

SITE LEASE AGREEMENT

Between Board of Water Commissioners of the City of Saint Paul and MP Integrated Solutions, LLC

This Lease Agreement ("Lease") is entered into this 6th day of June, 2017, between the **BOARD OF WATER COMMISSIONERS OF THE CITY OF SAINT PAUL**, a Minnesota municipal corporation ("Lessor"), and **MP MOBILE SOLUTIONS, LLC**, a Minnesota limited liability company ("Lessee").

WHEREAS, Lessee desires to lease certain space for the installation and operation of wireless communication equipment at the Board's Fairgrounds Water Tower site, located at 1530 Cosgrove Street, Falcon Heights, Minnesota 55108 and described in Exhibit "A", *Legal Description*, attached hereto and incorporated herein ("Fairgrounds Tank Site"); and

WHEREAS, the Minnesota State Agricultural Society ("Society") currently holds fee simple title to the real estate upon which the Fairgrounds Tank Site is situated ("Real Estate"); and

WHEREAS, pursuant to an Agreement dated June 14, 1985, entered into by and between the Lessor and the Society (the "Easement Agreement"), Society conveyed to the Lessor a perpetual tank site and utility easement, which was filed with the Ramsey County Recorder on January 23, 1987, recorded in the Office of the Ramsey Country Recorder as Document No. 2356936; and

WHEREAS, Lessee desires to enter into this Lease with the expectation that Lessee and the Society will enter into a Non-Disturbance Agreement or Access Agreement acceptable to Lessee;

NOW THEREFORE, in consideration of the terms and conditions of this Lease, the parties agree as follows:

1. Leased Premises.

(a) Lessor hereby leases to Lessee certain space located at and on Lessor's Fairgrounds Water Tower site, located at 1530 Cosgrove Street, Falcon Heights, Minnesota and legally described in Exhibit "A" *Legal Description*. The water storage facility and its appurtenances ("Structure"), and the Lessor's easement upon which the Structure is situated are collectively called "the Property". The property interest leased and granted by the Lessor to Lessee (collectively, the "Leased Premises") consists of the following:

- (1) ground space comprised of approximately _____ square feet, subject to any and all existing easements;
- (2) structure exterior space for attachment of antennas at alpha, beta & gamma sectors at 92 FAGL;
- (3) space required for cable runs to connect equipment and antennas;
- (4) non-exclusive easements required to run utility lines and cables;

(5) a non-exclusive easement across the Property for access.

(b) No other space or property interests are being leased to Lessee except as described above.

2. Terms/Renewals.

(a) The initial term of this Lease shall commence on June 6, 2017 (the “Commencement Date”), and shall expire on December 31, 2022. Lessee and Lessor agree to enter into a memorandum confirming the Commencement Date, as contained in Exhibit “F” *Memorandum of Lease Recording*.

(b) Lessee shall have the right to extend this Lease for three (3) additional five (5) year terms (each a “Renewal Term”) subject to (c) below.

(c) This Lease shall automatically be renewed for each successive Renewal Term unless Lessee is in default beyond applicable notice and cure periods of any of the terms or conditions of this Lease, or unless Lessee provides Lessor with written notice of its intention not to renew not less than thirty (30) days prior to commencement of the succeeding Renewal Term.

3. Rent.

(a) Lessee shall make all payments of rent to Lessor at the following address or until otherwise notified of a change in address:

Board of Water Commissioners
Attn: SPRWS Accounting
1900 Rice Street, Office Building
Saint Paul, Minnesota 55113

(b) Lessor’s FIN number is # 41-6005521.

(c) Lessee shall pay rent annually in advance, as indicated in the payment schedule below:

(1) Lessee shall pay Lessor, as rent, the sum of \$15,600.00 per year plus annual escalator described in Section 3(c)(4) based upon Lessee’s installation and operation of the antenna facilities and frequencies identified in Exhibit “D” *Antenna Facilities and Frequencies*, (“Antenna Facilities”).

(2) The first year’s rent shall be pro-rated to the end of 2017 based the on the Commencement Date for year 2017, and shall include a one-time administrative fee of Two Thousand Five Hundred Dollars (\$2,500.00), and shall be paid within sixty (60) days after the Commencement Date. Thereafter, the rent due hereunder shall be paid on or before the fifth (5th) day of each January of each succeeding year.

(3) Exhibit “D” *Antenna Facilities and Frequencies* sets forth the antennas and related equipment Lessor will install as part of its initial installation of the Antenna Facilities.

The installation of additional antennas and related equipment not set forth on Exhibit “D” may require an amendment to the Lease and increase in rent, as may be determined by Lessor. However, changes made exclusively to frequencies shall not require an amendment and shall not constitute grounds for revision of rent. Notwithstanding, Lessee has the right to perform routine maintenance and repairs without Lessor’s approval.

- (4) Commencing January 1, 2018, and on January 1st of each subsequent year, the rent shall be increased annually by five percent (5%).

4. Engineering Studies

(a) **Structural Study**

Lessee must obtain an engineering study carried out by a qualified engineer, showing that the Structure is able to support the Antenna Facilities. If the study finds that the Structure is inadequate to support the proposed antenna loads, Lessor may terminate this Lease immediately.

(b) **Interference Study**

Lessee must obtain a radio frequency interference study carried out by an independent professional radio frequency engineer (“RF Engineer”) showing that Lessee’s intended use will not interfere with any existing communications facilities located on the structure. RF Engineer shall provide said evaluation no later than thirty (30) days after frequencies are provided by Lessee. Lessee shall provide Lessor with a copy of a satisfactorily completed RF evaluation prior to transmitting or receiving radio waves at the Property.

5. Use of Leased Premises.

(a) **Primary Use of Property**

The primary use and purpose of the Property, including the Leased Premises, is for a water storage structure and appurtenances to provide water service to customers of the Lessor (“Primary Use”). Lessor’s operations in connection with pursuit of the Primary Use (“Lessor’s Operations”) take priority over Lessee’s operations.

(b) **User priority**

Lessee agrees that the following priorities of use, in descending order, shall apply in the event of communication interference, emergency public safety needs, or other conflict while this Lease is in effect, and Lessee’s use shall be subordinate accordingly:

- (1) Lessor;
- (2) Public safety agencies, including law enforcement, fire, and ambulance services, that are not related to Lessor;
- (3) Other governmental agencies where use is not related to public safety;
- (4) Pre-existing lessees;

(5) Lessee.

(c) Jeopardy of Primary Use

- (1) In the event that the Lessor's Primary Use of the Structure is put at risk because of Lessee's operations ("Jeopardy"), Lessor shall provide written notice of such event to Lessee. Lessor and Lessee agree to work together to cure the occurrence that causes the Jeopardy. Lessee shall make all good efforts to cure the Jeopardy within thirty (30) days of receipt of written notice of event. If Lessee does not cure the Jeopardy within thirty (30) days of receipt of written notice of event, said occurrence of Jeopardy shall constitute an event of default by Lessee, as otherwise defined in *Section 14. Termination*. If circumstances beyond the control of Lessee prohibit the Jeopardy from reasonably being cured within thirty (30) days, Lessee shall notify Lessor of such circumstances and commence actions required to cure the Jeopardy (e.g. assessing the problem, ordering necessary equipment) within seven (7) days of Lessor's written notice of Jeopardy and shall diligently pursue the cure to completion within a reasonable time thereafter.
- (2) In the event of Jeopardy that poses an immediate threat of substantial harm or damage to the water supply, to persons, and/or property on the Leased Premises, as solely determined by Lessor ("Severe Jeopardy"), Lessor may enter the Leased Premises and take actions it determines are required to protect the water, individuals or personal property from such Severe Jeopardy; provided that promptly after such emergency entry onto the Leased Premises, and in no event later than twenty-four (24) hours after such entry, Lessor gives written notice to Lessee of Lessor's emergency entrance.
- (3) If Lessor determines that the conditions of a Severe Jeopardy would be benefited by cessation of Lessee's operations, Lessee shall immediately cease its operations on the Premises upon notice from Lessor to do so and Lessee shall be permitted to terminate this Lease upon written notice to Lessor.

(d) Lessee's Use of Leased Premises

- (1) Lessee shall have the non-exclusive right, at its sole cost and expense, to use the Leased Premises for the transmission and reception of communications signals ("Approved Use").
- (2) In accordance with this Approved Use, the Lessee has the right to install, operate, maintain, repair, replace, store or remove its antennas, utility building, equipment, personal property, leasehold improvements, and appurtenances as shown in Exhibit "D" *Antenna Facilities and Frequencies* and Exhibit "C" *Construction Plans*.
- (3) Lessee shall be responsible for all expenses incurred by the Lessor resulting from the use and/or occupancy of the Leased Premises by Lessee. Lessor shall submit an itemized invoice of such expenses to Lessee and Lessee shall make payment to Lessor within sixty (60) days of receipt.

(e) Laws Governing Use

Lessee's Antenna Facilities and any other facilities shall be installed, maintained, and operated in accordance with all state or federal or local or municipal statutes, ordinances, rules, or regulations now in effect, or that hereafter may be issued by the Federal Communications Commission ("FCC") or any other governing bodies which apply to Lessee's Approved Use of the Leased Premises.

6. Installation of Equipment and Leasehold Improvements.

(a) Construction Plans

For the initial installation of all Antenna Facilities and for any and all subsequent revisions and/or modifications thereof, or additions thereto, Lessee shall provide Lessor and Lessor's Water Tower Construction Engineer ("Construction Engineer") each with comprehensive construction plans ("Construction Plans") consisting of the following:

- (1) line or CAD drawings showing location of all planned installations plus materials and construction methods;
- (2) specifications for all planned installations;
- (3) diagrams of Antenna Facilities for initial installation, and subsequently, diagrams of proposed antenna facilities for any and all revisions, modifications, or approved additions;
- (4) a complete and detailed inventory of all proposed equipment and personal property of Lessee to be placed on the Leased Premises. Lessor retains the right, at its sole cost and expense, to survey such equipment and personal property.

(b) Construction Plans shall be easily readable and subject to prior written approval by the Construction Engineer, which shall not be withheld, conditioned or delayed without cause. Lessor shall have thirty (30) business days to review and comment on the Construction Plans.

(c) Lessee shall be solely responsible for all costs associated with said review and approval of Construction Plans by Construction Engineer ("Review Fee") for either the review of the Construction Plans for the initial installation or for the review of the Construction Plans for each subsequent revision, modification or approved addition to the Antenna Facilities.

(d) Construction Scheduling

At least five (5) days prior to Lessee's construction mobilization, Lessee shall conduct a pre-construction meeting on the Property or other location as determined by Lessor. Said meeting shall be attended by the Construction Engineer, Lessee's representative and all contractors involved in the installation.

(e) Construction Inspection.

All construction activity for the initial installation of all Antenna Facilities and for any and all subsequent revisions and/or modifications thereof, or additions thereto shall be subject to inspection and approval by the Construction Engineer to ensure compliance with the approved Construction Plans and the terms of this Lease. Inspection will be performed beginning with the pre-construction meeting and continuing through installation/construction/punch-list and verification of as-built drawings at project completion as determined by Lessor. Lessee agrees to pay for the cost of said inspections and project documentation ("Inspection Fees"). If deemed necessary by the Construction Engineer, construction work performed without approval of the Construction Engineer will not be accepted and shall be removed or uninstalled at Lessee's sole expense, provided Lessor or the Construction Engineer notifies Lessee of such non-compliance within thirty (30) days of submission of as-built drawings to Lessor.

(f) Escrow

Lessee agrees to pay an escrow amount equal to the estimated costs of Review Fees and Inspection Fees as determined by Lessor for the initial installation of all Antenna Facilities and for any and all subsequent revisions and/or modifications thereof, or additions thereto, prior to commencement of such activities. If the escrow amount is insufficient for these expenses, Lessee agrees to pay the additional costs within forty-five (45) days of receipt of a detailed invoice from Lessor.

(g) Exposed Antenna Facilities

All Antenna Facilities affixed to the Structure which have exterior exposure shall be as close to the color of the Structure as is commercially available to the Lessee. For exposed coaxial cables, Lessor reserves the right to require Lessee to provide cables in manufactured colors in lieu of painting.

(h) Damage by Lessee

Any damage to the Property, Leased Premises, or Lessor's equipment thereon caused by Lessee's installation or operations shall be repaired or replaced at Lessee's expense and to Lessor's reasonable satisfaction.

(i) As-built drawings

Within thirty (30) days after Lessee activates the Antenna Facilities, Lessee shall provide Lessor with a Site Plan in electronic file format compatible with Lessor's record file system consisting of as-built drawings of the Antenna Facilities and the improvements installed on the Property, which shall show the actual location of all equipment and improvements. Said drawings shall be accompanied by a complete and detailed site survey of the property, inventory of all equipment, personal property, and Antenna Facilities.

7. Modifications.

- (a) Before the Lessee may update or replace the Antenna Facilities, Lessee must provide a detailed proposal to Lessor. The proposal shall include any information reasonably requested by Lessor of such requested update or replacement, including but not limited to

revised lease exhibits as may be necessary, construction drawings and specifications as may be required under *Section 6. Installation of Equipment and Leasehold Improvements*, and engineering studies as may be required under *Section 4. Engineering Studies* of this Lease, carried out at Lessee's expense. The proposal must be approved by Lessor, which such approval will not be unreasonably withheld, conditioned or delayed. Notwithstanding anything to the contrary contained herein, Lessee maintains the right to perform routine maintenance, repairs and in-kind replacements.

- (b) Lessee shall provide at least thirty (30) days written notice to Lessor before modifying frequencies on the Leased Premises. Said notice shall describe all equipment and frequencies proposed to be added or modified and shall be subject to evaluation by a RF Engineer approved by Lessor, which shall not be withheld, conditioned or delayed without cause. Said review shall consist of necessary interference studies to ensure that the modified or additional frequencies will not cause harmful radio interference to Lessor's Operations or the operations of Lessor's existing tenants. Lessee shall pay all costs for any such interference studies. In the alternative, Lessee may perform the interference studies and submit the results to the Lessor for review and approval.
- (c) If Lessee seeks to increase the number of antennas and/or associated transmitting accessories, and such installation shall exceed the requirements or standard discussed in the engineering report as required by Section 4.(a), then Lessee must obtain an engineering study carried out by a qualified professional demonstrating that the Structure can structurally support the additional accessories.
- (d) As-built drawings
Within thirty (30) days after Lessee activates the Antenna Facilities, Lessee shall provide Lessor with a Site Plan in electronic file format compatible with Lessor's record file system consisting of as-built drawings of the Antenna Facilities and the improvements installed on the Property, which shall show the actual location of all equipment and improvements. Said drawings shall be accompanied by a complete and detailed site survey of the property, inventory of all equipment, personal property, and Antenna Facilities.

8. Maintenance and Repairs.

- (a) Property
 - (1) Lessor reserves the right to take any action it deems necessary, in its sole and reasonable discretion, to repair, maintain, alter, or improve the Property in connection with Lessor's Operations.
 - (2) Lessor agrees to provide Lessee with thirty (30) days advance notice of such actions that may directly affect Lessee's operations, and to reasonably cooperate with Lessee to carry out such activities in a manner that minimizes interference with Lessee's Approved Use.

(b) Structure Reconditioning and Repairs

- (1) From time to time, Lessor paints, reconditions, or otherwise improves or repairs the Structure in a substantial way ("Reconditioning Work"). Lessor shall reasonably cooperate with Lessee to carry out Reconditioning Work activities in a timely manner and in a manner that minimizes interference with Lessee's Approved Use.
- (2) Prior to commencing Reconditioning Work, Lessor shall provide Lessee with not less than ninety (90) days prior written notice thereof. Upon receiving such notice, it shall be the sole responsibility of Lessee to provide adequate measures to cover or otherwise protect Lessee's Antenna Facilities from the consequences of such activities, including but not limited to paint and debris fallout. Lessor reserves the right to require Lessee to remove all Antenna Facilities from the Structure and Leased Premises during Reconditioning Work.
- (3) During Lessor's Reconditioning Work, Lessee may maintain a mobile site on the Property or, after approval by Lessor, on any land owned or controlled by Lessor in the immediate area of the Property. If Property will not accommodate mobile equipment, it shall be Lessee's responsibility to locate auxiliary sites.
- (4) Lessee may request a modification of Lessor's procedures for carrying out Reconditioning Work in order to reduce the interference with Lessee's Approved Use. If Lessor agrees to the modification, Lessee shall be responsible for all incremental cost related to the modification.

(c) Leased Premises

Lessee shall, at its own cost and expense, maintain the Antenna Facilities in good and safe condition, and in compliance with applicable fire, health, building, and other life safety codes applicable to Lessee's Approved Use of the Leased Premises.

9. Property Access.

Access to the Property, including the Leased Premises, by outside persons, including Lessee's employees, agents and assigns, shall at all times be governed by Lessor's Security Plan, as may be revised from time to time, with the most recent Plan being attached hereto and incorporated herein as Exhibit "E" *Security Plan*. Lessee agrees it shall conduct its operations on the Property and the Leased Premises in accordance with all requirements and conditions of said Security Plan. Subject to said requirements and conditions of said Security Plan, Lessee and Lessor agree to the following:

- (a) At no additional charge to Lessee, Lessee shall have access to the Leased Premises and Property, for any purpose relating to this Lease, twenty-four (24) hours a day, seven (7) days a week by means of existing access, as shown on Exhibit "B" *Site Survey*.
- (b) Lessee may, at its own cost and expense, enter upon the Property to study and determine the Property's suitability for any other use of Lessee, which studies may include surveys, radio wave propagation measurements, or field strength tests.

- (c) Lessor retains the right to examine and inspect the Leased Premises for safety reasons and to ensure Lessee's compliance with the terms of this Lease. Lessor shall be liable for, and hold harmless Lessee from, any damage to the Leased Premises or to Lessee's equipment and Antenna Facilities caused by Lessor in exercising its right to examine and inspect the Leased Premises.
- (d) At Lessee's sole cost and expense, Lessee has the right to obtain a title report or commitment for a leasehold time policy from a title company of its choice and to have the Property surveyed by a surveyor of its choice.

10. Utilities.

Lessor makes no representations that utilities adequate for Lessee's use of the Leased Premises are available. Lessee shall be responsible for the cost of all utilities installed and used by it at the Leased Premises. Lessor will cooperate with Lessee in Lessee's efforts to obtain utilities from any location provided by the servicing utility.

11. Personal Property and Real Estate Taxes.

If any of Lessee's improvements constructed on the Leased Premises should cause the Property, or any portion of it, to be taxed for real estate purposes, it shall be the liability of Lessee to pay that portion of such property taxes directly attributable to Lessee's equipment, provided Lessor shall give Lessee prior written notification of such taxes so that Lessee will have the opportunity to appear before the taxing authority to contest such taxes. Notwithstanding Lessee's right to contest such taxes, Lessee shall pay its share of such taxes within ninety (90) days of receiving notice of the same.

12. Certificates, Permits, Zoning, and other Approvals.

Lessee's use of the Leased Premises herein is contingent upon its obtaining all certificates, permits, zoning, and other approvals that may be required by any federal, state or local authority, including but not limited to an engineering study and a radio frequency interference study. Lessee shall, at its sole cost and expense, obtain all such necessary permits, licenses and other approvals and Lessor agrees to cooperate with Lessee in Lessee's pursuit of all such necessary permits, licenses or approvals, and Lessee shall reimburse Lessor its reasonable costs to provide such cooperation.

13. Interference.

- (a) Prior to the installation of Lessee's equipment on the Leased Premises, Lessor shall provide Lessee with a report setting forth the current radio frequency users on the Structure to allow Lessee to evaluate potential interference risks. In the performance of its Approved Use, Lessee shall not damage or interfere with Lessor's Operations, including its radio frequency transmissions, or approved operations of other parties that were in place on the Property prior to the Commencement Date of this Lease, provided that the equipment used by Lessor or other lessees is operating within the technical parameters specified by its manufacturer and/or as defined by the FCC. In the event of

any such interference, Lessee shall immediately cease such interference, except for brief tests necessary for the elimination of the interference and until Lessee is able to resolve the problem. In the event Lessee cannot correct the interference, Lessee shall have the option to terminate this Lease, pursuant to *Section 14. Termination*. Lessee shall not be responsible for interference that results from a change in the operations of other tenants after the Commencement Date of this Lease.

- (b) Lessee acknowledges that Lessor may lease the Property, or any part of it, to other parties in close proximity to the Leased Premises, and Lessee agrees to work cooperatively with any such other parties, using accepted technical standards in accordance with FCC standards, to ensure that such other parties' use and Lessee's use will be compatible and will not cause interference with each other.
- (c) Lessor in no way guarantees to Lessee noninterference with Lessee's transmission operations provided, however, that in the event that any other party requests permission to place any type of additional antenna or transmission facility on the Property, the procedures of this Section shall govern to determine whether such antenna or transmission facility will interfere with Lessee's transmission operations.
- (d) In the event that Lessee or other tenants on the Property experience interference of their approved frequencies and they cannot reach agreement as to the cause and remedy of such interference, an RF Engineer approved by the Lessor shall determine such cause and remedy and Lessee shall abide by the RF Engineer's determination, subject to Lessee's right to terminate this Lease.

14. Termination.

- (a) Except as provided for in Section 14.(a)(3)b. below, or as otherwise provided herein, this Lease may be terminated by either party upon sixty (60) days written notice to the other party for the following reasons:
 - (1) By either party, upon a material default of any other covenant or term hereof by the other party; which default is not cured within sixty (60) days of receipt of written notice of default to the other party (without, however, limiting any other rights of the parties at law, in equity, or pursuant to any other provisions hereof), or if such cure cannot be completed within sixty (60) days, within such reasonable time as may be required, provided the defaulting party commences the cure within ten (10) days of receipt of written notice of default and diligently pursues such cure to completion;
 - (2) By Lessee, in the event that:
 - a. Lessee is unable to obtain or maintain any license, permit, or other governmental approval necessary for the construction and/or operation of the Antenna Facilities;
 - b. the Leased Premises are or become unusable under Lessee's design or engineering specifications for its Antenna Facilities, or the communications system to which the Antenna Facilities belong; or

- c. Lessee's transmission is interfered with by Lessor or its other tenants' equipment. Such right to terminate shall become void if Lessor cures such interference within thirty (30) days of receipt of written notice.
 - d. If the Property or any portion thereof is destroyed or damaged so as to hinder its effective use, Lessee may elect to terminate this Lease upon thirty (30) days written notice to Lessor. In such event, all rights and obligations of the parties shall cease as of the date of the damage or destruction and Lessee shall be entitled to the reimbursement of any rent prepaid by Lessee, prorated to the date of the event.
- (3) By Lessor, in the event that:
- a. Lessor determines, after review by an independent structural engineer, that the Property is structurally unsound, including but not limited to consideration of age of the Structure, damage or destruction of all or part of the Property from any source, or factors relating to condition of the Property;
 - b. Lessee fails to pay rent provided for in *Section 3. Rent* within thirty (30) days of receipt of written notice from Lessor of a rent payment being overdue; or
 - c. Lessee does not complete installation of its Antenna Facilities as shown on Exhibit "D" *Antenna Facilities and Frequencies* within one (1) year of the Commencement Date of this Lease.
 - d. Upon 120 days prior written notice by the Lessor to Lessee if Lessor decides, for any reason, to redevelop and/or discontinue use of the Leased Premises in a manner inconsistent with continued use of the Leased Premises by Lessee.
- (b) If this Lease is terminated, pursuant to the terms and conditions of Section 14.(a), rent shall be pro-rated to the expiration date or the date on which all of Lessee's equipment is removed from the Leased Premises and the Property is restored pursuant to *Section 23. Surrender of Leased Premises*, whichever is later.
- (c) If Lessee terminates this Lease other than provided for in Section 14.(a), Lessee shall pay to Lessor a termination fee in the amount of twenty-five percent (25%) of the rent for the year in which Lessee terminates, unless Lessee terminates during the last year of any Term under *Section 2. Terms/Renewal* and Lessee has paid the rent for that year.
- (d) In the event Lessee becomes aware of any hazardous materials on the Property, or any environmental, health or safety conditions or matter relating to the Property, that, in Lessee's sole determination, renders the condition of the Leased Premises or Property unsuitable for Lessee's use, or if Lessee believes that the leasing or continued leasing of the Leased Premises would expose Lessee to undue risks of liability to a government agency or third party, Lessee will have the right, in addition to any other rights it may have at law or in equity, to terminate this Lease upon written notice to Lessor specifically identifying all such materials, conditions or matters relating to the Property.

15. Insurance.

- (a) Lessee shall obtain and maintain the following insurance to protect the parties against any and all claims, demands, actions, judgments, expenses, and liabilities that may arise out of or result from Lessee's use of the Leased Premises:

(1) General Liability Insurance

- a. Bodily Injury \$1,500,000 each occurrence
 \$3,000,000 aggregate
- b. Property Insurance \$1,500,000 each accident
 \$3,000,000 aggregate
- c. These limits may be satisfied by the commercial general liability coverage or in combinations with an umbrella or excess liability policy, provided coverage afforded by the umbrella or excess policy are no less than the underlying commercial general liability coverages.
- d. Policy must include an “all services, products, or completed operations” endorsement. Lessee shall maintain Completed Operations coverage for a minimum of two years after the construction is completed.

(2) Automobile Insurance

- a. Bodily Injury \$1,000,000 per person
 \$1,500,000 per accident
- b. Property damage not less than \$1,500,000 per accident
- c. The liability limits may be afforded under the Commercial Policy, or in combination with an umbrella or excess liability policy provided coverages of rides afforded by the umbrella or excess policy are not less than the underlying Commercial Auto Liability coverage.
- d. The Commercial Automobile Policy shall include at least statutory personal injury protection, uninsured motorists and under insured coverages.
- e. Coverage shall be provided by Bodily Injury and Property Damage for the ownership, use, maintenance or operation of all owned, non-owned and hired automobiles.

(3) Workers’ Compensation and Employer’s Liability

- a. Workers’ Compensation per Minnesota Statute
- b. Employer’s Liability shall have minimum limits of:
 - 1. \$500,000 per accident;
 - 2. \$500,000 per employee
 - 3. \$500,000 per disease policy limit
- c. Lessees with 10 or fewer employees who do not have Workers’ Compensation coverage are required to provide a completed “Certificate of Compliance” (State of Minnesota form MN LIC 04) verifying the number of employees and the reason for their exemption.

- (b) Lessee shall provide Lessor, prior to the Commencement Date and, and annually thereafter prior to expiration date of the same, evidence of the required insurance in the

form of a certificate of insurance issued by an insurance company licensed to do business in the State of Minnesota, which includes all coverage required in Section 15.(a) above.

- (c) Policies are to be written on an occurrence basis or as acceptable to the Lessor. Certificate of Insurance must indicate if the policy is issued on a claims-made (if expressly approved by Lessor) or occurrence basis. All certificates of insurance shall provide that Lessor shall be given notice of cancellation in accordance with the policy's terms and conditions.
- (d) Additional Insured – Certificate of Insurance.
The Lessee shall provide, prior to tenancy, evidence of the required insurance in the form of a Certificate of Insurance issued by a company (rated A- or better by Best Insurance Guide) licensed to do business in the state of Minnesota, which includes all coverage required in this *Section 15. Insurance*. General Liability and Automobile policies shall include the Lessor and the City of Saint Paul as additional insured, and shall provide that it will be the primary coverage.

15. Indemnity.

Lessee agrees to indemnify, defend, save, and hold harmless Lessor and the City of Saint Paul, and/or any agents, officers or employees thereof from all claims, demands, actions, or causes of action of whatsoever nature or character, arising out of, or by reason of, the leasing of the Leased Premises by the Lessor to Lessee, or arising out of, or by reason of, the use or condition of the Leased Premises, or as a result of Lessee's operations or business activities taking place on the Leased Premises or Lessee's breach of any provision of this Lease, provided the same is not due to the contributory negligence or willful misconduct of the Lessor, the City of Saint Paul and/or any agents, contractors, officers, or employees thereof. It is fully understood and agreed that Lessee is aware of the conditions of the Leased Premises and leases the same "as is".

16. Notices.

All notices, requests, demands, and other communications hereunder shall be in writing and shall be deemed to have been duly given (a) when delivered in person, (b) upon receipt after dispatch by registered or certified mail or (c) on the next Business Day if transmitted by national overnight courier (with confirmation of delivery) to the following addresses:

If to Lessor: Board of Water Commissioners
 Attn: General Manager
 1900 Rice Street, Office Building
 Saint Paul, Minnesota 55113

If to Lessee: 500 CR 37 East
 Maple Lake, MN 55358
 Attn: Rob Pribyl

17. Representations and Warranties.

- (a) Lessor represents that (i) it has full right, power, and authority to execute this Lease; (ii) it has good and unencumbered title to the Property free and clear of any liens or mortgages, subject to such liens of record; (iii) Lessee shall have quiet enjoyment of the Leased Premises during the term of this Lease in accordance with its terms.
- (b) Lessee warrants that the individuals signing and executing this Lease on behalf of Lessee have the requisite corporate power and authority to enter into and perform this Lease on behalf of Lessee. Lessor warrants that the individuals signing and executing this Lease on behalf of Lessor have the requisite corporate power and authority to enter into and perform this Lease on behalf of Lessor.
- (c) Lessor represents that it has no knowledge of any substance, chemical or waste on the Property that is identified as hazardous, toxic or dangerous in any applicable federal, state or local law or regulation, as defined in Section 18.(d) of this Lease. Lessor will be solely liable for and will defend, indemnify and hold Lessee, its agents and employees harmless from and against any and all direct claims, costs and liabilities, including reasonable attorneys' fees and costs, arising out of or in connection with the removal, cleanup or restoration of the Property with respect to hazardous, toxic or dangerous materials from any and all sources other than those hazardous, toxic or dangerous materials introduced to the Property by Lessee. Lessee represents and warrants that its use of the Leased Premises herein will not generate and it will not store or dispose on the Property nor transport to or over the Property any hazardous substance, chemical or waste contrary to any applicable law or regulation. Lessee further agrees to hold Lessor harmless from and indemnify Lessor against any release of any such hazardous substance, and any damage, loss, expense, or liability resulting from the breach of this representation or from the violation of any applicable state or federal law by such release associated with Lessee's use of hazardous substances, including payment of all reasonable attorneys' fees, costs, and penalties incurred as a result thereof, except for any release caused by the negligence or willful misconduct of Lessor, its employees, or agents.
- (d) "Hazardous substance" shall be interpreted broadly to mean any substance or material defined or designated as hazardous or toxic waste, hazardous or toxic material, hazardous or toxic or radioactive substance, or other similar term by any federal, state, or local environmental law, regulation or rule presently in effect or promulgated in the future, as such laws, regulations, or rules may be amended from time to time. Lessor acknowledges Lessee's use of batteries as back-up power and deems them acceptable as long as such batteries are used and disposed of in accordance with all applicable laws.

18. No Liability on Lessor.

Except due to Lessor's willful misconduct or negligence, Lessor shall not be liable for any damage to Lessee's equipment or Antenna Facilities, and Lessor shall not be liable for vandalism or malicious mischief caused by third parties, known or unknown, to Lessee's

equipment or facilities, nor shall Lessor be liable for any lost revenue, business or profits of Lessee.

