

**AMENDMENT NO. 2 TO SITE LEASE AGREEMENT
BETWEEN
BOARD OF WATER COMMISSIONERS OF THE CITY OF SAINT PAUL
AND
T-MOBILE CENTRAL LLC**

This **AMENDMENT NO. 2 TO SITE LEASE AGREEMENT** ("Amendment") is made this _____ day of _____, 2017, by and between the Board of Water Commissioners of the City of Saint Paul, a Minnesota municipal corporation ("Lessor") and, T-Mobile Central LLC, a Delaware limited liability company, successor in interest to APT Minneapolis, Inc. ("Lessee").

RECITALS

A. Lessor and Lessee are parties to a Site Lease Agreement dated November 13, 2007 as amended by Amendment No. 1 to Lease Agreement dated July 29, 2015 ("Agreement") whereby Lessor has leased ground space and water tower space to Lessee at Lessor's Cottage Water Tower site, addressed as 2095 Clear Avenue, Saint Paul, Minnesota 55119.

B. Lessor and Lessee desire to amend the Agreement to (i) allow for the installation of three (3) Remote Radio Units, (ii) provide for an increase in the annual rent payable to Lessor under the Agreement, and (iii) eliminate caps on engineering costs to be paid by Lessee.

AGREEMENT

NOW, THEREFORE, in consideration of the facts contained in the Recitals above, the mutual covenants and conditions below, and other good and valuable consideration, the receipt and sufficiency of which are hereby acknowledged, the parties agree as follows:

1. **EFFECTIVE DATE.**

The effective date of this Amendment shall be the date last signed below ("Effective Date").

2. **REVISED INSTALLATION.**

a. Lessee shall have the right to modify its Communications Facilities as described and depicted on Exhibit A-2 (Construction Drawings Rev 1 dated September 28, 2017), attached hereto and incorporated herein. Exhibit A of the Agreement and any supplement(s) thereto are deleted in their entirety and replaced with said Exhibit A-2.

b. Exhibit B of the Agreement and any supplement(s) thereto are deleted in their entirety and replaced with Exhibit B-2, attached hereto and incorporated herein.

3. **REVISED ANNUAL RENT.** As consideration for the rights granted herein, commencing on the Effective Date of the Agreement, the annual Base Rent, as described in Section 3 of the Agreement, shall be Forty-Five Thousand Three Hundred Seventy-Six and

44/100 Dollars (\$45,376.44). The resulting increase in rent for 2017 shall be prorated from the Effective Date of this Amendment.

Lessee shall make all payments of rent to Lessor at the following address:

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

4. ENGINEERING COSTS. Subsections 5(a) and 5(c) of the Agreement are hereby amended as shown below. Deleted language is indicated by strikethrough.

5. 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 of same, Lessee shall provide Lessor and Lessor's Water Tower Construction Engineer ("Construction Engineer") each with two (2) sets of 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 proposed Antenna Facilities;
- (4) a complete and detailed inventory of all equipment and personal property of Lessee.

Construction Plans shall include a site landscaping plan. Landscaping improvements shall be at Lessee's sole expense and shall be subject to approval by Construction Engineer and Board inspector.

Construction Plans shall be easily readable and subject to prior written approval by the Construction Engineer, which shall not be unreasonably withheld, conditioned or delayed.

Lessee shall be solely responsible for all costs associated with said review and approval of Construction Plans by Construction Engineer. ~~at a cost not to exceed \$2,000.~~

(b) Construction Scheduling.

At least three (3) days prior to Lessee's construction mobilization, Lessee shall conduct a pre-construction meeting on the Property. Said meeting shall be attended by the Construction Engineer, Lessee's representative

and all parties involved in the installation.

(c) Construction Inspection.

All construction activity shall be subject to inspection and approval by the Construction Engineer. If deemed necessary or desirable by the Construction Engineer, construction work performed without direct inspection and approval of the Construction Engineer will not be accepted and shall be removed or uninstalled at Lessee's sole expense.

Lessee shall be solely responsible for all costs associated with said inspection and approval of construction work by Construction Engineer. ~~at a cost not to exceed \$4,000.~~

(d) Damage by Lessee.

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

5. NOTICE. Each party's notice address in Section 13 of the Agreement is hereby replaced with the following:

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

LESSEE: T-Mobile Central LLC
12920 SE 38th Street
Bellevue, WA 98006
Attn: Lease Compliance A1N0136C

6. RATIFICATION OF THE AMENDMENT.

a. Except as specifically modified by this Amendment, the parties agree that all of the terms and conditions of the Agreement are in full force and effect and remain unmodified, and the parties hereby ratify and reaffirm the terms and conditions of the Agreement and agree to perform and comply with the same.

b. In the event of a conflict between any term or provision of the Agreement and this Amendment, the terms and provisions of this Amendment shall control.

c. Except as otherwise stated in this Amendment, all initially capitalized terms will have the same respective defined meaning stated in the Agreement. All captions are for reference purposes only and shall not be used in the construction or interpretation of this Amendment.

[Remainder of page left intentionally blank.]

Site # A1N0136C
Market: Minneapolis

IN WITNESS WHEREOF, Lessor and Lessee have caused this Amendment to be executed by each party's duly authorized representative as of the Effective Date.

Approved:

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

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

Matt Anfang, President

Approved as to Form:

Mollie Gagnelius, Secretary

Assistant City Attorney

Todd Hurley, Director
Office of Financial Services

CITY OF SAINT PAUL

Kristin Beckmann, Deputy Mayor

Shari Moore, City Clerk

Date of Execution by Lessor: _____

T-MOBILE CENTRAL LLC

Hossein Sepehr
Area Director, Network Engineering & Ops

Date of Execution by Lessee: _____

Site # A1N0136C
Market: Minneapolis

Exhibit A-2
(Attached CDs Rev 1 dated 9/28/17)

T-Mobile® stick together®

NOTE:
THESE DRAWINGS BASED ON
RFDs DATED 01/05/2017.

T-Mobile®

T-MOBILE USA, INC.
8000 WEST 78TH STREET
SUITE 400
EDINA, MN 55439
OFFICE: 612.701.2069

insite

18660 MIDWEST ROAD
SUITE 140
OAKBROOK TERRACE, IL 60181
OFFICE: 773.960.8781

Edge
Consulting Engineers, Inc.

17645 JUNIPER PATH
SUITE 105
LAKEVILLE, MN 55044
608.644.1449
www.edgeconsult.com



DATE SIGNED: 9/28/2017

PROJECT NO: 16257

DRAWN BY: PER

CHECKED BY: OGD

REV.	DATE:	DESCRIPTION:
A	04/25/17	PRELIMINARY CDS
B	05/09/17	PRELIMINARY CDS
C	08/08/17	PRELIMINARY CDS
1	09/28/17	PRELIMINARY CDS

**ST PAUL
REGIONAL WT
(A1N0136C)**

SITE ADDRESS:
2095 CLEAR AVE E
ST. PAUL, MN 55119

TITLE SHEET

T-1

L1900 UPGRADE

T-MOBILE SITE NUMBER: A1N0136C
T-MOBILE SITE NAME: ST PAUL REGIONAL WT
SITE TYPE: 80' WATER TANK
SITE ADDRESS: 2095 CLEAR AVE E
ST. PAUL, MN 55119
COUNTY: RAMSEY COUNTY
JURISDICTION: N/A

PROJECT DESCRIPTION:

STRUCTURE HEIGHT: 80'
STRUCTURE TYPE: WATER TANK
ANTENNA QUANTITY: (9) EXISTING ANTENNA PANELS TO REMAIN
RADIO MODIFICATION: INSTALLATION OF (3) FHFB
ANTENNA HEIGHT (CL): 81'
EQUIPMENT MOUNTING: EQUIPMENT CABINETS ON STEEL PLATFORM
MOST RECENT RFDs: 01/05/2017

COORDINATES (PER RFDs):

LATITUDE: 44.98249557°
LONGITUDE: -93.01221790°

LOCATION SUMMARY:

PROPERTY ADDRESS:
2095 CLEAR AVE E
ST. PAUL, MN 55119

APPLICABLE CODES

ALL WORK SHALL COMPLY WITH THE FOLLOWING APPLICABLE CODES:
- 2012 INTERNATIONAL BUILDING CODE
- 2015 MINNESOTA BUILDING CODE
- TIA/EIA-222-G OR LATEST EDITION
IN THE EVENT OF CONFLICT, THE MOST RESTRICTIVE CODE SHALL PREVAIL

CONTACTS:

APPLICANT:
T-MOBILE USA, INC.
8000 WEST 78TH STREET, SUITE 400
EDINA, MN 55439
CONTACT: STEVE CARLSON
OFFICE: 612.810.5279

SITE ACQUISITION CONTACT:
INSITE, INC.
18660 MIDWEST RD
SUITE 140
OAKBROOK TERRACE, IL 60181
CONTACT: KELLY MOHR
PHONE: 773.960.8781

A/E FIRM:
EDGE CONSULTING ENGINEERS, INC.
17645 JUNIPER PATH
SUITE 105
LAKEVILLE, MN 55044
CONTACT: OTTO DINGFELDER III, P.E.
OFFICE: 952.683.1032

APPROVALS:

	PRINT NAME:	SIGNATURE:	DATE:
PROPERTY OWNER:			
SAC/ ZONING:			
CONSTRUCTION:			
REAL ESTATE:			
R.F. ENGINEER			
GENERAL MANAGER:			
OPERATIONS:			
UTILITIES:			

SHEET INDEX:

SHEET #	DESCRIPTION:	REV
T-1	TITLE SHEET	1
C-1	SITE PLAN	0
C-2	ENLARGED SITE PLAN	0
C-3	EQUIPMENT DETAILS	0
A-1	TOWER ELEVATION	0
A-2	ANTENNA CONFIGURATION	0
A-3	ANTENNA DETAILS	1
A-4	EQUIPMENT DETAILS	0
GN-1	GENERAL NOTES AND SPECIFICATIONS	0
	PROVIDED BY OTHERS	N/A

STRUCTURAL REVIEW NOTE:

TOWER STRUCTURAL ANALYSIS COMPLETED BY OTHERS. CONTRACTOR TO REVIEW STRUCTURAL REPORT IN ITS ENTIRETY. ANY DISCREPANCIES OR DISAGREEMENTS BETWEEN THE REPORT AND THESE PLANS SHOULD BE RESOLVED PRIOR TO CONSTRUCTION.

