Robinson+Cole

KENNETH C. BALDWIN

280 Trumbull Street
Hartford, CT 06103-3597
Main (860) 275-8200
Fax (860) 275-8299
kbaldwin@rc.com
Direct (860) 275-8345

Also admitted in Massachusetts

April 5, 2018

Via Federal Express

Melanie A. Bachman, Esq.
Executive Director/Staff Attorney
Connecticut Siting Council
10 Franklin Square
New Britain, CT 06051

Re: **Docket No. 472 – Application of Cellco Partnership d/b/a Verizon Wireless for a Certificate of Environmental Compatibility and Public Need for the Construction, Maintenance and Operation of a Wireless Telecommunications Facility Located at 541 Broadbridge Road, Bridgeport, Connecticut**

Development and Management Plan Submission

Dear Ms. Bachman:

Enclosed please find fifteen (15) copies of the following:

1. Final Development and Management ("D&M") Plans prepared by Hudson Design Group LLC for the approved telecommunications facility at 541 Broadbridge Road in Bridgeport, Connecticut incorporating the Council's conditions of approval. Also enclosed are four (4) full size (24" x 36") sets of D&M plans.

2. Tower and Foundation Design drawings from Engineered Endeavors.

3. Geotechnical Evaluation of Subsurface Conditions prepared by Hudson Design Group LLC, dated October 2, 2017.

4. Letter from Doug Roberts, AIA, Sr. Project Manager with Hudson Design Group regarding natural gas service to the proposed back-up generator.

Robinson+Cole

Together, this information constitutes the final D&M Plan submission for the approved telecommunications facility at 541 Broadbridge Road in Bridgeport.

We respectfully request that this information be reviewed and this matter be placed on the next available Siting Council agenda for approval. Please feel free to contact me if you have any questions or require additional information. Thank you.

Sincerely,

Kenneth C. Baldwin

KCB/kmd
Enclosures
Copy to:
Joseph P. Ganim, Mayor, City of Bridgeport
Laura R. Hoydick, Mayor, Town of Stratford
Vicki A. Tesoro, First Selectman, Town of Trumbull
Andrew Candiello, Verizon Wireless
Aleksey Tyurin, Structure Consulting Group
Chuck Webberly, Structure Consulting Group

CELLCO PARTNERSHIP

d.b.a. verizon

WIRELESS COMMUNICATIONS FACILITY

BRIDGEPORT NE CT

DEVELOPMENT & MANAGEMENT PLAN - DOCKET No. 472

541 BROADBRIDGE ROAD
BRIDGEPORT, CT 06610

VICINITY MAP — SCALE: N.T.S.

DIRECTIONS TO SITE:

HEAD NORTH ON ALEXANDER DR TOWARD BARNES INDUSTRIAL RD S
TURN RIGHT ONTO BARNES INDUSTRIAL RD S
TURN LEFT AT THE 1ST CROSS STREET ONTO CT-68 W
TURN RIGHT TOWARD US-5 N/N COLONY RD
TURN RIGHT ONTO US-5 N/N COLONY RD
TURN LEFT TO MERGE ONTO CT-15 S TOWARD NEW HAVEN
TAKE EXIT 52 FOR STATE ROUTE 108 S/STATE ROUTE 8 S TOWARD BRIDGEPORT
KEEP RIGHT, FOLLOW SIGNS FOR CT-108/STRATFORD
TURN LEFT ONTO CT-108 W/NICHOLS AVE
TURN RIGHT ONTO PENNY AVE
CONTINUE ONTO HUNTINGTON TURNPIKE
TURN LEFT ONTO BROADBRIDGE RD
DESTINATION WILL BE ON THE LEFT.

CONSULTANT TEAM

PROJECT ENGINEER

HUDSON DESIGN GROUP, LLC
45 BEECHWOOD DRIVE
NORTH ANDOVER, MA 01845
TEL: 1-(978)-557-5553
FAX: 1-(978)-336-5586

MEP ENGINEER

HUDSON DESIGN GROUP, LLC
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NORTH ANDOVER, MA 01845
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FAX: 1-(978)-336-5586

SURVEYOR

NORTHEAST SURVEY CONSULTANTS
116 PLEASANT ST. SUITE 302
EASTHAMPTON, MA 01027
TEL: 1-(413)-203-5144

PROJECT SUMMARY

SITE NAME:	BRIDGEPORT NE CT
SITE ADDRESS:	541 BROADBRIDGE ROAD BRIDGEPORT, CT 06610
PROPERTY OWNER:	BEARDSLEY PLAZA LIMITED PARTNERSHIP P.O. BOX 1700 BRIDGEPORT, CT 06601
APPLICANT:	CELLCO PARTNERSHIP d/b/a VERIZON 20 ALEXANDER DRIVE WALLINGFORD, CT 06492
SITE ACQUISITION CONTACT:	ALEKSEY TYURIN CELLCO PARTNERSHIP (806) 803-8213
LEGAL/REGULATORY COUNSEL:	KENNETH C. BALDWIN ESQ. ROBINSON + COLE LLP (860)275-8345
LATITUDE:	N41° 13' 19.494"
LONGITUDE:	W73° 10' 02.504"

SCOPE OF WORK INFO.

VERIZON WIRELESS IS PROPOSING TO INSTALL THE FOLLOWING IMPROVEMENTS ON PROPOSED TELECOMMUNICATION SITE:

- NEW 8'x19' FENCED LEASE AREA ON EXISTING PARCEL OF LAND.
- NEW PANEL ANTENNAS: (2) ANTENNA PER SECTOR WITH (3) SECTORS, FOR A TOTAL OF (6) ANTENNAS.
- (12) NEW QUADPLEXERS.

ITEMS LISTED ABOVE TO BE MOUNTED WITHIN PROPOSED VERIZON FLAGPOLE.

