Denver - P25 Simulcast	17	854.062500	27.9	145	117.1
Denver - P25 Simulcast	9	812.062500	Denver - P25 Simulcast	17	854.062500	27.9	145	117.1
Denver - P25 Simulcast	10	811.712500	Denver - P25 Simulcast	16	854.562500	27.8	145	117.2
Denver - P25 Simulcast	11	811.637500	Denver - P25 Simulcast	16	854.562500	27.8	145	117.2
Denver - P25 Simulcast	12	811.237500	Denver - P25 Simulcast	17	854.062500	27.8	145	117.2
Denver - P25 Simulcast	13	813.737500	Denver - P25 Simulcast	17	854.062500	28	145	117
Denver - P25 Simulcast	14	810.737500	Denver - P25 Simulcast	17	854.062500	27.8	145	117.2
Denver - P25 Simulcast	15	810.462500	Denver - P25 Simulcast	16	854.562500	27.7	145	117.3
Denver - P25 Simulcast	16	809.562500	Denver - P25 Simulcast	16	854.562500	27.6	145	117.4
Denver - P25 Simulcast	17	809.062500	Denver - P25 Simulcast	16	854.562500	27.6	145	117.4
Denver - Fire Repeaters	1	769.318750	Denver - VLAW31(NLEEC)	VLAW31(NL EEC)	155.475000	23	150.8	127.8
Denver - Fire Repeaters	2	769.856250	Denver - VLAW31(NLEEC)	VLAW31(NL EEC)	155.475000	23	150.8	127.8
Denver - Fire Repeaters	3	770.506250	Denver - VLAW31(NLEEC)	VLAW31(NL EEC)	155.475000	23	150.8	127.8
Denver - Fire Repeaters	4	770.756250	Denver - VLAW31(NLEEC)	VLAW31(NL EEC)	155.475000	23	150.8	127.8
Denver - Fire Repeaters	5	771.181250	Denver - VLAW31(NLEEC)	VLAW31(NL EEC)	155.475000	23	150.8	127.8
Denver - Fire Repeaters	6	771.431250	Denver - VLAW31(NLEEC)	VLAW31(NL EEC)	155.475000	23	150.8	127.8
Denver - Fire Repeaters	7	772.431250	Denver - VLAW31(NLEEC)	VLAW31(NL EEC)	155.475000	23	150.8	127.8
Denver - Fire Repeaters	8	772.681250	Denver - VLAW31(NLEEC)	VLAW31(NL EEC)	155.475000	23	150.8	127.8

**Analysis Results:** No receiver desensitization interference problems were predicted that were determined to be system performance limiting to any operators analyzed in this report. All calculations yielded results that determined, based upon the listed configurations, that there was adequate isolation between all analyzed transmitters and receivers either through physical separation, antenna broadcast pattern gain roll off or filtering and isolation devices considered to be part of the standard transmitter / receiver configuration deployed by the equipment manufacturers listed as part of this analysis.

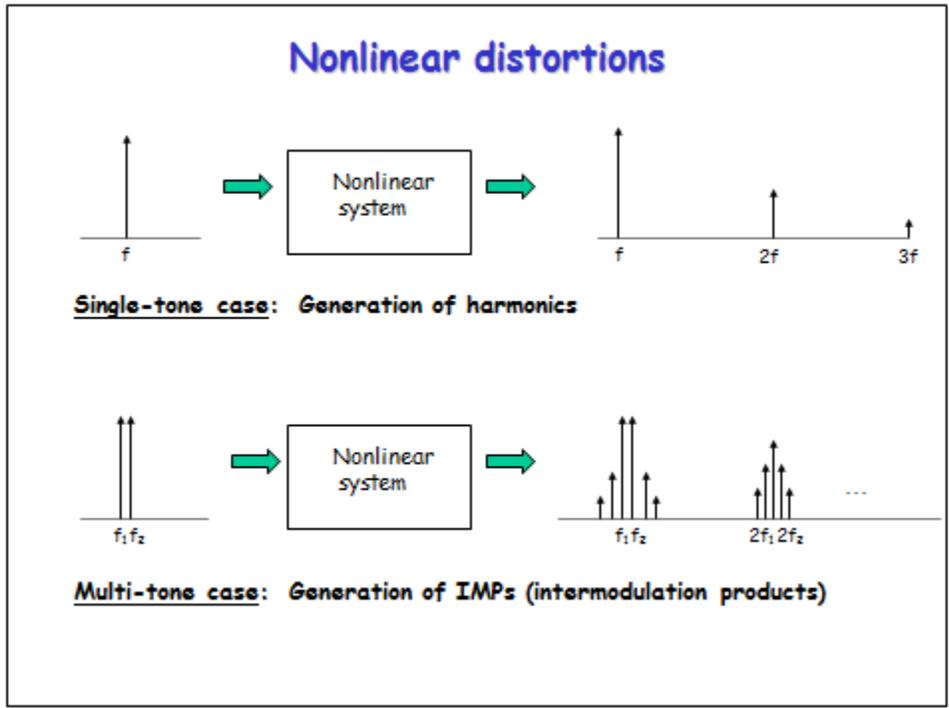
## 7.0 Intermodulation Interference Analysis