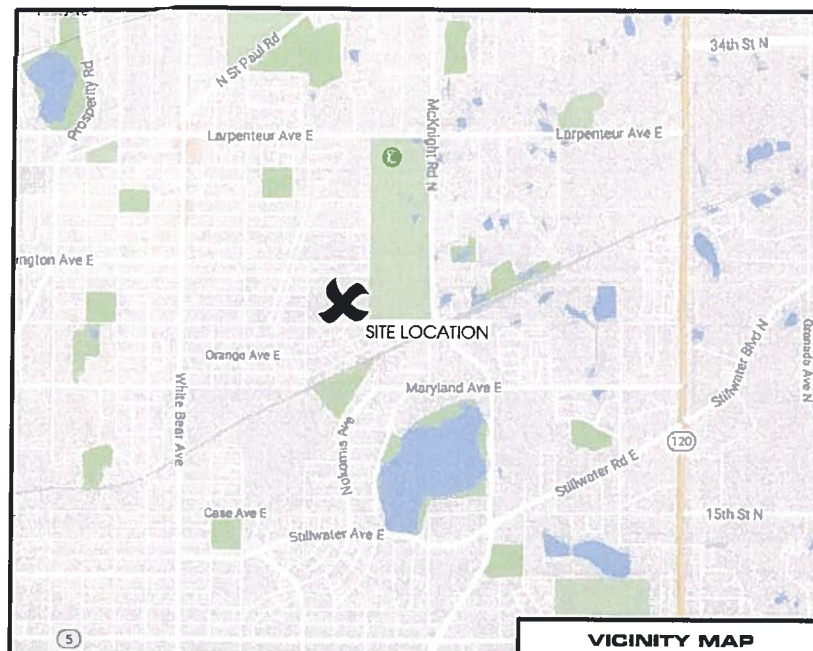
UTILITY INFORMATION:



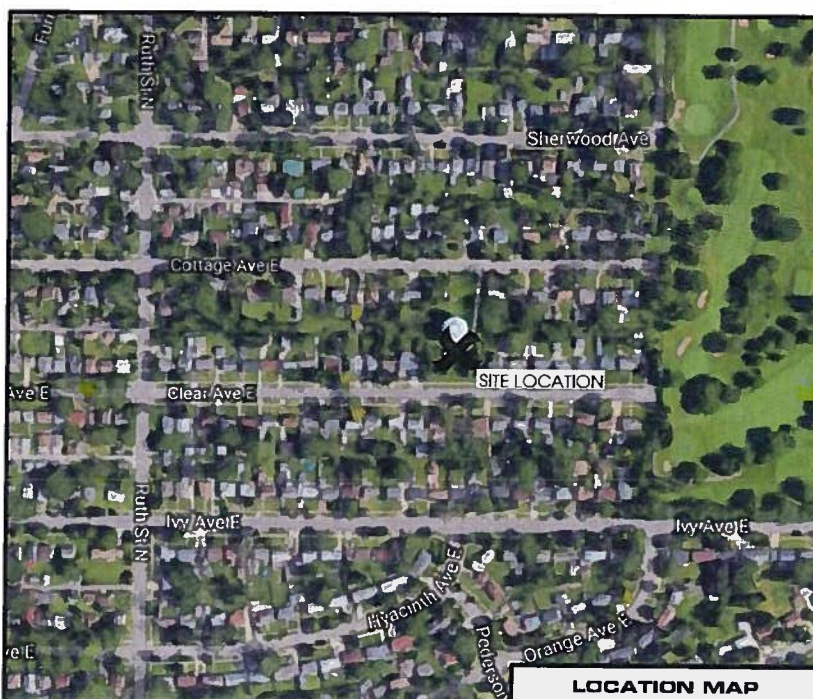
TO OBTAIN LOCATION OF PARTICIPANTS' UNDERGROUND FACILITIES BEFORE YOU DIG IN MINNESOTA, CALL Gopher State One Call.

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

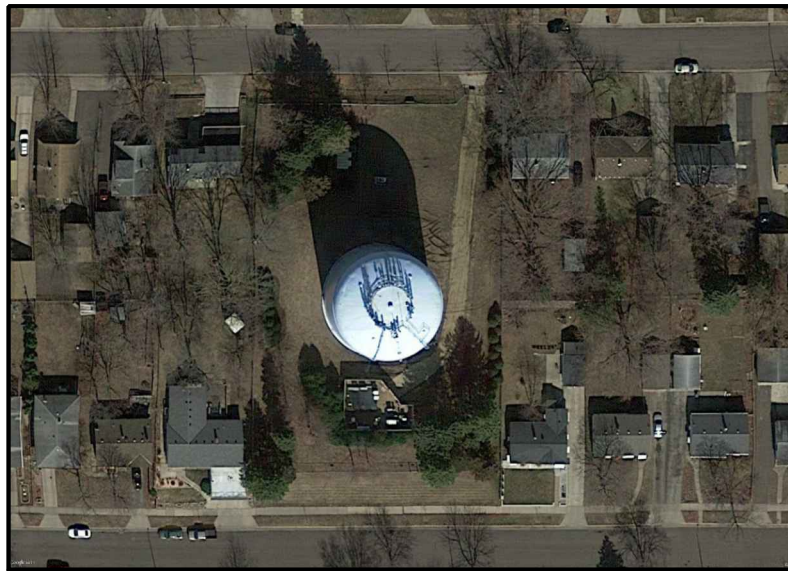
MINNESOTA STATUTE REQUIRES MIN. OF 48 HOURS NOTICE BEFORE YOU EXCAVATE.



VICINITY MAP

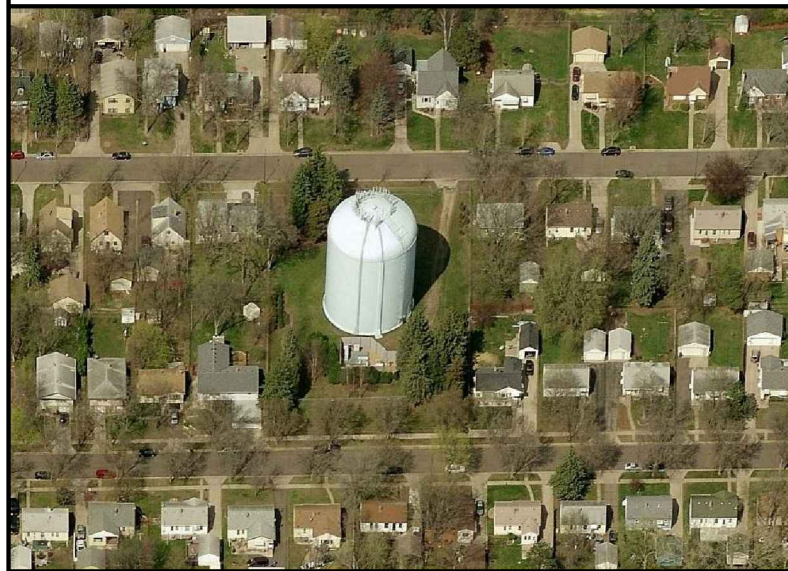


LOCATION MAP



1

AERIAL OVERVIEW



2

BIRD'S EYE OVERVIEW



3

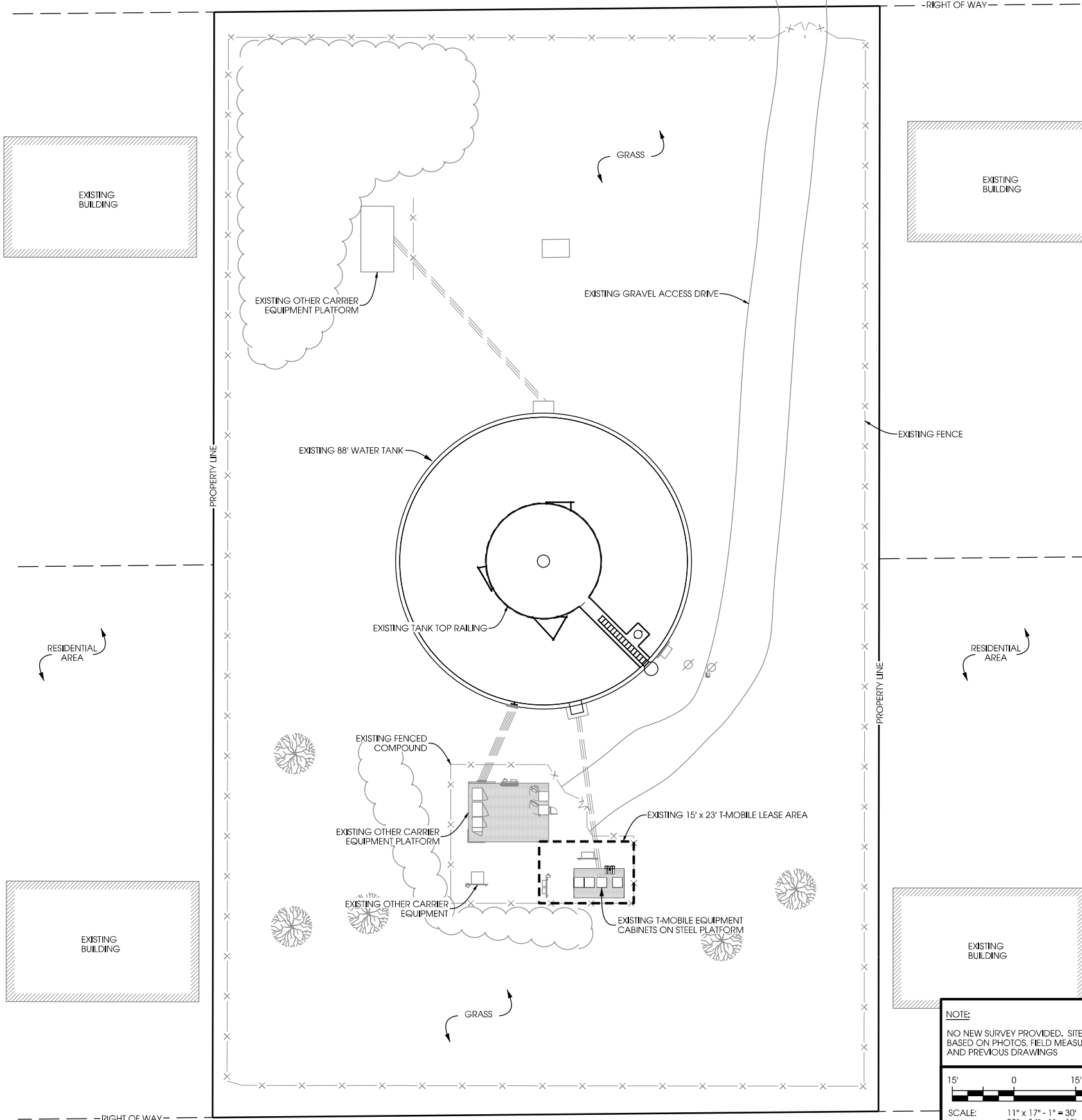
SITE OVERVIEW
[LOOKING EAST]



NORTH

COTTAGE AVE E

3
C-1



NOTE:
NO NEW SURVEY PROVIDED. SITE LAYOUT
BASED ON PHOTOS, FIELD MEASUREMENTS,
AND PREVIOUS DRAWINGS

15' 0 15' 30'

SCALE: 11" x 17" - 1" = 30'
22" x 34" - 1" = 15'

T-Mobile

T-MOBILE USA, INC.
8000 WEST 78TH STREET
SUITE 400
EDINA, MN 55439
OFFICE: 612.701.2069

insite

1s660 MIDWEST ROAD
SUITE 140
OAKBROOK TERRACE, IL 60181
OFFICE: 773.960.8781

Edge
Consulting Engineers, Inc.
17645 JUNIPER PATH
SUITE 105
LAKEVILLE, MN 55044
608.644.1449
www.edgeconsult.com