- NEW EQUIPMENT CABINETS: (2) CABINETS WITH GENERATOR ON PROPOSED 7'x14' CONCRETE EQUIPMENT PAD.
- NEW RRHs: (3) RRHs PER SECTOR WITH (3) SECTORS, FOR A TOTAL OF (9) RRHs

ITEMS LISTED ABOVE TO BE INSTALLED WITHIN THE PROPOSED 8'x19' FENCED COMPOUND.

- NEW POWER AND TELCO SERVICES WILL BE ROUTED UNDERGROUND FROM EXISTING UTILITY POLE TO PROPOSED ELECTRICAL METER AND HOFFMAN BOX ON PROPOSED H-FRAME.
- FINAL UTILITY ROUTING TO BE DETERMINED/VERIFIED BY UTILITY COMPANIES.

SHEET INDEX

SHT. NO.	DESCRIPTION
T-1	TITLE SHEET
C-1	PARTIAL SITE PLAN
C-2	COMPOUND PLAN
A-1	ELEVATION AND ANTENNA PLAN
A-2	EQUIPMENT DETAILS
A-3	CABLE SUPPORT DETAILS
A-4	FENCE DETAILS
A-5	RETAINING WALL DETAILS
A-6	SITE SURFACE AND EROSION CONTROL DETAILS

PREPARED FOR: CELLCO PARTNERSHIP D.B.A.

verizon

HUDSON Design Group LLC
45 BEECHWOOD DRIVE
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FAX: (978) 336-5586

STATE OF CONNECTICUT
DEREK J. CREASER
No. 23[illegible]
LICENSED
PROFESSIONAL ENGINEER

CHECKED BY: DJR

APPROVED BY: DJC

SUBMITTALS

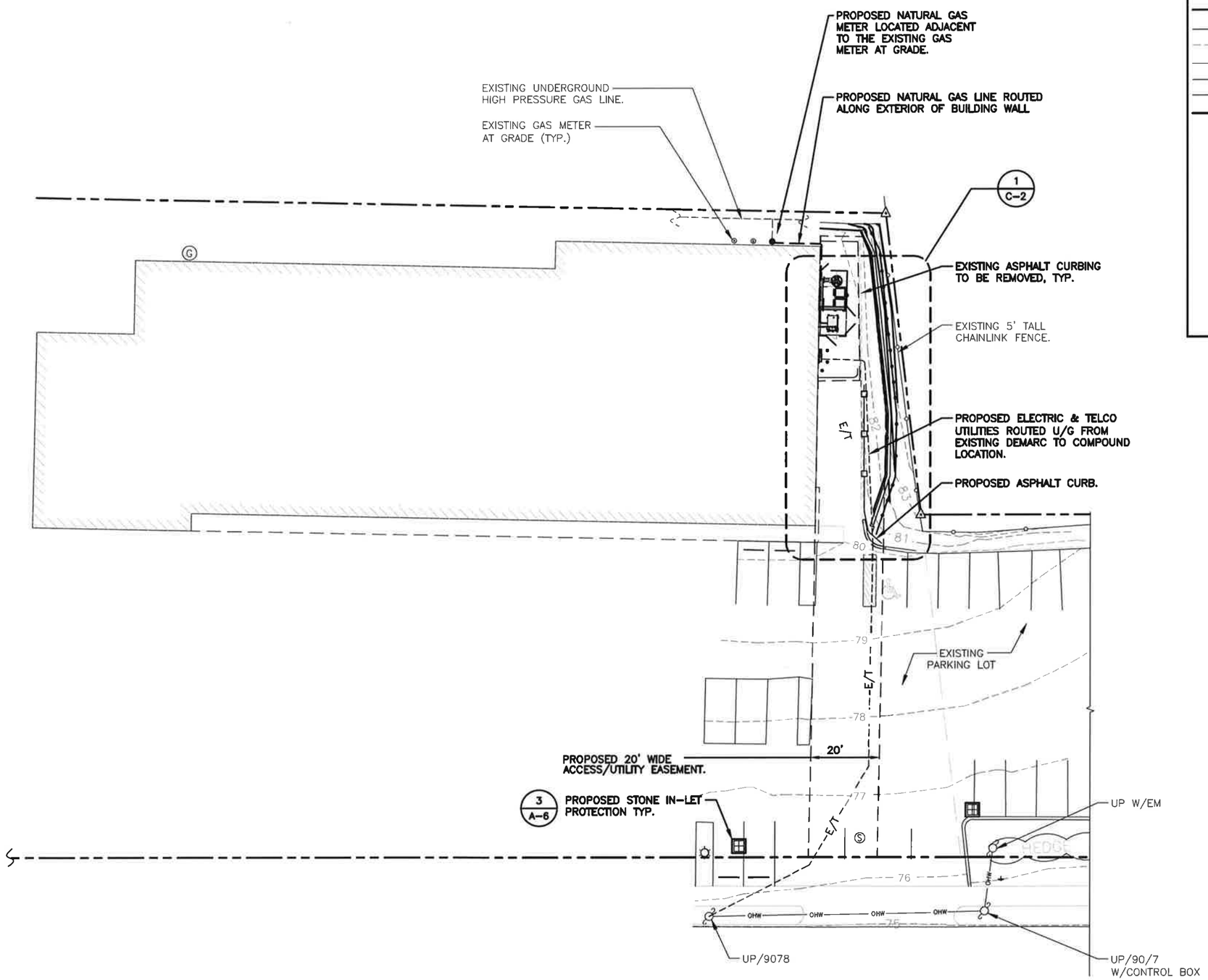
REV.	DATE	DESCRIPTION	BY
1	03/21/18	REVISED PER COMMENTS	JS
0	03/12/18	ISSUED FOR REVIEW	JS