19. Assignment.

- (a) This Lease may be sold, assigned or transferred by Lessee without approval or consent of Lessor to Lessee's principal, affiliates, subsidiaries of its principal or to any entity which acquires all, or substantially all, of Lessee's assets in the market defined by the FCC in which the Property is located by reason of a merger, acquisition or other business reorganization. Lessee shall provide Lessor written notice of any such sale, assignment or transfer within sixty (60) days after the effective date thereof. No change of stock ownership, partnership interest or control of Lessee or transfer upon partnership or corporate dissolution of Lessee shall constitute an assignment hereunder.
- (b) The parties acknowledge that this is a nonexclusive lease. Nothing in this Lease shall preclude Lessor from leasing other space on the Property to any other person or entity which may be in competition with Lessee, or any other party, subject to the conditions set forth in *Section 13. Interference*.
- (c) Lessee shall have the exclusive right, at its sole cost and expense, to sublet the Leased Premises for the transmission and reception of wireless communications signals ("Approved Use") to New Cingular Wireless PCS, LLC ("Carrier"). Such sublease by Lessee to Carrier shall be subject to the terms of this Lease and Carrier shall take possession of the Leased Space subject to the leasehold rights granted to Lessee by the terms of this Lease, a copy of which shall be provided to Carrier. Lessee may not otherwise sublet this Lease or any portion of the Leased Premises without the prior written consent of Lessor. Lessor hereby consents to the license of the Leased Premises by Lessee to Carrier. Carrier shall be required to maintain insurance in accordance with the terms of that certain DAS License Agreement, dated July 7, 2016, as amended. Additionally, Carrier, in its discretion, may self-insure any of the required insurance under the same terms as required by that DAS License Agreement.
- (d) Lessee shall be responsible for extraordinary expenses incurred by the Lessor resulting from the use and/or occupancy of the Leased Premises by Lessee or Carrier. Lessor shall submit an itemized invoice of such expenses to Lessee and Lessee shall make payment to Lessor within thirty (30) days of receipt.
- (e) Lessee shall be responsible for all actions, omissions, operations and liabilities of Carrier, including all actions and operations that may be required or prohibited by this Lease. In the event that Carrier acts or operates in a manner which is in violation of any terms or conditions of this Lease, or creates a situation as a result of its actions, omissions or operations which requires remedies as may be specified by this Lease, and rectification of such violations or remedy of such situations is not accomplished within thirty (30) days of written notice to Lessee of such violations or situation, Lessor shall have the right to take any and all actions it deems necessary to rectify such violations or accomplish such remedies, subject to terms and conditions of this Lease. Lessee is responsible for all costs and expenses Lessor incurs as a result of such actions. Lessee shall reimburse

Lessor for said costs and expenses within thirty (30) days of receipt of invoice for the same.

- (f) In the event that Lessor chooses not to exercise its right to take said actions, and rectification of such violations or remedy of such situations is not accomplished to Lessor's satisfaction within sixty (60) days of receipt by the Lessee of written notice of such violation or situation, Lessor may terminate this Lease, subject to Section 14.(a)(1).

20. Condemnation.

Lessor shall provide to Lessee notice of any condemnation proceedings within thirty (30) business days of receipt. In the event the whole of the Leased Premises is taken by eminent domain, this Lease shall terminate as of the date title to the Leased Premises vests in the condemning authority. In the event a portion of the Leased Premises is taken by eminent domain, either party shall have the right to terminate this Lease as of said date of title transfer, by giving thirty (30) days written notice to the other party. In the event of any taking under the power of eminent domain, Lessee shall not be entitled to any portion of the reward paid for the taking and the Lessor shall receive full amount of such award. Lessee hereby expressly waives any right or claim to any portion thereof. Although all damages, whether awarded as compensation for a decrease in value of the leasehold or to the fee of the Leased Premises, shall belong to Lessor, Lessee shall have the right to claim and recover from the condemning authority, but not from Lessor, such compensation as may be separately awarded or recoverable by Lessee on account of any and all damage to Lessee's business and any costs or expenses incurred by Lessee in moving/removing its equipment, personal property, Antenna Facilities, and leasehold improvements.

21. Successors and Assigns.

This Lease shall run with the Property. This Lease shall be binding upon and inure to the benefit of the parties, their respective successors and assigns.

22. Surrender of Leased Premises.

- (a) All portions of the Antenna Facilities brought onto the Property by Lessee will be and remains Lessee's personal property and, at Lessee's option, may be removed by Lessee at any time during or after the term or extension thereof. In the event that this Lease is terminated or not renewed, Lessee shall have sixty (60) days from the termination or expiration date to quit peacefully and surrender possession of the Leased Premises in as good condition as when it was delivered to Lessee, reasonable wear and tear and casualty loss excepted. Lessee shall remove its equipment, personal property, Antenna Facilities, and leasehold improvements from the Property, and shall repair any damage to the Property caused by such equipment, all at Lessee's own cost and expense.
- (b) In the event that Lessee's Antenna Facilities and related equipment are not removed and the Property is not restored to the reasonable satisfaction of the Lessor within sixty (60) days from the termination or expiration date, the Lessor shall have the option to fully

decommission the Antenna Facilities, have the Antenna Facilities removed, and repair the site and restore the property, and Lessee shall be responsible for the cost of such actions.

23. Marking and Lighting Requirements.

- (a) Lessor acknowledges that it shall be responsible, at its sole cost and expense, for compliance with all building marking and lighting requirements that the Federal Aviation Administration (“FAA”) may require with respect solely to the height of the Structure. The responsibility, however, is expressly limited to the requirements that would be required of an elevated water storage facility having no communications equipment installed on it, irrespective of Lessee’s Antenna Facilities. Lessor shall indemnify and hold harmless Lessee from any fines or other liabilities caused by Lessor’s failure to comply with such requirements for an elevated water storage facility Structure. Further, should the FAA cite Lessor, or in the event any claims are brought against Lessor because the Structure alone is not in compliance, as opposed to the Structure with Antenna Facilities, then Lessor shall indemnify Lessee for full costs, liabilities, damages and expenses, including reasonable attorney’s fees. Further, if Lessor does not cure the conditions of noncompliance on the Structure within the time frame allowed by the citing agency, Lessee may terminate this Lease immediately without any further liability hereunder upon written notice to Lessor.
- (b) Lessee acknowledges that it shall be responsible at its sole cost and expense, for compliance with all building marking and lighting requirements that the FAA may require with respect to Lessee’s Antenna Facilities. In the event the FAA determines that the Structure must be additionally marked, lighted, or in any way modified, due to the existence of Lessee’s Antenna Facilities, Lessee shall have the option to mark, light or modify the Structure at its sole expense, or to terminate this Lease, pursuant to *Section 14. Termination*. Said marking, lighting and modifying shall be subject to prior written approval by Lessor, such approval not to be withheld without cause. Lessor shall approve or object to such plans within a reasonable period of time to allow timely compliance with FAA regulations.

24. RF Radiation Compliance.

- (a) An RF Engineer approved by the Lessor shall perform a radiation survey of the Property following Lessee’s initial RF transmissions on the Leased Premises. Lessee shall be responsible for all costs of such survey.
- (b) Lessee shall implement all measures at the transmission site required by FCC regulations, including but not limited to posting signs and markings. Lessor shall cooperate with and permit Lessee to implement all reasonable measures in order for Lessee to fulfill its Radio Frequency exposure obligations. Lessor agrees that in the event any future party causes the entire site to exceed FCC Radio Frequency radiation limits, as measured on the Premises, Lessor shall hold such future party liable for all such later-arising non-compliance.

25. Third Party Approvals, Inspections and Evaluations.

The Lessee shall be responsible for all reasonable costs, as determined by Lessor, associated with obtaining required reviews, approvals, inspections, studies, surveys or evaluations, whether required by this Lease or by other governing authorities.

26. Noise Restrictions.

- (a) All wireless service facilities shall be constructed and operated in such a manner as to minimize the amount of noise impacts to residents of nearby homes and the users of recreational areas, such as public parks and trails. Proposed anticipated noise levels must be approved by Lessor. Plan review may require noise reduction measures.
- (b) Noise from Lessee's equipment shall not exceed the level allowed by the local jurisdiction ("Allowable Noise Level"), as measured at any location on neighboring property. Lessor will take noise level measurements from time to time to verify compliance. In the event it is found that Lessee's equipment exceeds the Allowable Noise Level, Lessor shall provide Lessee with written notice and Lessee shall take immediate steps to provide permanent reduction in the noise of its equipment to the Allowable Noise Level. If Lessee does not so reduce its Measured Sound Level within sixty (60) days of receipt of written notice of event, said occurrence shall constitute an event of default as otherwise defined in *Section 14. Termination*.
- (c) Board reserves the right to require noise reduction measures necessary to reduce noise to a level determined solely by the Board.

27. Miscellaneous.

- (a) Each party agrees to furnish to the other, within thirty (30) days after notice of receipt of the request, such truthful estoppel information as the other party may reasonably request.
- (b) This Lease constitutes the entire agreement and understanding of the parties and supersedes any and all offers, negotiations, or other agreements of any kind with respect to its subject matter. There are no representations or understandings of any kind not set forth herein. Any modification of or amendment to this Lease must be in writing and executed by both parties. No provision of this Lease will be deemed waived by either party unless expressly waived in writing by the waiving party. No waiver shall be implied by delay or any other act or omission of either party. No waiver by either party of any provisions of this Lease shall be deemed a waiver of such provision with respect to any subsequent matter relating to such provision.
- (c) This Lease shall be construed in accordance with the laws of the State of Minnesota. Any legal action may only be commenced and proceed in the relevant district court in Ramsey County, Saint Paul, Minnesota.
- (d) If any term of this Lease is found to be void or invalid, such invalidity shall not affect the remaining terms of this Lease, which shall continue in full force and effect.

- (e) Upon request by Lessee, Lessor agrees to execute a recordable Memorandum of this Lease.
- (f) Any terms and conditions contained in this Lease that by their sense and context are intended to survive the termination or expiration of this Lease shall so survive.
- (g) The submission of this Lease to any party for examination or consideration does not constitute an offer, reservation of or option for the Leased Premises based on the terms set forth herein. This Lease will become effective as a binding Lease only upon the handwritten legal execution and delivery hereof by Lessor and Lessee.
- (h) Exhibits “A” through “F” listed below and attached hereto are hereby incorporated into this Lease by reference.

Exhibit “A” *Legal Description*

Exhibit “B” *Site Survey*

Exhibit “C” *Construction Plans*

Exhibit “D” *Antenna Facilities and Frequencies*

Exhibit “E” *Security Plan*

Exhibit “F” *Memorandum of Lease Recording*

[Remainder of this page is left intentionally blank]

IN WITNESS WHEREOF, the parties hereto have executed this Lease, the day and year first written below.

For Lessor:

**BOARD OF WATER COMMISSIONERS
OF THE CITY OF SAINT PAUL**

Approved:

FIN # 41-6005521

By _____
Stephen P. Schneider, General Manager
Saint Paul Regional Water Services

By _____
Matt Anfang, President

Approved as to form:

By _____
Assistant City Attorney

By _____
Mollie Gagnelius, Secretary

By _____
Todd Hurley, Director
Office of Financial Service

For Lessee:

MP MOBILE SOLUTIONS, LLC

By _____

Print Name: _____

Its: _____

EXHIBIT “A”

Legal Description

Real Estate (owned by Minnesota State Agricultural Society)

The Southeast One-Quarter (SE1/4) of the Northeast One-Quarter (NE1/4) of Section 21, Township 29 North, Range 23 West, Ramsey County, Minnesota.

Tank Easement (to Board of Water Commissioners of the City of Saint Paul)

The South 100 feet of the North 675 feet of the West 100 feet of the East 153 feet of the Southeast One-Quarter (SE ¼) of the Northeast One-Quarter (NE ¼) of Section 21, Township 29 North, Range 23 West, Ramsey County, Minnesota.

Utility Easement (to Board of Water Commissioners of the City of Saint Paul)

The South 30 feet of the North 675 feet of the West 20 feet of the East 53 feet of the Southeast One-Quarter (SE ¼) of the Northeast One-Quarter (NE ¼) of Section 21. Township 29 North, Range 23 West, Ramsey County, Minnesota.

EXHIBIT “B”

Site Survey

Clearwire survey dated 5/20/2010

The Southeast Quarter of the Northeast Quarter of Section 21, Township 29 North, Range 23 West, Ramsey County, Minnesota.

An Access Easement 10 feet in width located in that part of the Southeast Quarter of the Northeast Quarter of Section 21, Township 29 North, Range 23 West, Ramsey County, Minnesota, and center line being more particularly described as follows:

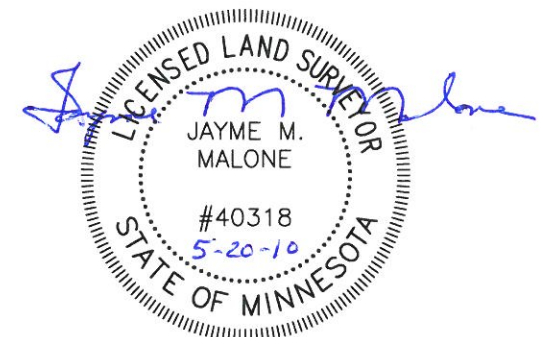
Referring to the Northeast Corner of said Section 21; thence southerly S 00°06'36" E, on the East line of the Northeast Quarter of said Section 21, 1911.52 feet; thence westerly S 89°53'24" W, 158.94 feet, to the Point of Beginning for the center line of the described easement; thence southerly S 00°06'26" W, 90.06 feet; thence southwesterly S 31°52'21" W, 28.28 feet; thence southwesterly S 45°30'16" W, 125.55 feet; thence southwesterly S 50°23'23" W, 19.76 feet; thence southwesterly S 56°34'07" W, 35.96 feet; thence southwesterly S 62°39'45" W, 32.19 feet; thence westerly N 90°00'00" W, 57.14 feet, to the Point of Termination for the center line of the described easement.

1.) All Bearings Based on Minnesota State Plane Coordinate System, South Zone. (NAD-83)

The map shows a section of St. Paul, Minnesota, with various streets and landmarks. The 'SITE' is indicated by an arrow pointing to a location near the intersection of Snelling Ave N and Larpenteur Ave W. Other streets shown include Falcon Heights, Roseville, and Como Park. The map also includes a copyright notice for Microsoft Corporation and a disclaimer for the data source.

Flood Information:
Property falls within
a Area not currently
printed by FEMA.

● = Cor. Fnd	AC = Air Conditioning Unit
○ = Cor. Set #5	⬢ = Electric Meter
Rebar w/cap	ⓔ = Electric Manhole
⊕ = Section Corner	Ⓟ = Electric Pedestal
Ⓟ = Benchmark	⦿ = Fire Hydrant
(M) = Meas. Dist.	Ⓒ = Gas Manhole
(P) = Plat Dist.	Ⓖ = Gas Meter
(D) = Deed Dist.	→ = Guy Wire
(R) = Record Dist.	Ⓜ = Manhole
P.O.B. = Point of Beginning	☼ = Light Pole
P.O.R. = Point of Reference	● = Post
— Elec — = Underground Electric	⚡ = Power Pole
— Tele — = Underground Telephone	Ⓢ = Sanitary Manhole
— TV — = Underground Television	Ⓢ = Storm Manhole
— FO — = Underground Fiber Optic	Ⓣ = Telephone Pedestal
— ohu — = Overhead Utilities	Ⓣ = Telephone Manhole
— o — = Chain Link Fence	Ⓣ = TV Pedestal
— x — = Barbed Wire Fence	Ⓣ = TV Manhole
— □ — = Wood Fence	⌘ = Valve
	Ⓦ = Water Manhole
	Ⓦ = Well



**W-T COMMUNICATION
DESIGN GROUP, LLC.**
WIRELESS INFRASTRUCTURE

2675 Pratum Avenue
Hoffman Estates, Illinois 60192
PH: (224) 293-6333 FAX: (224) 293-6444
www.wtengineering.com

IL License No.: 184-001108 Exp: 04/30/11

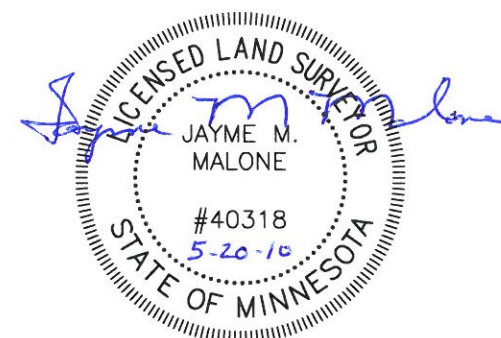
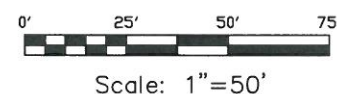
COPYRIGHT © 2009 W-T COMMUNICATION DESIGN GROUP, LLC

clearw're®
wireless broadband

**SITE NAME: FALCON HEIGHTS -
LARPENTEUR AVE. W & SNELLING AVE. N
SITE ID: MN-MSP-0369A**

1530 COSGROVE STREET
FALCON HEIGHTS, MN 55106

										PROJECT NUMBER	
										HS3194	
										DRAWING TITLE	
										LAND SURVEY	
										DRAWING NUMBER	
										LS-1	
NO.		DATE		REVISIONS				BY	CHK	APP'D	
SCALE: AS SHOWN		DESIGNED BY: TEG			DRAWN BY: TEG						



1530 COSGROVE STREET
FALCON HEIGHTS, MN 55106

NO.	DATE	REVISIONS	BY	CHK APP
SCALE: AS SHOWN		DESIGNED BY: TEG	DRAWN BY: TEG	

PROJECT NUMBER
HS3194

DRAWING TITLE
LAND SURVEY

DRAWING NUMBER
LS-2

EXHIBIT “C”

Construction Plans

Dated 03/31/2017, Rev 1

SITE PHOTO



PROJECT INFORMATION

SITE ADDRESS:	1530 COSGROVE STREET FALCON HEIGHTS, MN 55108
COUNTY	RAMSEY COUNTY
SITE NAME:	MN STATE FAIR WT
AT&T SITE ID	MNL01485
FA NUMBER:	13694784
USID NUMBER:	173991
LATITUDE (NAD 83):	44° 59' 11.1876" N 44.986441
LONGITUDE (NAD 83):	93° 10' 2.3016" W -93.167306
GROUND ELEVATION:	951' AMSL
ZONING DISTRICT:	MN STATE FAIR
TOWER OWNER:	CITY OF ST. PAUL
LANDLORD CONTACT:	ST. PAUL REGIONAL WATER WATERINQUIRIES@CI.STPAUL.MN.US
GROUND OWNER:	MN STATE FAIR
OCCUPANCY GROUP:	U
CONSTRUCTION TYPE:	V-B
AT&T PROJECT MANAGER	LANE GIBBONS (612) 865-0865 LG6734@ATT.COM
SITE ACQUISITION MANAGER:	JASON HALL (612) 670-0101 JHALL@HALLINSTITUTE.COM
B&V LEAD ENGINEER	R. AARON EVANS (952) 896-0751 (OFFICE) (320) 815-6068 (CELL) EVANSRA@BV.COM

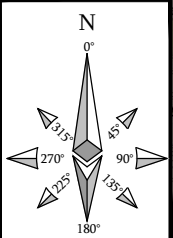
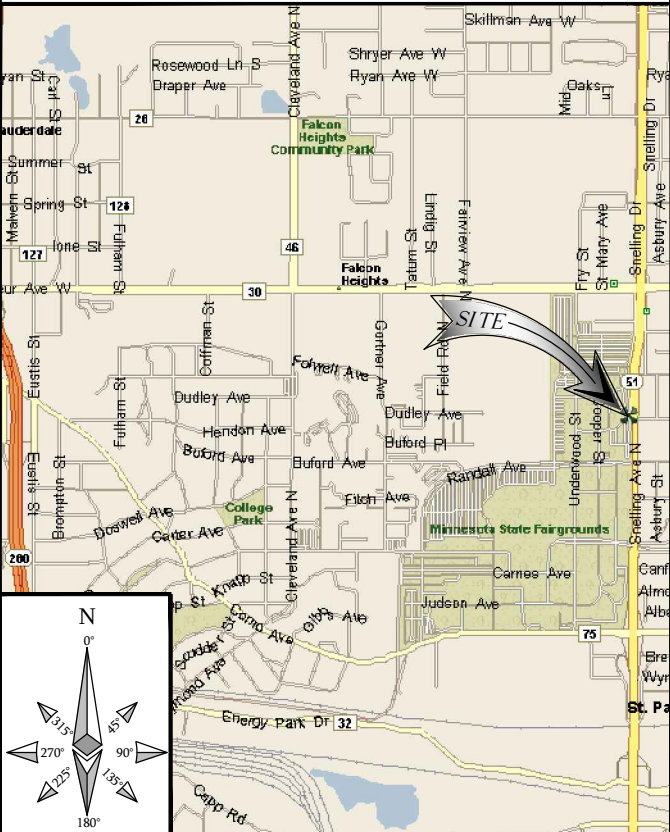
AT&T MOBILITY

PROJECT: DAS-SECTOR 12/13
AT&T SITE ID: MNL01485
FA#: 13694784

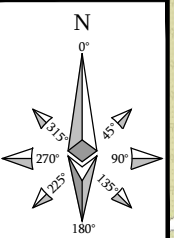
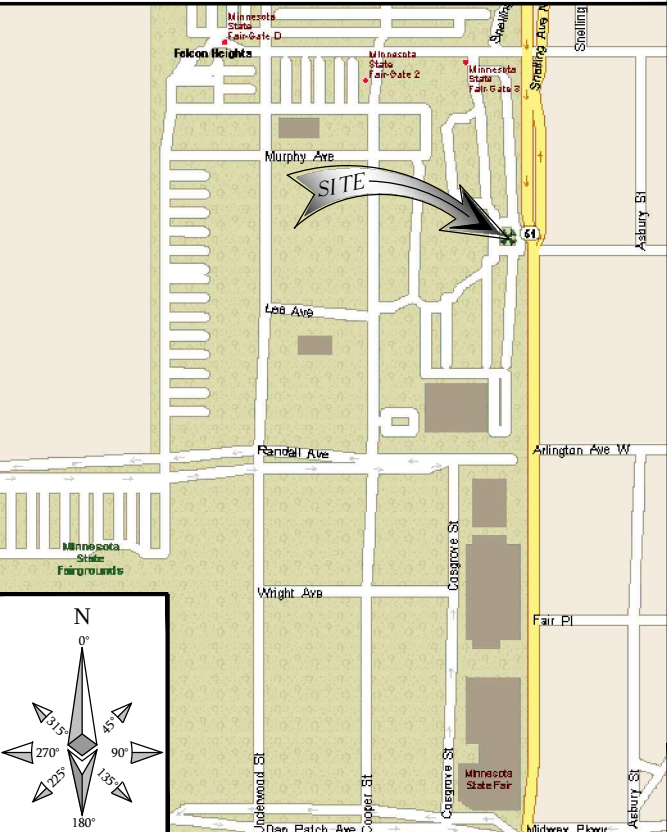
MN STATE FAIR WT FALCON HEIGHTS, MN 55108

AREA MAP

VICINITY MAP



LOCAL MAP



DRIVING DIRECTIONS

DIRECTIONS FROM AT&T OFFICE:
HEAD NORTH ON MARQUETTE AVE, TURN RIGHT (EAST) ONTO S 4TH ST/SR-122 TURN RIGHT ONTO RAMP TO CEDAR AVE / I-35W N AND TURN LEFT (NORTH) ONTO CR-152 TAKE RAMP (RIGHT) ONTO I-35W. THEN AT EXIT 23B, TAKE RAMP (RIGHT) ONTO I-35W AND KEEP RIGHT ONTO SR-36. THEN TAKE RAMP (RIGHT) ONTO MN-51 / SNELLING AVE TURN RIGHT (WEST) ONTO DAN PATCH AVE. TURN RIGHT (NORTH) ON COOPER STREET. THEN TURN RIGHT (EAST) ONTO LEE AVENUE. ACCESS DRIVE WILL BE THE FIRST DRIVE STRAIGHT AHEAD. TANK IS LOCATED ON NE SIDE OF MN STATE FAIR GROUNDS NEAR HOYT AVENUE W

ENGINEERING

2012 INTERNATIONAL BUILDING CODE
2015 MINNESOTA BUILDING CODE
2014 NATIONAL ELECTRIC CODE
TIA/EIA-222-G OR LATEST EDITION

REFERENCE MATERIALS

THESE LTE DRAWINGS ARE BASED ON AT&T SCOPING DOCUMENT DATED 02/24/17.
CONTRACTOR SHALL USE THE LATEST VERSION OF THE RFDS WITH THE CONSTRUCTION
DRAWINGS PER THE SCOPE OF WORK.

DRAWING INDEX

SHEET NO:	SHEET TITLE
COVER	TITLE SHEET
C-1	COMPOUND PLAN
C-2	EQUIPMENT LAYOUT PLAN
C-3	NOT USED
C-4	SITE WORK AND DRAINAGE NOTES
T-1	TOWER ELEVATIONS
T-2	ANTENNA CONFIGURATION
T-3	ANTENNA AND RRH REQUIREMENTS
T-4	TOWER EQUIPMENT DETAILS
T-4.1	TOWER EQUIPMENT DETAILS
T-5	TOWER SECTION NOTES
E-1	ONE-LINE GROUNDING DIAGRAM
E-2	GROUNDING DETAILS
E-3	ELECTRICAL SECTION NOTES
N-1	LEGEND AND ABBREVIATIONS
N-2	GENERAL NOTES
N-3	COATING NOTES AND SPECIFICATIONS

11"x17" PLOT WILL BE HALF SCALE UNLESS OTHERWISE NOTED



TO OBTAIN LOCATION OF PARTICIPANTS UNDERGROUND FACILITIES
BEFORE YOU DIG IN MINNESOTA, CALL GOPHER STATE ONE CALL

TOLL FREE: 1-800-252-1166 OR
FAX A LOCATE: 1-800-236-4967

MIN STATUTE REQUIRES MIN OF 48 HOURS NOTICE BEFORE YOU EXCAVATE

-THESE PLANS CONFORM TO ALL OF THE REQUIREMENTS CALLED OUT IN THE JURISDICTION
PLANNING AND ZONING FOR ANTENNAS AND SUPPORT STRUCTURES WHERE SITE IS LOCATED.
-SUBCONTRACTOR SHALL VERIFY ALL PLANS AND EXISTING CONDITIONS ON SITE. IMMEDIATELY
NOTIFY ENGINEER OF ANY DISCREPANCIES PRIOR TO PERFORMING ANY WORK OR BE RESPONSIBLE
FOR THE SAME

AT&T
MOBILITY

901 MARQUETTE AVENUE
MINNEAPOLIS, MN 55402



BLACK & VEATCH

BLACK & VEATCH CORPORATION
7760 FRANCE AVENUE SOUTH
SUITE 1200
BLOOMINGTON, MN 55435

PROJECT NO: 188262.1027

DRAWN BY: JJS

CHECKED BY: JAT

REV	DATE	DESCRIPTION
1	03/31/07	REVISED PER COMMENTS
0	03/13/17	ISSUED FOR CONSTRUCTION

I HEREBY CERTIFY THAT THIS PLAN,
SPECIFICATION, OR REPORT WAS
PREPARED BY ME OR UNDER MY
DIRECT SUPERVISION AND THAT I AM
A DULY LICENSED PROFESSIONAL
ENGINEER IN THE STATE OF
MINNESOTA.

PRINT NAME: NATHAN C. PETRY

SIGNATURE:

DATE: 03/31/2017 LICENSE# 51299
EXP. 6/18

IT IS A VIOLATION OF LAW FOR ANY PERSON,
UNLESS THEY ARE ACTING UNDER THE DIRECTION
OF A LICENSED PROFESSIONAL ENGINEER,
TO ALTER THIS DOCUMENT.

MN STATE FAIR WT
MNL01485
1530 COSGROVE STREET
FALCON HEIGHTS, MN 55108
DAS-SECTOR 12/13

SHEET TITLE

TITLE SHEET

SHEET NUMBER

COVER



PROJECT DESCRIPTION

1. CONTRACTOR SHALL FIELD VERIFY ALL DIMENSIONS.
2. CONTRACTOR SHALL MAINTAIN A 10'-0" MINIMUM SEPARATION BETWEEN THE PROPOSED LTE GPS ANTENNA AND TRANSMITTING ANTENNAS.
3. PROPERTY LINES ARE APPROXIMATIONS ONLY.
4. ANTENNAS & MOUNTS OMITTED FOR CLARITY.
5. FOR FIBER TRUNK REF AT&T LTE GUIDE LINES REV. 1.9 PAGE 13 TABLE 2.1.2.
6. FOR DC POWER CABLE TRUNK REF AT&T LTE GUIDE LINES REV 1.9 PAGE 14 TABLE 2.1.3

	<u>LEGEND</u>

SHEET NUMBER
C-1

1. CONTRACTOR SHALL FIELD VERIFY ALL DIMENSIONS.
2. CONTRACTOR SHALL MAINTAIN A 10'-0" MINIMUM SEPARATION BETWEEN THE PROPOSED GPS ANTENNAS AND TRANSMITTING ANTENNAS.

AT&T TO VERIFY
REQUIRED SHELTER
EQUIPMENT.

NOTES

AT&T
MOBILITY

901 MARQUETTE AVENUE
MINNEAPOLIS, MN 55402



BLACK & VEATCH

BLACK & VEATCH CORPORATION
7760 FRANCE AVENUE SOUTH
SUITE 1200
BLOOMINGTON, MN 55435

PROJECT NO:	188262.1027
DRAWN BY:	JJS
CHECKED BY:	JAT

1	03/31/07	REVISED PER COMMENTS
0	03/13/17	ISSUED FOR CONSTRUCTION
REV	DATE	DESCRIPTION

I HEREBY CERTIFY THAT THIS PLAN, SPECIFICATION, OR REPORT WAS PREPARED BY ME OR UNDER MY DIRECT SUPERVISION AND THAT I AM A DULY LICENSED PROFESSIONAL ENGINEER IN THE STATE OF MINNESOTA.

PRINT NAME: NATHAN C. PETRY

SIGNATURE: 

DATE: 03/31/2017 LICENSE# 51299
EXP. 6/18

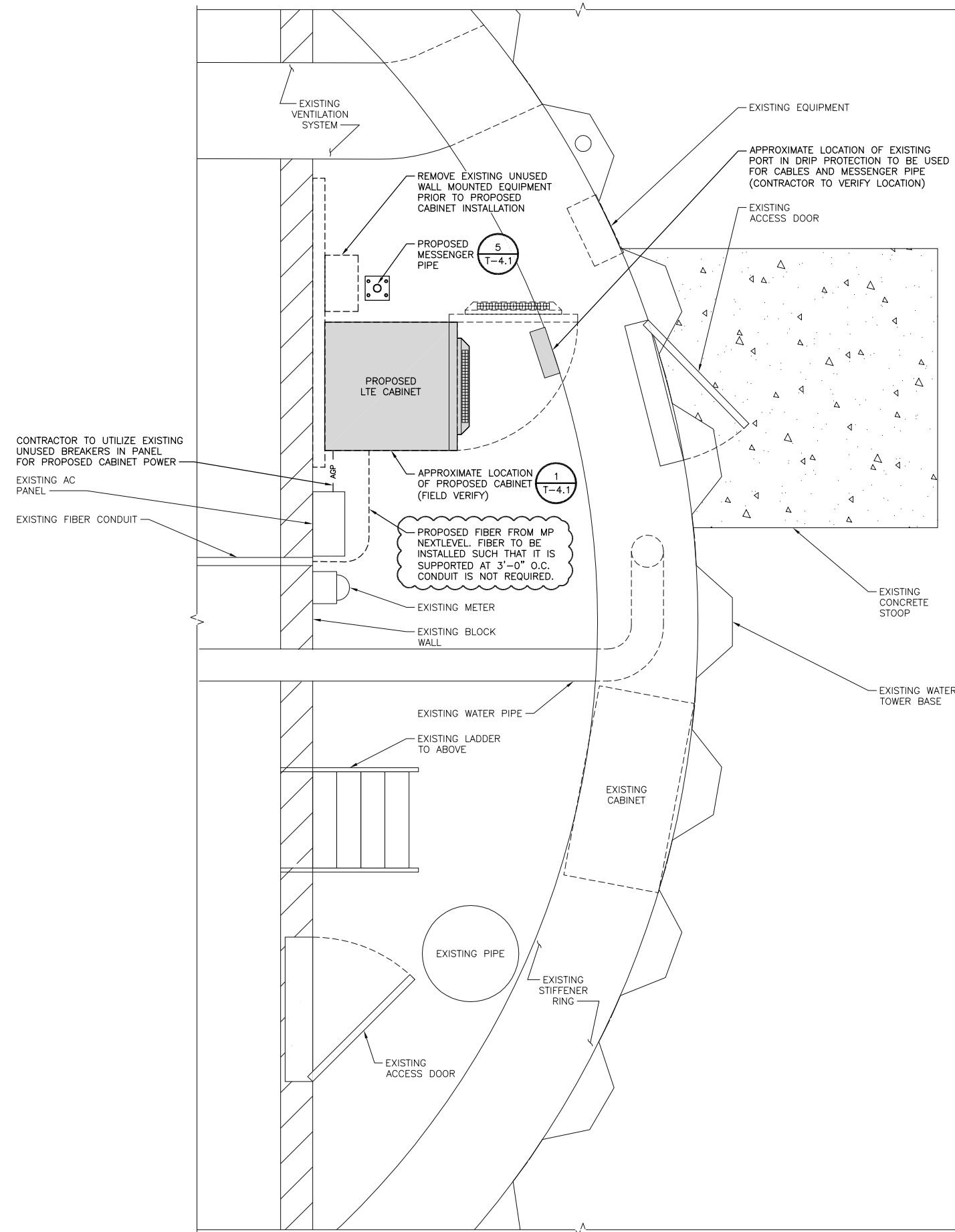
IT IS A VIOLATION OF LAW FOR ANY PERSON, UNLESS THEY ARE ACTING UNDER THE DIRECTION OF A LICENSED PROFESSIONAL ENGINEER, TO ALTER THIS DOCUMENT.