APPROVED

PROJECT NO: 16257

DRAWN BY: PER

CHECKED BY: OGD

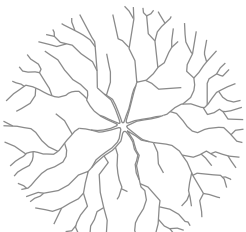
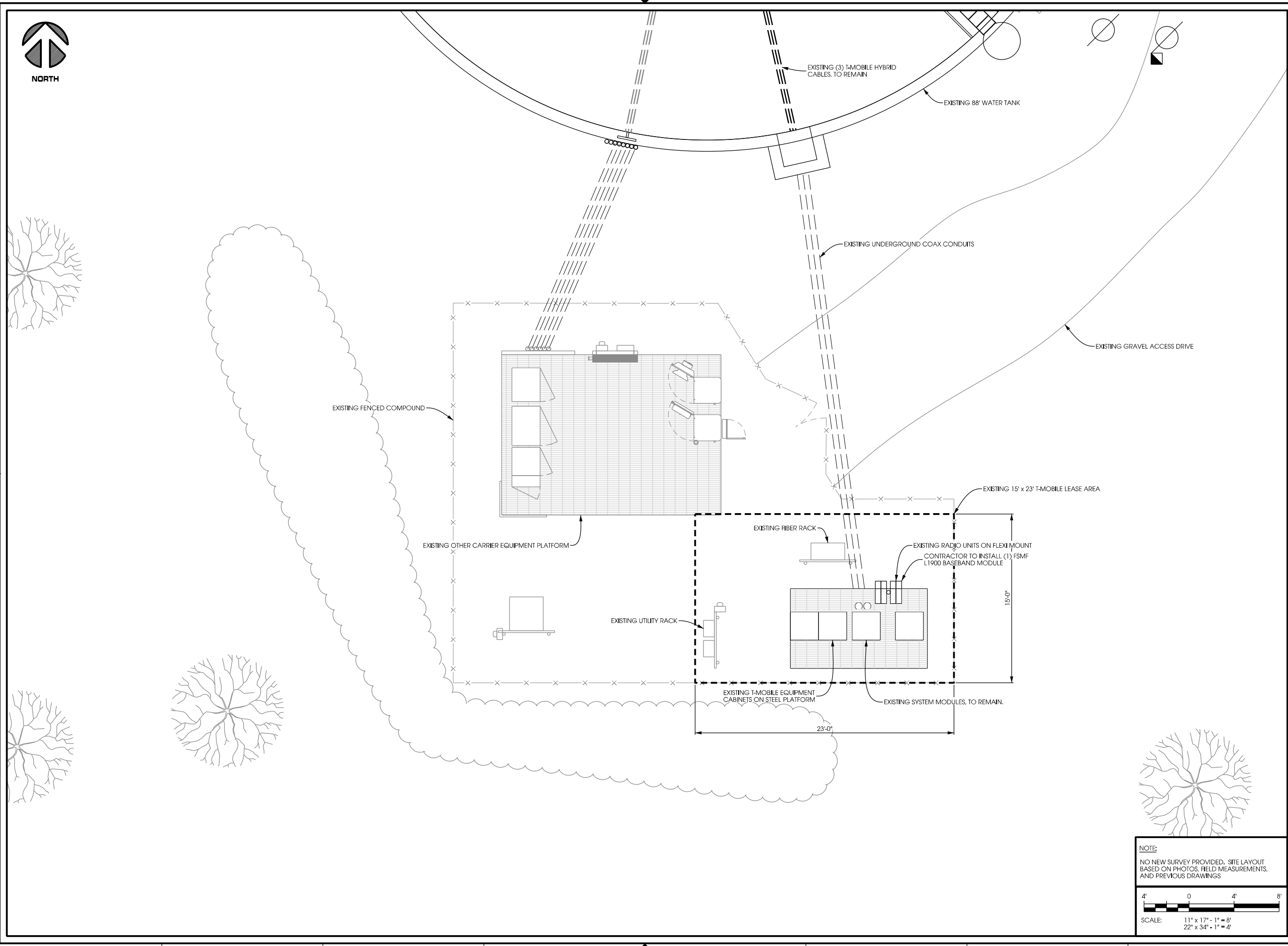
REV.	DATE	DESCRIPTION
A	04/25/17	PRELIMINARY CDS
B	05/09/17	PRELIMINARY CDS
C	08/08/17	PRELIMINARY CDS
1	09/28/17	PRELIMINARY CDS

ST PAUL
REGIONAL WT
[A1N0136C]

SITE ADDRESS:
2095 CLEAR AVE E
ST. PAUL, MN 55119

SITE PLAN

C-1



NOTE:
NO NEW SURVEY PROVIDED. SITE LAYOUT
BASED ON PHOTOS, FIELD MEASUREMENTS,
AND PREVIOUS DRAWINGS

4' 0 4' 8'

SCALE: 11" x 17" - 1" = 8'
22" x 34" - 1" = 4'



T-MOBILE USA, INC.
8000 WEST 78TH STREET
SUITE 400
EDINA, MN 55439
OFFICE: 612.701.2069



1s660 MIDWEST ROAD
SUITE 140
OAKBROOK TERRACE, IL 60181
OFFICE: 773.960.8781



17645 JUNIPER PATH
SUITE 105
LAKEVILLE, MN 55044
608.644.1449
www.edgeconsult.com

APPROVED

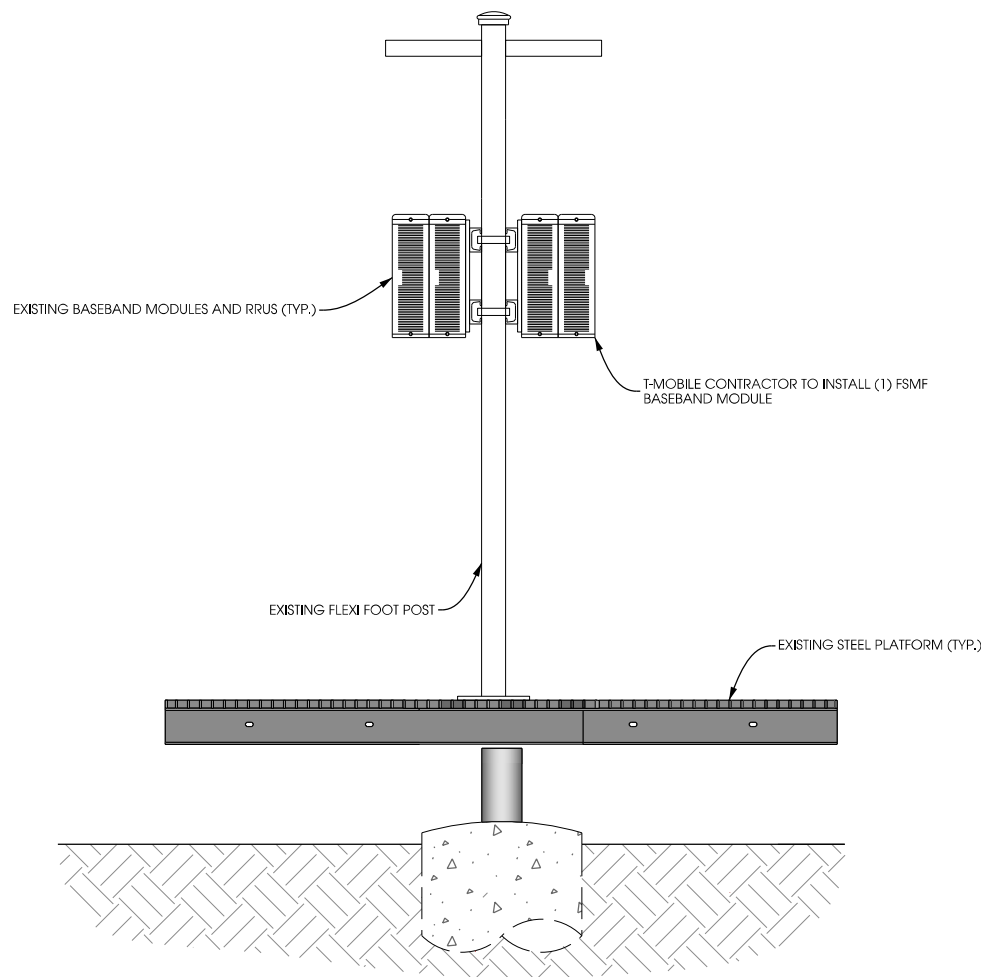
PROJECT NO: 16257		
DRAWN BY: PER		
CHECKED BY: OGD		
REV.	DATE:	DESCRIPTION:
A	04/25/17	PRELIMINARY CDS
B	05/09/17	PRELIMINARY CDS
0	08/08/17	PRELIMINARY CDS
1	09/28/17	PRELIMINARY CDS

**ST PAUL
REGIONAL WT
[A1N0136C]**

SITE ADDRESS:
2095 CLEAR AVE E
ST. PAUL, MN 55119

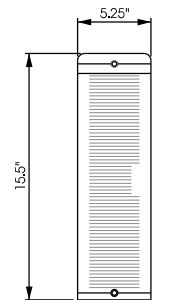
**ENLARGED
SITE PLAN**

C-2

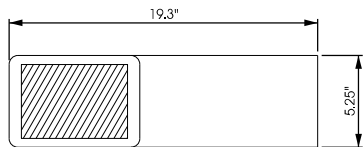


1 RADIO UNIT MOUNTING DETAIL
SCALE: NTS

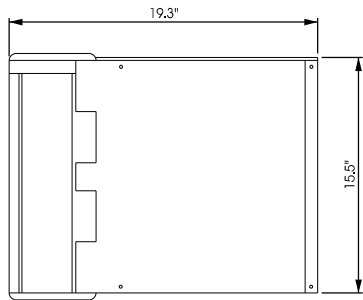
REMOTE RADIO HEAD WEIGHTS:	
FXFC (FLEXI 3-SECTOR RF MODULE 1900):	55 LBS (25 KG)
FRIA (FLEXI 3-SECTOR RF MODULE 1.7/2.1):	55 LBS (25 KG) (GROUND MOUNTED)
SYSTEM MODULE WEIGHTS:	
ESMB (FLEXI MULTIRADIO BTS SYSTEM MODULE):	33 LBS (15 KG)
FSME (FLEXI MULTIRADIO BTS SYSTEM MODULE):	50.6 LBS (23 KG)
FSMF (FLEXI MULTIRADIO BTS SYSTEM MODULE):	33 LBS (15 KG)



SIDE VIEW



TOP VIEW



FRONT VIEW

2 RRU AND SYSTEM MODULE DETAILS
SCALE: NTS



T-MOBILE USA, INC.
8000 WEST 78TH STREET
SUITE 400
EDINA, MN 55439
OFFICE: 612.701.2069



1s660 MIDWEST ROAD
SUITE 140
OAKBROOK TERRACE, IL 60181
OFFICE: 773.960.8781



Edge
Consulting Engineers, Inc.
17645 JUNIPER PATH
SUITE 105
LAKEVILLE, MN 55044
608.644.1449
www.edgeconsult.com