SITE NAME:
BRIDGEPORT NE CT

SITE ADDRESS:
541 BROADBRIDGE ROAD
BRIDGEPORT, CT 06610

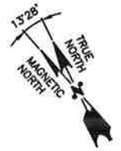
SHEET TITLE
TITLE SHEET

SHEET NUMBER
T-1



LEGEND

- PROPERTY LINE – SUBJECT PARCEL
- ABUTTERS PROPERTY LINE
- CONTOUR LINE
- OHW — OVERHEAD WIRE
- CHAIN LINK FENCE
- YELLOW PAINTED LINE
- 81 — PROPOSED CONTOUR LINE
- CATCH BASIN
- ROOF DRAIN
- POST
- MANHOLE
- GAS METER (EXISTING/NEW)
- EXISTING UTILITY POLE
- GUY WIRE ANCHOR
- LIGHT POLE
- IRON PIPE FOUND
- CONC. BOUND FOUND
- CALCULATED POINT
- CLR — CLEARANCE



PARTIAL SITE PLAN (1 / C-1)

22x34 SCALE: 1/16"=1'-0"
11x17 SCALE: 1/32"=1'-0"

GRAPHIC SCALE
0 8 16 32 48 FEET

PREPARED FOR: CELLCO PARTNERSHIP D.B.A.

verizon

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STATE OF CONNECTICUT
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No. 25[illegible]
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SITE ADDRESS:

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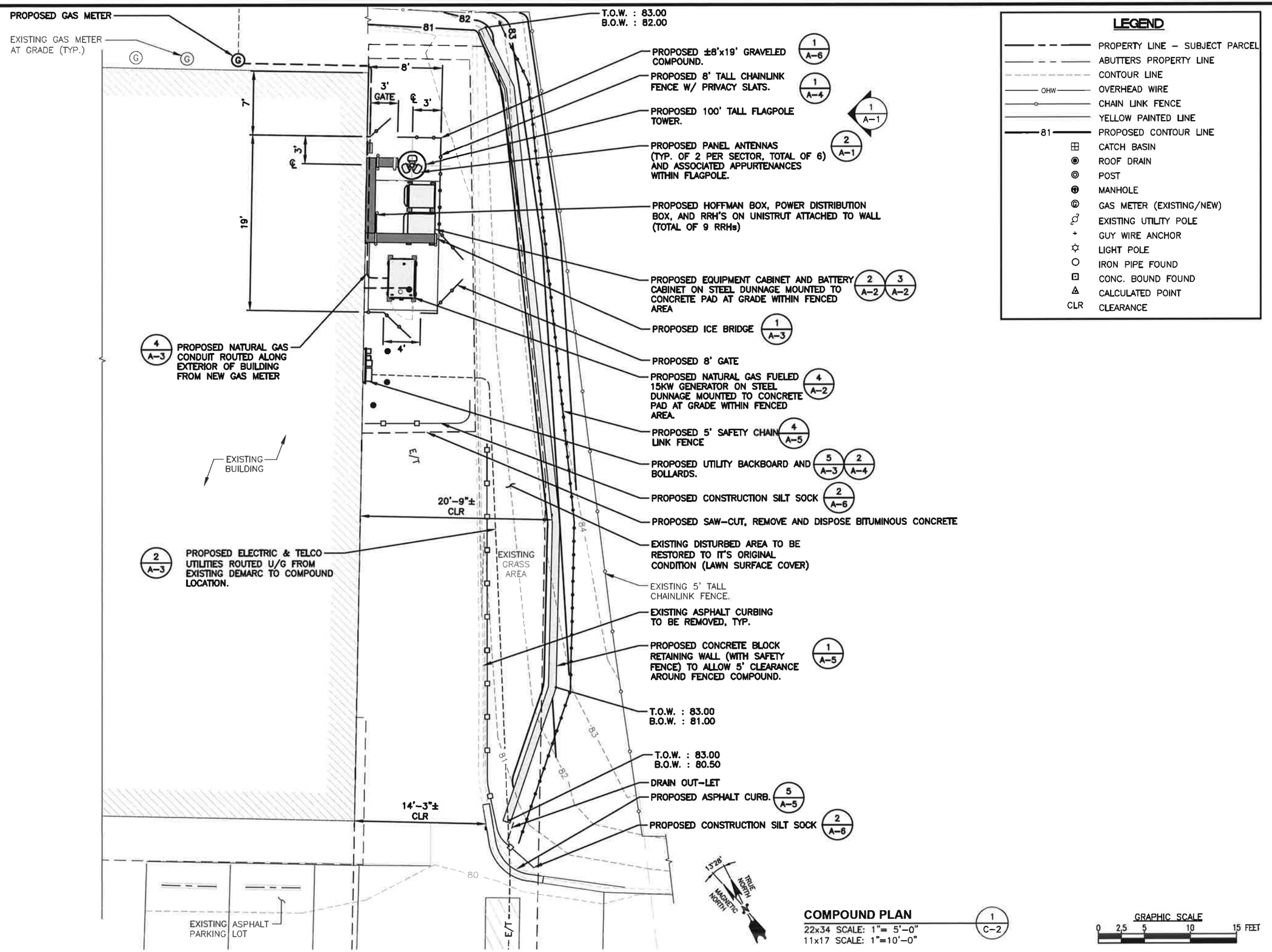
BRIDGEPORT, CT 06610

SHEET TITLE

PARTIAL SITE PLAN

SHEET NUMBER

C-1



LEGEND

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- GUY WIRE ANCHOR
- LIGHT POLE
- IRON PIPE FOUND
- CONC. BOUND FOUND
- CALCULATED POINT
- CLR CLEARANCE

COMPOUND PLAN 1 C-2
22x34 SCALE: 1"= 5'-0"
11x17 SCALE: 1"=10'-0"