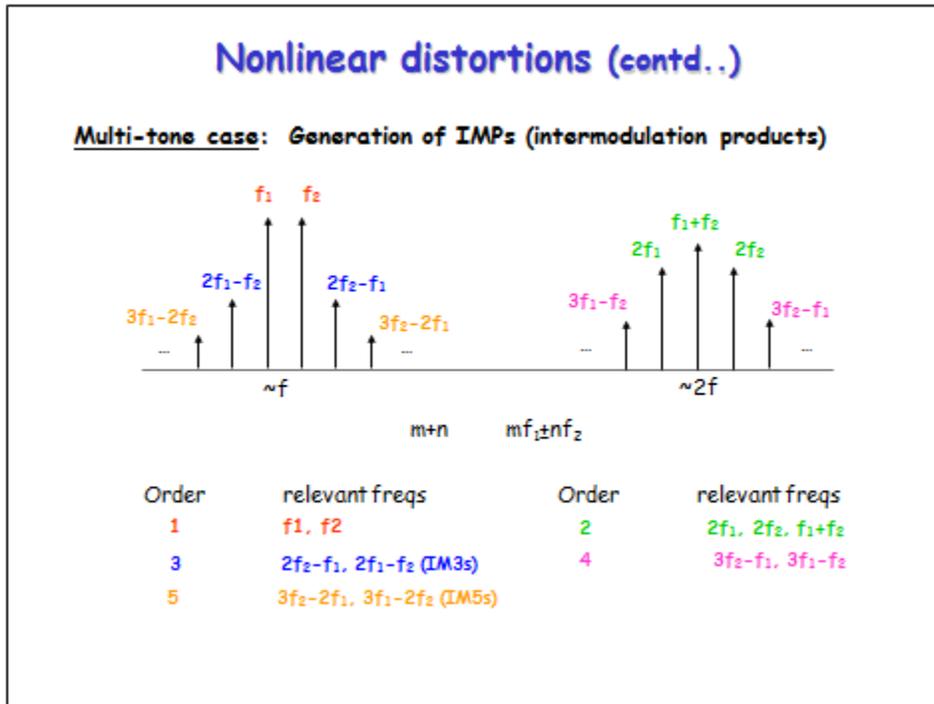
There are three basic categories of Intermodulation (IM) interference. They are receiver produced, transmitter produced, and "other" radiated IM. Transmitter produced IM is the result of one or more transmitters impressing a signal in the non-linear final output stage circuitry of another transmitter, usually via antenna coupling. The IM product frequency is then re-radiated from the transmitter's antenna. Receiver produced IM is the result of two or more transmitter signals mixing in a receiver RF amplifier or mixer stage when operating in a non-linear range.

"Other" radiated IM is the result of transmitter signals mixing in other non-linear junctions. These junctions are usually metallic, such as rusty bolts on a tower, dissimilar metallic junctions, or other non-linear metallic junctions in the area. IM products can also be caused by non-linearity in the transmission system such as antenna, transmission line, or connectors.

Communication sites with co-located transmitters, usually have RF coupling between each transmitter and antenna system. This results in the signals of each transmitter entering the nonlinear final output (PA) circuitry of the other transmitters. When intermodulation (IM) products are created in the output circuitry and they fall within the passband of the final amplifier, the IM products are re-radiated and may interfere with receivers at the same site or at other nearby sites. Additionally, these strong transmitter signals may directly enter a receiver and drive the RF amplifier into a nonlinear operation, or if not filtered effectively by the receiver input circuitry, these signals could mix in the nonlinear circuitry of the receiver front-end or mixer, creating IM products directly in the receiver.