APPROVED

PROJECT NO: 16257

DRAWN BY: PER

CHECKED BY: OGD

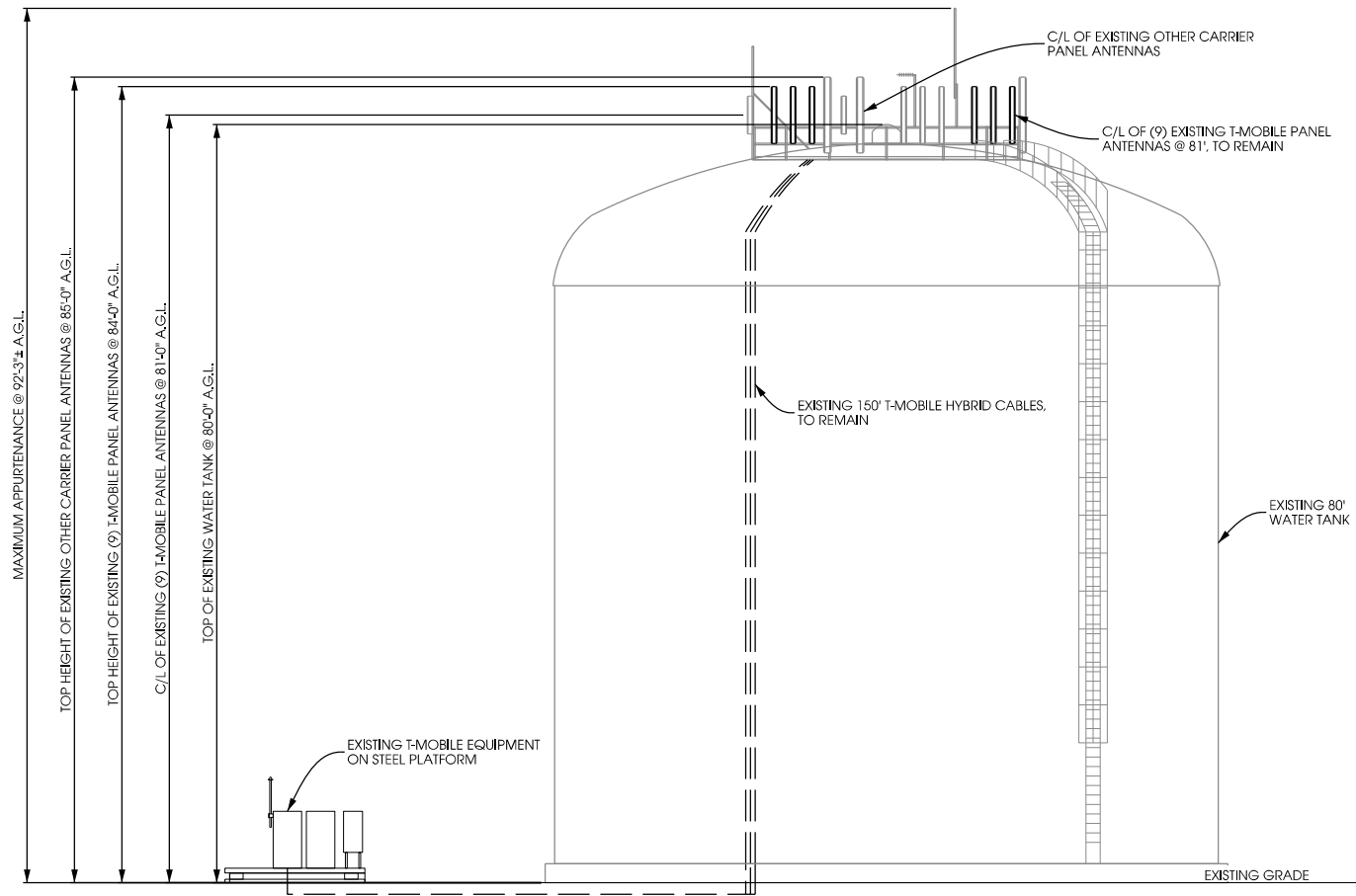
REV.	DATE:	DESCRIPTION:
A	04/25/17	PRELIMINARY CDS
B	05/09/17	PRELIMINARY CDS
0	08/08/17	PRELIMINARY CDS
1	09/28/17	PRELIMINARY CDS

**ST PAUL
REGIONAL WT
[A1N0136C]**

SITE ADDRESS:
2095 CLEAR AVE E
ST. PAUL, MN 55119

**EQUIPMENT
DETAILS**

NOTE:
PHOTO ON THIS PAGE WAS TAKEN 02/02/2012.



1 **TOWER ELEVATION (WEST ELEVATION)**
SCALE: 11" x 17" - 1'-0" = 30'-0"
22" x 34" - 1'-0" = 15'-0"



TOWER ELEVATION

T-Mobile

T-MOBILE USA, INC.
8000 WEST 78TH STREET
SUITE 400
EDINA, MN 55439
OFFICE: 612.701.2069

insite

1s660 MIDWEST ROAD
SUITE 140
OAKBROOK TERRACE, IL 60181
OFFICE: 773.960.8781

Edge

Consulting Engineers, Inc.
17645 JUNIPER PATH
SUITE 105
LAKEVILLE, MN 55044
608.644.1449
www.edgeconsult.com

APPROVED

PROJECT NO: 16257

DRAWN BY: PER

CHECKED BY: OGD

REV.	DATE:	DESCRIPTION:
A	04/25/17	PRELIMINARY CDS
B	05/09/17	PRELIMINARY CDS
0	08/08/17	PRELIMINARY CDS
1	09/28/17	PRELIMINARY CDS

**ST PAUL
REGIONAL WT
[A1N0136C]**

SITE ADDRESS:
2095 CLEAR AVE E
ST. PAUL, MN 55119

**TOWER
ELEVATION**

A-1

	ANTENNA NUMBER	TECHNOLOGY	ANTENNA VENDOR	MODEL NUMBER	ANTENNA RAD. CENTER	AZIMUTH	TMA	DIPLEXER	RRU TYPE	CABLE TYPE / SIZE	HYBRID CABLE LENGTHS	
											CABLE	JUMPER
ALPHA SECTOR	A-1	GSM/PCS	ANDREW	TMBXX-6517-A2M	81'	0°	N/A	N/A	FXFB	1.584" HIGH CAPACITY HCS	150'	15'
	A-2	LTE 700 / UMTS PCS	ANDREW	DBXNH-6565B-A2M	81'	0°	N/A	N/A	FRBG		N/A	15'
	A-3	AWS LTE	ANDREW	TMBXX-6517-A2M	81'	0°	N/A	N/A	FRIG	-	N/A	15'
BETA SECTOR	B-1	GSM/PCS	ANDREW	TMBXX-6517-A2M	81'	120°	N/A	N/A	FXFB	1.584" LOW CAPACITY HCS	50'	15'
	B-2	LTE 700 / UMTS PCS	ANDREW	DBXNH-6565B-A2M	81'	120°	N/A	N/A	FRBG		N/A	15'
	B-3	AWS LTE	ANDREW	TMBXX-6517-A2M	81'	120°	N/A	N/A	FRIG	-	N/A	15'
GAMMA SECTOR	C-1	GSM/PCS	ANDREW	TMBXX-6517-A2M	81'	240°	N/A	N/A	FXFB	1.584" LOW CAPACITY HCS	50'	15'
	C-2	LTE 700 / UMTS PCS	ANDREW	DBXNH-6565B-A2M	81'	240°	N/A	N/A	FRBG		N/A	15'
	C-3	AWS LTE	ANDREW	TMBXX-6517-A2M	81'	240°	N/A	N/A	FRIG	-	N/A	15'

EXISTING

	ANTENNA NUMBER	TECHNOLOGY	ANTENNA VENDOR	MODEL NUMBER	ANTENNA RAD. CENTER	AZIMUTH	TMA	DIPLEXER	RRU TYPE	CABLE TYPE / SIZE	HYBRID CABLE LENGTHS	
											CABLE	JUMPER
ALPHA SECTOR	A-1	LTE / UMTS PCS	ANDREW	TMBXX-6517-A2M	81'	0°	N/A	N/A	FHFB	1.584" HIGH CAPACITY HCS	150'	15'
	A-2	LTE 700 / GSM PCS	ANDREW	DBXNH-6565B-A2M	81'	0°	N/A	N/A	FRBG/FXFB		N/A	15'
	A-3	AWS LTE	ANDREW	TMBXX-6517-A2M	81'	0°	N/A	N/A	FRIG	-	N/A	15'
BETA SECTOR	B-1	LTE / UMTS PCS	ANDREW	TMBXX-6517-A2M	81'	120°	N/A	N/A	FHFB	1.584" LOW CAPACITY HCS	50'	15'
	B-2	LTE 700 / GSM PCS	ANDREW	DBXNH-6565B-A2M	81'	120°	N/A	N/A	FRBG/FXFB		N/A	15'
	B-3	AWS LTE	ANDREW	TMBXX-6517-A2M	81'	120°	N/A	N/A	FRIG	-	N/A	15'
GAMMA SECTOR	C-1	LTE / UMTS PCS	ANDREW	TMBXX-6517-A2M	81'	240°	N/A	N/A	FHFB	1.584" LOW CAPACITY HCS	50'	15'
	C-2	LTE 700 / GSM PCS	ANDREW	DBXNH-6565B-A2M	81'	240°	N/A	N/A	FRBG/FXFB		N/A	15'
	C-3	AWS LTE	ANDREW	TMBXX-6517-A2M	81'	240°	N/A	N/A	FRIG	-	N/A	15'

NOTE:

(1) FSMF UNIT TO BE ADDED AT GROUND LEVEL. NOT SHOWN FOR CLARITY ON SCHEDULE/PLAN

PROPOSED

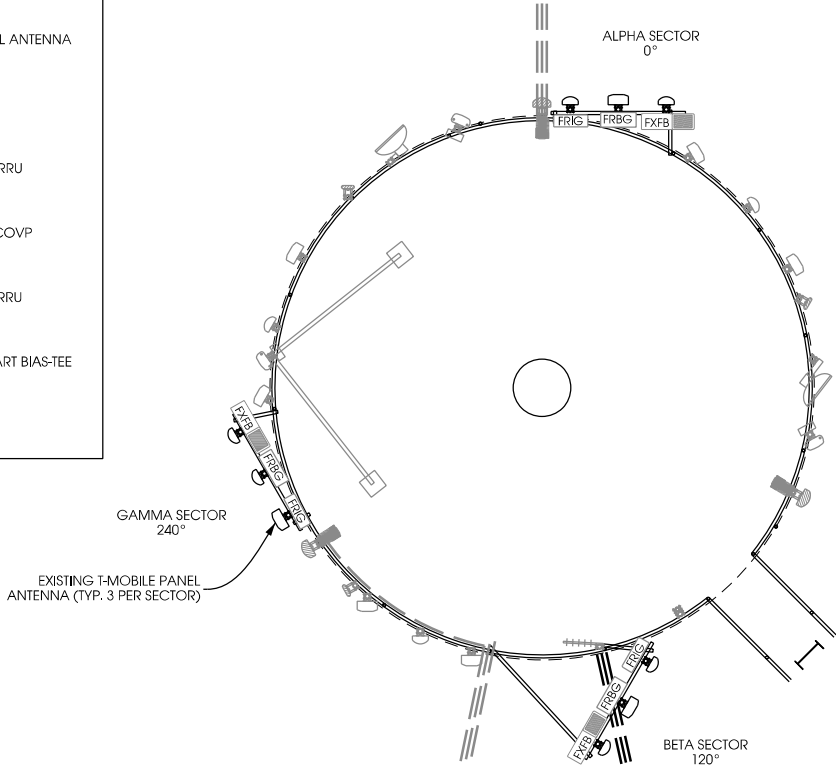
*NOTE: RED TEXT INDICATES CHANGE IN EQUIPMENT