GRAPHIC SCALE
0 2.5 5 10 15 FEET

PREPARED FOR: CELLCO PARTNERSHIP D.B.A.
verizon

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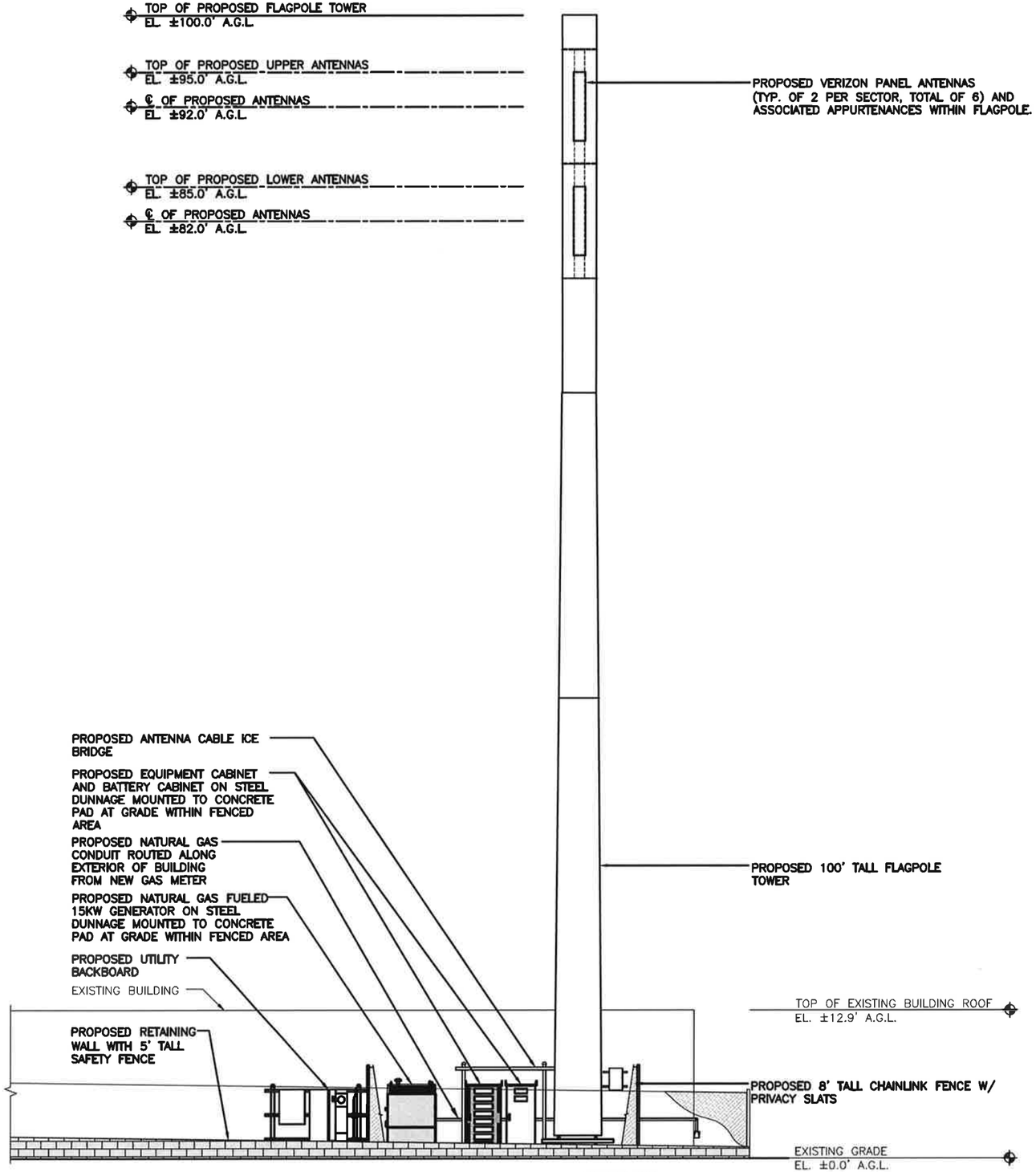
SHEET TITLE
COMPOUND PLAN

SHEET NUMBER
C-2



EAST ELEVATION (1 / A-1)
22x34 SCALE: 1/16"=1'-0"
11x17 SCALE: 1/32"=1'-0"

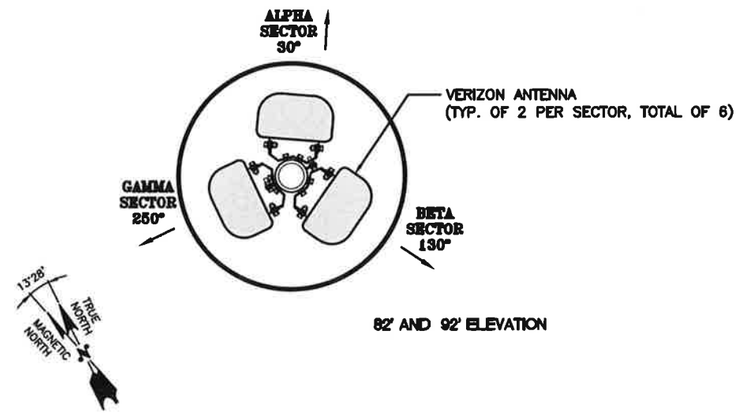
GRAPHIC SCALE 0 8 16 32 48 FEET

NOTE:

1. PROPOSED NEW TOWER AND FOUNDATION DESIGN BY OTHERS
2. VERIFY AZIMUTHS W/ RF ENGINEER.

TOWER NOTES:

1.) TOWER ELEVATION IS SHOWN FOR REFERENCE ONLY. CONTRACTOR SHALL REFER TO TOWER MANUFACTURER DRAWINGS FOR COMPLETE INSTALLATION AND BILL OF MATERIAL INFORMATION.
2.) TOWER MINIMUM DESIGN SPECIFICATIONS SHALL BE IN ACCORDANCE WITH ANSI/TIA/EIA 222-G "STRUCTURAL STANDARDS FOR SUPPORTING STRUCTURES AND ANTENNAS, REVISION G" AND GOVERNING FEDERAL, STATE, AND LOCAL CODE REQUIREMENTS
3.) TOWER MANUFACTURER SHALL BE RESPONSIBLE FOR DESIGN AND STRUCTURAL COMPONENTS OF THE TOWER.
4.) FINAL UTILITY CONNECTIONS SHALL BE COORDINATED WITH THE LOCAL UTILITIES.
5.) PROVIDE RIGID FOAM INSULATION ALONG EXISTING BUILDING FOUNDATION AT TOWER LOCATION.