The frequencies of IM mixing are known as nonlinear distortions. The images below depict how these IM products are derived when passing through a nonlinear junction/system.





Below are the mathematical formulae for common IM products. IM products are classified by their "order" (2nd, 3rd, 4th, ...Nth). Some of the more common forms of mixing are illustrated in the following examples. Note that the "A", "B", and "C" designations are the mixing frequencies. The numerical number assigned to the letter designation indicates the harmonic relationship of the frequency. Thus, 2A means the 2nd harmonic of frequency A.

<u>Order</u>	<u>Mixing Formulae</u>
First	A=B, A=C, etc.
Second	A ± B, A ± C, etc.
Third	A + B - C, A ± 2B, 2A ± B, etc.
Fourth	A ± 3B, 2A ± 2B, 3A ± B, etc.
Fifth	A ± 4B, 2A ± 3B, 3A ± 2B, 4A ± B, etc.
Sixth	A ± 3B ± 2C, 2A ± 2B ± 2C, 3A ± 2B ± C, etc.
Seventh	A ± 6B, 2A ± 5B, 3A ± 4B, 4A ± 3B, 5A ± 2B, etc.
Eighth	A ± 7B, 2A ± 6B, 3A ± 5B, 4A ± 4B, 5A ± 3B, 6A ± 2B, etc.
Ninth	A ± 8B, 2A ± 7B, 3A ± 6B, 4A ± 5B, 5A ± 4B, 6A ± 3B, etc.

The above IM product formulae are just a few of the many possible combinations. When there are four frequencies involved at one time, the mixing possibilities increase tremendously. Not all of the mixing possibilities are significant in creating interference signals. Some fall "out-of-band" of the receiver and the higher order IM products are usually weaker in signal strength.

**7.1 Transmitter Generated Intermodulation Analysis**

Intermodulation in transmitters occurs when a signal from another transmitter is impressed on the nonlinear final output stage circuitry, usually via antenna coupling. The power level of the IM product is determined by the power level of the incoming extraneous signal from another transmitter and by a conversion loss factor. The conversion loss factor takes into account the mixing efficiency of the transmitter's final output stage. Conversion loss differs with transmitter design, adjustment, frequency separation of the source signals, and with the order of the IM product.

The analysis calculates all possible IM product frequencies that could potentially interfere with receivers at the communications site based on each receiver's individual bandwidth. It then predicts each IM signal level present at the input of each affected receiver. For each IM frequency, the analysis considers all possible sources of IM generation in the transmitters. For example, if there are four transmitters involve, the analysis will calculate the IM signal level that would be generated in each transmitter. For this example, that would be four possible mixing conditions.

The analysis takes into account the transmitter's power output, modulation bandwidth, conversion losses, transmission line losses, filters, duplexers, combiners, isolators, multi-couplers and other RF devices that are present in each system. Additionally, the analysis considers the antenna separation space loss, horizontal and vertical gain components of the antennas as well as how they are mounted on the structure. The gain components are derived from antenna pattern data published by each manufacturer.

The analysis determines how much isolation is required to prevent receiver performance degradation for each IM interference signal that occurs. Receivers experiencing transmitter generated intermodulation interference are depicted in the following Table.

Tx 1 Source Mix Tx		Tx 2 Source		TX 3 Source		Tx 4 Source		Tx 5 Source		Intermod Hit		Affected Receiver		Attn Need (dB)
ID	Freq (MHz)	ID	Freq (MHz)	ID	Freq (MHz)	ID	Freq (MHz)	ID	Freq (MHz)	Freq (MHz)	Ord	ID	Freq (MHz)	
None														

**Analysis Results:** The above table lists any transmitter generated IM product that is determined to have potential to noticeably degrade the system performance to any receive systems analyzed as part of this study. Based upon the listed configurations for transmitters, receivers, antenna models, antenna patterns and equipment filtering and isolation specifications it has been determined that no transmitter generated intermodulation interference problems were predicted that have the potential to be system performance limiting to any receivers analyzed in this report. While there are thousands of potential IM product combinations based upon the large number of transmitters located at this facility, all potential products produced yielded values that were below the limit where any noticeable degradation to system performance would be experienced.