MN STATE FAIR WT
MNL01485
1530 COSGROVE STREET
FALCON HEIGHTS, MN 55108
DAS-SECTOR 12/13

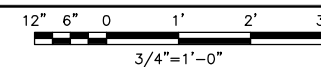
SHEET TITLE
EQUIPMENT
LAYOUT PLAN

SHEET NUMBER

C-2



EQUIPMENT LAYOUT PLAN



1

PART 1 – GENERAL

CLEARING, GRUBBING, STRIPPING, EROSION CONTROL, SURVEY, LAYOUT, SUBGRADE PREPARATION AND FINISH GRADING AS REQUIRED TO COMPLETE THE PROPOSED WORK SHOWN IN THESE PLANS.

1.1 REFERENCES:

- A. DOT (STATE DEPARTMENT OF TRANSPORTATION STANDARD SPECIFICATIONS FOR HIGHWAY CONSTRUCTION–CURRENT EDITION).
- B. ASTM (AMERICAN SOCIETY FOR TESTING AND MATERIALS).
- C. OSHA (OCCUPATION SAFETY AND HEALTH ADMINISTRATION).

1.2 INSPECTION AND TESTING:

- A. FIELD TESTING OF EARTHWORK COMPACTION AND CONCRETE CYLINDERS SHALL BE PERFORMED BY CONTRACTORS INDEPENDENT TESTING LAB. THIS WORK TO BE COORDINATED BY THE CONTRACTOR.
- B. ALL WORK SHALL BE INSPECTED AND RELEASED BY THE GENERAL CONTRACTOR WHO SHALL CARRY OUT THE GENERAL INSPECTION OF THE WORK WITH SPECIFIC CONCERN TO PROPER PERFORMANCE OF THE WORK AS SPECIFIED AND/OR CALLED FOR ON THE DRAWINGS. IT IS THE CONTRACTOR'S RESPONSIBILITY TO REQUEST TIMELY INSPECTIONS PRIOR TO PROCEEDING WITH FURTHER WORK THAT WOULD MAKE PARTS OF WORK INACCESSIBLE OR DIFFICULT TO INSPECT.

1.3 SITE MAINTENANCE AND PROTECTION:

- A. PROVIDE ALL NECESSARY JOB SITE MAINTENANCE FROM COMMENCEMENT OF WORK UNTIL COMPLETION OF THE SUBCONTRACT.
- B. AVOID DAMAGE TO THE SITE AND TO EXISTING FACILITIES, STRUCTURES, TREES, AND SHRUBS DESIGNATED TO REMAIN. TAKE PROTECTIVE MEASURES TO PREVENT EXISTING FACILITIES THAT ARE NOT DESIGNATED FOR REMOVAL FROM BEING DAMAGED BY THE WORK.
- C. KEEP SITE FREE OF ALL PONDING WATER.
- D. PROVIDE EROSION CONTROL MEASURES IN ACCORDANCE WITH STATE DOT AND EPA REQUIREMENTS.
- E. PROVIDE AND MAINTAIN ALL TEMPORARY FENCING, BARRICADES, WARNING SIGNALS AND SIMILAR DEVICES NECESSARY TO PROTECT AGAINST THEFT FROM PROPERTY DURING THE ENTIRE PERIOD OF CONSTRUCTION. REMOVE ALL SUCH DEVICES UPON COMPLETION OF THE WORK.
- F. EXISTING UTILITIES: DO NOT INTERRUPT EXISTING UTILITIES SERVING FACILITIES OCCUPIED BY THE OWNER OR OTHERS, EXCEPT WHEN PERMITTED IN WRITING BY THE ENGINEER AND THEN ONLY AFTER ACCEPTABLE TEMPORARY UTILITY SERVICES HAVE BEEN PROVIDED.
 - 1. PROVIDE A MINIMUM 48–HOUR NOTICE TO THE ENGINEER AND RECEIVE WRITTEN NOTICE TO PROCEED BEFORE INTERRUPTING ANY UTILITY SERVICE.

PART 2 – PRODUCTS

- 2.1 SUITABLE BACKFILL: ASTM D2321 (CLASS I, II, III OR IV) FREE FROM FROZEN LUMPS, REFUSE, STONES OR ROCKS LARGER THAN 3 INCHES IN ANY DIMENSION OR OTHER MATERIAL THAT MAY MAKE THE INORGANIC MATERIAL UNSUITABLE FOR BACKFILL.
- 2.2 NON–POROUS GRANULAR EMBANKMENT AND BACKFILL: ASTM D2321 (CLASS III, IVA OR IVB) COARSE AGGREGATE. FREE FROM FROZEN LUMPS, REFUSE, STONES OR ROCKS LARGER THAN 3 INCHES IN ANY DIMENSION OR OTHER MATERIAL THAT MAY MAKE THE INORGANIC MATERIAL UNSUITABLE FOR BACKFILL.
- 2.3 POROUS GRANULAR EMBANKMENT AND BACKFILL: ASTM D2321 (CLASS IA, IB OR II) COARSE AGGREGATE FREE FROM FROZEN LUMPS, REFUSE, STONES OR ROCKS LARGER THAN 3 INCHES IN ANY DIMENSION OR OTHER MATERIAL THAT MAY MAKE THE INORGANIC MATERIAL UNSUITABLE FOR BACKFILL.
- 2.4 SELECT STRUCTURAL FILL: GRANULAR FILL MATERIAL MEETING THE REQUIREMENTS OF ASTM E850–95. FOR USE AROUND AND UNDER STRUCTURES WHERE STRUCTURAL FILL MATERIAL ARE REQUIRED.
- 2.5 GRANULAR BEDDING AND TRENCH BACKFILL: WELL–GRADED SAND MEETING THE GRADATION REQUIREMENTS OF ASTM D2487 (SE OR SW–SM).
- 2.6 COARSE AGGREGATE FOR ACCESS ROAD SUBBASE COURSE SHALL CONFORM TO ASTM D2940.
- 2.7 UNSUITABLE MATERIAL: HIGH AND MODERATELY PLASTIC SILTS AND CLAYS (LL>45). MATERIAL CONTAINING REFUSE, FROZEN LUMPS, DEMOLISHED BITUMINOUS MATERIAL, VEGETATIVE MATTER, WOOD, STONES IN EXCESS OF 3 INCHES IN ANY DIMENSION, AND DEBRIS AS DETERMINED BY THE CONSTRUCTION MANAGER. TYPICALLY THESE WILL BE SOILS CLASSIFIED BY ASTM AS: PT, MH, CH, OH, ML, AND OL.
- 2.8 GEOTEXTILE FABRIC: MIRAFI 500X OR ENGINEER APPROVED EQUAL.
- 2.9 PLASTIC MARKING TAPE: SHALL BE ACID AND ALKALI RESISTANT POLYETHYLENE FILM SPECIFICALLY MANUFACTURED FOR MARKING AND LOCATING UNDERGROUND UTILITIES. 6 INCHES WIDE WITH A MINIMUM THICKNESS OF 0.004 INCH. TAPE SHALL HAVE MINIMUM STRENGTH OF 1500 PSI IN BOTH DIRECTIONS AND MANUFACTURED WITH INTEGRAL CONDUCTORS, FOIL BACKING OR OTHER MEANS TO ENABLE DETECTION BY A METAL DETECTOR WHEN BURIED UP TO 3 FEET DEEP. THE METALLIC CORE OF THE TAPE SHALL BE ENCASED IN A PROTECTIVE JACKET OR PROVIDED WITH OTHER MEANS TO PROTECT IT FROM CORROSION. TAPE COLOR SHALL BE RED FOR ELECTRIC UTILITIES AND ORANGE FOR TELECOMMUNICATION UTILITIES.

PART 3 – EXECUTION

3.1 GENERAL:

- A. BEFORE STARTING GENERAL SITE PREPARATION ACTIVITIES, INSTALL EROSION AND SEDIMENT CONTROL MEASURES. THE WORK AREA SHALL BE CONSTRUCTED AND MAINTAINED IN SUCH CONDITION THAT IN THE EVENT OF RAIN THE SITE WILL BE DRAINED AT ANY TIME.
- B. BEFORE ALL SURVEY, LAYOUT, STAKING, AND MARKING, ESTABLISH AND MAINTAIN ALL LINES, GRADES, ELEVATIONS AND BENCHMARKS NEEDED FOR EXECUTION OF THE WORK.
- C. CLEAR AND GRUB THE AREA WITHIN THE LIMITS OF THE SITE. REMOVE TREES, BRUSH, STUMPS, RUBBISH AND OTHER DEBRIS AND VEGETATION RESTING ON OR PROTRUDING THROUGH THE SURFACE OF THE SITE AREA TO BE CLEARED.
 - 1. REMOVE THE FOLLOWING MATERIALS TO A DEPTH OF NO LESS THAN 12 INCHES BELOW THE ORIGINAL GROUND SURFACE: ROOTS, STUMPS, AND OTHER DEBRIS, BRUSH, AND REFUSE EMBEDDED IN OR PROTRUDING THROUGH THE GROUND SURFACE, RAKE, DISK OR PLOW THE AREA TO A DEPTH OF NO LESS THAN 6 INCHES, AND REMOVE TO A DEPTH OF 12 INCHES ALL ROOTS AND OTHER DEBRIS THEREBY EXPOSED.
 - 2. REMOVE TOPSOIL MATERIAL COMPLETELY FROM THE SURFACE UNTIL THE SOIL NO LONGER MEETS THE DEFINITION OF TOPSOIL. AVOID MIXING TOPSOIL WITH SUBSOIL OR OTHER UNDESIRABLE MATERIALS.
 - 3. EXCEPT WHERE EXCAVATION TO GREATER DEPTH IS INDICATED, FILL DEPRESSIONS RESULTING FROM CLEARING, GRUBBING AND DEMOLITION WORK COMPLETELY WITH SUITABLE FILL.
- A. REMOVE FROM THE SITE AND DISPOSE IN AN AUTHORIZED LANDFILL ALL DEBRIS RESULTING FROM CLEARING AND GRUBBING OPERATIONS. BURNING WILL NOT BE PERMITTED.

- B. PRIOR TO EXCAVATING, THOROUGHLY EXAMINE THE AREA TO BE EXCAVATED AND/OR TRENCHED TO VERIFY THE LOCATIONS OF FEATURES INDICATED ON THE DRAWINGS AND TO ASCERTAIN THE EXISTENCE AND LOCATION OF ANY STRUCTURE, UNDERGROUND STRUCTURE, OR OTHER ITEM NOT SHOWN THAT MIGHT INTERFERE WITH THE PROPOSED CONSTRUCTION. NOTIFY THE CONSTRUCTION MANAGER OF ANY OBSTRUCTIONS THAT WILL PREVENT ACCOMPLISHMENT OF THE WORK AS INDICATED ON THE DRAWINGS.
- C. SEPARATE AND STOCK PILE ALL EXCAVATED MATERIALS SUITABLE FOR BACKFILL. ALL EXCESS EXCAVATED AND UNSUITABLE MATERIALS SHALL BE DISPOSED OF OFF–SITE IN A LEGAL MANNER.

3.2 BACKFILL:

- A. AS SOON AS PRACTICAL, AFTER COMPLETING CONSTRUCTION OF THE RELATED STRUCTURE, INCLUDING EXPIRATION OF THE SPECIFIED MINIMUM CURING PERIOD FOR CAST–IN–PLACE CONCRETE, BACKFILL THE EXCAVATION WITH APPROVED MATERIAL TO RESTORE THE REQUIRED FINISHED GRADE.
 - 1. PRIOR TO PLACING BACKFILL AROUND STRUCTURES, ALL FORMS SHALL BE REMOVED AND THE EXCAVATION CLEANED OF ALL TRASH, DEBRIS, AND UNSUITABLE MATERIALS.
 - 2. BACKFILL BY PLACING AND COMPACTING SUITABLE BACKFILL MATERIAL OR SELECT GRANULAR BACKFILL MATERIAL WHEN REQUIRED IN UNIFORM HORIZONTAL LAYERS OF NO GREATER THAN 8–INCHES LOOSE THICKNESS AND COMPACTED. WHERE HAND OPERATED COMPACTORS ARE USED, THE FILL MATERIAL SHALL BE PLACED IN LIFTS NOT TO EXCEED 4 INCHES IN LOOSE DEPTH AND COMPACTED.
 - 3. WHENEVER THE DENSITY TESTING INDICATES THAT THE CONTRACTOR HAS NOT OBTAINED THE SPECIFIED DENSITY, THE SUCCEEDING LAYER SHALL NOT BE PLACED UNTIL THE SPECIFICATION REQUIREMENTS ARE MET UNLESS OTHERWISE AUTHORIZED BY THE GEOTECHNICAL ENGINEER. THE CONTRACTOR SHALL TAKE WHATEVER APPROPRIATE ACTION IS NECESSARY, SUCH AS DISKING AND DRYING, ADDING WATER, OR INCREASING THE COMPACTIVE EFFORT TO MEET THE MINIMUM COMPACTION REQUIREMENTS.
- B. THOROUGHLY COMPACT EACH LAYER OF BACKFILL TO A MINIMUM OF 95 PERCENT OF THE MAXIMUM DRY DENSITY AS PROVIDED BY THE STANDARD PROCTOR TEST, ASTM D 698.

3.3 TRENCH EXCAVATION:

- A. UTILITY TRENCHES SHALL BE EXCAVATED TO THE LINES AND GRADES SHOWN ON THE DRAWINGS OR AS DIRECTED BY THE GENERAL CONTRACTOR. PROVIDE SHORING, SHEETING AND BRACING AS REQUIRED TO PREVENT CAVING OR SLOUGHING OF THE TRENCH WALLS.
- B. EXTEND THE TRENCH WIDTH A MINIMUM OF 6 INCHES BEYOND THE OUTSIDE EDGE OF THE OUTERMOST CONDUIT.
- C. WHEN SOFT YIELDING, OR OTHERWISE UNSTABLE SOIL CONDITIONS ARE ENCOUNTERED, BACKFILL AT THE REQUIRED TRENCH TO A DEPTH OF NO LESS THAN 12 INCHES BELOW THE REQUIRED ELEVATION AND BACKFILL WITH GRANULAR BEDDING MATERIAL.

3.4 TRENCH BACKFILL:

- A. PROVIDE GRANULAR BEDDING MATERIAL IN ACCORDANCE WITH THE DRAWINGS AND THE UTILITY REQUIREMENTS.
- B. NOTIFY THE GENERAL CONTRACTOR 24 HOURS IN ADVANCE OF BACKFILLING.
- C. CONDUCT UTILITY CHECK TESTS BEFORE BACKFILLING. BACKFILL AND COMPACT TRENCH BEFORE ACCEPTANCE TESTING.
- D. PLACE GRANULAR TRENCH BACKFILL UNIFORMLY ON BOTH SIDES OF THE CONDUITS IN 6–INCH UNCOMPACTED LIFTS UNTIL 12 INCHES OVER THE CONDUITS. SOLIDLY RAM AND TAMP BACKFILL INTO SPACE AROUND CONDUITS.
- E. PROTECT CONDUIT FROM LATERAL MOVEMENT, IMPACT DAMAGE, OR UNBALANCED LOADING.
- F. ABOVE THE CONDUIT EMBEDMENT ZONE, PLACE AND COMPACT SATISFACTORY BACKFILL MATERIAL IN 8–INCH MAXIMUM LOOSE THICKNESS LIFTS TO RESTORE THE REQUIRED FINISHED SURFACE GRADE.
- G. COMPACT FINAL TRENCH BACKFILL TO A DENSITY EQUAL TO OR GREATER THAN THAT OF THE EXISTING UNDISTURBED MATERIAL IMMEDIATELY ADJACENT TO THE TRENCH BUT NO LESS THAN A MINIMUM OF 95 PERCENT OF THE MAXIMUM DRY DENSITY AS PROVIDED BY THE STANDARD PROCTOR TEST, ASTM D 698.

3.5 AGGREGATE ACCESS ROAD:

- A. CLEAR, GRUB, STRIP AND EXCAVATE FOR THE ACCESS ROAD TO THE LINES AND GRADES INDICATED ON THE DRAWINGS. SCARIFY TO A DEPTH OF 6 INCHES AND PROOF–ROLL. ALL HOLES, RUTS, SOFT PLACES AND OTHER DEFECTS SHALL BE CORRECTED.
- B. THE ENTIRE SUBGRADE SHALL BE COMPACTED TO NOT LESS THAN 95 PERCENT OF THE MAXIMUM DRY DENSITY AS PROVIDED BY THE MODIFIED PROCTOR TEST, ASTM D 1557.
- C. AFTER PREPARATION OF THE SUBGRADE IS COMPLETE THE GEOTEXTILE FABRIC (MIRAFI 500X) SHALL BE INSTALLED TO THE LIMITS INDICATED ON THE DRAWINGS BY ROLLING THE FABRIC OUT LONGITUDINALLY ALONG THE ROADWAY. THE FABRIC SHALL NOT BE DRAGGED ACROSS THE SUBGRADE. PLACE THE ENTIRE ROLL IN A SINGLE OPERATION, ROLLING OUT AS SMOOTHLY AS POSSIBLE.
 - 1. OVERLAPS PARALLEL TO THE ROADWAY WILL BE PERMITTED AT THE CENTERLINE AND AT LOCATIONS BEYOND THE ROADWAY SURFACE WIDTH (I.E. WITHIN THE SHOULDER WIDTH) ONLY. NO LONGITUDINAL OVERLAPS SHALL BE LOCATED BETWEEN THE CENTERLINE AND THE SHOULDER. PARALLEL OVERLAPS SHALL BE A MINIMUM OF 3 FEET WIDE.
 - 2. TRANSVERSE (PERPENDICULAR TO THE ROADWAY) OVERLAPS AT THE END OF A ROLL SHALL OVERLAP IN THE DIRECTION OF THE AGGREGATE PLACEMENT (PREVIOUS ROLL ON TOP) AND SHALL HAVE A MINIMUM LENGTH OF 3 FEET.
 - 3. ALL OVERLAPS SHALL BE PINNED WITH STAPLES OR NAILS A MINIMUM OF 10 INCHES LONG TO INSURE POSITIONING DURING PLACEMENT OF AGGREGATE. PIN LONGITUDINAL SEAMS AT 25 FOOT CENTERS AND TRANSVERSE SEAMS EVERY 5 FEET.
- D. THE AGGREGATE BASE AND SURFACE COURSES SHALL BE CONSTRUCTED IN LAYERS NOT MORE THAN 4 INCH (COMPACTED) THICKNESS. AGGREGATE TO BE PLACED ON GEOTEXTILE FABRIC SHALL BE END–DUMPED ON THE FABRIC FROM THE FREE END OF THE FABRIC OR OVER PREVIOUSLY PLACED AGGREGATE. THE FIRST LIFT SHALL BE BLADED DOWN TO A THICKNESS OF 8 INCHES PRIOR TO COMPACTION. AT NO TIME SHALL EQUIPMENT, EITHER TRANSPORTING THE AGGREGATE OR GRADING THE AGGREGATE, BE PERMITTED ON THE ROADWAY WITH LESS THAN 4 INCHES OF MATERIAL COVERING THE FABRIC.
- E. THE AGGREGATE SHALL BE IMMEDIATELY COMPACTED TO NOT LESS THAN 95 PERCENT OF THE MAXIMUM DRY DENSITY AS PROVIDED BY THE MODIFIED PROCTOR TEST, ASTM D 1557 WITH A TAMPING ROLLER, OR WITH A PNEUMATIC–TIRE ROLLER, OR WITH A VIBRATORY MACHINE OR ANY COMBINATION OF THE ABOVE. THE TOP LAYER SHALL BE GIVEN A FINAL ROLLING WITH A THREE–WHEEL OR TANDEM ROLLER.

3.6 FINISH GRADING:

- A. PERFORM ALL GRADING TO PROVIDE POSITIVE DRAINAGE AWAY FROM STRUCTURES AND SMOOTH, EVEN SURFACE DRAINAGE OF THE ENTIRE AREA WITHIN THE LIMITS OF CONSTRUCTION. GRADING SHALL BE COMPATIBLE WITH ALL SURROUNDING TOPOGRAPHY AND STRUCTURES.
- B. UTILIZE SATISFACTORY FILL MATERIAL RESULTING FROM THE EXCAVATION WORK IN THE CONSTRUCTION OF FILLS, EMBANKMENTS AND FOR REPLACEMENT OF REMOVED UNSUITABLE MATERIALS.

- C. ACHIEVE FINISHED GRADE BY PLACING A MINIMUM OF 4 INCHES OF 1/2” – 3/4” CRUSHED STONE ON TOP SOIL STABILIZER FABRIC.
- D. REPAIR ALL ACCESS ROADS AND SURROUNDING AREAS USED DURING THE COURSE OF THIS WORK TO THEIR ORIGINAL CONDITION.

3.7 ASPHALT PAVING ROAD:

- KANSAS:
 - A. DIVISION 600 – KDOT FLEXIBLE PAVEMENT.
- MISSOURI:
 - A. SECTION 403 – MODOT ASPHALT CONCRETE PAVEMENT.
- COLORADO:
 - A. DIVISION 400 – CDOT PAVEMENT
- MINNESOTA:
 - A. SECTION 2321 – MN/DOT ROAD–MIXED BITUMINOUS SURFACE.
 - B. SECTION 2360 – MN/DOT PLANT MIXED ASPHALT PAVEMENT.
- IOWA:
 - A. IOWA DOT CHAPTER 8 – HOT MIX ASPHALT (HMA) PAVEMENT, BASES, AND SUBBASES.
- NEBRASKA:
 - A. DIVISION 500 – BITUMINOUS PAVEMENT.
- WISCONSIN:
 - A. SECTION 460 – WISDOT HOT MIX ASPHALT PAVEMENT.
- ILLINOIS:
 - A. ILLINOIS DOT SECTION 403 – BITUMINOUS SURFACE TREATMENT.
 - B. ILLINOIS DOT SECTION 406 – BITUMINOUS CONCRETE BINDER AND SURFACE COURSE CLASS I.

AT&T
MOBILITY

901 MARQUETTE AVENUE
MINNEAPOLIS, MN 55402



BLACK & VEATCH

BLACK & VEATCH CORPORATION
7760 FRANCE AVENUE SOUTH
SUITE 1200
BLOOMINGTON, MN 55435

PROJECT NO: 188262.1027

DRAWN BY: JJS

CHECKED BY: JAT

1	03/31/07	REVISED PER COMMENTS
0	03/13/17	ISSUED FOR CONSTRUCTION
REV	DATE	DESCRIPTION

I HEREBY CERTIFY THAT THIS PLAN, SPECIFICATION, OR REPORT WAS PREPARED BY ME OR UNDER MY DIRECT SUPERVISION AND THAT I AM A DULY LICENSED PROFESSIONAL ENGINEER IN THE STATE OF MINNESOTA.

PRINT NAME: NATHAN C. PETRY

SIGNATURE:

DATE: 03/31/2017 LICENSE# 51299
EXP. 6/18

IT IS A VIOLATION OF LAW FOR ANY PERSON, UNLESS THEY ARE ACTING UNDER THE DIRECTION OF A LICENSED PROFESSIONAL ENGINEER, TO ALTER THIS DOCUMENT.

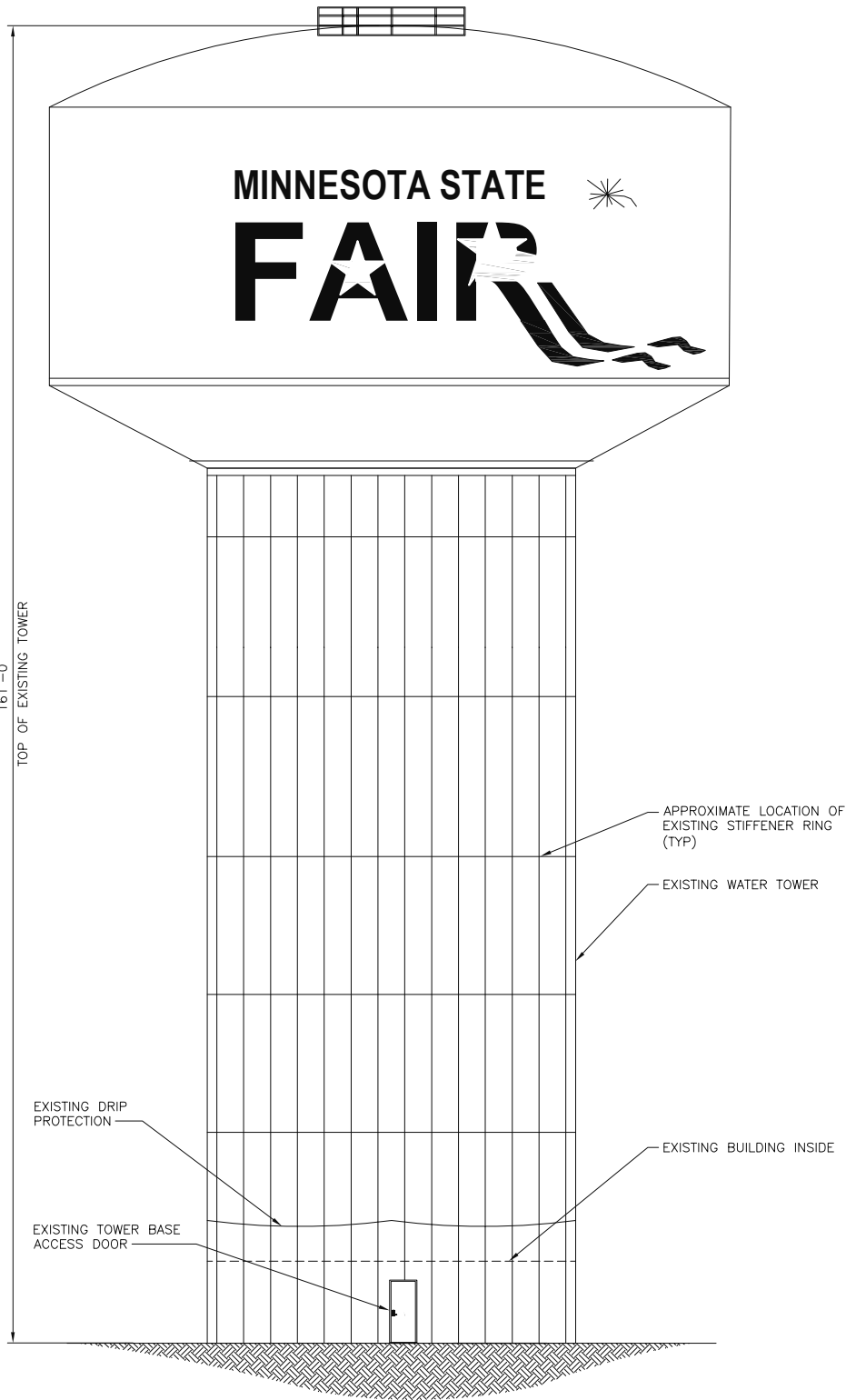
MN STATE FAIR WT
MNL01485
1530 COSGROVE STREET
FALCON HEIGHTS, MN 55108
DAS–SECTOR 12/13

SHEET TITLE

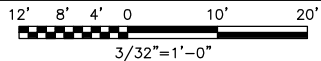
SITE WORK AND
DRAINAGE NOTES

SHEET NUMBER

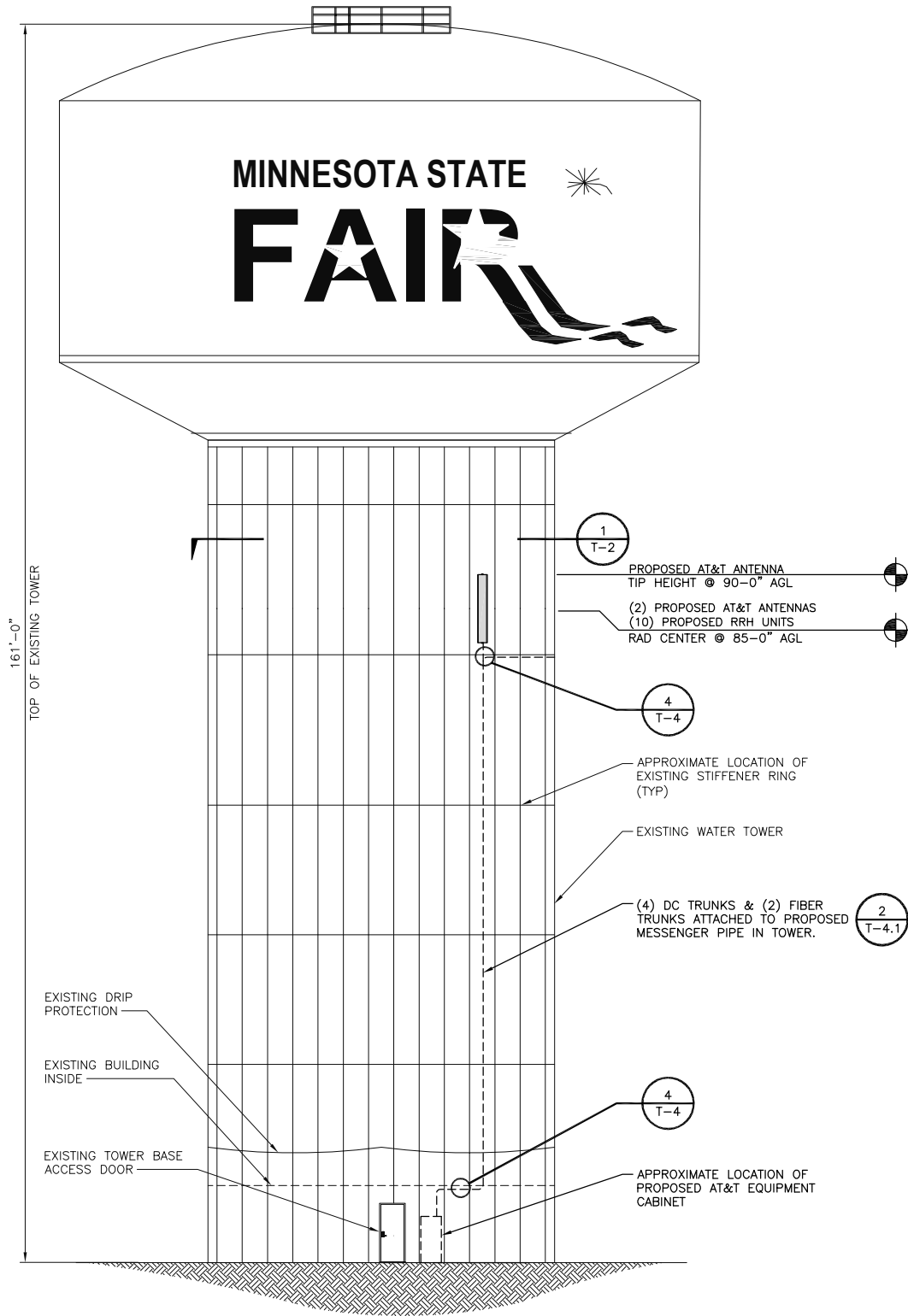
C-4



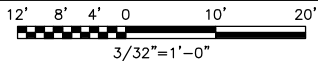
EXISTING TOWER EAST ELEVATION



1



PROPOSED TOWER EAST ELEVATION



2

THIS IS NOT AN ALL INCLUSIVE LIST. CONTRACTOR SHALL UTILIZE SPECIFIED EQUIPMENT PART OR ENGINEER APPROVED EQUIVALENT. CONTRACTOR SHALL VERIFY ALL NEEDED EQUIPMENT TO PROVIDE A FUNCTIONAL SITE.

THE PROJECT GENERALLY CONSISTS OF THE FOLLOWING:

PROPOSED-TOWER:
INSTALL (2) KATHREIN 800-10799 ANTENNAS AND MOUNTS
INSTALL (10) ALCATEL-LUCENT RRH UNITS (LTE)
INSTALL (2) RAYCAP DC6-48-60-18-8F SURGE UNIT
INSTALL (4) DC POWER TRUNKS
INSTALL (2) FIBER TRUNKS

PROPOSED-GROUND:
INSTALL (1) LTE CABINET
INSTALL (1) MESSENGER PIPE FOR CABLES
RE-CONNECT 100 AMP ELECTRIC SERVICE
CONNECT FIBER FROM MP NEXTLEVEL

AT&T TO VERIFY
REQUIRED SHELTER
EQUIPMENT.