82' AND 92' ELEVATION

ANTENNA MOUNTING CONFIGURATION (2 / A-1)
22x34 SCALE: 1"=1'-0"
11x17 SCALE: 1/2"=1'-0"

GRAPHIC SCALE 0 8 16 32 48 FEET

PREPARED FOR: CELLCO PARTNERSHIP D.B.A.
verizon

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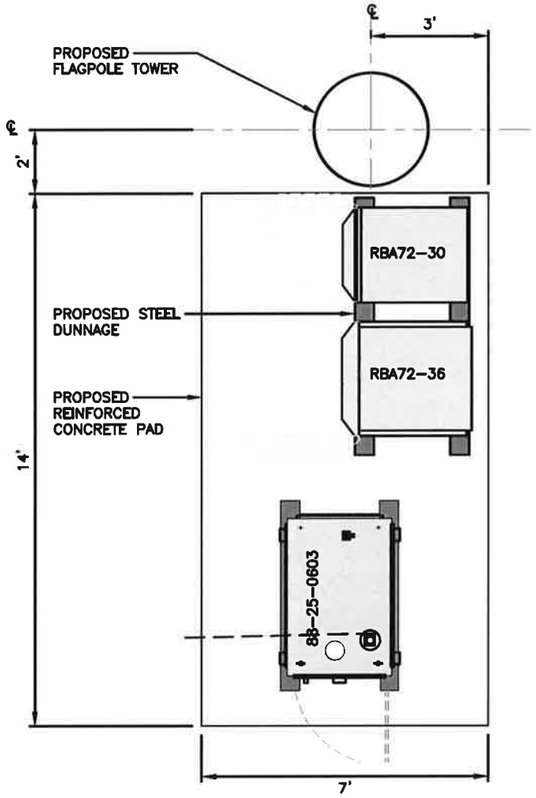
SHEET TITLE
ELEVATION AND ANTENNA PLAN

SHEET NUMBER
A-1

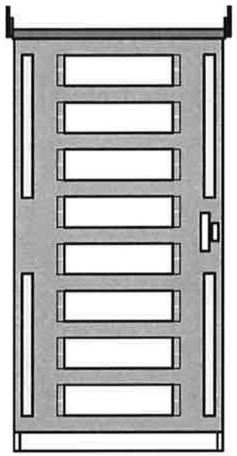


EQUIPMENT PLAN

1 / A-2

22x34 SCALE: 1/2"=1'-0"
11x17 SCALE: 1/4"=1'-0"

GRAPHIC SCALE
0 1 2 4 6 FEET



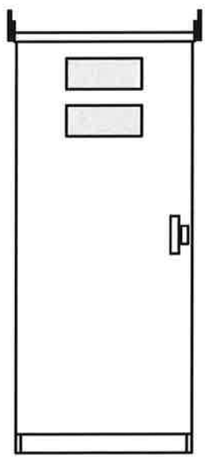
SPECIFICATIONS:
MANUFACTURER: COMMSCOPE
PART NO.: RBA72-36
SIZE: 72"x36"40"
WEIGHT: 2,500 LBS

NOTE:
ANCHOR CABINET TO STEEL DUNNAGE PER MANUFACTURERS RECOMMENDATIONS

BATTERY CABINET DETAIL

2 / A-2

SCALE: N.T.S



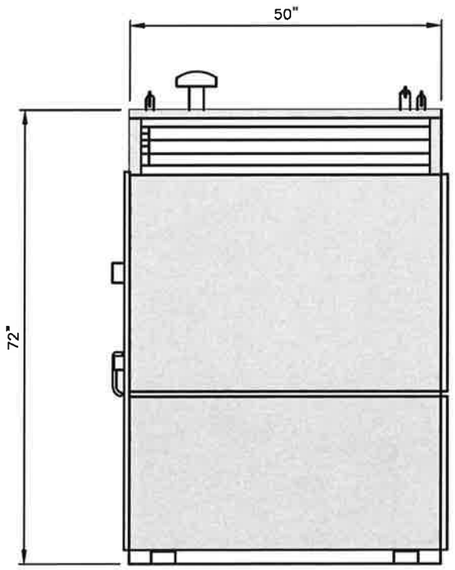
SPECIFICATIONS:
MANUFACTURER: COMMSCOPE
PART NO.: RBA72-30
SIZE: 72"x30"42"
WEIGHT: 740 LBS

NOTE:
ANCHOR CABINET TO STEEL DUNNAGE PER MANUFACTURERS RECOMMENDATIONS

EQUIPMENT CABINET DETAIL

3 / A-2

SCALE: N.T.S



SPECIFICATIONS:
MANUFACTURER: POLAR POWER INC.
PART NO.: 88-25-0603
SIZE: 72"x50"32"
WEIGHT: 943 LB.