1 ANTENNA AND COAXIAL CABLE SCHEDULE

SCALE: NTS

ANTENNA LEGEND:

- EXISTING PANEL ANTENNA
- EXISTING RRU
- EXISTING FRIG RRU
- EXISTING TOP COVP
- EXISTING FRLB RRU
- INSTALLED SMART BIAS-TEE



1 EXISTING EQUIPMENT PLAN

SCALE: NTS

NOTE:

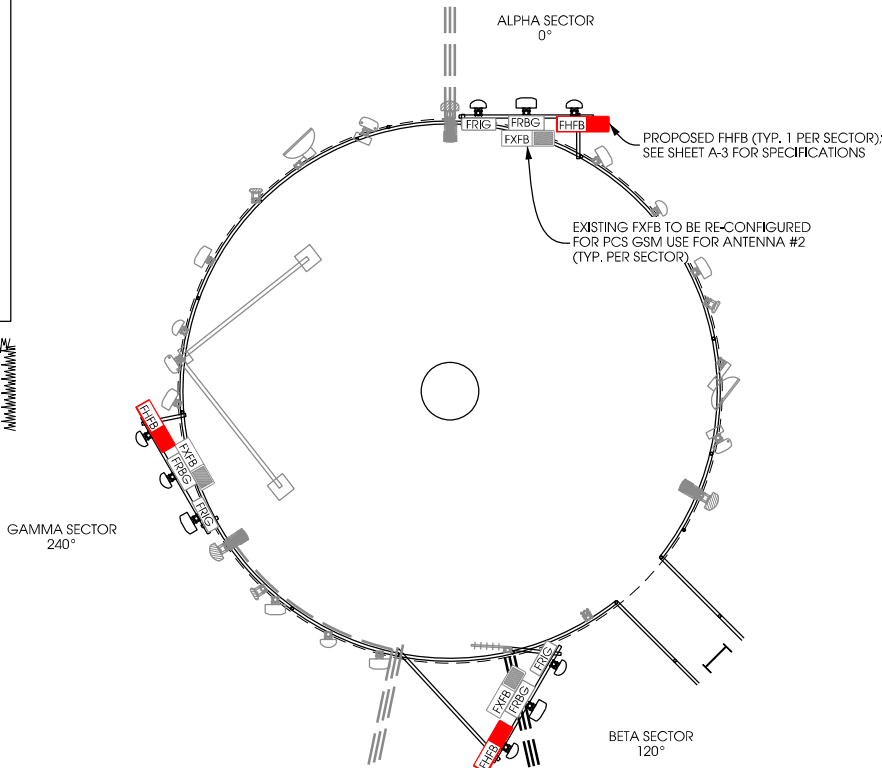
AZIMUTHS AS REPORTED BY T-MOBILE RFDS
SEE RFDS FOR CABLING REQUIREMENTS

ANTENNA LEGEND:

- EXISTING PANEL ANTENNA
- PROPOSED RRU
- EXISTING FRIG RRU
- EXISTING TOP COVP
- EXISTING FRLB RRU

NOTE:

ALL OPEN PORTS TO BE CAPPED OFF



2 PROPOSED EQUIPMENT PLAN

SCALE: NTS



T-MOBILE USA, INC.
8000 WEST 78TH STREET
SUITE 400
EDINA, MN 55439
OFFICE: 612.701.2069



1s660 MIDWEST ROAD
SUITE 140
OAKBROOK TERRACE, IL 60181
OFFICE: 773.960.8781



17645 JUNIPER PATH
SUITE 105
LAKEVILLE, MN 55044
608.644.1449
www.edgeconsult.com

APPROVED

PROJECT NO: 16257

DRAWN BY: PER

CHECKED BY: OGD

REV.	DATE:	DESCRIPTION:
A	04/25/17	PRELIMINARY CDS
B	05/09/17	PRELIMINARY CDS
0	08/08/17	PRELIMINARY CDS
1	09/28/17	PRELIMINARY CDS

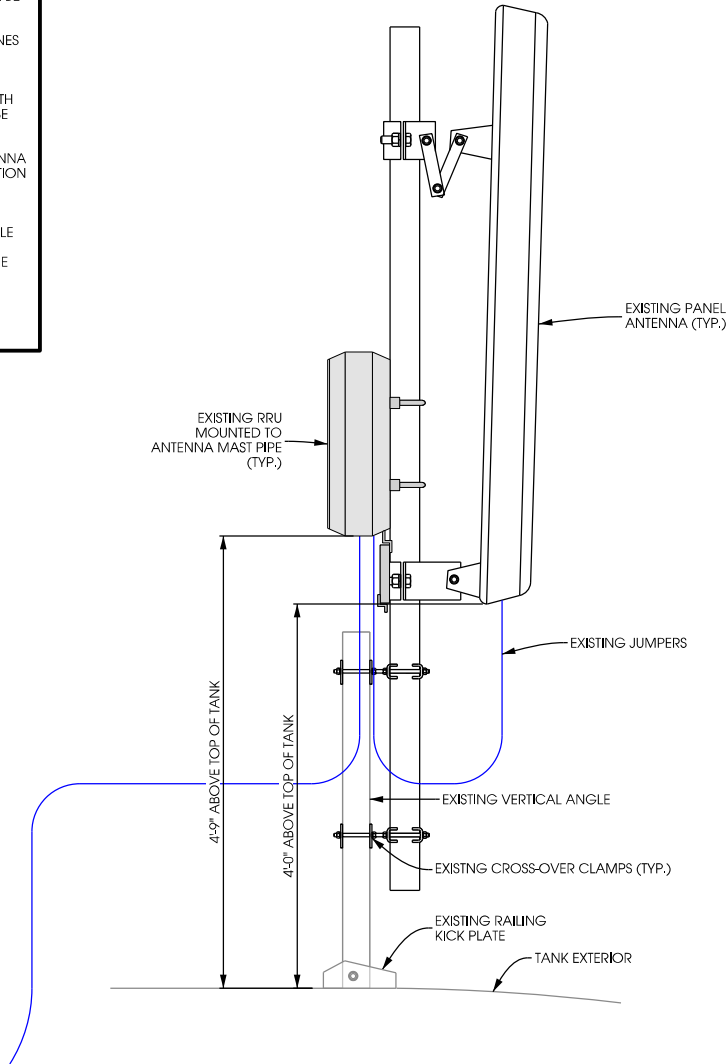
ST PAUL
REGIONAL WT
[A1N0136C]

SITE ADDRESS:
2095 CLEAR AVE E
ST. PAUL, MN 55119

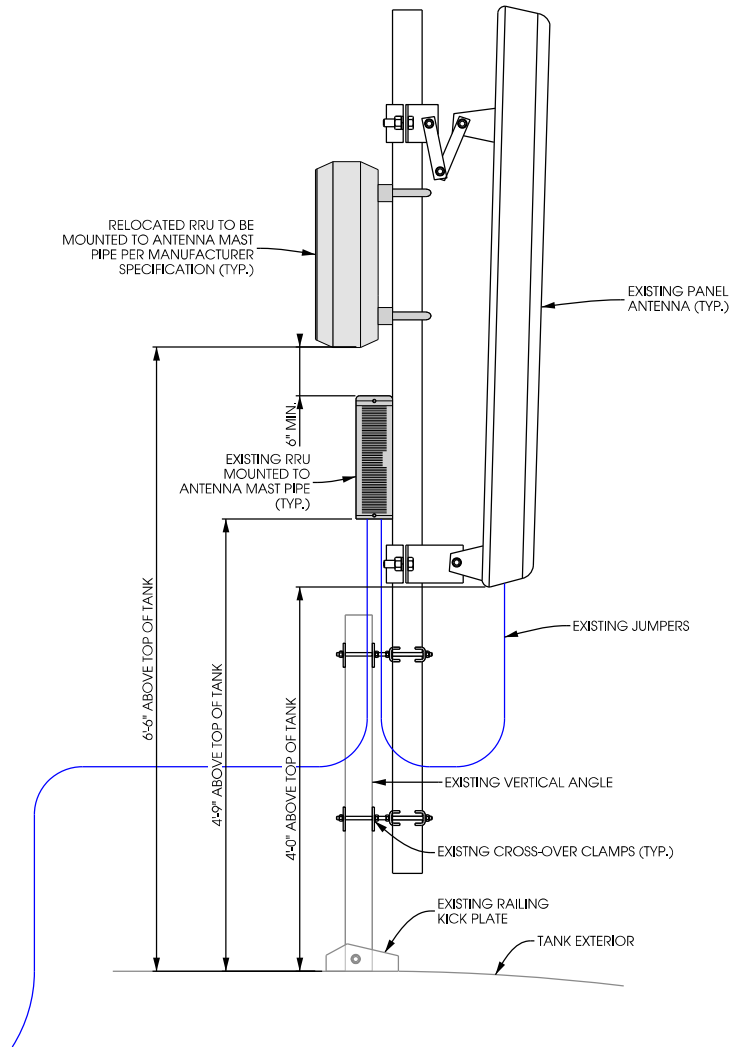
ANTENNA
CONFIGURATION

A-2

- NOTES:
- NEOPRENE TO BE USED AT ALL POINTS OF CONTACT W/ PAINTED SURFACES. FASTENING SEQUENCE SHOULD INCLUDE NYLON WASHERS BETWEEN THE PAINTED SURFACE AND GALVANIZED WASHER.
 - INSTALLED ANTENNAS ON THE EXTERIOR OF THE WATER TOWER SHALL BE SHOP PAINTED TO MATCH THE COLOR OF THE WATER TOWER (VERIFY COLOR).
 - ALL EXPOSED JUMPERS AND CABLES ARE TO BE PROVIDED WITH MANUFACTURED WHITE JACKETING OR TAPED WHITE.
 - INSTALLED MOUNTING PIPES AND ALL MOUNTING HARDWARE IS TO BE GALVANIZED AND/OR PROVIDED IN A NON-CORRODING MATERIAL. MOUNTING PIPES ARE TO BE CAPPED WITH RUBBER CAPS ON BOTH ENDS.
 - ALL ANTENNA FEED LINES, JUMPERS, COAX, AND HYBRID CABLES CANNOT INTERFERE WITH THE TOP OF THE HANDRAIL AND MUST BE ROUTED AS SUCH THAT THEY COMPLY WITH OSHA REQUIREMENTS REGARDING HANDRAILS.
 - THE INSTALLATION OF NEW EQUIPMENT WILL BE PLACED BEHIND THE ANTENNAS AND IN A MANNER THAT MAINTAINS THE HANDRAILS COMPLIANCE WITH CURRENT OSHA GUIDELINES FOR ACCESS.
 - CONTRACTOR TO TOUCH UP PAINTING ON EXISTING ANTENNAS, SPOT REPAIRS MADE WITH BRUSH AND WITHOUT FEATHERING, SHOULD BE COMPLETELY ROLLED FOR UNIFORMITY.
 - CONTRACTOR TO TOUCH UP EXISTING ANTENNA PIPE MASTS, DEPENDING UPON THEIR CONDITION (DAMAGED/FAILED) THE CITY MAY REQUEST REPLACEMENT.
 - ALL ABANDONED ANTENNAS, COAXIAL CABLE AND DETACHABLE EQUIPMENT THAT IS NO LONGER USED IS TO BE REMOVED DURING THE FINAL MIGRATION.
 - ALL EQUIPMENT IS TO BE IDENTIFIED BY THE TENANT (T-MOBILE).