**7.2 Receiver Generated Intermodulation Analysis**

Within a receiver, when two or more strong off-channel signals enter and mix in the receiver and one of the IM product frequencies created coincides with the receiver operating frequency, potential interference results. This internal IM mixing process takes place in the receiver's RF amplifier when it operates in a nonlinear range and/or in the first mixer, which, of course, has been designed to operate as a nonlinear device.

Receivers have a similar conversion loss type factor and receiver performance is commonly described in terms of conversion loss with respect to the 2A - B type products. Here, conversion loss is the ratio of a specified level of A and B to the level of the resulting IM product, when the product is viewed as an equivalent on-channel signal. Receiver conversion loss varies with input levels, AGC action, and product order.

The analysis calculates all possible IM product frequencies that could potentially interfere with receivers at the communications site based on each receiver's individual bandwidth. It then predicts each IM signal level present at the input of each affected receiver. For each IM frequency, the analysis considers that the IM signal is generated directly in the receiver.

The analysis takes into account the transmitter's power output, modulation bandwidth, conversion losses, transmission line losses, filters, duplexers, combiners, isolators, multi-couplers and other RF devices that are present in each system. Additionally, the analysis considers the antenna separation space loss, horizontal and vertical gain components of the antennas as well as how they are mounted on the structure. The gain components are derived from antenna pattern data published by each manufacturer.

The analysis determines how much isolation is required to prevent receiver performance degradation for each IM interference signal that occurs. Receivers experiencing receiver generated intermodulation interference are depicted in the following Table.

Tx 1 Source		Tx 2 Source		TX 3 Source		Tx 4 Source		Tx 5 Source		Intermod Hit		Affected Receiver		Attn Need (dB)
ID	Freq (MHz)	Freq (MHz)	Ord	ID	Freq (MHz)									
None														

**Analysis Results:** The above table lists any receiver generated IM product that is determined to have potential to noticeably degrade the system performance to any receive systems analyzed as part of this study. Based upon the listed configurations for transmitters, receivers, antenna models, antenna patterns and equipment filtering and isolation specifications it has been determined that no receiver generated intermodulation interference problems were predicted that have the potential to be system performance limiting to any operators analyzed in this report.

## 8.0 Transmitter Harmonic Output Interference Analysis

Transmitter harmonic interference is due to non-linear characteristics in a transmitter. The harmonics are typically created due to frequency multipliers and the non-linear design of the final output stage of the transmitter. If the harmonic signal falls within the passband of a nearby receiver and the signal level is of sufficient amplitude, it can degrade the performance of the receiver.

The analysis takes into account the transmitter’s harmonic characteristics, output level, transmission line losses, filters, duplexers, combiners, isolators, multi-couplers and other RF devices that are present in each system. Additionally, the analysis considers the antenna separation space loss, horizontal and vertical gain components of the antennas as well as how they are mounted on the structure. The gain components are derived from antenna pattern data published by each manufacturer.

The analysis determines how much isolation is required to prevent receiver performance degradation for any harmonics that fall within a receiver’s passband. Receivers experiencing transmitter harmonic interference are depicted in the following Table.

Transmitter		Harmonic		Affected Receiver		Attn Needed (dB)
ID	Frequency (MHz)	Frequency (MHz)	Order	ID	Frequency (MHz)	
None						

**Analysis Results:** No transmitter generated harmonic interference problems were predicted that have the potential to be system performance limiting to any operators analyzed in this report. The calculations to determine harmful out of band harmonics assumed that proper bandpass filtering was utilized to severely reduce these harmonics to levels below those that could be system performance limiting to any receivers analyzed as part of this analysis.

## 9.0 Transmitter Spurious Output Interference Analysis

Transmitter spurious output interference can be attributed to many different factors in a transmitter. The generation of spurious frequencies could be due to non-linear characteristics in a transmitter or possibly the physical placement of components and unwanted coupling. If a spurious signal falls within the passband of a nearby receiver and the signal level is of sufficient amplitude, it can degrade the performance of the receiver.

The analysis takes into account a transmitter’s spurious output specification, output levels, transmission line losses, filters, duplexers, combiners, isolators, multi-couplers and other RF devices that are present in each system. Additionally, the analysis considers the antenna separation space loss, horizontal and vertical gain components of the antennas as well as how they are mounted on the structure. The gain components are derived from antenna pattern data published by each manufacturer.