NOTE:
ANCHOR CABINET TO STEEL PLATFORM PER MANUFACTURERS RECOMMENDATIONS

GENERATOR DETAIL

4 / A-2

SCALE: N.T.S

PREPARED FOR: CELLCO PARTNERSHIP D.B.A.
verizon

HDG HUDSON Design Group LLC
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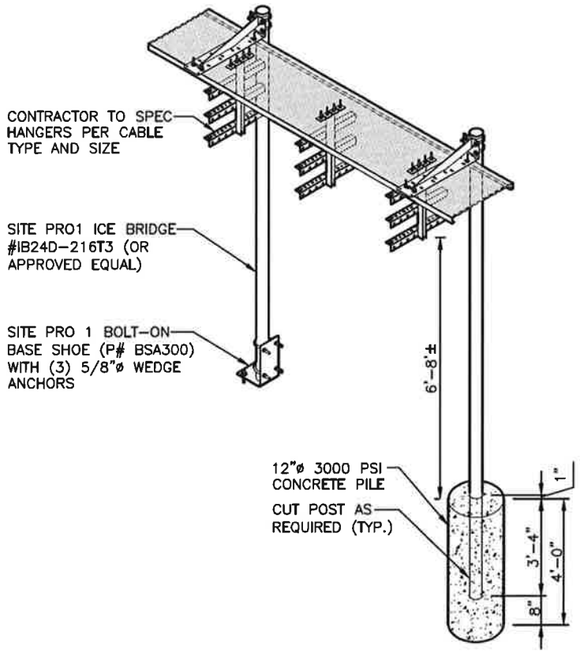
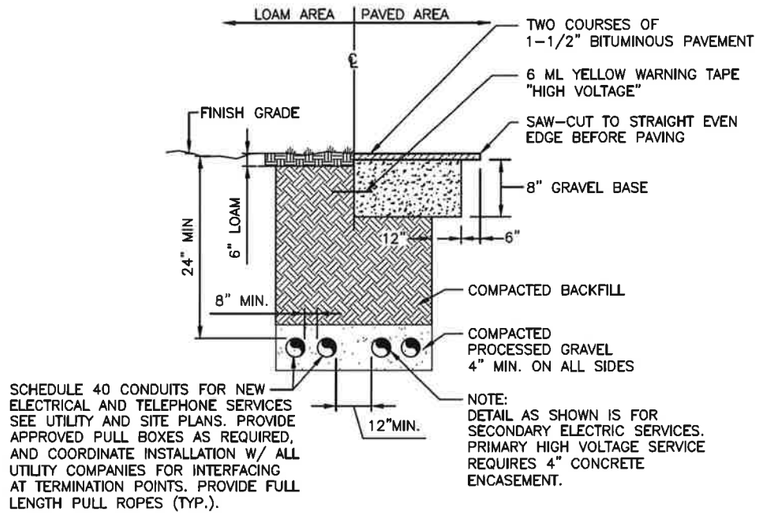
SHEET TITLE
EQUIPMENT DETAILS

SHEET NUMBER
A-2

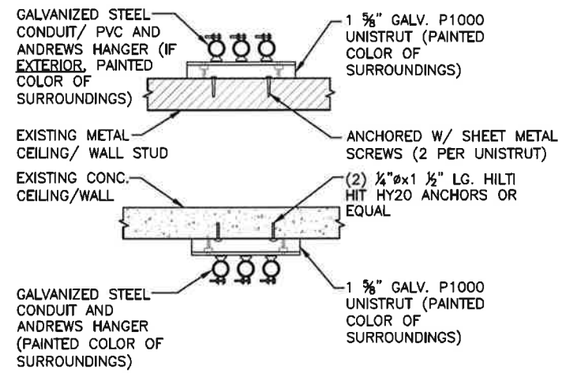


CABLE BRIDGE DETAIL 1 / A-3
22x34 SCALE: N.T.S

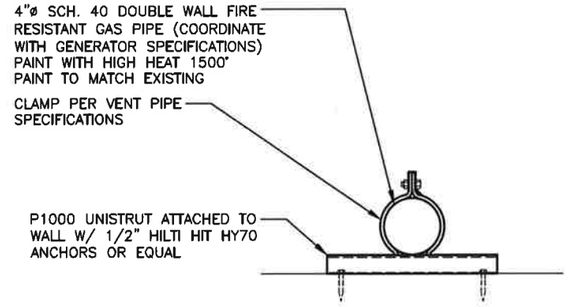
INSTALL (2) PULL STRINGS AND CAP THE TELCO CONDUITS INSIDE THE VAULT AND MESA CABINET TO AVOID WATER/ICE FILL UP



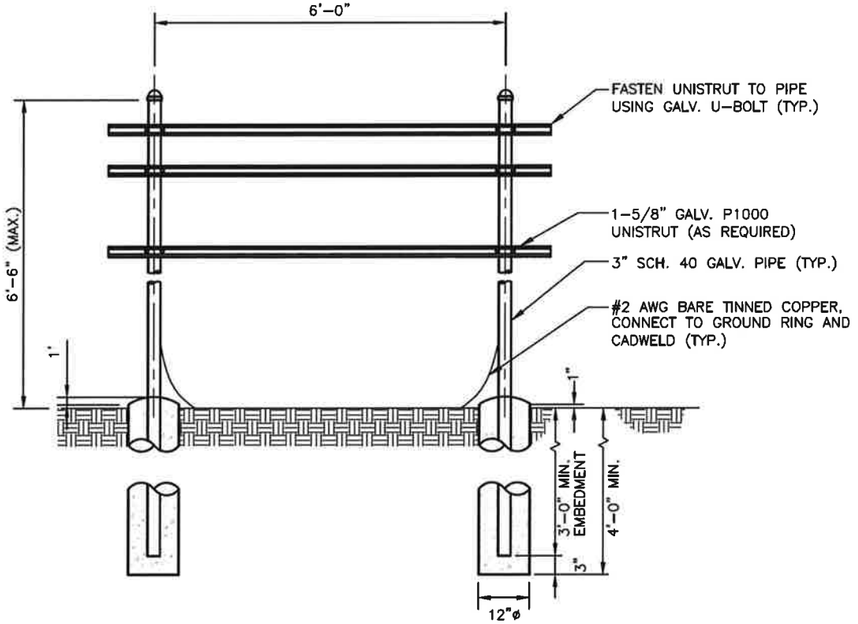
BURIED CONDUIT DETAIL 2 / A-3
SCALE: N.T.S