PROJECT DESCRIPTION

- FENCE NOT ENTIRELY SHOWN FOR CLARITY.
- WHEN STACKING CABLES 3 OR MORE DEEP, USE STACKABLE SNAP-INS, TALLEY PART NUMBER SSH-158-3 (OR ENGINEER APPROVED EQUAL)

NOTES

THE EXISTING TOWER IS CURRENTLY BEING ANALYZED BY OTHERS TO DETERMINE ITS STRUCTURAL CAPACITY TO CARRY THE PROPOSED LOADS. THESE DRAWINGS HAVE BEEN CREATED BASED ON THE ASSUMPTION THAT THE STRUCTURAL ANALYSIS WILL SHOW THAT THE TOWER HAS SUFFICIENT CAPACITY TO SUPPORT THE PROPOSED NEW LOADS. INSTALLATION OF THE PROPOSED EQUIPMENT SHALL NOT COMMENCE UNTIL AN APPROVED STRUCTURAL ANALYSIS HAS BEEN RECEIVED BY THE OWNER OR AT&T AND HAS BEEN REVIEWED BY BLACK & VEATCH. CONTRACTOR SHALL REFERENCE THE TOWER STRUCTURAL ANALYSIS/DESIGN DRAWINGS FOR DIRECTIONS ON CABLE DISTRIBUTION/ROUTING.

STRUCTURAL NOTE

AT&T
MOBILITY

901 MARQUETTE AVENUE
MINNEAPOLIS, MN 55402



BLACK & VEATCH

BLACK & VEATCH CORPORATION
7760 FRANCE AVENUE SOUTH
SUITE 1200
BLOOMINGTON, MN 55435

PROJECT NO: 188262.1027
DRAWN BY: JJS
CHECKED BY: JAT

REV	DATE	DESCRIPTION
1	03/31/07	REVISED PER COMMENTS
0	03/13/17	ISSUED FOR CONSTRUCTION

I HEREBY CERTIFY THAT THIS PLAN, SPECIFICATION, OR REPORT WAS PREPARED BY ME OR UNDER MY DIRECT SUPERVISION AND THAT I AM A DULY LICENSED PROFESSIONAL ENGINEER IN THE STATE OF MINNESOTA.

PRINT NAME: NATHAN C. PETRY

SIGNATURE:

DATE: 03/31/2017 LICENSE# 51299
EXP. 6/18

IT IS A VIOLATION OF LAW FOR ANY PERSON, UNLESS THEY ARE ACTING UNDER THE DIRECTION OF A LICENSED PROFESSIONAL ENGINEER, TO ALTER THIS DOCUMENT.

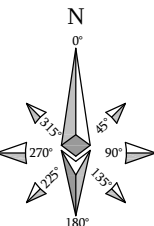
MN STATE FAIR WT
MNL01485
1530 COSGROVE STREET
FALCON HEIGHTS, MN 55108
DAS-SECTOR 12/13

SHEET TITLE

TOWER ELEVATIONS

SHEET NUMBER

T-1



T-2

SPECIAL INSTRUCTIONS:

- ALL ATTACHMENTS TO PAINTED SURFACES ARE TO INCLUDE THE PLACEMENT OF NEOPRENE STRIPS OR PADS BETWEEN HARDWARE AND POINTS OF CONTACT TO REDUCE/ELIMINATE DAMAGE TO THE PAINTED SURFACE. METAL SHIMS ARE REQUIRED IN SITUATIONS WHERE TIGHTENING A CLAMP MAY CAUSE THE NEOPRENE TO TEAR CAUSING METAL TO METAL CONTACT. WHERE POSSIBLE EXPOSED NEOPRENE SHOULD BE WRAPPED WITH WHITE TAPE. FASTENING SEQUENCE SHOULD INCLUDE NYLON WASHERS BETWEEN THE PAINTED SURFACE AND THE GALVANIZED WASHER.
- PROPOSED ANTENNAS INSTALLED ON THE EXTERIOR OF THE WATER TOWER SHALL BE SHOP PAINTED TO MATCH THE COLOR OF THE TANK. ALSO ANY TOUCH UP PAINTING ON THE WATER TOWER WILL NEED TO MATCH THE COLOR OF THE TANK. MOUNTING PIPES ARE TO BE CAPPED AT BOTH ENDS WITH WELDED END CAPS. ALL MOUNTING HARDWARE IS TO BE GALVANIZED AND /OR PROVIDED IN A NON-CORRODING MATERIAL.
- RUBBER GROMMETS ARE TO BE INSTALLED IN ALL EXTERIOR PENETRATIONS FOR COAX AND SEALED WITH SILICONE CAULK.
- RRH UNITS AND ALL COMPONENTS ATTACHED TO THE STIFFENER RING SHALL BE MOUNTED FACING INWARD AND VERTICALLY SO AS TO NOT INTERFERE WITH WALKWAY ACCESS ON THE STIFFENER RING. ALL CABLES AND LINES SHOULD BE ROUTED UNDER STIFFENER RING SO AS TO NOT INTERFERE WITH WALKWAY ACCESS. ALL CABLES AND LINES SHOULD BE BUNDLED OR SUPPORTED TO CREATE A "NEAT OR CLEAN" INSTALLATION APPEARANCE.
- INSTALLATION OF EQUIPMENT TO STIFFENER RING TO INCLUDE CARRIAGE BOLTS ON THE WALKWAY PORTION OF THE STIFFENER RING TO AVOID A TRIPPING HAZARD.
- ALL EQUIPMENT TO BE IDENTIFIED AND LABELED BY TENANT.

PROPOSED ANTENNA AND TRANSMISSION EQUIPMENT REQUIREMENTS (VERIFY WITH LATEST RFDS)										
SECTOR	RAD CENTER	POSITION	ANTENNA TILT		AZIMUTH	ANTENNA MODEL	TECHNOLOGY	RRH / TMA	SURGE & DISTRIBUTION	
			MECH	ELEC					MODEL	CABLE (QTY) TYPES
A	85'	1			30°	KATHREIN 800-10799	LTE	(5) RRH UNITS	(2) RAYCAP DC6-48-60-18-8F	(4) 3-PAIR DC POWER
B	85'	1			110°	KATHREIN 800-10799	LTE	(5) RRH UNITS		(2) 18-PAIR FIBER

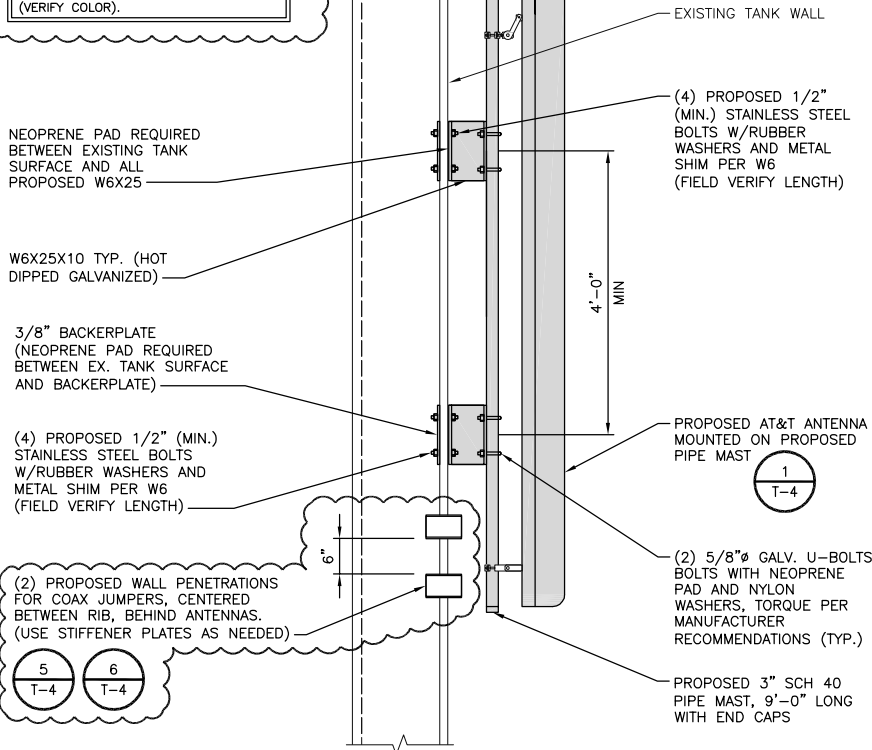
- CONTRACTOR IS TO REFER TO AT&T'S MOST CURRENT RADIO FREQUENCY DATA SHEET (RFDS) PRIOR TO CONSTRUCTION.
- CONTRACTOR TO USE ROSENBERGER FIBER LINE HANGER COMPONENTS (OR ENGINEER APPROVED EQUAL).

NOTES

ANTENNA AND TRANSMISSION EQUIPMENT REQUIREMENTS

1

NOTE: PAINTING AND REPAIRS WILL NEED TO BE DONE PER SEH COATING SYSTEMS FOR TELECOMMUNICATIONS EQUIPMENT (VERIFY COLOR).

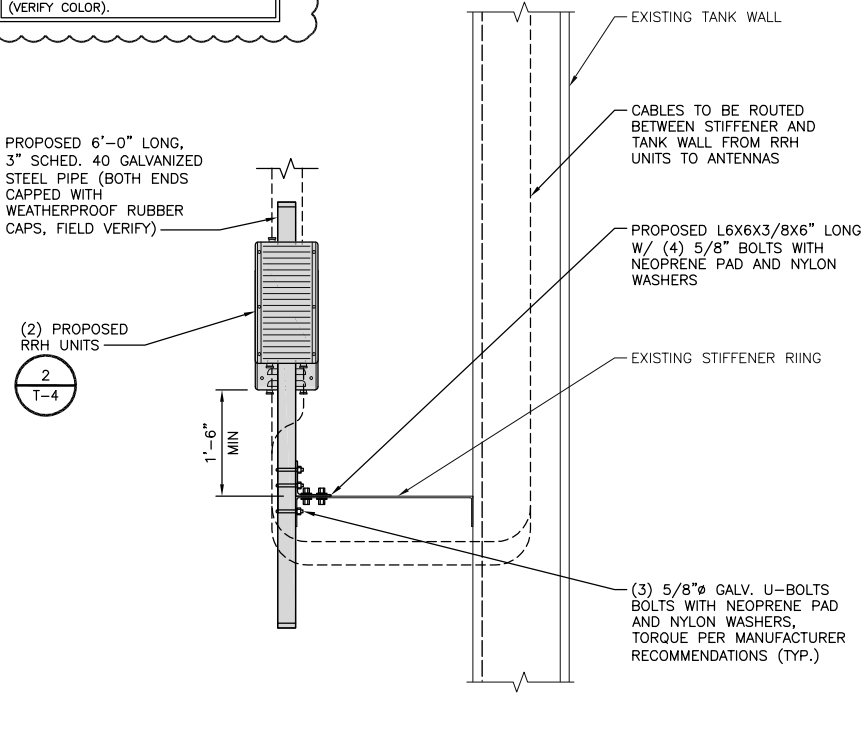


ANTENNA MOUNTING DETAIL

NO SCALE

2

NOTE: PAINTING AND REPAIRS WILL NEED TO BE DONE PER SEH COATING SYSTEMS FOR TELECOMMUNICATIONS EQUIPMENT (VERIFY COLOR).

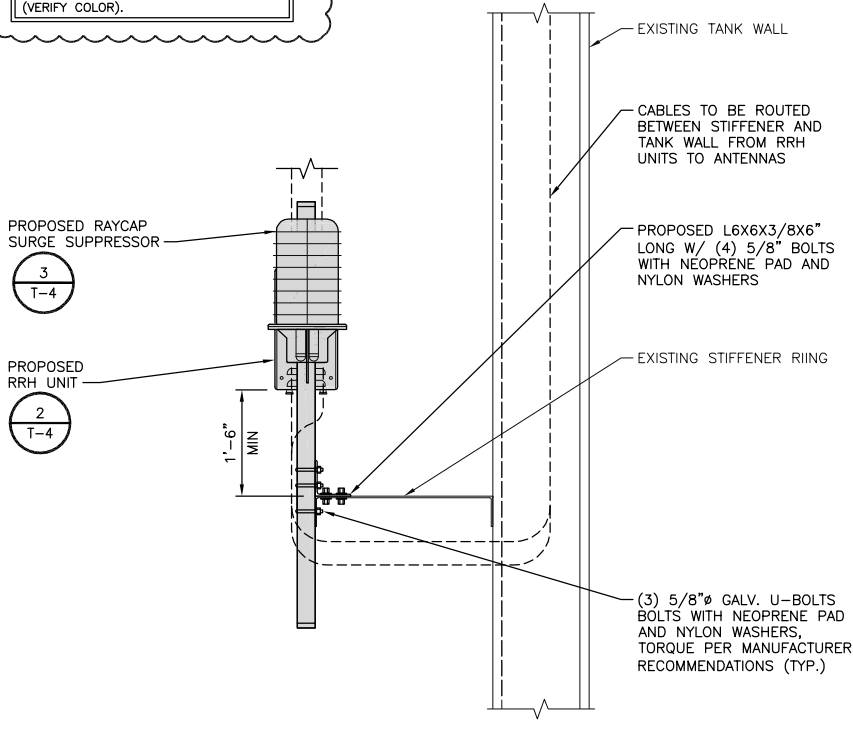


RRH MOUNTING DETAIL

NO SCALE

3

NOTE: PAINTING AND REPAIRS WILL NEED TO BE DONE PER SEH COATING SYSTEMS FOR TELECOMMUNICATIONS EQUIPMENT (VERIFY COLOR).



RRH AND SURGE MOUNTING DETAIL

NO SCALE

4

AT&T
MOBILITY

901 MARQUETTE AVENUE
MINNEAPOLIS, MN 55402



BLACK & VEATCH

BLACK & VEATCH CORPORATION
7760 FRANCE AVENUE SOUTH
SUITE 1200
BLOOMINGTON, MN 55435

PROJECT NO: 188262.1027
DRAWN BY: JJS
CHECKED BY: JAT

REV	DATE	DESCRIPTION
1	03/31/07	REVISED PER COMMENTS
0	03/13/17	ISSUED FOR CONSTRUCTION

I HEREBY CERTIFY THAT THIS PLAN, SPECIFICATION, OR REPORT WAS PREPARED BY ME OR UNDER MY DIRECT SUPERVISION AND THAT I AM A DULY LICENSED PROFESSIONAL ENGINEER IN THE STATE OF MINNESOTA.

PRINT NAME: NATHAN C. PETRY

SIGNATURE:
DATE: 03/31/2017 LICENSE# 51299
EXP. 6/18

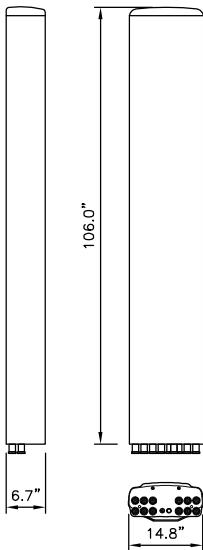
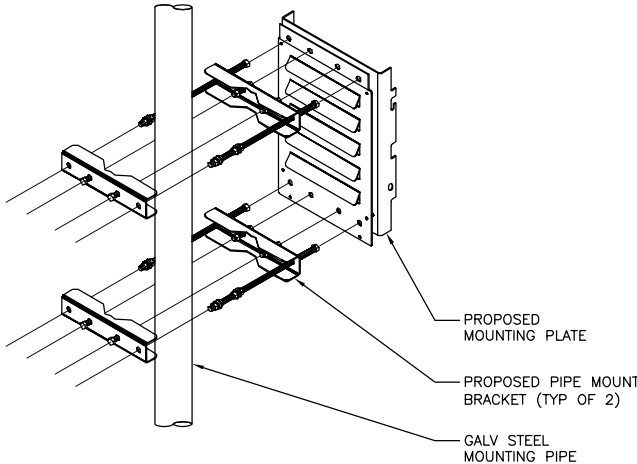
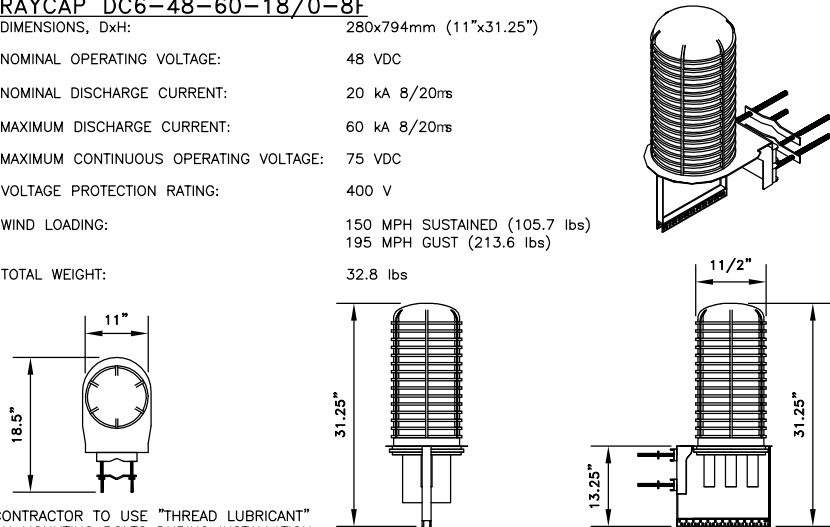
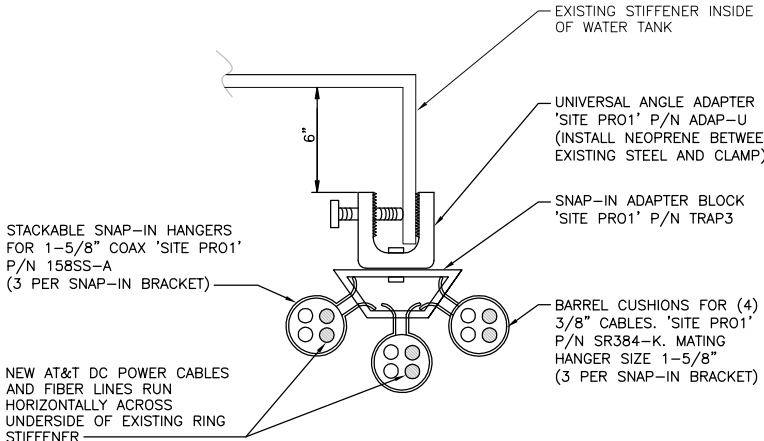
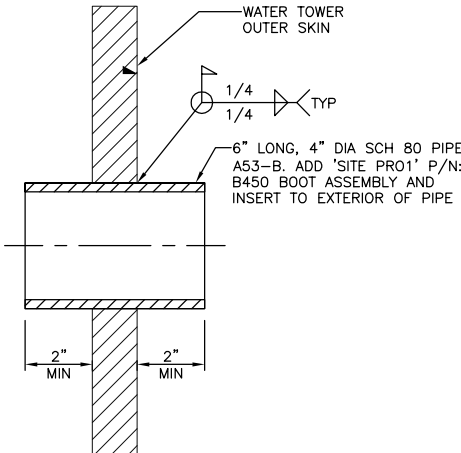
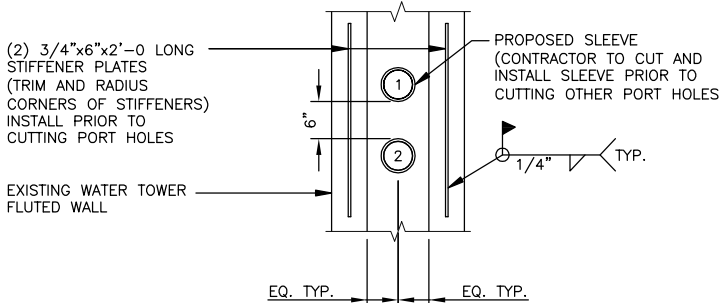
IT IS A VIOLATION OF LAW FOR ANY PERSON, UNLESS THEY ARE ACTING UNDER THE DIRECTION OF A LICENSED PROFESSIONAL ENGINEER, TO ALTER THIS DOCUMENT.

MN STATE FAIR WT
MNL01485
1530 COSGROVE STREET
FALCON HEIGHTS, MN 55108
DAS-SECTOR 12/13

SHEET TITLE
ANTENNA AND RRH
REQUIREMENTS

SHEET NUMBER

T-3

<div>KATHREIN 800-10799</div> <div><div><div>WIDTH:</div><div>14.8" (377mm)</div></div><div><div>DEPTH:</div><div>6.7" (169mm)</div></div><div><div>HEIGHT:</div><div>106.0" (2693mm)</div></div><div><div>TOTAL WEIGHT (WITHOUT BRACKETS):</div><div>108 lb (49 kg)</div></div><div><div>CONNECTOR:</div><div>12x4.3-10 DIN FEMALE LONG NECK</div></div></div> <div></div> <div><div>NOTE: ANTENNA NOT SHOWN FOR CLARITY</div><div></div></div>			<div>RAYCAP DC6-48-60-18/0-8F</div> <div><div><div>DIMENSIONS, DxH:</div><div>280x794mm (11"x31.25")</div></div><div><div>NOMINAL OPERATING VOLTAGE:</div><div>48 VDC</div></div><div><div>NOMINAL DISCHARGE CURRENT:</div><div>20 kA 8/20ns</div></div><div><div>MAXIMUM DISCHARGE CURRENT:</div><div>60 kA 8/20ns</div></div><div><div>MAXIMUM CONTINUOUS OPERATING VOLTAGE:</div><div>75 VDC</div></div><div><div>VOLTAGE PROTECTION RATING:</div><div>400 V</div></div><div><div>WIND LOADING:</div><div>150 MPH SUSTAINED (105.7 lbs) 195 MPH GUST (213.6 lbs)</div></div><div><div>TOTAL WEIGHT:</div><div>32.8 lbs</div></div></div> <div></div> <div>CONTRACTOR TO USE "THREAD LUBRICANT" ON MOUNTING BOLTS DURING INSTALLATION</div>					
ANTENNA SPECIFICATIONS	NO SCALE	1	RRH MOUNTING PLATE DETAIL	NO SCALE	2	DC SURGE SUPPRESSOR DETAIL	NO SCALE	3
<div></div>			<div><div><div>NOTE: ALL ADJACENT SURFACES MUST BE PROTECTED FROM METAL SHAVINGS PRODUCED BY THE DRILLING FOR THE PROPOSED 4" SLEEVE PENETRATIONS. NOT LIMITED TO THE USE OF WELD BLANKETS. ALL METAL SHAVINGS ARE TO BE CLEANED UP AND PROPERLY DISPOSED OF.</div><div></div></div><div><div>NOTE: PAINTING AND REPAIRS WILL NEED TO BE DONE PER SEH COATING SYSTEMS FOR TELECOMMUNICATIONS EQUIPMENT (VERIFY COLOR).</div></div></div>			<div><div><div>NOTE: THE PROPOSED SLEEVE PENETRATIONS CANNOT BE INSTALLED ON A FLUTE THAT HAS A SEAM. INSTALLATION OF ADJACENT SLEEVE PENETRATIONS MAY NOT BE PERFORMED CONCURRENTLY. ONE SLEEVE PENETRATION MUST BY COMPLETELY INSTALLED PRIOR TO BEGINNING WORK ON THE NEXT SLEEVE PENETRATION.</div><div></div></div><div><div>NOTE: PAINTING AND REPAIRS WILL NEED TO BE DONE PER SEH COATING SYSTEMS FOR TELECOMMUNICATIONS EQUIPMENT (VERIFY COLOR).</div></div></div>		
HORIZONTAL CABLE ROUTING DETAIL	NO SCALE	4	WALL PENETRATION DETAIL	NO SCALE	5	WALL PENETRATION REINFORCEMENTS	NO SCALE	6
<div>NOT USED</div>			<div>NOT USED</div>			<div>NOT USED</div>		
NOT USED	NO SCALE	7	NOT USED	NO SCALE	8	NOT USED	NO SCALE	9

AT&T
MOBILITY

901 MARQUETTE AVENUE
MINNEAPOLIS, MN 55402

BLACK & VEATCH

BLACK & VEATCH CORPORATION
7760 FRANCE AVENUE SOUTH
SUITE 1200
BLOOMINGTON, MN 55435

PROJECT NO:

188262.1027

DRAWN BY:

JJS

CHECKED BY:

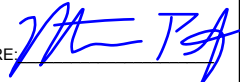
JAT

1	03/31/07	REVISED PER COMMENTS
0	03/13/17	ISSUED FOR CONSTRUCTION
REV	DATE	DESCRIPTION

I HEREBY CERTIFY THAT THIS PLAN, SPECIFICATION, OR REPORT WAS PREPARED BY ME OR UNDER MY DIRECT SUPERVISION AND THAT I AM A DULY LICENSED PROFESSIONAL ENGINEER IN THE STATE OF MINNESOTA.

PRINT NAME: NATHAN C. PETRY

SIGNATURE:



DATE:

03/31/2017

LICENSE# 51299

EXP. 6/18

IT IS A VIOLATION OF LAW FOR ANY PERSON, UNLESS THEY ARE ACTING UNDER THE DIRECTION OF A LICENSED PROFESSIONAL ENGINEER, TO ALTER THIS DOCUMENT.

MN STATE FAIR WT
MNL01485
1530 COSGROVE STREET
FALCON HEIGHTS, MN 55108
DAS-SECTOR 12/13

SHEET TITLE

TOWER EQUIPMENT
DETAILS

SHEET NUMBER

T-4

AT&T
MOBILITY

901 MARQUETTE AVENUE
MINNEAPOLIS, MN 55402



BLACK & VEATCH

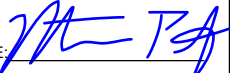
BLACK & VEATCH CORPORATION
7760 FRANCE AVENUE SOUTH
SUITE 1200
BLOOMINGTON, MN 55435

PROJECT NO:	188262.1027
DRAWN BY:	JJS
CHECKED BY:	JAT

1	03/31/07	REVISED PER COMMENTS
0	03/13/17	ISSUED FOR CONSTRUCTION
REV	DATE	DESCRIPTION

I HEREBY CERTIFY THAT THIS PLAN, SPECIFICATION, OR REPORT WAS PREPARED BY ME OR UNDER MY DIRECT SUPERVISION AND THAT I AM A DULY LICENSED PROFESSIONAL ENGINEER IN THE STATE OF MINNESOTA.

PRINT NAME: NATHAN C. PETRY

SIGNATURE: 

DATE: 03/31/2017 LICENSE# 51299
EXP. 6/18

IT IS A VIOLATION OF LAW FOR ANY PERSON, UNLESS THEY ARE ACTING UNDER THE DIRECTION OF A LICENSED PROFESSIONAL ENGINEER, TO ALTER THIS DOCUMENT.

MN STATE FAIR WT
MNL01485
1530 COSGROVE STREET
FALCON HEIGHTS, MN 55108
DAS-SECTOR 12/13

SHEET TITLE

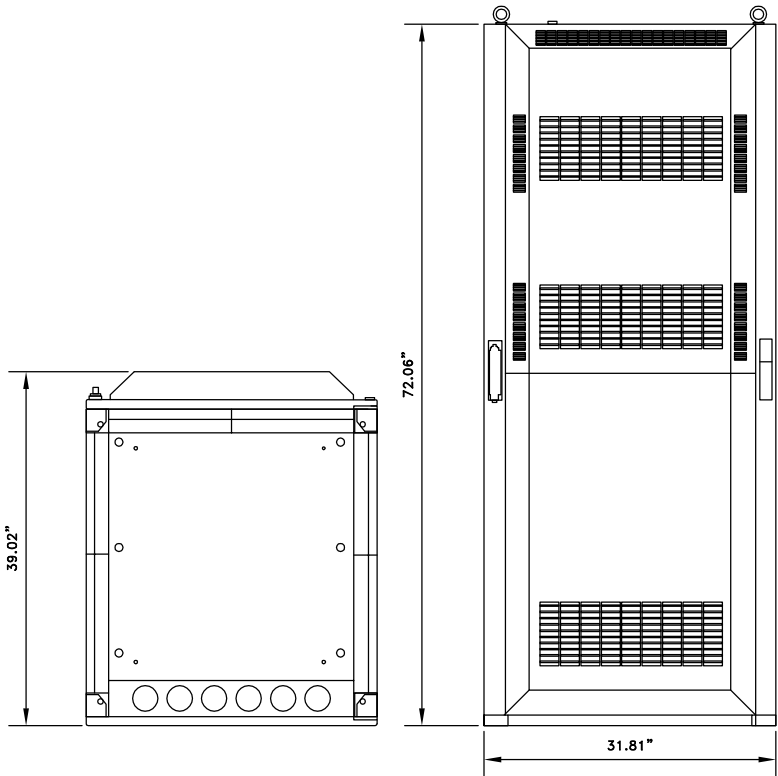
TOWER EQUIPMENT
DETAILS

SHEET NUMBER

T-4

EMERSON NETSURE 512 (F2012504)

DIMENSIONS, WxDxH: 30"x37.8"x72"
NOMINAL OPERATING VOLTAGE: -48 VDC
TOTAL WEIGHT (WITH BATTERIES): 2300 lbs



TOP VIEW

FRONT VIEW

OUTDOOR LTE CABINET

NO SCALE

1

MESSENGER PIPE MOUNT TO STIFFENER RING

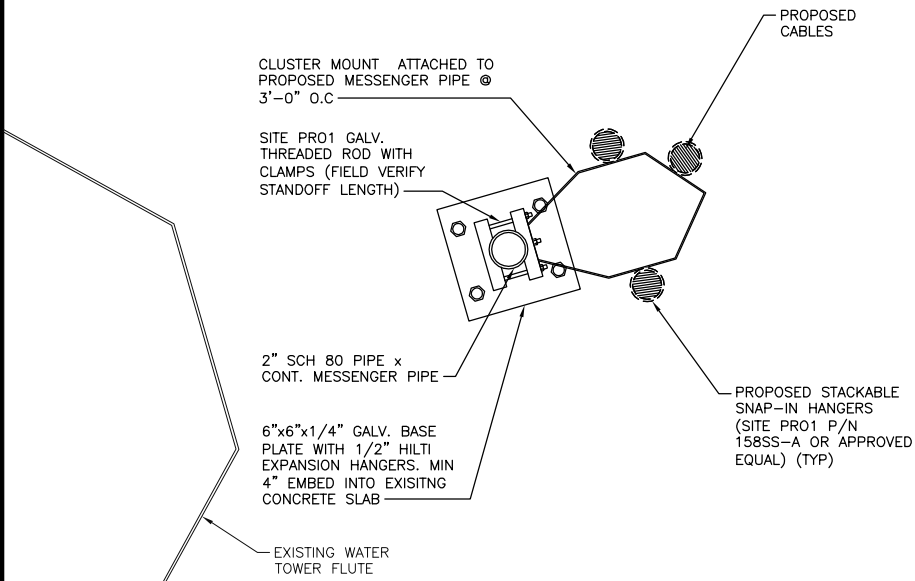
NO SCALE

2

NOT USED

NO SCALE

4



CABLE MANAGEMENT MESSENGER PIPE

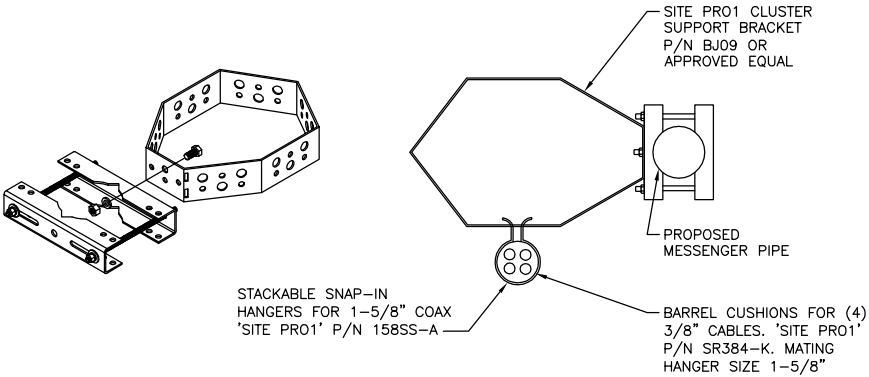
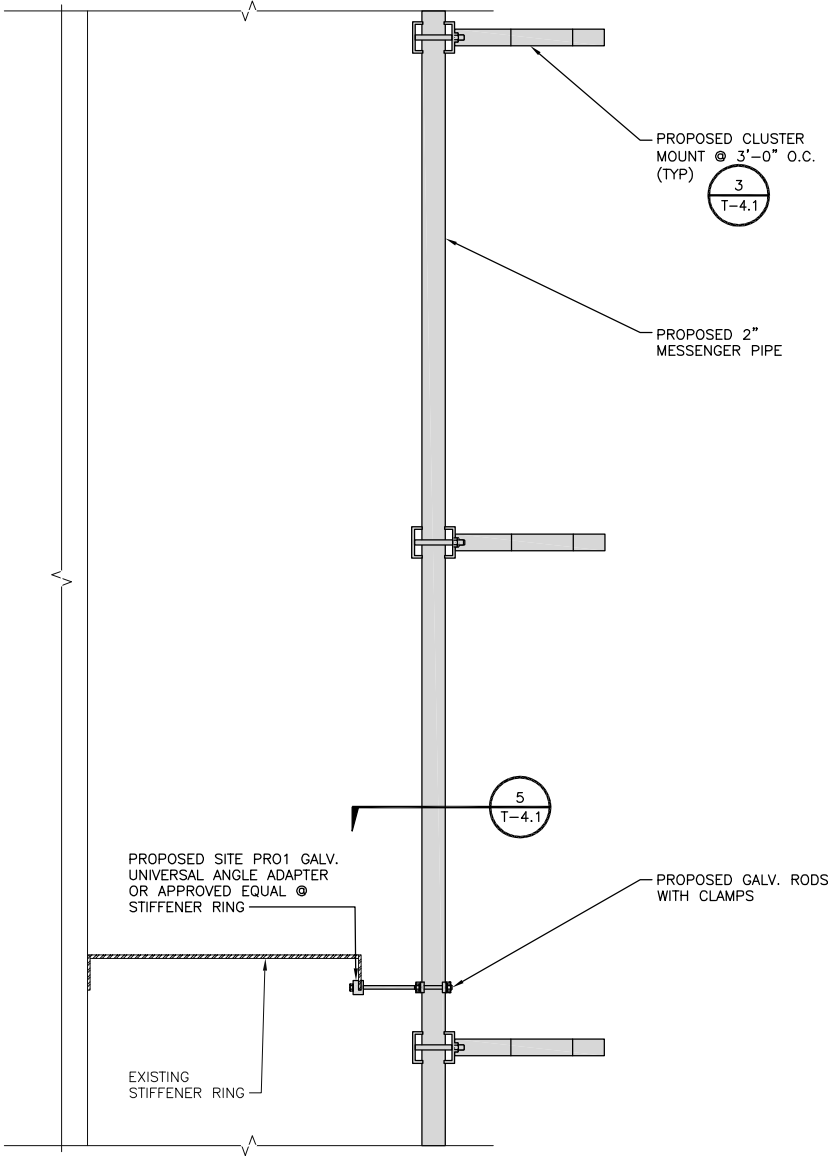
NO SCALE

5

NOT USED

NO SCALE

6



CLUSTER SUPPORT BRACKET DETAIL

NO SCALE

3

AT&T
MOBILITY

901 MARQUETTE AVENUE
MINNEAPOLIS, MN 55402



BLACK & VEATCH

BLACK & VEATCH CORPORATION
7760 FRANCE AVENUE SOUTH
SUITE 1200
BLOOMINGTON, MN 55435

PROJECT NO: 188262.1027
DRAWN BY: JJS
CHECKED BY: JAT

REV	DATE	DESCRIPTION
1	03/31/07	REVISED PER COMMENTS
0	03/13/17	ISSUED FOR CONSTRUCTION

I HEREBY CERTIFY THAT THIS PLAN, SPECIFICATION, OR REPORT WAS PREPARED BY ME OR UNDER MY DIRECT SUPERVISION AND THAT I AM A DULY LICENSED PROFESSIONAL ENGINEER IN THE STATE OF MINNESOTA.