The analysis determines how much isolation is required to prevent receiver performance degradation for any transmitter spurious signals that fall within a receiver’s passband. Receivers experiencing transmitter spurious output interference are depicted in the following Table.

Transmitter		Affected Receiver		Attn Needed (dB)
ID	Frequency (MHz)	ID	Frequency (MHz)	
None				

**Analysis Results:** No transmitter generated spurious emission interference problems were predicted that have the potential to be system performance limiting to any operators analyzed in this report. The calculations to determine harmful off channel emissions assumed that proper bandpass filtering was utilized to severely reduce these products to levels below those that could be system performance limiting to any receivers analyzed as part of this analysis.

## 10.0 Summary & Limitations

Based upon the data received regarding the proposed radio equipment to be utilized by AT&T and the existing radio systems utilized by the city of Denver, there should not be any negative impact to the performance of any radio systems proposed or existing on this self-support tower facility from the proposed AT&T installation based upon calculations performed utilizing the radio configurations described in this report.

This analysis was performed solely based upon radio configuration data provided by AT&T and the City of Denver. In certain instances, where assumptions were required, industry standard values were utilized for variables such as transmission power levels, filter response curves, combining schemes and other configuration variables if not provided by the parties listed above. The scope of this study was limited to radio systems present on this self-support tower exclusively. It does not take into account emissions from surrounding radio sources.

As identified in the various sections of this report, the potential is present for certain forms of interference to exist. However, based upon the supplied and assumed radio system configurations, the isolation provided by physical separation, Antenna pattern gain roll off, filtering variables and isolation devices appears adequate to allow these radio systems to co-exist as outlined in the drawings and configuration documents provided by AT&T and the City of Denver.

This analysis was also performed assuming that all radio equipment including lines and antennas are performing to manufacturers specifications. Each system was analyzed assuming proper filtering was used to maintain compliance with all FCC licenses and reduce out of band emissions.

**EXHIBIT D**

**[FORM OF] BILL OF SALE  
DFD Station #26**

KNOW ALL MEN BY THESE PRESENTS, THAT **NEW CINGULAR WIRELESS PCS, LLC**, a Delaware Limited Liability Company authorized to conduct business in Colorado, with its principal office located at 1025 Lenox Park Boulevard NE, Atlanta, Georgia 303019 (“Assignor”) for consideration of **TEN and NO/100 DOLLARS (\$10.00) AND OTHER GOOD AND VALUABLE CONSIDERATION**, the receipt and sufficiency of which are hereby acknowledged, does hereby grant, bargain, sell, transfer and deliver, and by these presents does grant and convey, unto **THE CITY AND COUNTY OF DENVER**, a home rule city and municipal corporation of the State of Colorado (“City” or “Assignee”), right title and interest in and to an extension to the existing tower (“Tower Extension”) located on Denver Fire Department Station #26, located at 7934 Martin Luther King Boulevard, Denver, Colorado 80207 (the “Site”). The Tower Extension has been installed and transferred in accordance with the License Agreement between the Parties, CCD Contract Control No. \_\_\_\_\_, and as depicted in Exhibit A to that License Agreement.

The Tower Extension is sold and transferred to the City “As-Is”, “Where-Is” and with all faults as of the date of this Bill of Sale without any representation or warranty whatsoever as to titles, or as to the condition, fitness or any particular purpose or merchantability or any other warranty, express or implied.

Assignor and Assignee acknowledge the following facts and circumstances set forth in this paragraph: The Tower Extension is located at the Site pursuant the License Agreement.

This Bill of Sale shall be of no force and effect unless agreed to and acknowledged by Assignee as evidenced by execution hereof.

**[REMAINDER OF PAGE INTENTIONALLY LEFT BLANK]**

**[SIGNATURES ON NEXT PAGE]**

IN WITNESS WHEREOF, the City has executed this Bill of Sale this \_\_\_\_ day of \_\_\_\_\_, 202\_\_\_\_.