1 **FHFB MOUNT DETAIL**
SCALE: NTS



2 **FXFB/FRBG MOUNT DETAIL**
SCALE: NTS

T-Mobile

T-MOBILE USA, INC.
8000 WEST 78TH STREET
SUITE 400
EDINA, MN 55439
OFFICE: 612.701.2069

insite

1s660 MIDWEST ROAD
SUITE 140
OAKBROOK TERRACE, IL 60181
OFFICE: 773.960.8781

Edge
Consulting Engineers, Inc.
17645 JUNIPER PATH
SUITE 105
LAKEVILLE, MN 55044
608.644.1449
www.edgeconsult.com

APPROVED

PROJECT NO: 16257

DRAWN BY: PER

CHECKED BY: OGD

REV.	DATE:	DESCRIPTION:
A	04/25/17	PRELIMINARY CDS
B	05/09/17	PRELIMINARY CDS
0	08/08/17	PRELIMINARY CDS
1	09/28/17	PRELIMINARY CDS

**ST PAUL
REGIONAL WT
[A1N0136C]**

SITE ADDRESS:
2095 CLEAR AVE E
ST. PAUL, MN 55119

**ANTENNA
DETAILS**

A-3

DIMENSIONS:	
HEIGHT (W/O BRACKETS):	23.0 IN.
DEPTH:	7.8 IN.
WIDTH:	12.6 IN.

FHFB [LTE1149/RAN3103]



THIS FEATURE INTRODUCES A NEW FLEXI RF MODULE CALLED FHFB WITH 4TX/4RX FOR 1900 MHZ 3GPP BAND 2 (UPLINK: 1850-1910 MHZ, DOWNLINK: 1930-1990 MHZ) AND BAND 25 (UPLINK: 1850-1915 MHZ, DOWNLINK: 1930-1995 MHZ). THE FHFB IS FOR FEEDERLESS INSTALLATIONS (ALSO CALLED REMOTE RADIO HEAD, RRH OR REMOTE RADIO UNIT, RRU). THE RADIO CAN BE USED IN LTE OR UMTS DEPENDING ON THE AVAILABLE SW LEVEL. IN L15 (RL70), THE FEATURE ID IS LTE1149. IN WCDMA16, THE FEATURE ID IS RAN3103.

THE RRH IS A STAND-ALONE FULLY OPERATIONAL TRANSCIVER MODULE WITH INTEGRATED ANTENNA FILTERS. IT SUPPORTS ONE SECTOR IN A FLEXI MULTIRADIO BASE STATION. THE RRH HOSTS THE RF FUNCTIONALITY AND PROVIDES CONTROL AND POWER SUPPLY TO THE FLEXI ANTENNA LINE. THE RRH DOES NOT HAVE ANY FANS.

THE FHFB RRH IS A 4TX/4RX UNIT WITH FOUR 40W POWER AMPLIFIERS (PAS). IT IS A ONE SECTOR RADIO THAT SUPPORTS 4TX MIMO AND 4RX DIVERSITY.

THE FHFB RF MODULE WHICH CAN BE USED FOR LTE, HSPA+ AND WCDMA HAS THE FOLLOWING MAIN FEATURES AND OPERATOR BENEFITS:

-40 MHZ LTE OCCUPIED BANDWIDTH AT 3GPP BAND 25 (EXT 1900 MHZ)
-TX RANGE: 1930-1995 MHZ
-RX RANGE: 1850-1915 MHZ

-65 MHZ INSTANTANEOUS BANDWIDTH

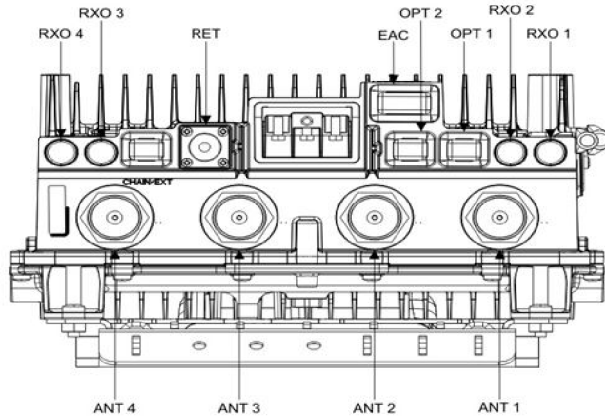
-ONE LTE CELL WITH 4TX MIMO UP TO 20 MHZ LTE PER SECTOR.

-TWO LTE CELLS WITH 4TX MIMO UP TO 40 MHZ LTE PER SECTOR.

-4-WAY UPLINK RX MAXIMUM RATIO COMBINING (MRC) HW SUPPORT (LTE72 SW FEATURE)

-OPTICAL CHAINING SUPPORTED BY HW (THREE OPTICAL CONNECTORS WITH 6 GBIT/S INTERFACES, ONE DEDICATED TO CHAINING)

-IP65 WITH -35 TO +50 °C WITH CONVECTION COOLING



FHFB PORT DIAGRAM

1

RADIO SPECIFICATIONS

SCALE: NTS

COATING SYSTEMS FOR TELECOMMUNICATION 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-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 spatter, weld scabs, mill scale, and loose paint.

- C. Protect areas adjacent to welding and 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.

3.03 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: 4.06.0 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: 4.06.0 mils
 - Color: By Owner

- Finish: Sherwin Williams Acrolon 218 or Tnemec Series 10740/10750
- Number of Coats: 1
- Dry Film Thickness: 2.03.0 mils
- Color: By Owner

3. Antenna Covers:

- Primer: Sherwin Williams Pro-Cryl Primer
- Number of Coats: 1
- Dry Film Thickness: 2.04.0 mils
- Finish: Sherwin Williams Sher-Cryl HPA

- Number of Coats: 1
- Dry Film Thickness: 2.54.0 mils
- Color: By Owner

4. Coaxial Cable

- Primer: X-M 1138
- Number of Coats: 1
- Dry Film Thickness: 2.03.0 mils
- Finish: Sherwin Williams Sher-Cryl HPA

- Number of Coats: 1
- Dry Film Thickness: 2.54.0 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 E/A.
- 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 runs, sags, dry spray, overspray, embedded particles and missed areas.

- C. Repair defective or damaged areas in accordance with Articles 3.02 and 3.03.

T-Mobile

T-MOBILE USA, INC.
8000 WEST 78TH STREET
SUITE 400
EDINA, MN 55439
OFFICE: 612.701.2069

insite

1660 MIDWEST ROAD
SUITE 140
OAKBROOK TERRACE, IL 60181
OFFICE: 773.960.8781



Edge

Consulting Engineers, Inc.

17645 JUNIPER PATH
SUITE 105
LAKEVILLE, MN 55044
608.644.1449
www.edgeconsult.com

APPROVED

PROJECT NO: 16257

DRAWN BY: PER

CHECKED BY: OGD

REV.	DATE:	DESCRIPTION:
A	04/25/17	PRELIMINARY CDS
B	05/09/17	PRELIMINARY CDS

0	08/08/17	PRELIMINARY CDS
1	09/28/17	PRELIMINARY CDS

ST PAUL
REGIONAL WT
[A1N0136C]

SITE ADDRESS:
2095 CLEAR AVE E
ST. PAUL, MN 55119

EQUIPMENT
DETAILS

A-4

PART 1 GENERAL

1.00 GENERAL REQUIREMENTS

- THE CONTRACTOR SHALL BE RESPONSIBLE FOR COMPLYING WITH ALL SAFETY PRECAUTIONS AND REGULATIONS DURING THE WORK. ALL GENERAL NOTES AND STANDARD DETAILS ARE THE MINIMUM REQUIREMENTS TO BE USED IN CONDITIONS WHICH ARE NOT SPECIFICALLY SHOWN OTHERWISE.
- ALL SYMBOLS AND ABBREVIATIONS ARE CONSIDERED CONSTRUCTION INDUSTRY STANDARDS. IF A CONTRACTOR HAS A QUESTION REGARDING THEIR EXACT MEANING THE ARCHITECT/ENGINEER SHALL BE NOTIFIED FOR CLARIFICATIONS.
- WHERE SPECIFIED, MATERIALS TESTING SHALL BE TO THE LATEST STANDARDS AVAILABLE AS REQUIRED BY THE LOCAL GOVERNING AGENCY RESPONSIBLE FOR RECORDING THE RESULTS.
- THE CONTRACTOR SHALL PROVIDE THE MATERIALS APPROVED BY THE FIRE MARSHALL FOR FILLING OR SEALING PENETRATIONS THROUGH FIRE RATED ASSEMBLIES.
- ALL DIMENSIONS TAKE PRECEDENCE OVER SCALE UNLESS OTHERWISE NOTED.
- THE CONTRACTOR SHALL BE RESPONSIBLE FOR THE COMPLETE SECURITY OF THE SITE FROM THE START OF THE PROJECT TO THE COMPLETION OF THE PROJECT. THE CONTRACTOR SHALL VISIT THE SITE PRIOR TO BID TO ASSESS CONDITIONS THAT MAY ADVERSELY AFFECT THE WORK OR THE COST OF THE WORK.
- THE CONTRACTOR SHALL FIELD VERIFY THE DIMENSIONS, ELEVATIONS, ETC, NECESSARY FOR THE PROPER CONSTRUCTION OF NEW PORTION OF THE WORK AND ALIGNMENT OF THE NEW PORTION OF THE WORK TO THE EXISTING WORK. THE CONTRACTOR SHALL MAKE ALL MEASUREMENTS NECESSARY FOR FABRICATION AND ERECTION OF STRUCTURAL MEMBERS. ANY DISCREPANCIES SHALL IMMEDIATELY BE BROUGHT TO THE ATTENTION OF THE A & E.
- NEW CONSTRUCTION ADDED TO EXISTING CONSTRUCTION SHALL BE MATCHED IN FORM, TEXTURE, MATERIAL AND PAINT COLOR EXCEPT AS NOTED IN THE PLANS.
- NO CHANGES ARE TO BE MADE TO THESE PLANS WITHOUT THE KNOWLEDGE AND WRITTEN CONSENT OF THE A & E.
- ANY REFERENCE TO THE WORDS APPROVED OR APPROVAL IN THESE DOCUMENTS SHALL BE HERE DEFINED TO MEAN GENERAL ACCEPTANCE OR REVIEW AND SHALL NOT RELIEVE THE CONTRACTOR AND/OR HIS SUB-CONTRACTORS OF ANY LIABILITY IN FURNISHING THE REQUIRED MATERIALS OR LABOR SPECIFIED.
- THE CONTRACTOR SHALL PROVIDE ALL NECESSARY BLOCKING, BACKING, FRAMING, HANGERS OR SUPPORTS FOR INSTALLATION OF ITEMS INDICATED ON THE DRAWINGS.
- ALL WORK PERFORMED AND MATERIALS INSTALLED SHALL CONFORM TO THE REQUIREMENTS OF THE LATEST EDITIONS OF THE FOLLOWING CODES/SPECIFICATIONS:
 - LATEST LOCAL JURISDICTIONAL BUILDING CODES.
 - ALL APPLICABLE LOCAL, STATE, AND FEDERAL CODES AND REGULATIONS
 - AMERICAN CONCRETE INSTITUTE (ACI)
 - AMERICAN SOCIETY FOR TESTING AND MATERIALS (ASTM)
 - ANSII/EIA - 222 - E
 - UNIFORM BUILDING CODE (UBC)
 - BUILDING OFFICIALS & CODE ADMINISTRATION (BOCA)
 - NATIONAL ELECTRICAL CODE (NEC) WITH ALL AMENDMENTS
 - AMERICAN INSTITUTE FOR STEEL CONSTRUCTION OR SPECIFICATIONS (AISC)
 - LIFE SAFETY CODE NIFFA - 101
 - FEDERAL AVIATION REGULATIONS