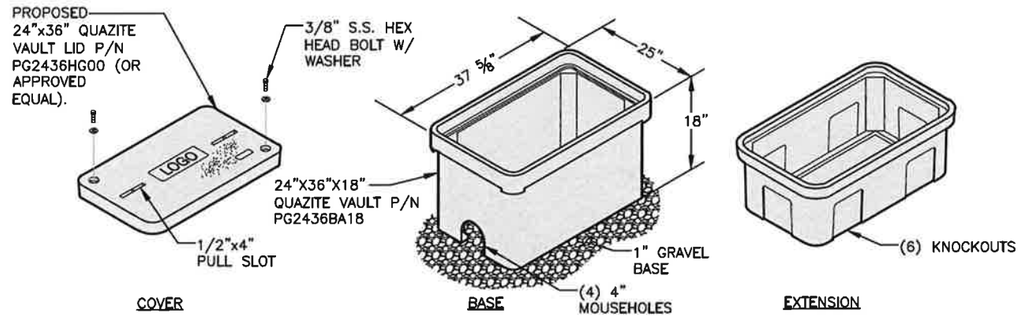
CONDUIT RUN DETAIL 3 / A-3
SCALE: N.T.S



GAS PIPE SUPPORT DETAIL 4 / A-3
SCALE: N.T.S



H-FRAME DETAIL 5 / A-3
SCALE: N.T.S



NOTE:
1. THIS INFORMATION MAY NOT CONTAIN ALL DETAILS REQUIRED FOR CONSTRUCTION. APPROPRIATE MODIFICATION MAY BE REQUIRED TO ENSURE SUITABILITY OF THESE DRAWINGS FOR THE SPECIFIC APPLICATION. SEE SPECIFICATION PROVIDED BY ELECTRICAL DESIGNER FOR FURTHER DETAIL AND INSTALLATION.
2. PROVIDE STANDARD HANDHOLE. COVER COLOR SHALL BE AS SPECIFIED BY THE NIH.
3. PROVIDE 25mm (1") X 10mm (3/8") BELL PULL SLOT FOR EACH HANDHOLE.
4. COVER, RING AND BOX SHALL BE MADE OF SAME MATERIAL.
5. PROVIDE IMPRINTED LOGO TO MATCH.

FOR TELCO AND POWER

HANDHOLE DETAIL 6 / A-3
SCALE: N.T.S

PREPARED FOR: CELLCO PARTNERSHIP D.B.A.

verizon

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STATE OF CONNECTICUT
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LICENSED PROFESSIONAL ENGINEER

CHECKED BY: DJR

APPROVED BY: DJC

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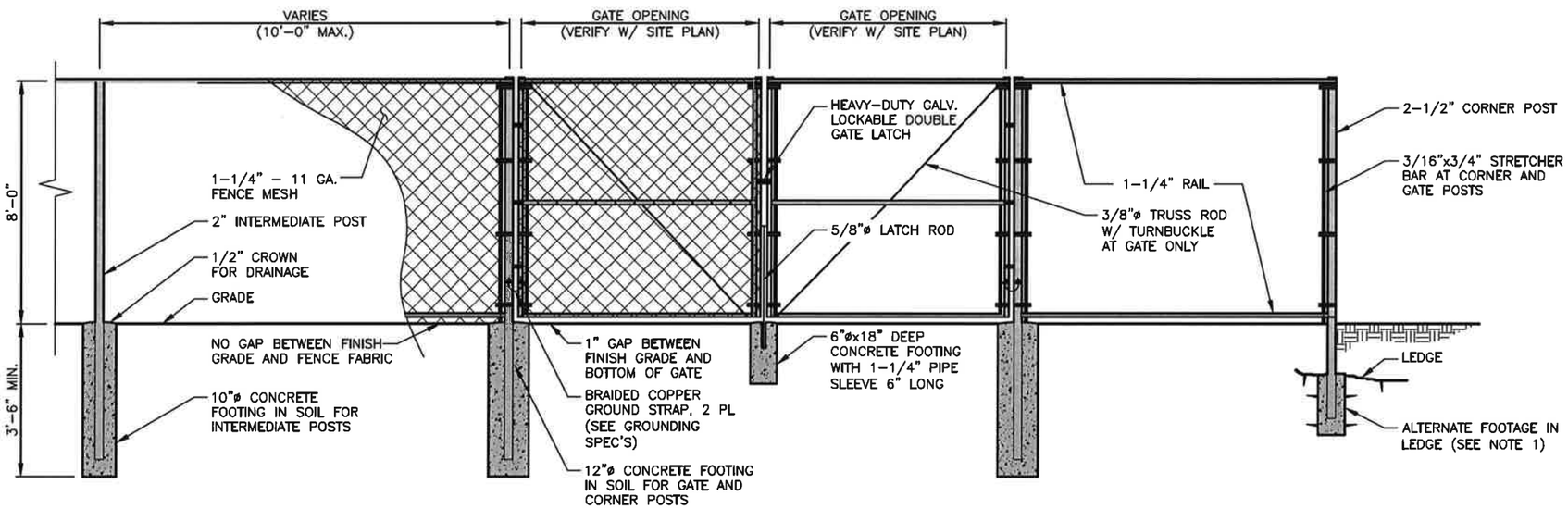
SHEET TITLE
CABLE SUPPORT DETAILS