PRINT NAME: NATHAN C. PETRY

SIGNATURE: *Nathan C. Petry*

DATE: 03/31/2017 LICENSE# 51299
EXP. 6/18

IT IS A VIOLATION OF LAW FOR ANY PERSON, UNLESS THEY ARE ACTING UNDER THE DIRECTION OF A LICENSED PROFESSIONAL ENGINEER, TO ALTER THIS DOCUMENT.

MN STATE FAIR WT
MNL01485
1530 COSGROVE STREET
FALCON HEIGHTS, MN 55108
DAS-SECTOR 12/13

SHEET TITLE
TOWER EQUIPMENT
DETAILS

SHEET NUMBER
T-4.1

PART 1 – GENERAL

- 1.1SCOPE:
- A. PROVIDE FABRICATION AND ERECTION OF STRUCTURAL STEEL AND OTHER ITEMS AS SHOWN ON THE DRAWINGS OR REQUIRED BY OTHER SECTIONS OF THESE SPECIFICATIONS.
- 1.2REFERENCES:
- A. AMERICAN INSTITUTE OF STEEL CONSTRUCTION (AISC). MANUAL OF STEEL CONSTRUCTION (13TH EDITION), ALLOWABLE STRESS DESIGN (ASD).

B. AMERICAN SOCIETY FOR TESTING AND MATERIALS (ASTM).
ASTM A36: STRUCTURAL STEEL.
ASTM A53: PIPE, STEEL BLACK AND HOT DIPPED, ZINC–COATED WELDED AND SEAMLESS.
ASTM A108: STEEL BARS, CARBON, COLD FINISHED, STANDARD QUALITY.
ASTM A123: ZINC (HOT–DIPPED GALVANIZED) COATING ON IRON AND STEEL PRODUCTS.
ASTM A307: CARBON STEEL BOLTS AND STUDS, 60,000 PSI TENSILE STRENGTH.
ASTM A325: HIGH–STRENGTH BOLT FOR STRUCTURAL STEEL JOINTS.
ASTM A490: HEAT–TREATED, STRUCTURAL STEEL BOLTS, 150 (KSI) (1035MPA) TENSILE STRENGTH.
ASTM A500: COLD–FORMED WELDED AND SEAMLESS CARBON STEEL STRUCTURAL TUBING IN ROUNDS AND SHAPES.
ASTM A563: CARBON AND ALLOY STEEL NUTS.
ASTM B695: COATINGS OF ZINC MECHANICALLY DEPOSITED ON IRON AND STEEL.
ASTM F436: HARDENED STEEL WASHERS.
ASTM F959: COMPRESSIBLE–WASHER–TYPE DIRECT TENSION INDICATOR FOR USE WITH STRUCTURAL FASTENERS.

C. AMERICAN WELDING SOCIETY (AWS):
AWS A5.1: COVERED CARBON STEEL ARC WELDING ELECTRODES.
AWS A5.5: LOW ALLOY STEEL COVERED ARC WELDING ELECTRODES.
AWS D1.1: STRUCTURAL WELDING CODE – STEEL.

D. RESEARCH COUNCIL ON STRUCTURAL CONNECTIONS (RCSC): "SPECIFICATIONS FOR STRUCTURAL JOINTS USING ASTM A325 BOLTS OR ASTM A490 BOLTS" AS ENDORSED BY AISC.

E. STEEL STRUCTURES PAINTING COUNCIL (SSPC):
SSPC–SP3: POWER TOOL CLEANING.
SSPC–PAINT 11: RED IRON OXIDE, ZINC CHROME, RAW LINSEED OIL OR ALKYD PAINT.
- 1.3SUBMITTALS:
- A. SUBMIT THE FOLLOWING FOR APPROVAL:

1. FABRICATION AND ERECTION DRAWINGS SHOWING ALL DETAILS, CONNECTIONS, MATERIAL DESIGNATIONS, AND ALL TOP STEEL ELEVATIONS.

B. WELDERS SHALL BE QUALIFIED AS PRESCRIBED IN AWS D1.1.

PART 2 – PRODUCTS

- 2.1STRUCTURAL STEEL:
- A. SHAPES, PLATES AND BARS SHALL CONFORM TO ASTM A36 AND ASTM A992.

B. STRUCTURAL TUBING SHALL CONFORM TO ASTM A500, GRADE B. STEEL PIPE SHALL CONFORM TO ASTM A53, TYPE E OR S, GRADE B.
- 2.2ANCHOR BOLTS:
- A. ANCHOR BOLTS SHALL CONFORM TO ASTM A307 WITH HEAVY HEXAGONAL NUTS.
- 2.3BOLTS:
- A. COMMON (MACHINE) BOLTS SHALL CONFORM TO ASTM A307 GRADE A AND NUTS TO ASTM A563. ONE COMMON BOLT ASSEMBLY SHALL CONSIST OF A BOLT, A HEAVY HEX NUT, AND A HARDENED WASHER.

B. HIGH STRENGTH BOLT SHALL CONFORM TO ASTM A325, ONE HIGH STRENGTH BOLT ASSEMBLY SHALL CONSIST OF A HEAVY HEX STRUCTURAL BOLT, A HEAVY HEX NUT, A HARDENED WASHER CONFIRMING WITH ASTM F436 AND A DIRECT TENSION INDICATOR CONFORMING WITH STM F959. THE HARDENED WASHER SHALL BE INSTALLED AGAINST THE ELEMENT TURNED IN TIGHTENING.UNLESS NOTED OTHERWISE ON THE DRAWINGS, ALL CONNECTIONS SHALL BE BEARING TYPE CONNECTIONS.
- 2.4WELDING ELECTRODES:
- A. WELDING ELECTRODES SHALL COMPLY WITH AWS D1.1 USING A5.1 OR A5.5 E70XX AND SHALL BE COMPATIBLE WITH THE WELDING PROCESS SELECTED.
- 2.5PRIMER:
- A. PRIMER SHALL BE RED OXIDE–CHROMATE PRIMER COMPLYING WITH SSPC PAINT SPECIFICATION NO. 11.

PART 3 – EXECUTION

- 3.1FABRICATION:
- A. SHOP FABRICATE AND ASSEMBLY MATERIALS AS SPECIFIED HEREIN.

1. FABRICATE ITEMS OF STRUCTURAL STEEL IN ACCORDANCE WITH THE AISC–ASD SPECIFICATION, AND AS INDICATED ON THE APPROVED SHOP DRAWINGS.

2. ALL EXPOSED STRUCTURAL STEEL SHALL BE HOT DIP GALVANIZED PER ASTM.

3. PROPERLY MARK AND MATCH–MARK MATERIALS FOR FIELD ASSEMBLY AND FOR IDENTIFICATION AS TO LOCATION FOR WHICH INTENDED.

4. FABRICATE AND DELIVER IN A SEQUENCE WHICH WILL EXPEDITE ERECTION AND MINIMIZE FIELD HANDLING OF MATERIALS.

5. WHERE FINISHING IS REQUIRED, COMPLETE THE ASSEMBLY, INCLUDING THE WELDING OF UNITS, BEFORE START OF FINISHING OPERATIONS.

6. PROVIDE FINISH SURFACE OF MEMBERS EXPOSED IN THE FINAL STRUCTURE FREE FROM MARKINGS, BURNS, AND OTHER DEFECTS.

B. PROVIDE CONNECTIONS AS SPECIFIED HEREIN:

1. PROVIDE BOLTS AND WASHERS OF TYPES AND SIZE REQUIRED FOR COMPLETION OF FIELD ERECTION. USE 3/4 INCH DIAMETER A325 BOLTS UNLESS NOTED OTHERWISE.

2. INSTALL HIGH STRENGTH THREADED FASTENERS IN ACCORDANCE WITH RCSC "SPECIFICATION FOR STRUCTURAL JOINTS USING ASTM A325 OR ASTM A490 BOLTS."

3. WELDED CONSTRUCTION SHALL COMPLY WITH AWS D1.1 FOR PROCEDURES, APPEARANCE, QUALITY OF WELD, AND METHODS USED IN CORRECTING WELDED WORK.
4. THE FABRICATOR SHALL FURNISH AND INSTALL ERECTION CLIPS FOR FIT–UP OF WELDED CONNECTIONS.
5. DOUBLE ANGLE MEMBERS SHALL HAVE WELDED FILLERS SPACED IN ACCORDANCE WITH CHAPTER E4 OF THE AISC–ASD SPECIFICATION.
6. GUSSET AND STIFFENER PLATES SHALL BE 3/8 INCH THICK MINIMUM.
- 3.2PRIMING:
- A. STRUCTURAL STEEL SHALL BE PRIMED AS SPECIFIED HEREIN, UNLESS SHOWN OTHERWISE ON THE DRAWINGS.

B. STRUCTURAL STEEL SURFACE PREPARATION SHALL CONFORM TO SSPC–SP3, "POWER TOOL CLEANING."

C. SURFACE PREPARATION AND PRIMER SHALL BE IN ACCORDANCE WITH AISC CODE OF STANDARD PRACTICE AS INCLUDED IN THE ASD MANUAL OF STEEL CONSTRUCTION.

D. MATERIALS SHALL REMAIN CLOSED UNTIL REQUIRED FOR USE, MANUFACTURER’S POT–LIFE REQUIREMENTS SHALL BE STRICTLY ADHERED TO.

E. PRIMER SHALL BE APPLIED TO DRY, CLEAN, PREPARED SURFACE AND UNDER FAVORABLE CONDITIONS IN ACCORDANCE WITH MANUFACTURER’S INSTRUCTIONS. UNLESS OTHERWISE RECOMMENDED BY THE MANUFACTURER PRIMING SHALL NOT BE DONE WHEN AMBIENT TEMPERATURE IS LESS THAN 50 DEGREES F. THE RELATIVE HUMIDITY IS MORE THAN 90 PERCENT, OR THE SURFACE TEMPERATURE IS LESS THAN 5 DEGREES F ABOVE THE DEW POINT.

F. GENERALLY ALL PRIMER SHALL BE SPRAY APPLIED. BRUSH OR ROLLER APPLICATION SHALL BE RESTRICTED TO TOUCHUP AND TO AREAS NOT ACCESSIBLE BY SPRAY GUN.

G. PRIMER SHALL BE UNIFORMLY APPLIED WITHOUT RUNS, SAGS, SOLVENT BLISTERS, DRY SPRAY OR OTHER BLEMISHES. ALL BLEMISHES AND OTHER IRREGULARITIES SHALL BE REPAIRED OR REMOVED AND THE AREA RE–COATED. SPECIAL ATTENTION SHALL BE PAID TO CREVICES, WELD LINES, BOLT HEADS, CORNERS, EDGES, ETC., TO OBTAIN THE REQUIRED NOMINAL FILM THICKNESS.

H. THE DRY FILM THICKNESS OF THE PRIMER SHALL BE 2.0 MILS.

I. IF THE PRIMER IS DAMAGED BY WELDING OR PHYSICAL ABUSE, THE AREA SHALL BE TOUCHED–UP AND REPAIRED. THE TOUCHUP PAINT SHALL BE COMPATIBLE WITH THE APPLIED PRIMER WITH MINIMUM DRY FILM THICKNESS OF 1.5 MILS.
- 3.3INSTALLATION:
- A. INSTALLATION OF STRUCTURAL STEEL SHALL COMPLY WITH AISC "CODE OF STANDARD PRACTICE."

B. STRUCTURAL FIELD WELDING SHALL BE DONE BY THE ELECTRIC SUBMERGED OR SHIELDED METAL ARC PROCESS. WELDED CONSTRUCTION SHALL COMPLY WITH AWS D1.1.

C. PROVIDE ANCHOR BOLTS AND OTHER CONNECTORS REQUIRED FOR SECURING STRUCTURAL STEEL TO ELEVATOR SHAFT WALLS AND OTHER IN–PLACE WORK. PROVIDE TEMPLATES AND OTHER DEVICES NECESSARY FOR PRESETTING BOLTS AND ANCHORS TO ACCURATE LOCATIONS.

D. SPLICE MEMBERS ONLY WHERE INDICATED ON THE DRAWINGS.

E. ANY GAS CUTTING TORCHES HAVE TO BE APPROVED IN WRITING BY THE PROJECT STRUCTURAL ENGINEER.

F. PROVIDE TEMPORARY SHORING BRACING WITH CONNECTIONS OF SUFFICIENT STRENGTH TO BEAR IMPOSED LOADS. REMOVE TEMPORARY CONNECTIONS AND MEMBERS WHEN PERMANENT MEMBERS ARE IN PLACE AND THE FINAL CONNECTIONS HAVE BEEN MADE.

G. ALIGN AND ADJUST MEMBERS, AND OTHER SURFACES WHICH WILL BE IN PERMANENT CONTACT, BEFORE ASSEMBLY.

H. HIGH–STRENGTH BOLTS AS A MINIMUM, SHALL BE TIGHTENED TO A "SNUG TIGHT" CONDITION AS DEFINED IN THE LATEST AISC SPECIFICATION. ALL HIGH–STRENGTH BOLTS SPECIFIED ON THE DESIGN DRAWINGS TO BE USED IN PRETENSIONED OR SLIP–CRITICAL JOINTS SHALL BE TIGHTENED TO A BOLT TENSION NOT LESS THAN THAT GIVEN IN AISC TABLE J3.1. INSTALLATION SHALL BE BY ANY OF THE FOLLOWING METHODS: TURN–OF NUT METHOD, A DIRECT–TENSION–INDICATOR, TWIST–OFF–TYPE TENSION–CONTROL BOLT, CALIBRATED WRENCH, OR ALTERNATIVE DESIGN BOLT.

AT&T
MOBILITY

901 MARQUETTE AVENUE
MINNEAPOLIS, MN 55402



BLACK & VEATCH

BLACK & VEATCH CORPORATION
7760 FRANCE AVENUE SOUTH
SUITE 1200
BLOOMINGTON, MN 55435

PROJECT NO:	188262.1027
DRAWN BY:	JJS
CHECKED BY:	JAT

1	03/31/07	REVISED PER COMMENTS
0	03/13/17	ISSUED FOR CONSTRUCTION
REV	DATE	DESCRIPTION

I HEREBY CERTIFY THAT THIS PLAN, SPECIFICATION, OR REPORT WAS PREPARED BY ME OR UNDER MY DIRECT SUPERVISION AND THAT I AM A DULY LICENSED PROFESSIONAL ENGINEER IN THE STATE OF MINNESOTA.

PRINT NAME: NATHAN C. PETRY

SIGNATURE:

DATE: 03/31/2017 LICENSE# 51299
EXP. 6/18

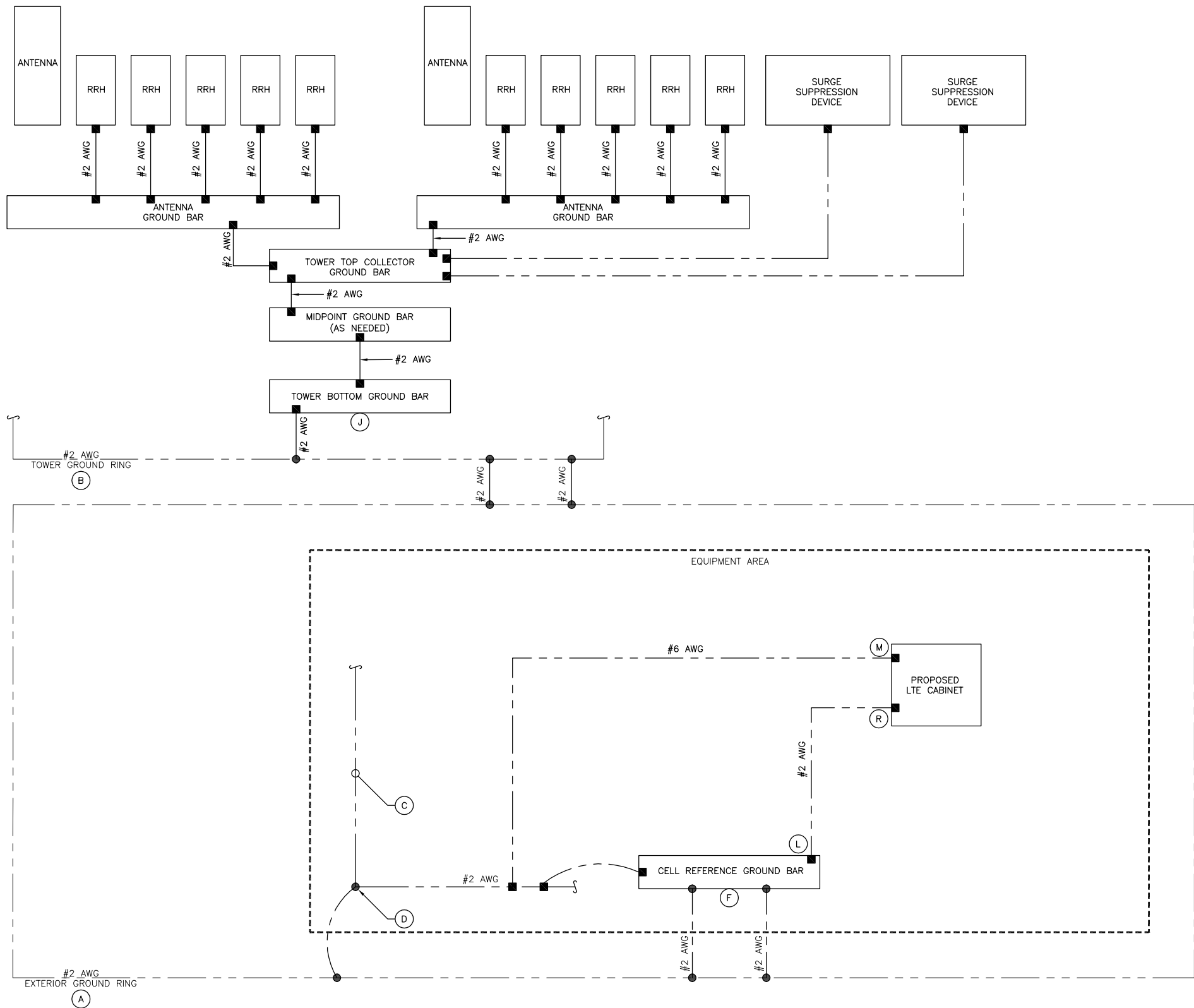
IT IS A VIOLATION OF LAW FOR ANY PERSON, UNLESS THEY ARE ACTING UNDER THE DIRECTION OF A LICENSED PROFESSIONAL ENGINEER, TO ALTER THIS DOCUMENT.

MN STATE FAIR WT
MNL01485
1530 COSGROVE STREET
FALCON HEIGHTS, MN 55108
DAS–SECTOR 12/13

SHEET TITLE
TOWER SECTION
NOTES

SHEET NUMBER

T-5



TOWER ANTENNA EQUIPMENT GROUNDING ONE-LINE

NO SCALE

1

- EXOTHERMIC CONNECTION
■ MECHANICAL CONNECTION
- GROUND ROD
—■— TEST GROUND ROD WITH INSPECTION SLEEVE

LEGEND

- GROUNDING IS SHOWN DIAGRAMMATICALLY ONLY. FOR GROUNDING DETAILS SEE DRAWING E-2
- CONTRACTOR SHALL GROUND ALL EQUIPMENT AS A COMPLETE SYSTEM. GROUNDING SHALL BE IN COMPLIANCE WITH NEC SECTION 250 AND AT&T GROUNDING AND BONDING REQUIREMENTS (ATT-TP-76416) AND MANUFACTURER'S SPECIFICATIONS.
- ALL GROUND CONDUCTORS SHALL BE COPPER; NO ALUMINUM CONDUCTORS SHALL BE USED.
- FOR ALCATEL-LUCENT 850 AND 1900 RRH's, TWO GROUNDS ARE REQUIRED (TOP AND BOTTOM).

NOTES

- (A) **EXTERIOR GROUND RING:** #2 AWG SOLID COPPER, BURIED AT A DEPTH OF AT LEAST 30 INCHES BELOW GRADE, OR 6 INCHES BELOW THE FROST LINE AND APPROXIMATELY 24 INCHES FROM THE EXTERIOR WALL OR FOOTING. (ATT-TP-76416 2.2.3.5/7.5.1)
- (B) **TOWER GROUND RING:** THE GROUND RING SYSTEM SHALL BE INSTALLED AROUND AN ANTENNA TOWER'S LEGS, AND/OR GUY ANCHORS. WHERE SEPARATE SYSTEMS HAVE BEEN PROVIDED FOR THE TOWER AND THE BUILDING, AT LEAST TWO BONDS SHALL BE MADE BETWEEN THE TOWER RING GROUND SYSTEM AND THE BUILDING RING GROUND SYSTEM USING MINIMUM #2 AWG SOLID COPPER CONDUCTORS. (ATT-TP-76416 7.5.1)
- (C) **INTERIOR GROUND RING:** #2 AWG STRANDED GREEN INSULATED COPPER CONDUCTOR EXTENDED AROUND THE PERIMETER OF THE EQUIPMENT AREA. ALL NON-TELECOMMUNICATIONS RELATED METALLIC OBJECTS FOUND WITHIN A SITE SHALL BE GROUNDED TO THE INTERIOR GROUND RING WITH #6 AWG STRANDED GREEN INSULATED CONDUCTOR. (ATT-TP-76416 7.6.4)
- (D) **BOND TO INTERIOR GROUND RING:** #2 AWG SOLID TINNED COPPER WIRE PRIMARY BONDS SHALL BE PROVIDED AT LEAST AT FOUR POINTS ON THE INTERIOR GROUND RING, LOCATED AT THE CORNERS OF THE BUILDING. (ATT-TP-76416 7.5.2.2)
- (E) **GROUND ROD:** UL LISTED COPPER CLAD STEEL, MINIMUM 5/8" DIAMETER BY EIGHT FEET LONG. ALL GROUND RODS MAY BE INSTALLED WITH INSPECTION SLEEVES. GROUND RODS SHALL BE DRIVEN TO THE DEPTH OF GROUND RING CONDUCTOR. (ATT-TP-76416 1.4 / 2.2.3.10)
- (F) **CELL REFERENCE GROUND BAR:** POINT OF GROUND REFERENCE FOR ALL COMMUNICATIONS EQUIPMENT FRAMES. ALL BONDS ARE MADE WITH #2 AWG STRANDED GREEN INSULATED COPPER CONDUCTORS. BOND TO GROUND RING WITH (2) #2 SOLID TINNED COPPER CONDUCTORS. (ATT-TP-76416 7.6.7)
- (G) **HATCH PLATE GROUND BAR:** BOND TO THE INTERIOR GROUND RING WITH TWO #2 AWG STRANDED GREEN INSULATED COPPER CONDUCTORS. WHEN A HATCH-PLATE AND A CELL REFERENCE GROUND BAR ARE BOTH PRESENT, THE CRGB MUST BE CONNECTED TO THE HATCH-PLATE AND TO THE INTERIOR GROUND RING USING TWO #2 AWG STRANDED GREEN INSULATED COPPER CONDUCTORS.
- (H) **EXTERIOR CABLE ENTRY PORT GROUND BARS:** LOCATED AT THE ENTRANCE TO THE CELL SITE BUILDING. BOND TO GROUND RING WITH A #2 AWG SOLID TINNED COPPER CONDUCTORS WITH AN EXOTHERMIC WELD AND INSPECTION SLEEVE. (ATT-TP-76416 7.6.7.2)
- (J) **TOWER EXIT GROUND BAR:** #2 AWG SOLID TINNED COPPER BOND TO THE TOWER GROUND RING. (ATT-TP-76416 7.5.5)
- (K) **TELCO GROUND BAR:** BOND TO BOTH CELL REFERENCE GROUND BAR AND EXTERIOR GROUND RING. (ATT-TP-76416 7.6.8)
- (L) **FRAME BONDING:** THE BONDING POINT FOR TELECOM EQUIPMENT FRAMES SHALL BE THE GROUND BUS THAT IS NOT ISOLATED FROM THE EQUIPMENTS METAL FRAMEWORK. BOND THE FRAME GROUND BUS TO THE "I" SECTION OF THE CELL REFERENCE GROUND BAR. (ATT-TP-76416 7.8)
- (M) **INTERIOR UNIT BONDS:** METAL FRAMES, CABINETS AND INDIVIDUAL METALLIC UNITS LOCATED WITHIN THE AREA OF THE INTERIOR GROUND RING REQUIRE A #6 AWG STRANDED GREEN INSULATED COPPER BOND TO THE INTERIOR GROUND RING. (ATT-TP-76416 7.12.3.1)
- (N) **FENCE AND GATE GROUNDING:** METAL FENCES WITHIN 7 FEET OF THE EXTERIOR GROUND RING OR OBJECTS BONDED TO THE EXTERIOR GROUND RING SHALL BE BONDED TO THE GROUND RING WITH A #2 AWG SOLID TINNED COPPER CONDUCTOR AT AN INTERVAL NOT EXCEEDING 25 FEET. BONDS SHALL BE MADE AT EACH GATE POST AND ACROSS GATE OPENINGS. (ATT-TP-76416 7.12.2.2)
- (P) **EXTERIOR UNIT BONDS:** METALLIC OBJECTS, EXTERNAL TO OR MOUNTED TO THE BUILDING, SHALL BE BONDED TO THE EXTERIOR GROUND RING. (ATT-TP-76416 7.12.2)
- (Q) **ICE BRIDGE SUPPORTS:** EACH ICE BRIDGE LEG SHALL BE BONDED TO THE GROUND RING WITH #2 AWG BARE TINNED COPPER CONDUCTOR. PROVIDE EXOTHERMIC WELDS AT BOTH THE ICE BRIDGE LEG AND BURIED GROUND RING. (ATT-TP-76416 7.4.2.6)
- (R) DURING ALL DC POWER SYSTEM CHANGES INCLUDING DC SYSTEM CHANGE OUTS, RECTIFIER REPLACEMENTS OR ADDITIONS, BREAKER DISTRIBUTION CHANGES, BATTERY ADDITIONS, BATTERY REPLACEMENTS AND INSTALLATIONS OR CHANGES TO DC CONVERTER SYSTEMS IT SHALL BE REQUIRED THAT SERVICES CONTRACTORS VERIFY ALL DC POWER SYSTEMS ARE EQUIPPED WITH A MASTER DC SYSTEM RETURN GROUND CONDUCTOR FROM THE DC POWER SYSTEM COMMON RETURN BUS DIRECTLY CONNECTED TO THE CELL SITE REFERENCE GROUND BAR (CRGB) PER TP76300 SECTION H 6 AND TP76416 FIGURE 7-11 REQUIREMENTS.

GROUNDING KEY NOTES

AT&T
MOBILITY

901 MARQUETTE AVENUE
MINNEAPOLIS, MN 55402



BLACK & VEATCH

BLACK & VEATCH CORPORATION
7760 FRANCE AVENUE SOUTH
SUITE 1200
BLOOMINGTON, MN 55435

PROJECT NO:	188262.1027
DRAWN BY:	JJS
CHECKED BY:	JAT

1	03/31/07	REVISED PER COMMENTS
0	03/13/17	ISSUED FOR CONSTRUCTION
REV	DATE	DESCRIPTION

I HEREBY CERTIFY THAT THIS PLAN, SPECIFICATION, OR REPORT WAS PREPARED BY ME OR UNDER MY DIRECT SUPERVISION AND THAT I AM A DULY LICENSED PROFESSIONAL ENGINEER IN THE STATE OF MINNESOTA.

PRINT NAME: NATHAN C. PETRY

SIGNATURE:

DATE: 03/31/2017 LICENSE# 51299
EXP. 6/18

IT IS A VIOLATION OF LAW FOR ANY PERSON, UNLESS THEY ARE ACTING UNDER THE DIRECTION OF A LICENSED PROFESSIONAL ENGINEER, TO ALTER THIS DOCUMENT.

MN STATE FAIR WT
MNL01485
1530 COSGROVE STREET
FALCON HEIGHTS, MN 55108
DAS-SECTOR 12/13

SHEET TITLE
ONE-LINE
GROUNDING DIAGRAM

SHEET NUMBER

E-1

AT&T
MOBILITY

901 MARQUETTE AVENUE
MINNEAPOLIS, MN 55402



BLACK & VEATCH

BLACK & VEATCH CORPORATION
7760 FRANCE AVENUE SOUTH
SUITE 1200
BLOOMINGTON, MN 55435

PROJECT NO: 188262.1027

DRAWN BY: JJS

CHECKED BY: JAT

REV	DATE	DESCRIPTION
1	03/31/07	REVISED PER COMMENTS
0	03/13/17	ISSUED FOR CONSTRUCTION

I HEREBY CERTIFY THAT THIS PLAN, SPECIFICATION, OR REPORT WAS PREPARED BY ME OR UNDER MY DIRECT SUPERVISION AND THAT I AM A DULY LICENSED PROFESSIONAL ENGINEER IN THE STATE OF MINNESOTA.