1.03 CONFLICTS

- A. THE CONTRACTOR AND EACH SUBCONTRACTOR SHALL BE RESPONSIBLE FOR VERIFICATION OF ALL MEASUREMENTS AT THE SITE BEFORE ORDERING ANY MATERIALS OR PERFORMING ANY WORK. NO EXTRA CHARGE OR COMPENSATION SHALL BE ALLOWED DUE TO DIFFERENCES BETWEEN ACTUAL DIMENSION AND DIMENSIONS INDICATED ON THE CONSTRUCTION DRAWINGS. ANY SUCH DISCREPANCY IN DIMENSIONS WHICH MAY INADVERTENTLY OCCUR SHALL BE SUBMITTED TO THE SDM OR DESIGNATED REPRESENTATIVES FOR CONSIDERATION BEFORE THE CONTRACTOR PROCEEDS WITH WORK IN THE AFFECTED AREAS.
- B. THE CONTRACTOR SHALL NOTIFY A & E OF ANY ERRORS, OMISSIONS, OR DISCREPANCIES AS THEY MAY BE DISCOVERED IN THE PLANS, SPECIFICATIONS AND NOTES PRIOR TO STARTING CONSTRUCTION, INCLUDING BUT NOT LIMITED TO DEMOLITION. THE CONTRACTOR SHALL BE RESPONSIBLE FOR CORRECTING ANY ERRORS, OMISSIONS, OR INCONSISTENCIES AFTER THE START OF CONSTRUCTION THAT HAVE NOT BEEN BROUGHT TO THE ATTENTION OF THE A & E AND SHALL INCUR ANY EXPENSES REQUIRED TO RECTIFY THE SITUATION. THE METHOD OF CORRECTION SHALL BE APPROVED BY THE A & E.
- C. THE CONTRACTOR, IF AWARDED THE CONTRACT, WILL NOT BE ALLOWED ANY EXTRA COMPENSATION BY REASON OF ANY MATTER OR THING WHICH THE CONTRACTOR MIGHT NOT HAVE FULLY INFORMED HIMSELF PRIOR TO BIDDING.
- D. NO PLEA OF IGNORANCE OF CONDITIONS THAT EXIST, OR OF DIFFICULTIES THAT MAY BE ENCOUNTERED OR OF ANY OTHER RELEVANT MATTER CONCERNING THE WORK TO BE PERFORMED WILL BE ACCEPTED AS A REASON FOR ANY FAILURE OR OMISSION ON THE PART OF THE CONTRACTOR TO FULFILL THE REQUIREMENTS OF THE CONTACT DOCUMENTS.

1.07 PROTECTION

- A. PROTECT FINISHED SURFACES, INCLUDING JAMBS AND WALLS USED AS PASSAGEWAYS THROUGH WHICH EQUIPMENT AND MATERIALS WILL PASS.
- B. PROVIDE PROTECTION FOR EQUIPMENT ROOM SURFACES PRIOR TO ALLOWING EQUIPMENT OR MATERIAL TO BE MOVED OVER SUCH SURFACES.
- C. MAINTAIN FINISHED SURFACES CLEAN, UNMARRED AND SUITABLY PROTECTED UNTIL JOB SITE IS ACCEPTED BY THE SDM.
- D. PRIOR TO STARTING CONSTRUCTION, THE CONTRACTOR SHALL PROTECT ALL AREAS FROM DAMAGE WHICH MAY OCCUR DURING CONSTRUCTION. ANY DAMAGE TO NEW OR EXISTING SURFACES, STRUCTURES OR EQUIPMENT SHALL BE IMMEDIATELY REPAIRED OR REPLACED TO THE SATISFACTION OF THE PROPERTY OWNER. THE CONTRACTOR SHALL BEAR THE EXPENSE OF REPAIRING OR REPLACING ANY DAMAGED AREAS.

1.08 REPAIRS AND REPLACEMENTS

- A. IN EVENT OF DAMAGES, THE CONTRACTOR SHALL NOTIFY OWNER SDM, THEN PROMPTLY MAKE ALL REPLACEMENTS AND REPAIRS AT NO ADDITIONAL COST TO OWNER.
- B. ADDITIONAL TIME THAT IS REQUIRED TO SECURE REPLACEMENTS AND TO MAKE REPAIRS WILL NOT BE CONSIDERED BY OWNER TO JUSTIFY EXTENSION IN THE CONTRACT TIME FOR COMPLETION.

1.10 CLEAN UP

- A. THE CONTRACTOR SHALL AT ALL TIMES KEEP THE SITE FREE FROM ACCUMULATION OF WASTE MATERIALS OR RUBBISH CAUSED BY THEIR EMPLOYEES AT WORK, AND AT THE COMPLETION OF THE WORK, THEY SHALL REMOVE ALL RUBBISH FROM AND ABOUT THE BUILDING, INCLUDING ALL TOOLS, SCAFFOLDING AND SURPLUS MATERIALS, AND SHALL LEAVE THE WORK AREA CLEAN AND READY FOR USE EACH DAY.
- B. EXTERIOR: VISUALLY INSPECT EXTERIOR SURFACES AND REMOVE ALL TRACES OF SOIL, WASTE MATERIAL, DUST, SMUDGES, AND OTHER FOREIGN MATTER.
 - 1. REMOVE ALL TRACES OF SPLASHED MATERIALS FROM ADJACENT SURFACES.
 - 2. IF NECESSARY TO ACHIEVE A UNIFORM DEGREE OF CLEANLINESS, HOSE DOWN THE EXTERIOR OF THE STRUCTURE.
- C. INTERIOR: VISUALLY INSPECT INTERIOR SURFACES AND REMOVE ALL TRACES OF SOIL, WASTE MATERIAL, SMUDGES AND OTHER FOREIGN MATTER.
 - 1. REMOVE ALL TRACES OF SPLASHED MATERIALS FROM ADJACENT SURFACES.
 - 2. REMOVE PAINT DROPPINGS, SPOTS, STAINS AND DIRT FROM FINISHED SURFACES.
- D. CONTRACTOR SHALL WASH AND WAX FLOOR PRIOR TO FINAL ACCEPTANCE FROM SDM. WAX SHALL BE THE ANTI-STATIC TYPE.

1.12 RELATED DOCUMENTS AND COORDINATION

- A. GENERAL CARPENTRY, ELECTRICAL AND ANTENNA DRAWINGS ARE INTERRELATED. IN PERFORMANCES OF THE WORK EACH CONTRACTOR JUST REFERS ALL DRAWINGS. ALL COORDINATION TO BE THE RESPONSIBILITY OF THE GENERAL CONTRACTOR.
- B. THE CONTRACTOR SHALL SUPERVISE AND COORDINATE ALL WORK, USING HIS PROFESSIONAL KNOWLEDGE AND SKILLS. HE IS SOLELY RESPONSIBLE FOR ALL CONSTRUCTION MEANS, METHODS, TECHNIQUES AND PROCEDURES, AND FOR SUPERVISING, SEQUENCING AND COORDINATING ALL PORTIONS OF THE WORK.

1.13 SHOP DRAWINGS

- A. CONTRACTOR TO SUBMIT SHOP DRAWINGS AS REQUIRED AND LISTED IN THESE SPECIFICATIONS AND THROUGH THE GENERAL CONTRACT TO THE SDM FOR APPROVAL.
- B. SHOP DRAWINGS FOR ALL STRUCTURAL STEEL SHALL BE SUBMITTED TO THE ENGINEER OF RECORD UNLESS SPECIFICALLY NOTED OTHERWISE; CONTRACTOR SHALL NOT FABRICATE STEEL UNTIL DRAWINGS HAVE BEEN ACCEPTED IN WRITING.
- C. ALL SHOP DRAWINGS TO BE REVISED, CHECKED AND CORRECTED BY GENERAL CONTRACTOR PRIOR TO SUBMITTAL TO THE SDM.

1.14 PRODUCTS AND SUBSTITUTIONS

- A. SUBMIT 3 COPIES OF EACH REQUEST FOR SUBMISSION, IN EACH REQUEST IDENTIFY THE PRODUCT FABRICATION OR INSTALLATION METHOD TO BE REPLACED BY THE SUBSTITUTION, INCLUDE RELATED INSECTIONS AND DRAWING NUMBERS, AND COMPLETE DOCUMENTATION SHOWING COMPLIANCE WITH THE REQUIREMENTS FOR SUBSTITUTIONS.
- B. ALL NECESSARY PRODUCT DATA AND CUT SHEETS SHOULD PROPERLY INDICATES AND DESCRIBE ITEMS, PRODUCTS AND MATERIALS BEING INSTALLED. THE CONTRACTOR SHALL, IF DEEMED NECESSARY BY THE SDM, SUBMIT ACTUAL SAMPLES TO THE SDM FOR APPROVAL IN LIEU OF CUT SHEETS.