**CITY AND COUNTY OF DENVER**, a home rule city and municipal corporation of the State of Colorado

By: \_\_\_\_\_  
Print Name: Michael B. Hancock  
Title: Mayor

Approved as to form:

DENVER CITY ATTORNEY

By: \_\_\_\_\_  
Assistant City Attorney

New Cingular Wireless PCS, LLC,  
a Delaware limited liability company

By: AT&T Mobility Corporation  
Its: Manager

By:  
Print Name: [ \_\_\_\_\_ ]  
Its: [Insert Title]  
Date: [Insert Date]

## EXHIBIT E – CERTIFICATE OF INSURANCE



# CERTIFICATE OF LIABILITY INSURANCE

DATE (MM/DD/YYYY)  
05/19/2021

**THIS CERTIFICATE IS ISSUED AS A MATTER OF INFORMATION ONLY AND CONFERS NO RIGHTS UPON THE CERTIFICATE HOLDER. THIS CERTIFICATE DOES NOT AFFIRMATIVELY OR NEGATIVELY AMEND, EXTEND OR ALTER THE COVERAGE AFFORDED BY THE POLICIES BELOW. THIS CERTIFICATE OF INSURANCE DOES NOT CONSTITUTE A CONTRACT BETWEEN THE ISSUING INSURER(S), AUTHORIZED REPRESENTATIVE OR PRODUCER, AND THE CERTIFICATE HOLDER.**

**IMPORTANT: If the certificate holder is an ADDITIONAL INSURED, the policy(ies) must have ADDITIONAL INSURED provisions or be endorsed. If SUBROGATION IS WAIVED, subject to the terms and conditions of the policy, certain policies may require an endorsement. A statement on this certificate does not confer rights to the certificate holder in lieu of such endorsement(s).**

<b>PRODUCER</b> Marsh USA Inc. 701 Market Street, Suite 1100 St. Louis, MO 63101		<b>CONTACT NAME:</b> Marsh   U.S. Operations <b>PHONE (A/C, No. Ext):</b> 866-966-4664 <b>E-MAIL ADDRESS:</b> Att.CertRequest@marsh.com		<b>FAX (A/C, No):</b>
CN103150778-GAW-CRT-21-22      N      Y      ds8317      Y		<b>INSURER(S) AFFORDING COVERAGE</b>		<b>NAIC #</b>
<b>INSURED</b> New Cingular Wireless PCS, LLC One AT&T Plaza 208 South Akard Room 1820 Dallas, TX 75202		<b>INSURER A :</b> Old Republic Insurance Company		24147
		<b>INSURER B :</b>		
		<b>INSURER C :</b>		
		<b>INSURER D :</b>		
		<b>INSURER E :</b>		
		<b>INSURER F :</b>		

**COVERAGES**      **CERTIFICATE NUMBER:** CHI-009849696-01      **REVISION NUMBER:**

THIS IS TO CERTIFY THAT THE POLICIES OF INSURANCE LISTED BELOW HAVE BEEN ISSUED TO THE INSURED NAMED ABOVE FOR THE POLICY PERIOD INDICATED. NOTWITHSTANDING ANY REQUIREMENT, TERM OR CONDITION OF ANY CONTRACT OR OTHER DOCUMENT WITH RESPECT TO WHICH THIS CERTIFICATE MAY BE ISSUED OR MAY PERTAIN, THE INSURANCE AFFORDED BY THE POLICIES DESCRIBED HEREIN IS SUBJECT TO ALL THE TERMS, EXCLUSIONS AND CONDITIONS OF SUCH POLICIES. LIMITS SHOWN MAY HAVE BEEN REDUCED BY PAID CLAIMS.