PRINT NAME: NATHAN C. PETRY

SIGNATURE:

DATE: 03/31/2017 LICENSE# 51299
EXP. 6/18

IT IS A VIOLATION OF LAW FOR ANY PERSON, UNLESS THEY ARE ACTING UNDER THE DIRECTION OF A LICENSED PROFESSIONAL ENGINEER, TO ALTER THIS DOCUMENT.

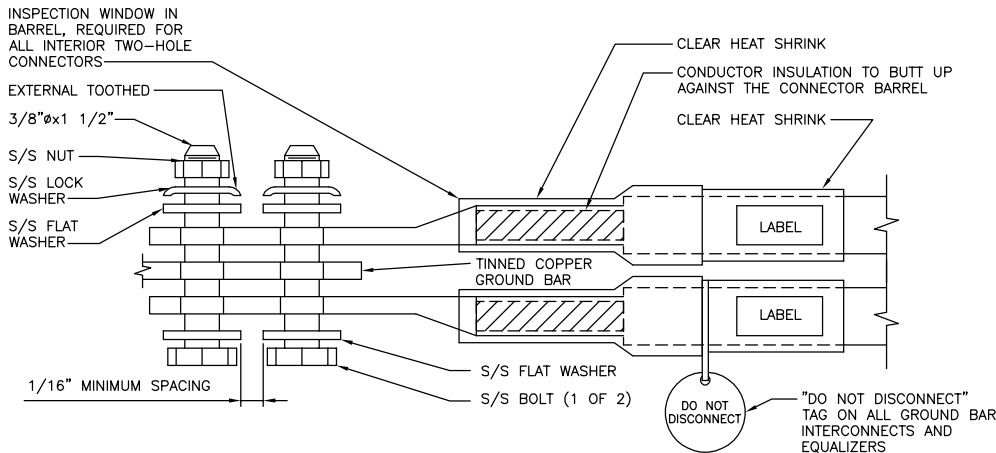
MN STATE FAIR WT
MNL01485
1530 COSGROVE STREET
FALCON HEIGHTS, MN 55108
DAS-SECTOR 12/13

SHEET TITLE

GROUNDING DETAILS

SHEET NUMBER

E-2



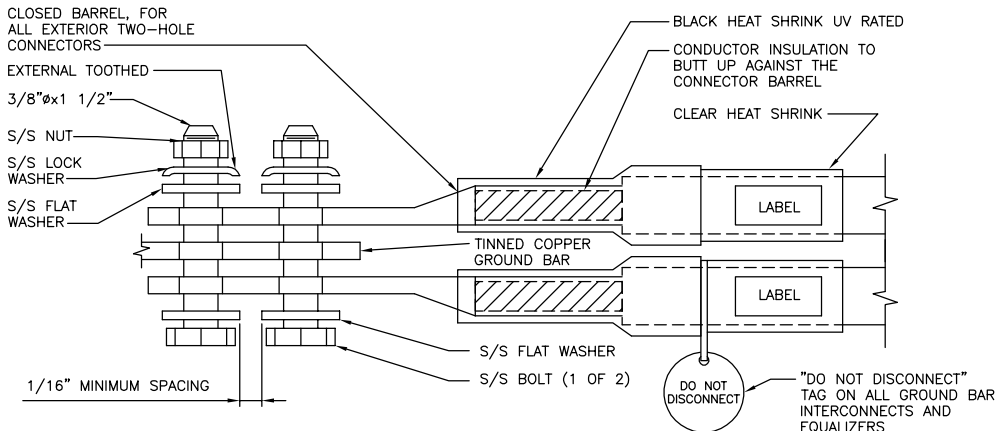
NOTES

- EXOTHERMIC WELD (2) TWO, #2 AWG BARE TINNED SOLID COPPER CONDUCTORS TO GROUND BAR. ROUTE CONDUCTORS TO BURIED GROUND RING AND PROVIDE PARALLEL EXOTHERMIC WELD.
- ALL GROUND BARS SHALL BE STAMPED IN TO THE METAL "IF STOLEN DO NOT RECYCLE." THE CONTRACTOR SHALL USE PERMANENT MARKER TO DRAW THE LINES BETWEEN EACH SECTION AND LABEL EACH SECTION ("P", "A", "I") WITH 1" HIGH LETTERS.
- ALL HARDWARE SHALL BE STAINLESS STEEL 3/8" DIAMETER OR LARGER. ALL HARDWARE 18-8 STAINLESS STEEL INCLUDING LOCK WASHERS, COAT ALL SURFACES WITH AN ANTI-OXIDANT COMPOUND BEFORE MATING.
- FOR GROUND BOND TO STEEL ONLY: INSERT A CADMIUM FLAT WASHER BETWEEN LUG AND STEEL, COAT ALL SURFACES WITH AN ANTI-OXIDANT COMPOUND BEFORE MATING.
- DO NOT INSTALL CABLE GROUND KIT AT A BEND AND ALWAYS DIRECT GROUND CONDUCTOR DOWN TO GROUND BUS.
- NUT & WASHER SHALL BE PLACED ON THE FRONT SIDE OF THE GROUND BAR AND BOLTED ON THE BACK SIDE. INSTALL BLACK HEAT-SHRINKING TUBE, 600 VOLT INSULATION, ON ALL GROUND TERMINATIONS. THE INTENT IS TO WEATHERPROOF THE COMPRESSION CONNECTION.
- SUPPLIED AND INSTALLED BY CONTRACTOR.
- THE CONTRACTOR SHALL BE RESPONSIBLE FOR INSTALLING ADDITIONAL GROUND BAR AS REQUIRED, PROVIDING 50% SPARE CONNECTION POINTS.
- ENSURE THE WIRE INSULATION TERMINATION IS WITHIN 1/8" OF THE BARREL (NO SHINERS).
- BOLTS SHALL BE MADE "SNUG-TIGHT" PLUS 1/4 TURN.

INTERIOR TWO HOLE LUG DETAIL

NO SCALE

1



NOTES

- EXOTHERMIC WELD (2) TWO, #2 AWG BARE TINNED SOLID COPPER CONDUCTORS TO GROUND BAR. ROUTE CONDUCTORS TO BURIED GROUND RING AND PROVIDE PARALLEL EXOTHERMIC WELD.
- ALL GROUND BARS SHALL BE STAMPED IN TO THE METAL "IF STOLEN DO NOT RECYCLE." THE CONTRACTOR SHALL USE PERMANENT MARKER TO DRAW THE LINES BETWEEN EACH SECTION AND LABEL EACH SECTION ("P", "A", "I") WITH 1" HIGH LETTERS.
- ALL HARDWARE SHALL BE STAINLESS STEEL 3/8" DIAMETER OR LARGER. ALL HARDWARE 18-8 STAINLESS STEEL INCLUDING LOCK WASHERS, COAT ALL SURFACES WITH AN ANTI-OXIDANT COMPOUND BEFORE MATING.
- FOR GROUND BOND TO STEEL ONLY: INSERT A CADMIUM FLAT WASHER BETWEEN LUG AND STEEL, COAT ALL SURFACES WITH AN ANTI-OXIDANT COMPOUND BEFORE MATING.
- DO NOT INSTALL CABLE GROUND KIT AT A BEND AND ALWAYS DIRECT GROUND CONDUCTOR DOWN TO GROUND BUS.
- NUT & WASHER SHALL BE PLACED ON THE FRONT SIDE OF THE GROUND BAR AND BOLTED ON THE BACK SIDE. INSTALL BLACK HEAT-SHRINKING TUBE, 600 VOLT INSULATION, ON ALL GROUND TERMINATIONS. THE INTENT IS TO WEATHERPROOF THE COMPRESSION CONNECTION.
- SUPPLIED AND INSTALLED BY CONTRACTOR.
- THE CONTRACTOR SHALL BE RESPONSIBLE FOR INSTALLING ADDITIONAL GROUND BAR AS REQUIRED, PROVIDING 50% SPARE CONNECTION POINTS.
- ENSURE THE WIRE INSULATION TERMINATION IS WITHIN 1/8" OF THE BARREL (NO SHINERS).
- BOLTS SHALL BE MADE "SNUG-TIGHT" PLUS 1/4 TURN.

EXTERIOR TWO HOLE LUG DETAIL

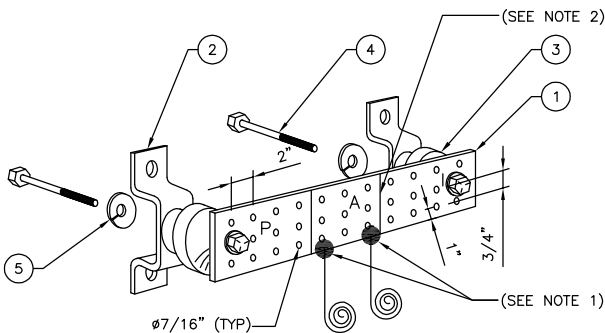
NO SCALE

2

NEWTON INSTRUMENT COMPANY, INC.
BUTNER, N.C.

NO	REQUIRED	PART NUMBER	DESCRIPTION
1	1	HAGAR TGBI-14420C OR A.L.T 382227	GALVANIZED STEEL GROUND BAR * (1/4" x 4" x 20)
2	2	A-6056	WALL MOUNTING BRACKET
3	2	3061-4	INSULATORS
4	2	3012-1	5/8"-11x1" H.H.C.S. BOLTS
5	4	3015-8	5/8" LOCKWASHER

* HOLE CENTERS TO MATCH NEMA DOUBLE LUG CONFIGURATION.



EACH GROUND CONDUCTOR TERMINATING ON ANY GROUND BAR SHALL HAVE AN IDENTIFICATION TAG ATTACHED AT EACH END THAT WILL IDENTIFY ITS ORIGIN AND DESTINATION

SECTION "P" - SURGE PROTECTORS

(EC) CELL REFERENCE GROUND BAR (IF COLLOCATED)
(EC) GENERATOR FRAMEWORK (IF AVAILABLE) (#2 AWG)
(EC) TELCO GROUND BAR (#2 AWG)
(EC) COMMERCIAL POWER COMMON NEUTRAL/GROUND BOND (3/0)
(EC) FIBER GROUND BAR (#2 AWG)
(EC) POWER ROOM REFERENCE GROUND BAR (#2 AWG)
(AT&T) RECTIFIER FRAMES

SECTION "A" - SURGE ABSORBERS

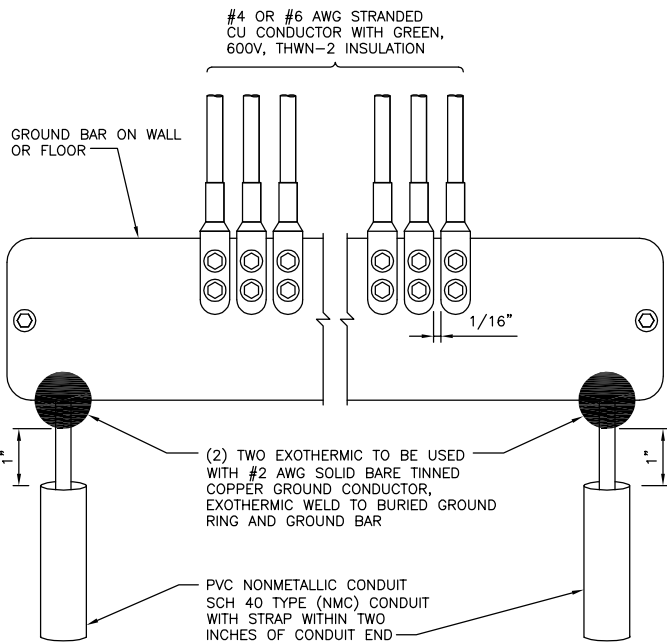
(EC) INTERIOR GROUND RING (#2 AWG)
(EC) EXTERNAL EARTH GROUND FIELD (BURIED GROUND RING) (#2 AWG)
(EC) METALLIC COLD WATER PIPE (IF AVAILABLE) (1/0 AWG)
(EC) BUILDING STEEL (IF AVAILABLE) (1/0 AWG)

SECTION "I" - ISOLATED GROUND ZONE

(AT&T) ALL ISOLATED GROUND REFERENCE
(AT&T) GROUND WINDOW BAR

DETAIL NOTES

- EXOTHERMICALLY WELD #2 AWG BARE TINNED SOLID COPPER CONDUCTOR TO GROUND BAR. ROUTE CONDUCTOR TO BURIED GROUND RING AND PROVIDE PARALLEL EXOTHERMIC WELD.
- THE INSTALLER SHALL USE PERMANENT MARKER TO DRAW THE LIKE BETWEEN SECTION AND LABEL EACH SECTION ("P", "A", "I" WITH 1" HIGH LETTERS



GROUNDING BAR DETAIL

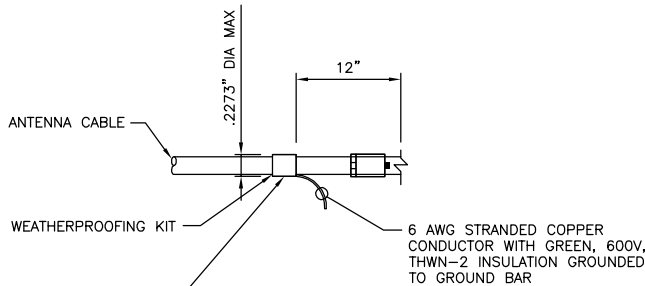
NO SCALE

4

CONNECTION OF CABLE GROUNDING
KIT TO ANTENNA CABLE

NO SCALE

5



PART 1 – GENERAL

- 1.1GENERAL CONDITIONS:
- A.

CONTRACTOR SHALL INSPECT THE EXISTING SITE CONDITIONS PRIOR TO SUBMITTING BID. ANY QUESTIONS ARISING DURING THE BID PERIOD IN REGARDS TO THE CONTRACTORS FUNCTIONS, THE SCOPE OF WORK, OR ANY OTHER ISSUE RELATED TO THIS PROJECT SHALL BE BROUGHT UP DURING THE BID PERIOD WITH THE PROJECT MANAGER FOR CLARIFICATION, NOT AFTER THE CONTRACT HAS BEEN AWARDED.
- B.

THE CONTRACTOR SHALL OBTAIN PERMITS, LICENSES, MAKE ALL DEPOSITS, AND PAY ALL FEES REQUIRED FOR THE CONSTRUCTION PERFORMANCE FOR THE WORK UNDER THIS SECTION.
- C.

DRAWINGS SHOW THE GENERAL ARRANGEMENT OF ALL SYSTEMS AND COMPONENTS COVERED UNDER THIS SECTION. THE CONTRACTOR SHALL VERIFY ALL DIMENSIONS. DRAWING SHALL NOT BE SCALED TO DETERMINE DIMENSIONS.
- 1.2LAWS, REGULATIONS, ORDINANCES, STATUTES AND CODES.
- A.

ALL WORK SHALL BE INSTALLED IN ACCORDANCE WITH THE LATEST EDITION OF THE NATIONAL ELECTRICAL CODE, AND ALL APPLICABLE LOCAL LAWS, REGULATIONS, ORDINANCES, STATUTES AND CODES. CONDUIT BENDS SHALL BE THE RADIUS BEND FOR THE TRADE SIZE OF CONDUIT IN COMPLIANCE WITH THE LATEST EDITIONS OF NEC.
- 1.3REFERENCES:
- A.

THE PUBLICATIONS LISTED BELOW ARE PART OF THIS SPECIFICATION. EACH PUBLICATION SHALL BE THE LATEST REVISION AND ADDENDUM IN EFFECT ON THE DATE. THIS SPECIFICATION IS ISSUED FOR CONSTRUCTION UNLESS OTHERWISE NOTED. EXCEPT AS MODIFIED BY THE REQUIREMENT SPECIFIED HEREIN OR THE DETAILS OF THE DRAWINGS, WORK INCLUDED IN THIS SPECIFICATION SHALL CONFORM TO THE APPLICABLE PROVISION OF THESE PUBLICATIONS.
1.

ANSI/IEEE (AMERICAN NATIONAL STANDARDS INSTITUTE)
2.

ASTM (AMERICAN SOCIETY FOR TESTING AND MATERIALS)
3.

ICEA (INSULATED CABLE ENGINEERS ASSOCIATION)
4.

NEMA (NATIONAL ELECTRICAL MANUFACTURER'S ASSOCIATION)
5.

NFPA (NATIONAL FIRE PROTECTION ASSOCIATION)
6.

OSHA (OCCUPATIONAL SAFETY AND HEALTH ADMINISTRATION)
7.

UL (UNDERWRITERS LABORATORIES INC.)
8.

AT&T GROUNDING AND BONDING STANDARDS TP-76416
- 1.4SCOPE OF WORK
- A.

WORK UNDER THIS SECTION SHALL CONSIST OF FURNISHING ALL LABOR, MATERIAL, AND ASSOCIATED SERVICES REQUIRED TO COMPLETE REQUIRED CONSTRUCTION AND BE OPERATIONAL.
- B.

ALL ELECTRICAL EQUIPMENT UNDER THIS CONTRACT SHALL BE PROPERLY TESTED, ADJUSTED, AND ALIGNED BY THE CONTRACTOR.
- C.

THE CONTRACTOR SHALL BE RESPONSIBLE FOR ALL EXCAVATING, DRAINING, TRENCHES, BACKFILLING, AND REMOVAL OF EXCESS DIRT.
- D.

THE CONTRACTOR SHALL FURNISH TO THE OWNER WITH CERTIFICATES OF A FINAL INSPECTION AND APPROVAL FROM THE INSPECTION AUTHORITIES HAVING JURISDICTION.
- E.

THE CONTRACTOR SHALL PREPARE A COMPLETE SET OF AS-BUILT DRAWINGS, DOCUMENT ALL WIRING EQUIPMENT CONDITIONS, AND CHANGES WHILE COMPLETING THIS CONTRACT. THE AS-BUILT DRAWINGS SHALL BE SUBMITTED AT COMPLETION OF THE PROJECT.

PART 2 – PRODUCTS

- 2.1GENERAL:
- A.

ALL MATERIALS AND EQUIPMENT SHALL BE UL LISTED, NEW, AND FREE FROM DEFECTS.
- B.

ALL ITEMS OF MATERIALS AND EQUIPMENT SHALL BE ACCEPTABLE TO THE AUTHORITY HAVING JURISDICTION AS SUITABLE FOR THE USE INTENDED.
- C.

ALL EQUIPMENT SHALL BEAR THE UNDERWRITERS LABORATORIES LABEL OF APPROVAL, AND SHALL CONFORM TO REQUIREMENT OF THE NATIONAL ELECTRICAL CODE.
- D.

ALL OVERCURRENT DEVICES SHALL HAVE AN INTERRUPTING CURRENT RATING THAT SHALL BE GREATER THAN THE SHORT CIRCUIT CURRENT TO WHICH THEY ARE SUBJECTED, 10,000 AIC MINIMUM. VERIFY AVAILABLE SHORT CIRCUIT CURRENT DOES NOT EXCEED THE RATING OF ELECTRICAL EQUIPMENT IN ACCORDANCE WITH ARTICLE 110.24 NEC OR THE MOST CURRENT ADOPTED CODE PER THE GOVERNING JURISDICTION.
- 2.2MATERIALS AND EQUIPMENT:
- A.

CONDUIT:
1.

RIGID METAL CONDUIT (RMC) SHALL BE HOT-DIPPED GALVANIZED INSIDE AND OUTSIDE INCLUDING ENDS AND THREADS AND ENAMELED OR LACQUERED INSIDE IN ADDITION TO GALVANIZING.
2.

LIQUDTIGHT FLEXIBLE METAL CONDUIT SHALL BE UL LISTED.
3.

CONDUIT CLAMPS, STRAPS AND SUPPORTS SHALL BE STEEL OR MALLEABLE IRON. ALL FITTINGS SHALL BE COMPRESSION AND CONCRETE TIGHT TYPE. GROUNDING BUSHINGS WITH INSULATED THROATS SHALL BE INSTALLED ON ALL CONDUIT TERMINATIONS.
4.

NONMETALLIC CONDUIT AND FITTINGS SHALL BE SCHEDULE 40 PVC. INSTALL USING SOLVENT-CEMENT-TYPE JOINTS AS RECOMMENDED BY THE MANUFACTURER.
- B.

CONDUCTORS AND CABLE:
1.

CONDUCTORS AND CABLE SHALL BE FLAME-RETARDANT, MOISTURE AND HEAT RESISTANT THERMOPLASTIC, SINGLE CONDUCTOR, COPPER, TYPE THHN/THWN-2, 600 VOLT, SIZE AS INDICATED, #12 AWG SHALL BE THE MINIMUM SIZE CONDUCTOR USED.
2.

#10 AWG AND SMALLER CONDUCTOR SHALL BE SOLID OR STRANDED AND #8 AWG AND LARGER CONDUCTORS SHALL BE STRANDED.
3.

SOLDERLESS, COMPRESSION-TYPE CONNECTORS SHALL BE USED FOR TERMINATION OF ALL STRANDED CONDUCTORS.
4.

STRAIN-RELIEF SUPPORTS GRIPS SHALL BE HUBBELL KELLEMS OR APPROVED EQUAL. CABLES SHALL BE SUPPORTED IN ACCORDANCE WITH THE NEC AND CABLE MANUFACTURER'S RECOMMENDATIONS.
5.

ALL CONDUCTORS SHALL BE TAGGED AT BOTH ENDS OF THE CONDUCTOR, AT ALL PULL BOXES, J-BOXES, EQUIPMENT AND CABINETS AND SHALL BE IDENTIFIED WITH APPROVED PLASTIC TAGS (ACTION CRAFT, BRADY, OR APPROVED EQUAL).
- C.

DISCONNECT SWITCHES:
1.

DISCONNECT SWITCHES SHALL BE HEAVY DUTY, DEAD-FRONT, QUICK-MAKE, QUICK-BREAK, EXTERNALLY OPERABLE, HANDLE LOCKABLE AND INTERLOCK WITH COVER IN CLOSED POSITION, RATING AS INDICATED, UL LABELED FURNISHED IN NEMA 3R ENCLOSURE, SQUARE-D OR ENGINEER APPROVED EQUAL.
- D.

CHEMICAL ELECTROLYTIC GROUNDING SYSTEM:
1.

INSTALL CHEMICAL GROUNDING AS REQUIRED. THE SYSTEM SHALL BE ELECTROLYTIC MAINTENANCE FREE ELECTRODE CONSISTING OF RODS WITH A MINIMUM #2 AWG CU EXOTHERMICALLY WELDED PIGTAIL, PROTECTIVE BOXES, AND BACKFILL MATERIAL. MANUFACTURER SHALL BE LYNCOLE XIT GROUNDING ROD TYPES K2-(*)CS OR K2L-(*)CS (*) LENGTH AS REQUIRED.
2.

GROUND ACCESS BOX SHALL BE A POLYPLASTIC BOX FOR NON-TRAFFIC APPLICATIONS, INCLUDING BOLT DOWN FLUSH COVER WITH "BREATHER" HOLES, XIT MODEL #XB-22. ALL DISCONNECT SWITCHES AND CONTROLLING DEVICES SHALL BE PROVIDED WITH ENGRAVED LAMICOID NAMEPLATES INDICATING EQUIPMENT CONTROLLED, BRANCH CIRCUITS ID NUMBERING, AND THE ELECTRICAL POWER SOURCE.
3.

BACKFILL MATERIAL SHALL BE LYNCONITE AND LYNCOLE GROUNDING GRAVEL.

- E.
- SYSTEM GROUNDING:
1.

ALL GROUNDING COMPONENTS SHALL BE TINNED AND GROUNDING CONDUCTOR SHALL BE #2 AWG BARE, SOLID, TINNED, COPPER. ABOVE GRADE GROUNDING CONDUCTORS SHALL BE INSULATED WHERE NOTED.
2.

GROUNDING BUSSES SHALL BE BARE, TINNED, ANNEALED COPPER BARS OF RECTANGULAR CROSS SECTION. STANDARD BUS BARS MGB, SHALL BE FURNISHED AND INSTALLED BY THE CONTRACTOR. THEY SHALL NOT BE FABRICATED OR MODIFIED IN THE FIELD. ALL GROUNDING BUSES SHALL BE IDENTIFIED WITH MINIMUM 3/4" LETTERS BY WAY OF STENCILING OR DESIGNATION PLATE.
3.

CONNECTORS SHALL BE HIGH-CONDUCTIVITY, HEAVY DUTY, LISTED AND LABELED AS GROUNDING CONNECTORS FOR THE MATERIALS USED. USE TWO-HOLE COMPRESSION LUGS WITH HEAT SHRINK FOR MECHANICAL CONNECTIONS. INTERIOR CONNECTIONS USE TWO-HOLE COMPRESSION LUGS WITH INSPECTION WINDOW AND CLEAR HEAT SHRINK.
4.

EXOTHERMIC WELDED CONNECTIONS SHALL BE PROVIDED IN KIT FORM AND SELECTED FOR THE SPECIFIC TYPES, SIZES, AND COMBINATIONS OF CONDUCTORS AND OTHER ITEMS TO BE CONNECTED.
5.

GROUND RODS SHALL BE COPPER-CLAD STEEL WITH HIGH-STRENGTH STEEL CORE AND ELECTROLYTIC-GRADE COPPER OUTER SHEATH, MOLTEN WELDED TO CORE, 5/8"x10'-0". ALL GROUNDING RODS SHALL BE INSTALLED WITH INSPECTION SLEEVES.
6.

INSTALL AN EQUIPMENT GROUNDING CONDUCTOR IN ALL CONDUITS IN COMPLIANCE WITH THE AT&T SPECIFICATIONS AND NEC. THE EQUIPMENT GROUNDING CONDUCTORS SHALL BE BONDED AT ALL JUNCTION BOXES, PULLBOXES, DISCONNECT SWITCHES, STARTERS, AND EQUIPMENT CABINETS.
- F.

OTHER MATERIALS:
1.

THE CONTRACTOR SHALL PROVIDE OTHER MATERIALS, THOUGH NOT SPECIFICALLY DESCRIBED, WHICH ARE REQUIRED FOR A COMPLETELY OPERATIONAL SYSTEM AND PROPER INSTALLATION OF THE WORK.
2.

PROVIDE PULL BOXES AND JUNCTION BOXES WHERE SHOWN OR REQUIRED BY NEC.
- G.

PANELS AND LOAD CENTERS:
1.

ALL PANEL DIRECTORIES SHALL BE TYPEWRITTEN.

PART 3 – EXECUTION

- 3.1GENERAL:
- A.

ALL MATERIAL AND EQUIPMENT SHALL BE INSTALLED IN STRICT ACCORDANCE WITH THE MANUFACTURER'S RECOMMENDATIONS.
- B.

EQUIPMENT SHALL BE TIGHTLY COVERED AND PROTECTED AGAINST DIRT OR WATER, AND AGAINST CHEMICAL OR MECHANICAL INJURY DURING INSTALLATION AND CONSTRUCTION PERIODS.
- 3.2LABOR AND WORKMANSHIP:
- A.

ALL LABOR FOR THE INSTALLATION OF MATERIALS AND EQUIPMENT FURNISHED FOR THE ELECTRICAL SYSTEM SHALL BE INSTALLED BY EXPERIENCED WIREMEN, IN A NEAT AND WORKMAN-LIKE MANNER.
- B.

ALL ELECTRICAL EQUIPMENT SHALL BE ADJUSTED, ALIGNED AND TESTED BY THE CONTRACTOR AS REQUIRED TO PRODUCE THE INTENDED PERFORMANCE.
- C.

UPON COMPLETION OF WORK, THE CONTRACTOR SHALL THOROUGHLY CLEAN ALL EXPOSED EQUIPMENT, REMOVE ALL LABELS AND ANY DEBRIS, CRATING OR CARTONS AND LEAVE THE INSTALLATION FINISHED AND READY FOR OPERATION.
- 3.3COORDINATION:
- A.

THE CONTRACTOR SHALL COORDINATE THE INSTALLATION OF ELECTRICAL ITEMS WITH THE OWNER-FURNISHED EQUIPMENT DELIVERY SCHEDULE TO PREVENT UNNECESSARY DELAYS IN THE TOTAL WORK.
- 3.4INSTALLATION:
- A.

CONDUIT:
1.

ALL ELECTRICAL WIRING SHALL BE INSTALLED IN CONDUIT AS SPECIFIED. NO CONDUIT OR TUBING OF LESS THAN 3/4 INCH TRADE SIZE.
2.

PROVIDE RIGID PVC SCHEDULE 80 CONDUITS FOR ALL RISERS, RMC OTHERWISE NOTED. EMT MAY BE INSTALLED FOR EXTERIOR CONDUITS WHERE NOT SUBJECT TO PHYSICAL DAMAGE.
3.

INSTALL SCHEDULE 40 PVC CONDUIT WITH A MINIMUM COVER OF 24" UNDER ROADWAYS, PARKING LOTS, STREETS, AND ALLEYS; CONDUIT SHALL HAVE A MINIMUM COVER OF 18" IN ALL OTHER NON-TRAFFIC APPLICATIONS (REFER TO 2008 NEC, TABLE 300.5).
4.

USE GALVANIZED FLEXIBLE STEEL CONDUIT WHERE DIRECT CONNECTION TO EQUIPMENT WITH MOVEMENT, VIBRATION, OR FOR EASE OF MAINTENANCE. USE LIQUID TIGHT, FLEXIBLE METAL CONDUIT FOR OUTDOOR APPLICATIONS. INSTALL GALVANIZED FLEXIBLE STEEL CONDUIT AT ALL POINTS OF CONNECTION TO EQUIPMENT MOUNTED ON SUPPORT TO ALLOW FOR EXPANSION AND CONTRACTION.
5.

A RUN OF CONDUIT BETWEEN BOXES OR EQUIPMENT SHALL NOT CONTAIN MORE THAN THE EQUIVALENT OF THREE QUARTER-BENDS. CONDUIT BEND SHALL BE MADE WITH THE UL LISTED BENDER OR FACTORY 90 DEGREE ELBOWS MAY BE USED.
6.

FIELD FABRICATED CONDUITS SHALL BE CUT SQUARE WITH A CONDUIT CUTTING TOOL AND REAMED TO PROVIDE A SMOOTH INSIDE SURFACE.
7.

PROVIDE INSULATED GROUNDING BUSHING FOR ALL CONDUITS.
8.

CONTRACTOR IS RESPONSIBLE FOR PROTECTING ALL CONDUITS DURING CONSTRUCTION. TEMPORARY OPENINGS IN THE CONDUIT SYSTEM SHALL BE PLUGGED OR CAPPED TO PREVENT ENTRANCE OF MOISTURE OR FOREIGN MATTER. CONTRACTOR SHALL REPLACE ANY CONDUITS CONTAINING FOREIGN MATERIALS THAT CANNOT BE REMOVED.
9.

ALL CONDUITS SHALL BE SWABBED CLEAN BY PULLING AN APPROPRIATE SIZE MANDREL THROUGH THE CONDUIT BEFORE INSTALLATION OF CONDUCTORS OR CABLES. CONDUIT SHALL BE FREE OF DIRT AND DEBRIS.
10.

INSTALL PULL STRINGS IN ALL CLEAN EMPTY CONDUITS. IDENTIFY PULL STRINGS AT EACH END.
11.

INSTALL 2" HIGHLY VISIBLE AND DETECTABLE TAPE 12" ABOVE ALL UNDERGROUND CONDUITS AND CONDUCTORS.
12.

CONDUITS SHALL BE INSTALLED IN SUCH A MANNER AS TO INSURE AGAINST COLLECTION OF TRAPPED CONDENSATION.
13.

PROVIDE CORE DRILLING AS NECESSARY FOR PENETRATIONS TO ALLOW FOR RACEWAYS AND CABLES TO BE ROUTED THROUGH THE BUILDING. DO NOT PENETRATE STRUCTURAL MEMBERS. SLEEVES AND/OR PENETRATIONS IN FIRE RATED CONSTRUCTION SHALL BE EFFECTIVELY SEALED WITH FIRE RATED MATERIAL WHICH SHALL MAINTAIN THE FIRE RATING OF THE WALL OR STRUCTURE. FIRE STOPS AT FLOOR PENETRATIONS SHALL PREVENT PASSAGE OF WATER, SMOKE, FIRE, AND FUMES. ALL MATERIAL SHALL BE UL APPROVED FOR THIS PURPOSE.
- B.

CONDUCTORS AND CABLE:
1.