1.15 COMPLIANCE

- A. ALL MATERIALS, DESIGN AND WORKMANSHIP SHALL BE IN ACCORDANCE WITH ALL APPLICABLE CODES (SOME ARE LISTED HEREIN) ORDINANCES, AND AUTHORITIES HAVING JURISDICTION OVER THE WORK. UPON THE COMPLETION OF THE WORK, THE CONTRACTOR SHALL PROVIDE CARRIER WITH THE CERTIFICATES OF OCCUPANCY (IF REQUIRED), JOB SITE PERMITTED PLANS AND INSPECTION CARD WITH ALL FINAL INSPECTION SIGNATURES AND OTHER LEGAL DOCUMENTS TO VERIFY SUCH COMPLIANCES. WHERE NO CODES EXIST, THE WORK SHALL CONFORM TO THE UNIFORM BUILDING CODE AND/OR THE SPECIFICATIONS HEREIN, WHICHEVER IS MORE STRINGENT AND A DOCUMENT STATEMENT SHALL BE FURNISHED TO THIS EFFECT.
- B. IT IS THE CONTRACTOR'S RESPONSIBILITY TO VERIFY COMPLIANCE WITH THE GOVERNING CODES AND TO NOTIFY THE SDM OF ANY DISCREPANCIES PRIOR TO PERFORMING WORK.
- C. REFERENCES TO ANY STANDARD OR CODE OF PRACTICES IN THIS SPECIFICATION SHALL BE DEEMED TO MEAN THE EDITION CURRENT AT THE TIME OF AWARD OF THE CONTRACT.
- D. THE TELECOMMUNICATIONS EQUIPMENT SPACE SHOWN IN THESE DRAWINGS IS NOT CUSTOMARILY OCCUPIED. WORK TO BE PERFORMED IN THIS FACILITY CANNOT REASONABLY BE PERFORMED BY PERSONS WITH A SEVERE IMPAIRMENT TO MOBILITY, SIGHT OR HEARING, THEREFORE, PER THE APPLICABLE CODES: THIS FACILITY SHALL BE EXEMPTED FROM ALL TITLE 24 ACCESS REQUIREMENTS.
- E. THE CONTRACTOR SHALL COMPLY WITH ALL ZONING AND SITE ACQUISITION SPECIAL STIPULATIONS AS OUTLINED IN THE JOB SPECIFICATIONS, OR AS DIRECTED BY THE SDM.
 - 1. ANSII/EIA - 222 - G
 - 2. UNIFORM BUILDING CODE (UBC)
 - 3. BUILDING OFFICIALS & CODE ADMINISTRATION (BOCA)
 - 4. NATIONAL ELECTRICAL CODE (NEC) WITH ALL AMENDMENTS
 - 5. AMERICAN INSTITUTE FOR STEEL CONSTRUCTION OR SPECIFICATIONS (AISC)
 - 6. LIFE SAFETY CODE NIFFA - 101
 - 7. FEDERAL AVIATION REGULATIONS

SERVICE NOTES:

- A. ELECTRICAL PLANS, DETAILS, AND DIAGRAMS ARE DIAGRAMMATIC ONLY; VERIFY EXACT LOCATIONS AND MOUNTING HEIGHTS WITH OWNER; PLACEMENT AND ROUTING OF ALL COMPONENTS SHALL BE IN ACCORDANCE WITH ALL APPLICABLE CODES.
- B. SERVICE EQUIPMENT SHALL HAVE A FAULT WITHSTAND RATING EQUAL TO OR EXCEEDING THE MAXIMUM AVAILABLE FAULT CURRENT AT THE SUPPLY TERMINAL. INSTALLATION SHALL BE FREE FROM ALL FAULTS AND GROUNDS.
- C. ALL ELECTRICAL EQUIPMENT, CONDUITS, AND SUPPORT SHALL BE ABLE TO WITHSTAND 80 M.P.H. WIND SPEED; EXPOSURE C.
- D. ALL ELECTRICAL EQUIPMENT SHALL HAVE A PERMANENTLY AFFIXED NEOPRENE PLASTIC LABEL – BLACK ON WHITE; LETTER HEIGHT SHALL BE 1"; ALL NAMEPLATES TO BE FASTENED WITH (2) STAINLESS STEEL SCREWS, NOT ADHESIVE.
- E. ALL WIRING SHALL BE COPPER WITH THHN/THWN DUAL RATED 600V, COLOR CODED, #12 AWG MINIMUM UNLESS NOTED OTHERWISE.

CONDUIT NOTES:

- F. RIGID CONDUIT SHALL BE U.L. LABEL GALVANIZED ZINC COATED WITH GALVANIZED ZINC INTERIOR AND SHALL BE USED WHEN INSTALLED IN OR UNDER CONCRETE SLABS, IN CONTACT WITH EARTH, UNDER PUBLIC ROADWAYS, IN MASONRY WALLS, OR EXPOSED ON BUILDING EXTERIOR.
- G. ELECTRICAL METALLIC TUBING SHALL BE U.L. LABEL; FITTING SHALL BE GLAND RING COMPRESSION TYPE.
- H. CORING THROUGH FLOORS AND WALLS SHALL NOT BE DONE WITHOUT FINAL APPROVAL OF BUILDING OWNER OR OWNER REPRESENTATIVE.
- I. CORING SHALL NOT BE PERFORMED DURING WORKING HOURS UNLESS OTHERWISE APPROVED BY THE OWNER.

GENERAL NOTES:

- J. SUBMITTAL OF BID INDICATES CONTRACTOR IS FAMILIAR WITH ALL JOB SITE CONDITIONS AND WORK TO BE PERFORMED AS DETAILED AND OUTLINED IN THESE DRAWINGS.
- K. THE ELECTRICAL PORTION OF THESE DRAWINGS IS ONLY A PART OF THE OVERALL DESIGN. IT IS NECESSARY FOR THE ELECTRICIAN TO CONSIDER ALL ASPECTS OF THIS PROJECT WHEN BIDDING AND PLANNING THE WORK.
- L. IN THE EVENT OF A CONFLICTING DESIGN OR NOTATION, THE CONTRACTOR SHALL ASSUME THE MOST EXPENSIVE OR RESTRICTIVE METHOD UNTIL A CLARIFICATION IS MADE.
- M. ALL THINGS, WHICH IN THE OPINION OF THE CONTRACTOR ARE DEFICIENCIES, OMISSIONS, CONTRADICTIONS, OR AMBIGUITIES, IN THESE DESIGN DRAWINGS SHALL BE BROUGHT TO THE ATTENTION OF THE ENGINEER BEFORE WORK PROCEEDS; ALL CLARIFICATIONS MUST BE RECEIVED IN WRITING IN ORDER FOR THE MATTER TO BE CONSIDERED RESOLVED.
- N. ELECTRICAL WORK SHALL INCLUDE BUT NOT LIMITED TO ALL MATERIALS AND LABOR TO COMPLETE ALL ELECTRICAL SYSTEMS INCLUDING LIGHTING, LOW VOLTAGE SYSTEMS, PANELS, POWER AND TELEPHONE DATA SERVICE, CONTROL WIRING, AND GROUNDING.
- O. ALL WORK TO BE EXECUTED IN A WORKMAN LIKE MANNER AND SHALL PRESENT A NEAT, UNIFORM, AND WELL INSTALLED APPEARANCE; THE CONTRACTOR SHALL BE RESPONSIBLE FOR ALL PROTECTION, CLEAN-UP AND RESTORATION OF OWNER FACILITIES ASSOCIATED WITH THE WORK.
- P. SUBMITTAL OF BID INDICATES CONTRACTOR IS AWARE AND WILL CONFORM TO ALL LOADING AND UNLOADING RESTRICTIONS, ELEVATOR RESTRICTIONS, AND UNDERSTANDS OWNER EXPECTATION REGARDING TO THE SCHEDULE OF CORING AND OTHER TENANT IMPACTING ACTIVITIES.
- Q. CONTRACTOR TO VERIFY ACCEPTANCE OF THESE PLANS AND DESIGNS WITH THE LOCAL UTILITY COMPANY ENGINEER BEFORE THE START OF ANY WORK AND ORDERING OF ANY MATERIAL.
- R. CONTRACTOR TO VERIFY OWNER APPROVAL OF ANY PLANNED OUTAGES PRIOR TO SUBMITTAL OF BID.



T-MOBILE USA, INC.
8000 WEST 78TH STREET
SUITE 400
EDINA, MN 55439
OFFICE: 612.701.2069



1s660 MIDWEST ROAD
SUITE 140
OAKBROOK TERRACE, IL 60181
OFFICE: 773.960.8781



Edge
Consulting Engineers, Inc.
17645 JUNIPER PATH
SUITE 105
LAKEVILLE, MN 55044
608.644.1449
www.edgeconsult.com

APPROVED

PROJECT NO: 16257

DRAWN BY: PER

CHECKED BY: OGD

REV.	DATE:	DESCRIPTION:
A	04/25/17	PRELIMINARY CDS
B	05/09/17	PRELIMINARY CDS
0	08/08/17	PRELIMINARY CDS
1	09/28/17	PRELIMINARY CDS

**ST PAUL
REGIONAL WT
[A1N0136C]**

SITE ADDRESS:
2095 CLEAR AVE E
ST. PAUL, MN 55119

**GENERAL NOTES
AND
SPECIFICATIONS**

GN-1

EXHIBIT "B-2"

**T-Mobile
A1N0136C
2095 East Clear Avenue
STPL WT-Cottage**

Antenna Facilities and Frequencies

1. Shelter and Shelter Components

Shelter: 345 square feet
Power plant (DC current): Yes
Battery supply back up: Yes
T-1 switch equipment: Yes
Commercial switch gear equipment: Yes
Radio transmitters: Radio units with FCC radio licensed frequencies ranging from 2100/1900/700 MHz; frequencies are dependent upon the technologies utilized at each site
Air conditioner: N/A

2. Generators: none

3. Antennas

Quantity: (9) Total; (3) per Sector
Type: Manufacturer: (9) Andrew
Azimuths: 0°; 120°; 240°
Model: (6) TMBXX-6517-A2M, (3) DBXNH-6565B-A2M
Dimensions: (6) 84.1" x 12" x 6.5" (3) 72.7" x 12" x 7"
Weight: (6) 43.4 lbs. ea. (3) 46.3 lbs. ea.
Type: Panel
Centerline of the antenna: 90' Rad Center

4. Coax Cable

Number of Lines: 0
Type: (0) coax; (3) Hybrid to be reused
Size: 1-5/8"

5. Tower Mounted Amplifiers (TMAs) – N/A

Quantity: 0 Total; 0 per Sector
Manufacturer:
Model:
Dimensions:
Weight:
Mounting:

6. Diplexers

Quantity: none
Manufacturer:
Model:
Dimensions:
Weight:
Mounting:

7. Remote Radio Heads (RRHs)

Quantity: (12) Total; (4) per Sector
Manufacturer: Nokia
Model: (3) FXFB (Tank), (3) FRIG (Tank), (3) FRLB (Tank); (3) FHFB (Tank)
Dimensions: (3) 19.3''x22''x5.25'', (3) 18.9''x15.2''x6'', (3)15.75'' x 15.75'' x 5.9'', (3) 23'' x 7.8'' x 12.6''
Weight: (3) 55.2 lbs., (3) 57.3 lbs., (3) 59.5 lbs., (3) 51.0 lbs.
Mounting: Pipe

8. Distribution Box (COVP)

Quantity: (2) Total, one on tank, one in ground lease area
Manufacturer: RayCap
Model: RNSWDC-7771-PF48
Dimensions: 20.38'' x 18.86'' x 5.83''
Weight: 14.85 lbs. each

9. Sector Box – N/A

Quantity: none
Manufacturer:
Model:
Dimensions:
Weight:

10. Hybrid Cable

Type: Mid Capacity HCS
Number of Lines: (1) Total

Site # A1N0136C
Market: Minneapolis

11. Frequencies

Band	Frequencies (TX and RX)	Antenna Gain	ERP
700A	(698-704 and 728-734)	16.61	1928.7
PCS B	(1870-1885 and 1950-1965)	16.61	1928.7
PCS D	(1865-1870 and 1945-1950)	16.61	1928.7
AWS D	(1735-1740 and 2135-2140)	16.61	1928.7
AWS E	(1740-1745 and 2140-2145)	16.61	1928.7
AWS F1 & F2	(1745-1755 and 2145-2155)	16.61	1928.7

12. Proposed Scope of Work

Remove: NA

Replace: NA

Add: (3) FHFB RRUs