INSR LTR	TYPE OF INSURANCE	ADDL INSD	SUBR WVD	POLICY NUMBER	POLICY EFF (MM/DD/YYYY)	POLICY EXP (MM/DD/YYYY)	LIMITS	
A	<input checked="" type="checkbox"/> <b>COMMERCIAL GENERAL LIABILITY</b> <input type="checkbox"/> CLAIMS-MADE <input checked="" type="checkbox"/> OCCUR GEN'L AGGREGATE LIMIT APPLIES PER: <input checked="" type="checkbox"/> POLICY <input type="checkbox"/> PRO-JECT <input type="checkbox"/> LOC OTHER:			MWZY 313636 21	06/01/2021	06/01/2022	EACH OCCURRENCE	\$ 2,000,000
							DAMAGE TO RENTED PREMISES (Ea occurrence)	\$ 1,000,000
							MED EXP (Any one person)	\$ N/A
							PERSONAL & ADV INJURY	\$ 2,000,000
							GENERAL AGGREGATE	\$ 10,000,000
							PRODUCTS - COMP/OP AGG	\$ 2,000,000
								\$
A	<input checked="" type="checkbox"/> <b>AUTOMOBILE LIABILITY</b> <input checked="" type="checkbox"/> ANY AUTO <input type="checkbox"/> OWNED AUTOS ONLY <input type="checkbox"/> SCHEDULED AUTOS <input type="checkbox"/> HIRED AUTOS ONLY <input type="checkbox"/> NON-OWNED AUTOS ONLY			MWTB 313635 21	06/01/2021	06/01/2022	COMBINED SINGLE LIMIT (Ea accident)	\$ 1,000,000
							BODILY INJURY (Per person)	\$
							BODILY INJURY (Per accident)	\$
							PROPERTY DAMAGE (Per accident)	\$
								\$
	<input type="checkbox"/> <b>UMBRELLA LIAB</b> <input type="checkbox"/> OCCUR <input type="checkbox"/> <b>EXCESS LIAB</b> <input type="checkbox"/> CLAIMS-MADE DED      RETENTION \$						EACH OCCURRENCE	\$
							AGGREGATE	\$
								\$
A	<b>WORKERS COMPENSATION AND EMPLOYERS' LIABILITY</b> ANY PROPRIETOR/PARTNER/EXECUTIVE OFFICER/MEMBER EXCLUDED? <input type="checkbox"/> Y <input checked="" type="checkbox"/> N <input type="checkbox"/> N/A (Mandatory in NH) If yes, describe under DESCRIPTION OF OPERATIONS below			MWC 313638 21 (AOS)	06/01/2021	06/01/2022	<input checked="" type="checkbox"/> PER STATUTE <input type="checkbox"/> OTHER E.L. EACH ACCIDENT	\$ 1,000,000
							E.L. DISEASE - EA EMPLOYEE	\$ 1,000,000
							E.L. DISEASE - POLICY LIMIT	\$ 1,000,000
A	Excess Workers' Compensation / Employers' Liability			MWXS 313639 21 (OH,WA) See Second Page	06/01/2021	06/01/2022	EL Each Accident / EL Disease EL Disease-Policy Limit	1,000,000 1,000,000

**DESCRIPTION OF OPERATIONS / LOCATIONS / VEHICLES (ACORD 101, Additional Remarks Schedule, may be attached if more space is required)**

Re: MLK and Trenton / / FA# 14799270.

City and County of Denver, its elected officials, employees, volunteers and each of their affiliates, subsidiaries, partners, officers, directors, agents and employees is/are included as Additional Insured under the General Liability and Automobile Liability policies but only with respect to the requirements of the contract between the Certificate Holder and the Insured. Waiver of Subrogation is provided for General Liability, Automobile Liability and Workers' Compensation as required by written contract and allowable by law.

## CERTIFICATE HOLDER

## CANCELLATION

The City and County of Denver Attn: Real Estate Division 201 Colfax Ave. Dept 1010 Denver, CO 80202	<b>SHOULD ANY OF THE ABOVE DESCRIBED POLICIES BE CANCELLED BEFORE THE EXPIRATION DATE THEREOF, NOTICE WILL BE DELIVERED IN ACCORDANCE WITH THE POLICY PROVISIONS.</b>
	<b>AUTHORIZED REPRESENTATIVE</b> of Marsh USA Inc. 

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**ADDITIONAL REMARKS SCHEDULE**

<b>AGENCY</b> Marsh USA Inc.		<b>NAMED INSURED</b> New Cingular Wireless PCS, LLC One AT&T Plaza 208 South Akard Room 1820 Dallas, TX 75202	
<b>POLICY NUMBER</b>		<b>EFFECTIVE DATE:</b>	
<b>CARRIER</b>	<b>NAIC CODE</b>		

**ADDITIONAL REMARKS**

**THIS ADDITIONAL REMARKS FORM IS A SCHEDULE TO ACORD FORM,**  
**FORM NUMBER:** 25 **FORM TITLE:** Certificate of Liability Insurance

Excess Workers' Compensation -MWXS 313639 21 (OH-WA)  
 Self Insured Retentions  
 OH & WA - \$500,000,000 (except Terrorism)  
 OH & WA - \$600,000,000 Terrorism