ALL POWER WIRING SHALL BE COLOR CODED AS FOLLOWS:
- | | |
|-------------|--------------------------|
| DESCRIPTION | 208/240/120 VOLT SYSTEMS |
| PHASE A | BLACK |
| PHASE B | RED |
| PHASE C | BLUE |
| NEUTRAL | WHITE |
| GROUNDING | GREEN |
2.

SPLICES SHALL BE MADE ONLY AT OUTLETS, JUNCTION BOXES, OR ACCESSIBLE RACEWAY CONDUITS APPROVED FOR THIS PURPOSE.
3.

PULLING LUBRICANTS SHALL BE UL APPROVED. CONTRACTOR SHALL USE NYLON OR HEMP ROPE FOR PULLING CONDUCTOR OR CABLES INTO THE CONDUIT.
4.

CABLES SHALL BE NEATLY TRAINED, WITHOUT INTERLACING, AND BE OF SUFFICIENT LENGTH IN ALL BOXES & EQUIPMENT TO PERMIT MAKING A NEAT ARRANGEMENT. CABLES SHALL BE SECURED IN A MANNER TO AVOID TENSION ON CONDUCTORS OR TERMINALS. CONDUCTORS SHALL BE PROTECTED FROM MECHANICAL INJURY AND MOISTURE. SHARP BENDS OVER CONDUIT BUSHINGS IS PROHIBITED. DAMAGED CABLES SHALL BE REMOVED AND REPLACED AT THE CONTRACTOR'S EXPENSE.

- C.

DISCONNECT SWITCHES:
1.

INSTALL DISCONNECT SWITCHES LEVEL AND PLUMB. CONNECT TO WIRING SYSTEM AND GROUNDING SYSTEM AS INDICATED.
- D.

GROUNDING:
1.

ALL METALLIC PARTS OF ELECTRICAL EQUIPMENT WHICH DO NOT CARRY CURRENT SHALL BE GROUNDED IN ACCORDANCE WITH THE REQUIREMENTS OF THE BUILDING MANUFACTURER, AT&T GROUNDING AND BONDING STANDARDS TP-76416, ND-00135, AND THE NATIONAL ELECTRICAL CODE.
2.

PROVIDE ELECTRICAL GROUNDING AND BONDING SYSTEM INDICATED WITH ASSEMBLY OF MATERIALS, INCLUDING GROUNDING ELECTRODES, BONDING JUMPERS AND ADDITIONAL ACCESSORIES AS REQUIRED FOR A COMPLETE INSTALLATION.
3.

ALL GROUNDING CONDUCTORS SHALL PROVIDE A STRAIGHT DOWNWARD PATH TO GROUND WITH GRADUAL BEND AS REQUIRED. GROUNDING CONDUCTORS SHALL NOT BE LOOPED OR SHARPLY BENT. ROUTE GROUNDING CONNECTIONS AND CONDUCTORS TO GROUND IN THE SHORTEST AND STRAIGHTEST PATHS POSSIBLE TO MINIMIZE TRANSIENT VOLTAGE RISES.
4.

BUILDINGS AND/OR NEW TOWERS GREATER THAN 75 FEET IN HEIGHT AND WHERE THE MAIN GROUNDING CONDUCTORS ARE REQUIRED TO BE ROUTED TO GRADE, THE CONTRACTOR SHALL ROUTE TWO GROUNDING CONDUCTORS FROM THE ROOFTOP, TOWERS, AND WATER TOWERS GROUNDING RING, TO THE EXISTING GROUNDING SYSTEM, THE GROUNDING CONDUCTORS SHALL NOT BE SMALLER THAN 2/0 AWG COPPER. ROOFTOP GROUNDING RING SHALL BE BONDED TO THE EXISTING GROUNDING SYSTEM, THE BUILDING STEEL COLUMNS, LIGHTNING PROTECTION SYSTEM, AND BUILDING MAIN WATER LINE (FERROUS OR NONFERROUS METAL PIPING ONLY). SEE STANDARD 6.3.2.2.
5.

TIGHTEN GROUNDING AND BONDING CONNECTORS, INCLUDING SCREWS AND BOLTS, IN ACCORDANCE WITH MANUFACTURER'S PUBLISHED TORQUE TIGHTENING VALUES FOR CONNECTORS AND BOLTS. WHERE MANUFACTURER'S TORQUING REQUIREMENTS ARE NOT AVAILABLE, TIGHTEN CONNECTIONS TO COMPLY WITH TIGHTENING TORQUE VALUES SPECIFIED IN UL TO ASSURE PERMANENT AND EFFECTIVE GROUNDING.
6.

CONTRACTOR SHALL VERIFY THE LOCATIONS OF GROUNDING TIE-IN-POINTS TO THE EXISTING GROUNDING SYSTEM. ALL UNDERGROUND GROUNDING CONNECTIONS SHALL BE MADE BY THE EXOTHERMIC WELD PROCESS AND INSTALLED IN ACCORDANCE WITH THE MANUFACTURER'S INSTRUCTIONS.
7.

ALL GROUNDING CONNECTIONS SHALL BE INSPECTED FOR TIGHTNESS. EXOTHERMIC WELDED CONNECTIONS SHALL BE APPROVED BY THE INSPECTOR HAVING JURISDICTION BEFORE BEING PERMANENTLY CONCEALED.
8.

APPLY CORROSION-RESISTANT FINISH TO FIELD CONNECTIONS AND PLACES WHERE FACTORY APPLIED PROTECTIVE COATINGS HAVE BEEN DESTROYED. USE KOPR-SHIELD ANTI-OXIDATION COMPOUND ON ALL COMPRESSION GROUNDING CONNECTIONS.
9.

A SEPARATE, CONTINUOUS, INSULATED EQUIPMENT GROUNDING CONDUCTOR SHALL BE INSTALLED IN ALL FEEDER AND BRANCH CIRCUITS.
10.

BOND ALL INSULATED GROUNDING BUSHINGS WITH A BARE #6 AWG GROUNDING CONDUCTOR TO A GROUND BUS.
11.

DIRECT BURIED GROUNDING CONDUCTORS SHALL BE INSTALLED AT A NOMINAL DEPTH OF 36" MINIMUM BELOW GRADE, OR 6" BELOW THE FROST LINE, USE THE GREATER OF THE TWO DISTANCES.
12.

ALL GROUNDING CONDUCTORS EMBEDDED IN OR PENETRATING CONCRETE SHALL BE INSTALLED IN SCHEDULE 40 PVC CONDUIT.
13.

THE INSTALLATION OF CHEMICAL ELECTROLYTIC GROUNDING SYSTEM IN STRICT ACCORDANCE WITH MANUFACTURER'S INSTRUCTIONS. REMOVE SEALING TAPE FROM LEACHING AND BREATHER HOLES. INSTALL PROTECTIVE BOX FLUSH WITH GRADE.
14.

DRIVE GROUND RODS UNTIL TOPS ARE A MINIMUM DISTANCE OF 36" DEPTH OR 6" BELOW FROST LINE, USING THE GREATER OF THE TWO DISTANCES.
15.

IF COAX ON THE ICE BRIDGE IS MORE THAN 6 FT. FROM THE GROUNDING BAR AT THE BASE OF THE TOWER, A SECOND GROUNDING BAR WILL BE NEEDED AT THE END OF THE ICE BRIDGE, TO GROUND THE COAX CABLE GROUNDING KITS AND IN-LINE ARRESTORS.
16.

CONTRACTOR SHALL REPAIR, AND/OR REPLACE, EXISTING GROUNDING SYSTEM COMPONENTS DAMAGED DURING CONSTRUCTION AT THE CONTRACTORS EXPENSE.
- 3.5

ACCEPTANCE TESTING:
- A.

CERTIFIED PERSONNEL USING CERTIFIED EQUIPMENT SHALL PERFORM REQUIRED TESTS AND SUBMIT WRITTEN TEST REPORTS UPON COMPLETION.
- B.

WHEN MATERIAL AND/OR WORKMANSHIP IS FOUND NOT TO COMPLY WITH THE SPECIFIED REQUIREMENTS, THE NON-COMPLYING ITEMS SHALL BE REMOVED FROM THE PROJECT SITE AND REPLACED WITH ITEMS COMPLYING WITH THE SPECIFIED REQUIREMENTS PROMPTLY AFTER RECEIPT OF NOTICE FOR NON-COMPLIANCE.
- C.

TEST PROCEDURES:
1.

ALL FEEDERS SHALL HAVE INSULATION TESTED AFTER INSTALLATION, BEFORE CONNECTION TO DEVICES. THE CONDUCTORS SHALL TEST FREE FROM SHORT CIRCUITS AND GROUNDS. TESTING SHALL BE FOR ONE MINUTE USING 1000V DC. PROVIDE WRITTEN DOCUMENTATION FOR ALL TEST RESULTS.
2.

PRIOR TO ENERGIZING CIRCUITRY, TEST WIRING DEVICES FOR ELECTRICAL CONTINUITY AND PROPER POLARITY CONNECTIONS.
3.

MEASURE AND RECORD VOLTAGES BETWEEN PHASES AND BETWEEN PHASE CONDUCTORS AND NEUTRALS. SUBMIT A REPORT OF MAXIMUM AND MINIMUM VOLTAGES.
4.

PERFORM GROUNDING TEST TO MEASURE GROUNDING RESISTANCE OF GROUNDING SYSTEM USING THE IEEE STANDARD 3-POINT "FALL-OF-POTENTIAL" METHOD. PROVIDE PLOTTED TEST VALUES AND LOCATION SKETCH. NOTIFY THE ENGINEER IMMEDIATELY IF MEASURED VALUE IS OVER 5 OHMS.

AT&T
MOBILITY

901 MARQUETTE AVENUE
MINNEAPOLIS, MN 55402



BLACK & VEATCH

BLACK & VEATCH CORPORATION
7760 FRANCE AVENUE SOUTH
SUITE 1200
BLOOMINGTON, MN 55435

PROJECT NO:	188262.1027
DRAWN BY:	JJS
CHECKED BY:	JAT

1	03/31/07	REVISED PER COMMENTS
0	03/13/17	ISSUED FOR CONSTRUCTION
REV	DATE	DESCRIPTION

I HEREBY CERTIFY THAT THIS PLAN, SPECIFICATION, OR REPORT WAS PREPARED BY ME OR UNDER MY DIRECT SUPERVISION AND THAT I AM A DULY LICENSED PROFESSIONAL ENGINEER IN THE STATE OF MINNESOTA.

PRINT NAME: NATHAN C. PETRY

SIGNATURE:

DATE: 03/31/2017 LICENSE# 51299
EXP. 6/18

IT IS A VIOLATION OF LAW FOR ANY PERSON, UNLESS THEY ARE ACTING UNDER THE DIRECTION OF A LICENSED PROFESSIONAL ENGINEER, TO ALTER THIS DOCUMENT.

MN STATE FAIR WT
MNL01485
1530 COSGROVE STREET
FALCON HEIGHTS, MN 55108
DAS-SECTOR 12/13

SHEET TITLE
ELECTRICAL SECTION
NOTES

SHEET NUMBER

E-3

ELECTRICAL SECTION NOTES

GENERAL CONSTRUCTION

1. FOR THE PURPOSE OF CONSTRUCTION DRAWINGS, THE FOLLOWING DEFINITIONS SHALL APPLY:
GENERAL CONTRACTOR – OVERLAND CONTRACTING INC. (B&V)
CONTRACTOR: (CONSTRUCTION)
OWNER – AT&T
2. ALL SITE WORK SHALL BE COMPLETED AS INDICATED ON THE DRAWINGS AND AT&T PROJECT SPECIFICATIONS.
3. GENERAL CONTRACTOR SHALL VISIT THE SITE AND SHALL FAMILIARIZE HIMSELF WITH ALL CONDITIONS AFFECTING THE PROPOSED WORK AND SHALL MAKE PROVISIONS. GENERAL CONTRACTOR SHALL BE RESPONSIBLE FOR FAMILIARIZING HIMSELF WITH ALL CONTRACT DOCUMENTS, FIELD CONDITIONS, DIMENSIONS, AND CONFIRMING THAT THE WORK MAY BE ACCOMPLISHED AS SHOWN PRIOR TO PROCEEDING WITH CONSTRUCTION. ANY DISCREPANCIES SHALL BE BROUGHT TO THE ATTENTION OF THE ENGINEER PRIOR TO THE COMMENCEMENT OF WORK.
4. ALL MATERIALS FURNISHED AND INSTALLED SHALL BE IN STRICT ACCORDANCE WITH ALL APPLICABLE CODES, REGULATIONS, AND ORDINANCES. GENERAL CONTRACTOR SHALL ISSUE ALL APPROPRIATE NOTICES AND COMPLY WITH ALL LAWS, ORDINANCES, RULES, REGULATIONS, AND LAWFUL ORDERS OF ANY PUBLIC AUTHORITY REGARDING THE PERFORMANCE OF WORK.
5. ALL WORK CARRIED OUT SHALL COMPLY WITH ALL APPLICABLE MUNICIPAL AND EQUIPMENT COMPANY SPECIFICATIONS AND LOCAL JURISDICTIONAL CODES, ORDINANCES, AND APPLICABLE REGULATIONS.
6. UNLESS NOTED OTHERWISE, THE WORK SHALL INCLUDE FURNISHING MATERIALS, EQUIPMENT, APPURTENANCES, AND LABOR NECESSARY TO COMPLETE ALL INSTALLATIONS AS INDICATED ON THE DRAWINGS.
7. PLANS ARE NOT TO BE SCALED. THESE PLANS ARE INTENDED TO BE A DIAGRAMMATIC OUTLINE ONLY UNLESS OTHERWISE NOTED. DIMENSIONS SHOWN ARE TO FINISH SURFACES UNLESS OTHERWISE NOTED. SPACING BETWEEN EQUIPMENT IS THE MINIMUM REQUIRED CLEARANCE. THEREFORE, IT IS CRITICAL TO FIELD VERIFY DIMENSIONS, SHOULD THERE BE ANY QUESTIONS REGARDING THE CONTRACT DOCUMENTS, THE CONTRACTOR SHALL BE RESPONSIBLE FOR OBTAINING A CLARIFICATION FROM THE ENGINEER PRIOR TO PROCEEDING WITH THE WORK. DETAILS ARE INTENDED TO SHOW DESIGN INTENT. MODIFICATIONS MAY BE REQUIRED TO SUIT JOB DIMENSIONS OR CONDITIONS AND SUCH MODIFICATIONS SHALL BE INCLUDED AS PART OF WORK AND PREPARED BY THE ENGINEER PRIOR TO PROCEEDING WITH WORK.
8. THE CONTRACTOR SHALL INSTALL ALL EQUIPMENT AND MATERIALS IN ACCORDANCE WITH MANUFACTURER'S RECOMMENDATIONS UNLESS SPECIFICALLY STATED OTHERWISE.
9. IF THE SPECIFIED EQUIPMENT CANNOT BE INSTALLED AS SHOWN ON THESE DRAWINGS, THE CONTRACTOR SHALL PROPOSE AN ALTERNATIVE INSTALLATION SPACE FOR APPROVAL BY THE ENGINEER PRIOR TO PROCEEDING.
10. GENERAL CONTRACTOR SHALL BE RESPONSIBLE FOR THE SAFETY OF WORK AREA, ADJACENT AREAS AND BUILDING OCCUPANTS THAT ARE LIKELY TO BE AFFECTED BY THE WORK UNDER THIS CONTRACT. WORK SHALL CONFIRM TO ALL OSHA REQUIREMENTS AND THE LOCAL JURISDICTION.
11. GENERAL CONTRACTOR SHALL COORDINATE WORK AND SCHEDULE WORK ACTIVITIES WITH OTHER DISCIPLINES.
12. ERECTION SHALL BE DONE IN A WORKMANLIKE MANNER BY COMPETENT EXPERIENCED WORKMAN IN ACCORDANCE WITH APPLICABLE CODES AND THE BEST ACCEPTED PRACTICE. ALL MEMBERS SHALL BE LAID PLUMB AND TRUE AS INDICATED ON THE DRAWINGS.
13. SEAL PENETRATIONS THROUGH FIRE RATED AREAS WITH UL LISTED MATERIALS APPROVED BY LOCAL JURISDICTION. CONTRACTOR SHALL KEEP AREA CLEAN, HAZARD FREE, AND DISPOSE OF ALL DEBRIS.
14. WORK PREVIOUSLY COMPLETED IS REPRESENTED BY LIGHT SHADED LINES AND NOTES. THE SCOPE OF WORK FOR THIS PROJECT IS REPRESENTED BY DARK SHADED LINES AND NOTES. CONTRACTOR SHALL NOTIFY THE GENERAL CONTRACTOR OF ANY EXISTING CONDITIONS THAT DEVIATE FROM THE DRAWINGS PRIOR TO BEGINNING CONSTRUCTION.
15. CONTRACTOR SHALL PROVIDE WRITTEN NOTICE TO THE CONSTRUCTION MANAGER 48 HOURS PRIOR TO COMMENCEMENT OF WORK.
16. THE CONTRACTOR SHALL PROTECT EXISTING IMPROVEMENTS, PAVEMENTS, CURBS, LANDSCAPING AND STRUCTURES. ANY DAMAGED PART SHALL BE REPAIRED AT CONTRACTOR'S EXPENSE TO THE SATISFACTION OF THE OWNER.
17. THE CONTRACTOR SHALL CONTACT UTILITY LOCATING SERVICES PRIOR TO THE START OF CONSTRUCTION.
18. GENERAL CONTRACTOR SHALL COORDINATE AND MAINTAIN ACCESS FOR ALL TRADES AND CONTRACTORS TO THE SITE AND/OR BUILDING.
19. THE GENERAL CONTRACTOR SHALL BE RESPONSIBLE FOR SECURITY OF THE SITE FOR THE DURATION OF CONSTRUCTION UNTIL JOB COMPLETION.
20. THE GENERAL CONTRACTOR SHALL MAINTAIN IN GOOD CONDITION ONE COMPLETE SET OF PLANS WITH ALL REVISIONS, ADDENDA, AND CHANGE ORDERS ON THE PREMISES AT ALL TIMES.
21. THE GENERAL CONTRACTOR SHALL PROVIDE PORTABLE FIRE EXTINGUISHERS WITH A RATING OF NOT LESS THAN 2-A OT 2-A:10-B-C AND SHALL BE WITHIN 25 FEET OF TRAVEL DISTANCE TO ALL PORTIONS OF WHERE THE WORK IS BEING COMPLETED DURING CONSTRUCTION.
22. ALL EXISTING ACTIVE SEWER, WATER, GAS, ELECTRIC, AND OTHER UTILITIES SHALL BE PROTECTED AT ALL TIMES, AND WHERE REQUIRED FOR THE PROPER EXECUTION OF THE WORK, SHALL BE RELOCATED AS DIRECTED BY THE ENGINEER. EXTREME CAUTION SHOULD BE USED BY THE CONTRACTOR WHEN EXCAVATING OR DRILLING PIERS AROUND OR NEAR UTILITIES. CONTRACTOR SHALL PROVIDE SAFETY TRAINING FOR THE WORKING CREW. THIS SHALL INCLUDE BUT NOT BE LIMITED TO A) FALL PROTECTION, B) CONFINED SPACE, C) ELECTRICAL SAFETY, AND D) TRENCHING & EXCAVATION.
23. ALL EXISTING INACTIVE SEWER, WATER, GAS, ELECTRIC, AND OTHER UTILITIES, WHICH INTERFERE WITH THE EXECUTION OF THE WORK, SHALL BE REMOVED, CAPPED, PLUGGED OR OTHERWISE DISCONNECTED AT POINTS WHICH WILL NOT INTERFERE WITH THE EXECUTION OF THE WORK, AS DIRECTED BY THE RESPONSIBLE ENGINEER, AND SUBJECT TO THE APPROVAL OF THE OWNER AND/OR LOCAL UTILITIES.
24. THE AREAS OF THE OWNER'S PROPERTY DISTURBED BY THE WORK AND NOT COVERED BY THE TOWER, EQUIPMENT OR DRIVEWAY, SHALL BE GRADED TO A UNIFORM SLOPE, AND STABILIZED TO PREVENT EROSION.
25. CONTRACTOR SHALL MINIMIZE DISTURBANCE TO THE EXISTING SITE DURING CONSTRUCTION. EROSION CONTROL MEASURES, IF REQUIRED DURING CONSTRUCTION, SHALL BE IN CONFORMANCE WITH THE FEDERAL AND LOCAL JURISDICTION FOR EROSION AND SEDIMENT CONTROL.
26. NO FILL OR EMBANKMENT MATERIAL SHALL BE PLACED ON FROZEN GROUNDING. FROZEN MATERIALS, SNOW OR ICE SHALL NOT BE PLACED IN ANY FILL OR EMBANKMENT.
27. THE SUBGRADE SHALL BE BROUGHT TO A SMOOTH UNIFORM GRADE AND COMPACTED TO 95 PERCENT STANDARD PROCTOR DENSITY UNDER PAVEMENT AND STRUCTURES AND 80 PERCENT STANDARD PROCTOR DENSITY IN OPEN SPACE. ALL TRENCHES IN PUBLIC RIGHT OF WAY SHALL BE BACKFILLED WITH FLOWABLE FILL OR OTHER MATERIAL PRE-APPROVED BY THE LOCAL JURISDICTION.
28. ALL NECESSARY RUBBISH, STUMPS, DEBRIS, STICKS, STONES, AND OTHER REFUSE SHALL BE REMOVED FROM THE SITE AND DISPOSED OF IN A LAWFUL MANNER.
29. ALL BROCHURES, OPERATING AND MAINTENANCE MANUALS, CATALOGS, SHOP DRAWINGS, AND OTHER DOCUMENTS SHALL BE TURNED OVER TO THE GENERAL CONTRACTOR AT COMPLETION OF CONSTRUCTION AND PRIOR TO PAYMENT.
30. CONTRACTOR SHALL SUBMIT A COMPLETE SET OF AS-BUILT REDLINES TO THE GENERAL CONTRACTOR UPON COMPLETION OF PROJECT AND PRIOR TO FINAL PAYMENT.
31. CONTRACTOR SHALL LEAVE PREMISES IN A CLEAN CONDITION.
32. THE PROPOSED FACILITY WILL BE UNMANNED AND DOES NOT REQUIRE POTABLE WATER OR SEWER SERVICE, AND IS NOT FOR HUMAN HABITAT (NO HANDICAP ACCESS REQUIRED).
33. OCCUPANCY IS LIMITED TO PERIODIC MAINTENANCE AND INSPECTION, APPROXIMATELY 2 TIMES PER MONTH, BY AT&T TECHNICIANS.
34. NO OUTDOOR STORAGE OR SOLID WASTE CONTAINERS ARE PROPOSED.
35. ALL MATERIAL SHALL BE FURNISHED AND WORK SHALL BE PERFORMED IN ACCORDANCE WITH THE LATEST REVISION AT&T MOBILITY GROUNDING STANDARD "TECHNICAL SPECIFICATION FOR CONSTRUCTION OF GSM/GPRS WIRELESS SITES" AND "TECHNICAL SPECIFICATION FOR FACILITY GROUNDING". IN CASE OF A CONFLICT BETWEEN THE CONSTRUCTION SPECIFICATION AND THE DRAWINGS, THE DRAWINGS SHALL GOVERN.

36. CONTRACTORS SHALL BE RESPONSIBLE FOR OBTAINING ALL PERMITS AND INSPECTIONS REQUIRED FOR CONSTRUCTION. IF CONTRACTOR CANNOT OBTAIN A PERMIT, THEY MUST NOTIFY THE GENERAL CONTRACTOR IMMEDIATELY.
37. CONTRACTOR SHALL REMOVE ALL TRASH AND DEBRIS FROM THE SITE ON A DAILY BASIS.
38. INFORMATION SHOWN ON THESE DRAWINGS WAS OBTAINED FROM SITE VISITS AND/OR DRAWINGS PROVIDED BY THE SITE OWNER. CONTRACTORS SHALL NOTIFY THE ENGINEER OF ANY DISCREPANCIES PRIOR TO ORDERING MATERIAL OR PROCEEDING WITH CONSTRUCTION.
39. NO WHITE STROBE LIGHTS ARE PERMITTED. LIGHTING IF REQUIRED, WILL MEET FAA STANDARDS AND REQUIREMENTS.
40. ALL COAXIAL CABLE INSTALLATIONS TO FOLLOW MANUFACTURER'S INSTRUCTIONS AND RECOMMENDATIONS.

ANTENNA MOUNTING

1. DESIGN AND CONSTRUCTION OF ANTENNA SUPPORTS SHALL CONFORM TO CURRENT ANSI/TIA-222 OR APPLICABLE LOCAL CODES.
2. ALL STEEL MATERIALS SHALL BE GALVANIZED AFTER FABRICATION IN ACCORDANCE WITH ASTM A123 "ZINC (HOT-DIP GALVANIZED) COATINGS ON IRON AND STEEL PRODUCTS", UNLESS NOTED OTHERWISE.
3. ALL BOLTS, ANCHORS AND MISCELLANEOUS HARDWARE SHALL BE GALVANIZED IN ACCORDANCE WITH ASTM A153 "ZINC-COATING (HOT-DIP) ON IRON AND STEEL HARDWARE", UNLESS NOTED OTHERWISE.
4. DAMAGED GALVANIZED SURFACES SHALL BE REPAIRED BY COLD GALVANIZING IN ACCORDANCE WITH ASTM A780.
5. ALL ANTENNA MOUNTS SHALL BE INSTALLED WITH LOCK NUTS, DOUBLE NUTS AND SHALL BE TORQUED TO MANUFACTURER'S RECOMMENDATIONS.
6. CONTRACTOR SHALL INSTALL ANTENNA PER MANUFACTURER'S RECOMMENDATION FOR INSTALLATION AND GROUNDING.
7. ALL UNUSED PORTS ON ANY ANTENNAS SHALL BE TERMINATED WITH A 50-OHM LOAD TO ENSURE ANTENNAS PERFORM AS DESIGNED.
8. PRIOR TO SETTING ANTENNA AZIMUTHS AND DOWNTILTS, ANTENNA CONTRACTOR SHALL CHECK THE ANTENNA MOUNT FOR TIGHTNESS AND ENSURE THAT THEY ARE PLUMB. ANTENNA AZIMUTHS SHALL BE SET FROM TRUE NORTH AND BE ORIENTED WITHIN +/- 5% AS DEFINED BY THE RFDS. ANTENNA DOWNTILTS SHALL BE WITHIN +/- 0.5% AS DEFINED BY THE RFDS. REFER TO ND-00246.
9. JUMPERS FROM THE TMA's MUST TERMINATE TO OPPOSITE POLARIZATION'S IN EACH SECTOR.
10. CONTRACTOR SHALL RECORD THE SERIAL #, SECTOR, AND POSITION OF EACH ACTUATOR INSTALLED AT THE ANTENNAS AND PROVIDE THE INFORMATION TO AT&T.
11. TMA's SHALL BE MOUNTED ON PIPE DIRECTLY BEHIND ANTENNAS AS CLOSE TO ANTENNA AS FEASIBLE IN A VERTICAL POSITION.

TORQUE REQUIREMENTS

1. ALL RF CONNECTIONS SHALL BE TIGHTENED BY A TORQUE WRENCH.
2. ALL RF CONNECTIONS, GROUNDING HARDWARE AND ANTENNA HARDWARE SHALL HAVE A TORQUE MARK INSTALLED IN A CONTINUOUS STRAIGHT LINE FROM BOTH SIDES OF THE CONNECTION.
- A. RF CONNECTION BOTH SIDES OF THE CONNECTOR.
- B. GROUNDING AND ANTENNA HARDWARE ON THE NUT SIDE STARTING FROM THE THREADS TO THE SOLID SURFACE. EXAMPLE OF SOLID SURFACE: GROUND BAR, ANTENNA BRACKET METAL.
3. ALL 8M ANTENNA HARDWARE SHALL BE TIGHTENED TO 9 LB-FT (12 NM).
4. ALL 12M ANTENNA HARDWARE SHALL BE TIGHTENED TO 43 LB-FT (58 NM).
5. ALL GROUNDING HARDWARE SHALL BE TIGHTENED UNTIL THE LOCK WASHER COLLAPSES AND THE GROUNDING HARDWARE IS NO LONGER LOOSE.
6. ALL DIN TYPE CONNECTIONS SHALL BE TIGHTENED TO 18-22 LB-FT (24.4 - 29.8 NM).
7. ALL N TYPE CONNECTIONS SHALL BE TIGHTENED TO 15-20 LB-IN (1.7 - 2.3 NM).

FIBER & POWER CABLE MOUNTING

1. THE FIBER OPTIC TRUNK CABLES SHALL BE INSTALLED INTO CONDUITS, CHANNEL CABLE TRAYS, OR CABLE TRAY. WHEN INSTALLING FIBER OPTIC TRUNK CABLES INTO A CABLE TRAY SYSTEM, THEY SHALL BE INSTALLED INTO AN INTER DUCT AND A PARTITION BARRIER SHALL BE INSTALLED BETWEEN THE 600 VOLT CABLES AND THE INTER DUCT IN ORDER TO SEGREGATE CABLE TYPES. OPTIC FIBER TRUNK CABLES SHALL HAVE APPROVED CABLE RESTRAINTS EVERY (60) SIXTY FEET AND SECURELY FASTENED TO THE CABLE TRAY SYSTEM. NFPA 70 (NEC) ARTICLE 770 RULES SHALL APPLY.
2. THE TYPE TC-ER CABLES SHALL BE INSTALLED INTO CONDUITS, CHANNEL CABLE TRAYS, OR CABLE TRAY AND SHALL BE SECURED AT INTERVALS NOT EXCEEDING (6) SIX FEET. AN EXCEPTION; WHERE TYPE TC-ER CABLES ARE NOT SUBJECT TO PHYSICAL DAMAGE, CABLES SHALL BE PERMITTED TO MAKE A TRANSITION BETWEEN CONDUITS, CHANNEL CABLE TRAYS, OR CABLE TRAY WHICH ARE SERVING UTILIZATION EQUIPMENT OR DEVICES, A DISTANCE OF (6) SIX FEET SHALL NOT BE EXCEEDED WITHOUT CONTINUOUS SUPPORTING. NFPA 70 (NEC) ARTICLES 336 AND 392 RULES SHALL APPLY.
3. WHEN INSTALLING OPTIC FIBER TRUNK CABLES OR TYPE TC-ER CABLES INTO CONDUITS, NFPA 70 (NEC) ARTICLE 300 RULES SHALL APPLY.

COAXIAL CABLE NOTES

1. TYPES AND SIZES OF THE ANTENNA CABLE ARE BASED ON ESTIMATED LENGTHS. PRIOR TO ORDERING CABLE, CONTRACTOR SHALL VERIFY ACTUAL LENGTH BASED ON CONSTRUCTION LAYOUT AND NOTIFY THE PROJECT MANAGER IF ACTUAL LENGTHS EXCEED ESTIMATED LENGTHS.
2. CONTRACTOR SHALL VERIFY THE DOWN-TILT OF EACH ANTENNA WITH A DIGITAL LEVEL.
3. CONTRACTOR SHALL CONFIRM COAX COLOR CODING PRIOR TO CONSTRUCTION. REFER TO "ANTENNA SYSTEM LABELING STANDARD" ND-00027 LATEST VERSION.
4. ALL JUMPERS TO THE ANTENNAS FROM THE MAIN TRANSMISSION LINE SHALL BE 1/2" DIA. LDF AND SHALL NOT EXCEED 6'-0".
5. ALL COAXIAL CABLE SHALL BE SECURED TO THE DESIGNED SUPPORT STRUCTURE, IN AN APPROVED MANNER, AT DISTANCES NOT TO EXCEED 4'-0" OC.
6. CONTRACTOR SHALL FOLLOW ALL MANUFACTURER'S RECOMMENDATIONS REGARDING BOTH THE INSTALLATION AND GROUNDING OF ALL COAXIAL CABLES, CONNECTORS, ANTENNAS, AND ALL OTHER EQUIPMENT.
7. CONTRACTOR SHALL WEATHERPROOF ALL ANTENNA CONNECTORS WITH SELF AMALGAMATING TAPE. WEATHERPROOFING SHALL BE COMPLETED IN STRICT ACCORDANCE WITH AT&T STANDARDS.
8. CONTRACTOR SHALL GROUND ALL EQUIPMENT. INCLUDING ANTENNAS, RET MOTORS, TMA's, COAX CABLES, AND RET CONTROL CABLES AS A COMPLETE SYSTEM. GROUNDING SHALL BE EXECUTED BY QUALIFIED WIREMEN IN COMPLIANCE WITH MANUFACTURER'S SPECIFICATION AND RECOMMENDATION.

9. CONTRACTOR SHALL PROVIDE STRAIN-RELIEF AND CABLE SUPPORTS FOR ALL CABLE ASSEMBLIES, COAX CABLES, AND RET CONTROL CABLES. CABLE STRAIN-RELIEFS AND CABLE SUPPORTS SHALL BE APPROVED FOR THE PURPOSE. INSTALLATION SHALL BE IN ACCORDANCE WITH MANUFACTURER'S SPECIFICATIONS AND RECOMMENDATIONS.
10. CONTRACTOR TO VERIFY THAT EXISTING COAX HANGERS ARE STACKABLE SNAP IN HANGERS. IF EXISTING HANGERS ARE NOT STACKABLE SNAP IN HANGERS THE CONTRACTOR SHALL REPLACE EXISTING HANGERS WITH NEW SNAP IN HANGERS IF APPLICABLE.

GENERAL CABLE AND EQUIPMENT NOTES

1. CONTRACTOR SHALL BE RESPONSIBLE TO VERIFY ANTENNA, TMA's, DIPLEXERS, AND COAX CONFIGURATION, MAKE AND MODELS PRIOR TO INSTALLATION.
2. ALL CONNECTIONS FOR HANGERS, SUPPORTS, BRACING, ETC. SHALL BE INSTALLED PER TOWER MANUFACTURER'S RECOMMENDATIONS.
3. CONTRACTOR SHALL REFERENCE THE TOWER STRUCTURAL ANALYSIS/DESIGN DRAWINGS FOR DIRECTIONS ON CABLE DISTRIBUTION/ROUTING.
4. ALL OUTDOOR RF CONNECTORS/CONNECTIONS SHALL BE WEATHERPROOFED, EXCEPT THE RET CONNECTORS, USING BUTYL TAPE AFTER INSTALLATION AND FINAL CONNECTIONS ARE MADE. BUTYL TAPE SHALL HAVE A MINIMUM OF ONE-HALF TAPE WIDTH OVERLAP ON EACH TURN AND EACH LAYER SHALL BE WRAPPED THREE TIMES. WEATHERPROOFING SHALL BE SMOOTH WITHOUT BUCKLING. BUTYL BLEEDING IS NOT ALLOWED.
5. IF REQUIRED TO PAINT ANTENNAS AND/OR COAX:
- A. TEMPERATURE SHALL BE ABOVE 50° F.
- B. PAINT COLOR MUST BE APPROVED BY BUILDING OWNER/LANDLORD.
- C. FOR REGULATED TOWERS, FAA/FCC APPROVED PAINT IS REQUIRED.
- D. DO NOT PAINT OVER COLOR CODING OR ON EQUIPMENT MODEL NUMBERS.
6. ALL CABLES SHALL BE GROUNDED WITH COAXIAL CABLE GROUND KITS. FOLLOW THE MANUFACTURER'S RECOMMENDATIONS.
- A. GROUNDING AT THE ANTENNA LEVEL.
- B. GROUNDING AT MID LEVEL, TOWERS WHICH ARE OVER 200'-0", ADDITIONAL CABLE GROUNDING REQUIRED.
- C. GROUNDING AT BASE OF TOWER PRIOR TO TURNING HORIZONTAL.
- D. GROUNDING OUTSIDE THE EQUIPMENT SHELTER AT ENTRY PORT.
- E. GROUNDING INSIDE THE EQUIPMENT SHELTER AT THE ENTRY PORT.
7. ALL PROPOSED GROUND BAR DOWNLEADS ARE TO BE TERMINATED TO THE EXISTING ADJACENT GROUND BAR DOWNLEADS A MINIMUM DISTANCE OF 4'-0" BELOW GROUND BAR. TERMINATIONS MAY BE EXOTHERMIC OR COMPRESSION.
8. THE CONTRACTOR SHALL BE RESPONSIBLE FOR VERIFYING THE ANTENNA AND THE COAX CONFIGURATION IS THE CORRECT MAKE AND MODELS, PRIOR TO INSTALLATION.
9. ALL CONNECTIONS FOR HANGERS, SUPPORTS, BRACING, ETC. SHALL BE INSTALLED PER TOWER MANUFACTURER'S SPECIFICATION & RECOMMENDATIONS.
10. ANTENNA CONTRACTOR SHALL FURNISH AND INSTALL A 12'-0" STAND-OFF SECTOR ANTENNA MOUNT, OR 14'-16" PLATFORM WITH HANDRAIL, INCLUDING ALL HARDWARE AS REQUIRED AND NOTED ON DRAWINGS.

AT&T
MOBILITY

901 MARQUETTE AVENUE
MINNEAPOLIS, MN 55402



BLACK & VEATCH

BLACK & VEATCH CORPORATION
7760 FRANCE AVENUE SOUTH
SUITE 1200
BLOOMINGTON, MN 55435

PROJECT NO: 188262.1027

DRAWN BY: JJS

CHECKED BY: JAT

1	03/31/07	REVISED PER COMMENTS
0	03/13/17	ISSUED FOR CONSTRUCTION
REV	DATE	DESCRIPTION

I HEREBY CERTIFY THAT THIS PLAN, SPECIFICATION, OR REPORT WAS PREPARED BY ME OR UNDER MY DIRECT SUPERVISION AND THAT I AM A DULY LICENSED PROFESSIONAL ENGINEER IN THE STATE OF MINNESOTA.

PRINT NAME: NATHAN C. PETRY

SIGNATURE:

DATE: 03/31/2017 LICENSE# 51299
EXP. 6/18

IT IS A VIOLATION OF LAW FOR ANY PERSON, UNLESS THEY ARE ACTING UNDER THE DIRECTION OF A LICENSED PROFESSIONAL ENGINEER, TO ALTER THIS DOCUMENT.

MN STATE FAIR WT
MNL01485
1530 COSGROVE STREET
FALCON HEIGHTS, MN 55108
DAS-SECTOR 12/13

SHEET TITLE

GENERAL NOTES

SHEET NUMBER

N-2

GENERAL NOTES

COATING SYSTEMS FOR TELECOMMUNICATIONS EQUIPMENT

PART 1 GENERAL

1.01 SUMMARY

A. SECTION INCLUDES PAINTING AND PAINTING REPAIR WORK ASSOCIATED WITH THE INSTALLATION OF ANTENNAS, COAXIAL CABLES, AND OTHER COMMON COMPONENTS WITH DIRECT ATTACHMENT TO WATER TANK FACILITIES.

1.02 REFERENCES

- A. SOCIETY FOR PROTECTIVE COATINGS (SSPC): WWW.SSPC.ORG
- VOLUME 1: GOOD PAINTING PRACTICE
 - VOLUME 2: SYSTEMS AND SPECIFICATIONS

1.03 SUBMITTALS

- A. PRODUCT DATA: SUBMIT DATA SHEET FOR EACH COATING SYSTEM.

PART 2 PRODUCTS

2.01 MATERIALS

- A. MANUFACTURERS:
- SHERWIN WILLIAMS COMPANY WWW.SHERWIN-WILLIAMS.COM
 - TNEMEC COMPANY WWW.TNEMEC.COM
 - X-I-M PRODUCTS WWW.XIMBONDER.COM

PART 3 EXECUTION

3.01 EXAMINATION

- A. VISUALLY EVALUATE SURFACE PREPARATION BY COMPARISON WITH PICTORIAL STANDARDS OF SSPC-VIS-1-89.

3.02 PREPARATION

- A. REMOVE ALL SURFACE CONTAMINANTS IN ACCORDANCE WITH SSPC-SP1 SOLVENT CLEANING.
- DO NOT USE HYDROCARBON SOLVENTS ON SURFACES TO BE COATED WITH WATER-BASED COATINGS.
- B. CLEAN AND REMOVE ALL RUST, SLAG, WELD SPLATTER, WELD SCABS, MILL SCALE, AND LOOSE PAINT.
- C. PROTECT AREAS ADJACENT TO WELDING & OR GRINDING OPERATIONS TO PREVENT DAMAGE OF SURROUNDING INTACT PAINT SYSTEM.
- D. FERROUS METAL: SSPC-SP6 COMMERCIAL BLAST CLEANING
- E. GALVANIZED STEEL: SSPC-SP7 BRUSH OFF BLAST
- F. ANTENNA COVERS, COAXIAL CABLE, NON-METALLIC SUBSTRATES AND PREVIOUSLY PAINTED SURFACES: SCARIFY TO DEGLOSS. SSPC-SP1 WITH A NON-HYDROCARBON SOLVENT.
- G. SURFACE PROFILE SHALL BE IN ACCORDANCE WITH MANUFACTURER'S PRODUCT RECOMMENDATION.
- H. RE-BLAST ALL SURFACES:
- WHERE RUSTING HAS RECURRED.
 - THAT DO NOT MEET THE REQUIREMENTS OF THESE SPECIFICATIONS.

3.03 APPLICATION

- A. COATINGS SHALL BE APPLIED IN ACCORDANCE WITH MANUFACTURER'S PRINTED INSTRUCTIONS
- B. SURFACES TO BE COATED SHALL BE CLEAN, DRY, AND FREE OF AIRBORNE DUST AND CONTAMINANTS AT THE TIME OF APPLICATION AND WHILE FILM IS FORMING.
- C. FINISH COAT SHALL BE UNIFORM IN COLOR AND SHEEN WITHOUT STREAKS, LAPS, RUNS, SAGS OR MISSED AREAS.
- D. SHOP PAINTING: TAPE-OFF (2-INCH MINIMUM) SURFACES THAT WILL BE IN THE HEAT-AFFECTED-ZONE DURING FIELD WELDING.
- E. COMPONENT PAINTING:
- INTERIOR EXPOSED FERROUS METAL AND GALVANIZED STEEL:
 - PRODUCT: SHERWIN WILLIAMS MACROPOXY 646 OR TNEMEC SERIES 161
 - NUMBER OF COATS: 2
 - DRY FILM THICKNESS: 4.0-6.0 MILS (PER COAT)
 - COLOR: BY OWNER
 - EXTERIOR EXPOSED FERROUS METAL AND GALVANIZED STEEL:
 - PRIMER: SHERWIN WILLIAMS MACROPOXY 646 OR TNEMEC SERIES 161 OR N69
 - NUMBER OF COATS: 1
 - DRY FILM THICKNESS: 4.0-6.0 MILS
 - COLOR: BY OWNER
 - FINISH: SHERWIN WILLIAMS ACROLON 218 OR TNEMEC SERIES 10740/10750
 - NUMBER OF COATS: 1
 - DRY FILM THICKNESS: 2.0-3.0 MILS
 - COLOR: BY OWNER
 - ANTENNA COVERS:
 - PRIMER: SHERWIN WILLIAMS PRO-CRYL PRIMER
 - NUMBER OF COATS: 1
 - DRY FILM THICKNESS: 2.0-4.0 MILS
 - FINISH: SHERWIN WILLIAMS SHER-CRYL HPA
 - NUMBER OF COATS: 1
 - DRY FILM THICKNESS: 2.5-4.0 MILS
 - COLOR: BY OWNER
 - COAXIAL CABLE
 - PRIMER: X-I-M 1138

- NUMBER OF COATS: 1
 - DRY FILM THICKNESS: 2.0-3.0 MILS
- b. FINISH: SHERWIN WILLIAMS SHER-CRYL HPA
- NUMBER OF COATS: 1
 - DRY FILM THICKNESS: 2.5-4.0 MILS
 - COLOR: BY OWNER

3.04 REPAIR OF AREAS DAMAGED BY WELDING

- A. PREPARE THE DAMAGE BY ONE OF THE TWO FOLLOWING METHODS AS DIRECTED BY THE ENGINEER.
- ABRASIVE-BLAST TO SSPC-SP6.
 - MECHANICALLY CLEAN TO SSPC-SP11.
- B. FEATHER EDGES TO PROVIDE SMOOTH COATING TRANSITION.
- C. APPLY PRIME COAT TO BARE METAL SURFACE.
- D. MASK OFF RECTANGULAR AREA AROUND PRIME COAT.
- E. APPLY FINISH COAT.

3.05 QUALITY CONTROL

- A. MEASURE DRY FILM THICKNESS WITH A MAGNETIC FILM THICKNESS GAGE IN ACCORDANCE WITH SSPC-PA2.
- B. VISUALLY INSPECT DRIED FILM FOR FUNDS, SAGS, DRY SPRAY, OVERSPRAY, EMBEDDED PARTICLES AND MISSED AREAS.
- C. REPAIR DEFECTIVE OR DAMAGED AREAS IN ACCORDANCE WITH ARTICLES 3.02 AND 3.03

COATING SYSTEMS FOR TELECOMMUNICATION EQUIPMENT

PART 1 GENERAL

1.1 SUMMARY

A. SECTION INCLUDES PAINTING AND PAINTING REPAIR WORK ASSOCIATED WITH THE INSTALLATION OF ANTENNAS, COAXIAL CABLES, AND OTHER COMMON COMPONENTS WITH DIRECT ATTACHMENT TO WATER TANK FACILITIES.

1.2 REFERENCES

- A. SOCIETY FOR PROTECTIVE COATINGS (SSPC): WWW.SSPC.ORG
- VOLUME 1: GOOD PAINTING PRACTICE
 - VOLUME 2: SYSTEMS AND SPECIFICATIONS

1.3 SUBMITTALS

- A. PRODUCT DATA: SUBMIT DATA SHEET FOR EACH COATING SYSTEM.

PART 2 PRODUCTS

2.1 MATERIALS

- A. MANUFACTURERS:
- SHERWIN WILLIAMS COMPANY WWW.SHERWIN-WILLIAMS.COM
 - TNEMEC COMPANY WWW.TNEMEC.COM
 - X-I-M PRODUCTS WWW.XIMBONDER.COM

PART 3 EXECUTION

3.1 EXAMINATION

- A. VISUALLY EVALUATE SURFACE PREPARATION BY COMPARISON WITH PICTORIAL STANDARDS OF SSPC-VIS-1-89.

3.2 PREPARATION

- A. REMOVE ALL SURFACE CONTAMINANTS IN ACCORDANCE WITH SSPC-SP1 SOLVENT CLEANING.
- DO NOT USE HYDROCARBON SOLVENTS ON SURFACES TO BE COATED WITH WATER-BASED COATINGS.
- B. CLEAN AND REMOVE ALL RUST, SLAG, WELD SPLATTER, WELD SCABS, MILL SCALE, AND LOOSE PAINT.
- C. PROTECT AREAS ADJACENT TO WELDING & OR GRINDING OPERATIONS TO PREVENT DAMAGE OF SURROUNDING INTACT PAINT SYSTEM.
- D. FERROUS METAL: SSPC-SP6 COMMERCIAL BLAST CLEANING
- E. GALVANIZED STEEL: SSPC-SP7 BRUSH OFF BLAST
- F. ANTENNA COVERS, COAXIAL CABLE, NON-METALLIC SUBSTRATES AND PREVIOUSLY PAINTED SURFACES: SCARIFY TO DE- GLOSS. SSPC-SP1 WITH A NON-HYDROCARBON SOLVENT.
- G. SURFACE PROFILE SHALL BE IN ACCORDANCE WITH MANUFACTURER'S PRODUCT RECOMMENDATION.
- H. RE-BLAST ALL SURFACES:
- WHERE RUSTING HAS RECURRED.
 - THAT DO NOT MEET THE REQUIREMENTS OF THESE SPECIFICATIONS.

3.3 APPLICATION

- A. COATINGS SHALL BE APPLIED IN ACCORDANCE WITH MANUFACTURER'S PRINTED INSTRUCTIONS.
- B. SURFACES TO BE COATED SHALL BE CLEAN, DRY, AND FREE OF AIRBORNE DUST AND CONTAMINANTS AT THE TIME OF APPLICATION AND WHILE FILM IS FORMING.
- C. FINISH COAT SHALL BE UNIFORM IN COLOR AND SHEEN WITHOUT STREAKS, LAPS, RUNS, SAGS OR MISSED AREAS.
- D. SHOP PAINTING: TAPE-OFF (2-INCH MINIMUM) SURFACES THAT WILL BE IN THE HEAT-AFFECTED-ZONE DURING FIELD WELDING.
- E. COMPONENT PAINTING:
- INTERIOR EXPOSED FERROUS METAL AND GALVANIZED STEEL:
 - PRODUCT: SHERWIN WILLIAMS MACROPOXY 646 OR TNEMEC SERIES 161
 - NUMBER OF COATS: 2
 - DRY FILM THICKNESS: 4.0-6.0 MILS (PER COAT)
 - COLOR: BY OWNER
 - EXTERIOR EXPOSED FERROUS METAL AND GALVANIZED STEEL:
 - PRIMER: SHERWIN WILLIAMS MACROPOXY 646 OR TNEMEC SERIES 161 OR N69

- NUMBER OF COATS: 1
 - DRY FILM THICKNESS: 4.0-6.0 MILS
 - COLOR: BY OWNER
- b. FINISH: SHERWIN WILLIAMS ACROLON 218 OR TNEMEC SERIES 10740/10750
- NUMBER OF COATS: 1
 - DRY FILM THICKNESS: 2.0-3.0 MILS
 - COLOR: BY OWNER
3. ANTENNA COVERS:
- PRIMER: SHERWIN WILLIAMS PRO-CRYL PRIMER
 - NUMBER OF COATS: 1
 - DRY FILM THICKNESS: 2.0-4.0 MILS
 - FINISH: SHERWIN WILLIAMS SHER-CRYL HPA
 - NUMBER OF COATS: 1
 - DRY FILM THICKNESS: 2.5-4.0 MILS
 - COLOR: BY OWNER
4. COAXIAL CABLE
- PRIMER: X-I-M 1138
 - NUMBER OF COATS: 1
 - DRY FILM THICKNESS: 2.0-3.0 MILS
 - FINISH: SHERWIN WILLIAMS SHER-CRYL HPA
 - NUMBER OF COATS: 1
 - DRY FILM THICKNESS: 2.5-4.0 MILS
 - COLOR: BY OWNER

3.2 REPAIR OF AREAS DAMAGED BY WELDING

- A. PREPARE THE DAMAGE BY ONE OF THE TWO FOLLOWING METHODS AS DIRECTED BY THE ENGINEER.
- ABRASIVE-BLAST TO SSPC-SP6.
 - MECHANICALLY CLEAN TO SSPC-SP11.
- B. FEATHER EDGES TO PROVIDE SMOOTH COATING TRANSITION.
- C. APPLY PRIME COAT TO BARE METAL SURFACE.
- D. MASK OFF RECTANGULAR AREA AROUND PRIME COAT.
- E. APPLY FINISH COAT.
- 3.3 QUALITY CONTROL

- A. MEASURE DRY FILM THICKNESS WITH A MAGNETIC FILM THICKNESS GAGE IN ACCORDANCE WITH SSPC-PA2.
- B. VISUALLY INSPECT DRIED FILM FOR FUNDS, SAGS, DRY SPRAY, OVERSPRAY, EMBEDDED PARTICLES AND MISSED AREAS.
- C. REPAIR DEFECTIVE OR DAMAGED AREAS IN ACCORDANCE WITH ARTICLES 3.02 AND 3.03.

AT&T
MOBILITY

901 MARQUETTE AVENUE
MINNEAPOLIS, MN 55402



BLACK & VEATCH

BLACK & VEATCH CORPORATION
7760 FRANCE AVENUE SOUTH
SUITE 1200
BLOOMINGTON, MN 55435

PROJECT NO:	188262.1027
DRAWN BY:	JJS
CHECKED BY:	JAT

1	03/31/07	REVISED PER COMMENTS
0	03/13/17	ISSUED FOR CONSTRUCTION
REV	DATE	DESCRIPTION

I HEREBY CERTIFY THAT THIS PLAN, SPECIFICATION, OR REPORT WAS PREPARED BY ME OR UNDER MY DIRECT SUPERVISION AND THAT I AM A DULY LICENSED PROFESSIONAL ENGINEER IN THE STATE OF MINNESOTA.

PRINT NAME: NATHAN C. PETRY

SIGNATURE:

DATE: 03/31/2017 LICENSE# 51299
EXP. 6/18

IT IS A VIOLATION OF LAW FOR ANY PERSON, UNLESS THEY ARE ACTING UNDER THE DIRECTION OF A LICENSED PROFESSIONAL ENGINEER, TO ALTER THIS DOCUMENT.

MN STATE FAIR WT
MNL01485
1530 COSGROVE STREET
FALCON HEIGHTS, MN 55108
DAS-SECTOR 12/13

SHEET TITLE
COATING NOTES &
SPECIFICATIONS

SHEET NUMBER

N-3

EXHIBIT “D”

**AT&T
13694784
1530 Cosgrove Street
MN State Fair WT**

Antenna Facilities and Frequencies

1. Shelter and Shelter Components

Shelter: 7ft x 7ft leased area inside base of Tank, East side
Power plant (DC current): Emerson Netsure 512 Cabinet, -48 VDC
Battery supply back up: 15 batteries in lower level of Emerson Cabinet
T-1 switch equipment: MP Next Level Fiber, via existing conduit
Commercial switch gear equipment: Existing Power Meter
Radio transmitters : 5
Air conditioner: N/A, internal to Emerson Cabinet

2. Generators: N/A

3. Antennas

Quantity: 2 total, 1 per sector
Type: Panel
Manufacturer: Kathrein
Azimuths: 30 deg (Alpha / Sector 12 of DAS) and 110 deg (Beta / Sector 13 of DAS)
Model: 80010799
Dimensions: 106” H x 14.8” W x 6.7” D
Weight: 108lbs
Mount Type: Pipe
Centerline of the antenna: 85’

4. Coax Cable

Number of lines: N/A
Type: N/A
Size: N/A

5. Tower Mounted Amplifiers (TMAs)

Quantity: N/A
Manufacturer: N/A
Model: N/A
Dimensions: N/A
Weight: N/A
Mounting: N/A

6. Diplexers

Quantity: N/A

Manufacturer: N/A

Model: N/A

Dimensions: N/A

Weight: N/A

Mounting: N/A

7. Remote Radio Heads (RRHs)

Quantity: 10 (5 per sector)

Manufacturer: ALU

Model: RRH2x700, 850, 1900, AWS and WCS

Dimensions: 24.8" H x 12"W x 7.2" D

Weight: 44lbs-70lbs

Mounting: Pipe

Hybrid Jumper: Yes

8. Distribution Box (COVP)

Quantity: 2 (1 per sector)

Manufacturer: Raycap

Model: DC6-48-60-18-8F

Dimensions: 11" x 31.25"

Weight: 32.8 lbs

9. Sector Box

Quantity: N/A

Manufacturer: N/A

Model: N/A

Dimensions: N/A

Weight: N/A

10. Hybrid Cable

Type: DC Power & Fiber

Number of Lines: (4) power cables and (2) 18 pair fiber cables

11. Frequencies

Svc	Technology	EIRP (Watts)	Std Freq	Freq Tx/Start	Freq Tx/Stop	Freq Rx/Start	Freq Rx/Stop
1	700 (LTE)	1000		734	746	704	716
2	850	1000		869/890	880/891.5	824/845	835/846.5
3	1900	1000		1950	1975	1870	1895
4	2100 (AWS)	1000		2110/2130/2160	2125/2135/2170	1710/1730/1760	1725/1735/1770
5	2300 (WCS)	1000		2350	2360	2305	2315

EXHIBIT “E”

SECURITY PLAN

Remote Facilities Access
Saint Paul Regional Water Services (SPRWS)
Standard Operating Procedure (SOP)
Effective Date: November 15, 2010

INTENT:

SPRWS is dedicated to providing its employees with the safest work environment possible and to taking every reasonable precaution to ensure the safety of potable water delivered to our communities. This SOP provides conditions for persons with need to access SPRWS facilities outside the McCarrons Center facilities (Remote Facilities). It establishes procedures for access and responsibilities for both those wishing to enter remote facilities and those allowing such access.

SECURITY OF FACILITIES:

Persons with routine access to remote facilities include SPRWS staff, agents of entities leasing space, agents of various cities, and various law enforcement personnel. Other entities also have occasional access needs under the supervision of SPRWS staff. With so many persons having legitimate access needs, it is imperative that specific procedures be established to ensure that the highest level of security possible. As a result, the following procedures are established:

1.0 SITE ACCESS REQUIREMENTS

- 1.01 Request to access site required prior to entry. Important: note that the police will be called to the site if a call is not made to SPRWS prior to entry.

Note: all requests for entry to remote sites must be made through the Engine Room!
Any other employee asked to allow entry to a remote site must inform the requester to call the Engine Room so that they can be cleared for entry.

- a) Routine and regularly scheduled

Whenever possible, authorized agencies that require repeated, routine access should schedule such access during normal business hours at least one day in advance by calling SPRWS Engine Room at 651-266-1660. The Engine Room Pumping Engineer will record the name of the agent and arrange for crew to meet agent on site and allow for access after checking for proper ID. Pumping Engineer will verify that agents requesting access are those that arranged for the access previously, and pass the authorized agents names to the field crew for verification in the field. If access is allowed, field crew will notify Engine Room that an entry to a site will occur.

- b) Emergencies

1. Contact Engine Room 651-266-1660.

2. Engine Room Pumping Engineer (PE II) will check against a list of authorized companies for each site to ensure that a particular company has reason to be on site.
3. If company is authorized, PE II will make arrangements with the Distribution after-hours Turn-On truck to allow for access at the site.
4. Distribution personnel will be responsible to verify the identity of the agent(s) and to monitor agent(s') activity at the site.
5. Under certain conditions, Distribution personnel may not be available, in which case PE IIs will use their best judgment to determine if there is another way to grant access to the agent, or to deny or delay access.

1.02 While at site:

- a) Authorized agents are required to perform their necessary work on the site in a manner that does not compromise site security. This includes, but is not limited to, securing all doors and gates before leaving the site.
- b) SPRWS employees will determine whether or not they will need to monitor the activity at the site. If SPRWS employee believes that the agent is not there for a legitimate business reason, the employee should get to a safe area and call 911 to have police confront the agent and remove them if necessary. In this event, SPRWS employee should also call the Engine Room to inform them of the proceedings.

1.03 Leaving site:

- a) Authorized agents must notify Engine Room 651-266-1660 when leaving the site.

2.0 IDENTIFICATION PROCEDURES

- 2.01 All SPRWS staff and personnel are issued a SPRWS photo identification card (ID card) at the McCarrons facility. This ID is to be displayed above the waist. Anyone purporting to be a SPRWS employee should be asked to display this ID card if it is not visible.

Contractors or agents seeking entrance to a remote facility are required to show a valid driver's license. SPRWS employee allowing them access will forward the name and phone number of the entrant to the Engine Room to confirm that access should be granted.

3.0 FACILITY LOCKS

- 3.01 All Remote Facilities will be secured with high-security locks utilizing high-security keys.

- a) Locks will be furnished and installed by SPRWS.
- b) No other locks are permitted, and all such other locks will be removed and disposed of.
- c) SPRWS may make some exceptions in cases where, for the convenience of SPRWS staff, contractor locks will be allowed to be “daisy-chained” onto a SPRWS facility. These exceptions will be on a case by case basis, and the decision to allow this will be made by SPRWS security officer.
- d) For sites that are undergoing construction, SPRWS will install construction locks and give contractors construction keys.

3.02 Issuance of Keys

- a) SPRWS staff that require access, as determined by the appropriate SPRWS division manager, will be issued keys. Such keys will be reduced to the lowest possible number.
 - 1. SPRWS staff are responsible for the safe keeping of keys issued to them.
 - 2. Repeated lost keys will be considered negligence and may result in corrective action and/or discipline by SPRWS management.
- b) Key audits will be conducted at least once each calendar year.
 - 1. Each SPRWS staff member, and each Authorized Agent, to whom SPRWS keys were issued will be required to sign a key Audit Statement acknowledging their continued possession of the key.
 - 2. Both Public and Private Agencies are responsible for the return of all keys and/or contractor keys issued to their agents who leave their employ or are no longer required by the Authorized Agency to access SPRWS facilities. Lost keys must be reported immediately to SPRWS by contacting the Engine Room at 651-266-1660.
 - 3. Repeated losses may result in deposit requirements, as may be determined necessary by SPRWS staff.

4.0 SPRWS CONTACTS

Normal and emergency access after normal business hours:
PE II 651-266-1660.

CONTRACTOR PROCEDURES FOR ENTERING SPRWS WATER TOWER FACILITIES

Routine Accesses:

- 1) Notify SPRWS Pumping Engineer at 651-266-1660 of desired access at least 24 hours prior to accessing site. Pumping Engineer will verify that company has agreement to be on site, and if so will arrange for crew to meet contractor at designated time and place. Contractor must provide names of all employees that will access the site.
- 2) At time of arranged access, provide IDs (in the form of valid driver's licenses) for SPRWS field crew. If IDs match the names given to the Pumping Engineer, crew will provide access. If not, no access will be provided.
- 3) SPRWS field crew may accompany contractor while they are on site. If the crew does not accompany contractor, contractor must call the Pumping Engineer when they leave the site.

Emergency Accesses:

- 1) Notify SPRWS Engine Room at 651-266-1660 of need to access site.
- 2) Engine Room Pumping Engineer will verify that contractor has an agreement to be on a particular site.
- 3) If contractor has agreement to be on site, and a reasonable explanation of the emergency is given, Pumping Engineer will arrange for a crew to meet contractor at the site.
- 4) Contractor will need to produce IDs and work orders.
- 5) If OK, crew will allow for access.
- 6) Repeated emergencies will be cause for SPRWS to bill the contractor or deny access.
- 7) Contractor will call Engine Room when leaving site.

- End -

Exhibit “F”
Memorandum of Lease Recording

DRAFTED BY:
Saint Paul Regional Water Services
1900 Rice St
Saint Paul, MN 55117

AND RETURN TO:

(space above this line for Recorder’s use only)

MEMORANDUM OF LEASE

THIS MEMORANDUM OF LEASE is entered into as of this 6th day of June, 2017, by and between **BOARD OF WATER COMMISSIONERS OF THE CITY OF SAINT PAUL**, a municipal corporation under the laws of the State of Minnesota (“Lessor”), and **MP MOBILE SOLUTIONS, LLC**, a Minnesota limited liability company (“Lessee”).

1. **LEASE OF PREMISES.** For the purpose of installing, operating, and maintaining a communication facility and other improvements, Lessor hereby leases to Lessee, and Lessee hereby leases from Lessor, certain premises located at 1530 Cosgrove Street, Falcon Heights, Minnesota 55108, City of Saint Paul, County of Ramsey, State of Minnesota, and more particularly described in Section 4 of this Memorandum, and on the terms and conditions more particularly set forth in, that certain Site Lease Agreement dated June 6, 2017 (the “Lease”) by and between Lessor and Lessee, which terms and conditions are hereby incorporated by reference.
2. The initial term of the Lease shall commence on June 6, 2017, and terminate on December 31, 2022. Lessee shall have the right to extend the Lease for three (3) additional five (5) year terms.
3. The Lease provides in part the grant of a non-exclusive easement for unrestricted rights of access and to electric and telephone facilities.

EXHIBIT “E”

4. The subject property affected by the filing and recording of this Memorandum of Lease is described below:

The Southeast One-Quarter (SE1/4) of the Northeast One-Quarter (NE1/4) of Section 21, Township 29 North, Range 23 West, Ramsey County, Minnesota.

(Signature and Acknowledgement Pages Follow)

Lessor:

Approved:

By _____
Stephen P. Schneider, General Manager
Saint Paul Regional Water Services

Approved as to form:

By _____
Assistant City Attorney

**BOARD OF WATER COMMISSIONERS
OF THE CITY OF SAINT PAUL**
EIN 41-6005521

By _____
Matt Anfang, President

By _____
Mollie Gagnelius, Secretary

By _____
Todd Hurley, Director
Office of Financial Services

Lessee:

MP MOBILE SOLUTIONS, LLC

By _____

Print Name: _____

Its: _____

BOARD OF WATER COMMISSIONERS OF THE CITY OF SAINT PAUL

EXHIBIT “F”

LESSEE

STATE OF _____)
) ss.
COUNTY OF _____)

I certify that I know or have satisfactory evidence that _____ is the person who appeared before me, and said person acknowledged that he signed this instrument, on oath stated that he was authorized to execute the instrument and acknowledged it as the _____ of MP Mobile Solutions, LLC, a Minnesota limited liability company, to be the free and voluntary act of such party for the uses and purposes mentioned in the instrument.

Dated: _____

Witness my hand and official seal.

Notary Public