SHEET NUMBER
A-3

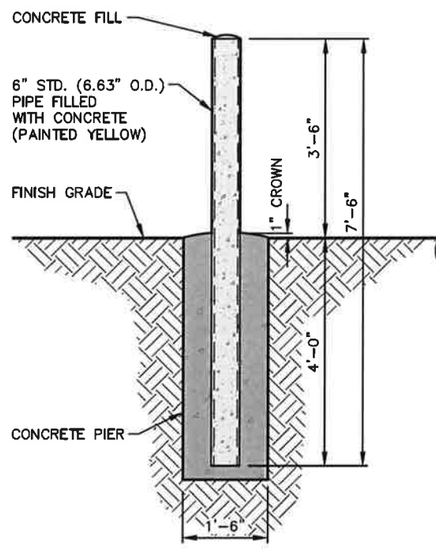
FENCE NOTES

1. ALTERNATE FOOTINGS FOR ALL FENCE POSTS IN LEDGE: IF LEDGE IS ENCOUNTERED AT GRADE, OR AT A DEPTH SHALLOWER THAN 3'-6", CORE DRILL AN 8" DIA HOLE 18" INTO THE LEDGE. CENTER POST IN THE HOLE AND FILL WITH CONCRETE OR GROUT. IF LEDGE IS BELOW FINISH GRADE, COAT BACKFILLED SECTION OF POST WITH COAL TAR, AND BACKFILL WITH WELL-DRAINING GRAVEL.

2. ATTACH EACH GATE WITH 1-1/2 PAIR OF NON-LIFT-OFF TYPE, MALLEABLE IRON OR FORGING, PIN-TYPE HINGES. ASSEMBLIES SHALL ALLOW FOR 180° OF GATE TRAVEL.



CHAINLINK FENCE DETAIL (1 / A-4)
SCALE: N.T.S



CONCRETE FILLED BOLLARD (2 / A-4)
22x34 SCALE: N.T.S

PREPARED FOR: CELLCO PARTNERSHIP D.B.A.

verizon

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STATE OF CONNECTICUT
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06.29.05
LICENSED PROFESSIONAL ENGINEER

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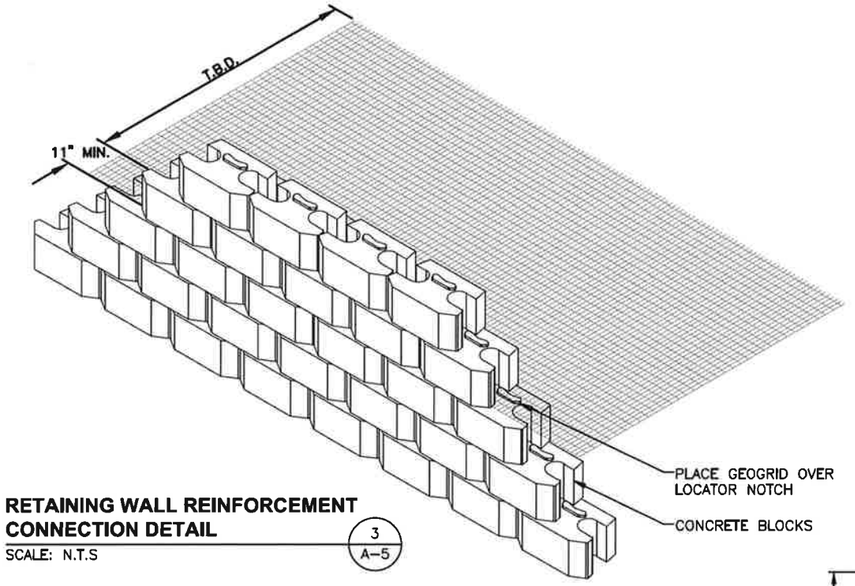
SHEET TITLE
FENCE DETAILS

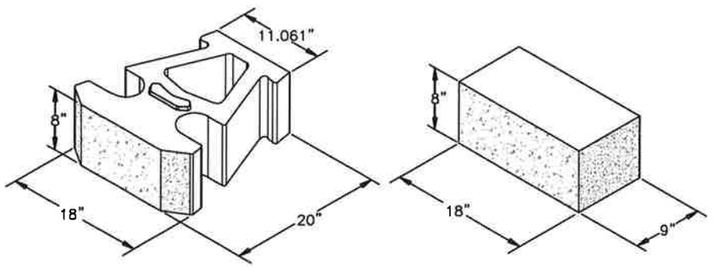
SHEET NUMBER
A-4

RETAINING WALL NOTES:

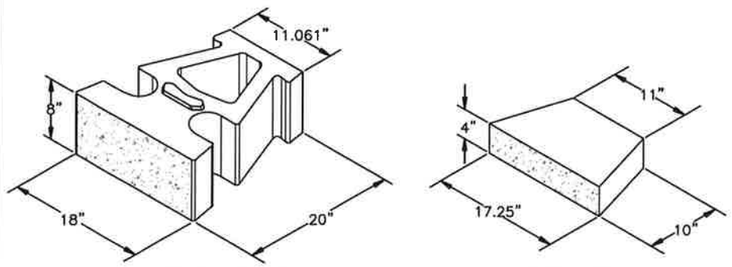
1. CONCRETE UNITS TO BE VERTICA PRO BLOCKS AS MANUFACTURED BY ANCHOR WALL SYSTEMS OR APPROVED EQUAL
2. DRAWINGS FOR SCHEMATIC & BIDDING PURPOSES ONLY. FINAL DESIGN BY VERTICA PRO (OR EQUAL).
3. WALL HEIGHT GREATER THAN 6 FEET WILL REQURE THE USE OF GEOSYNTHETIC REINFORCEMENT. CONSULT MANUFACTURER FOR PLACEMENT REQUIREMENTS.



RETAINING WALL REINFORCEMENT CONNECTION DETAIL (3 / A-5)
SCALE: N.T.S

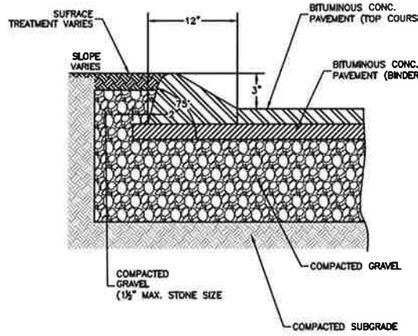


BEVELED UNIT **CORNER UNIT**

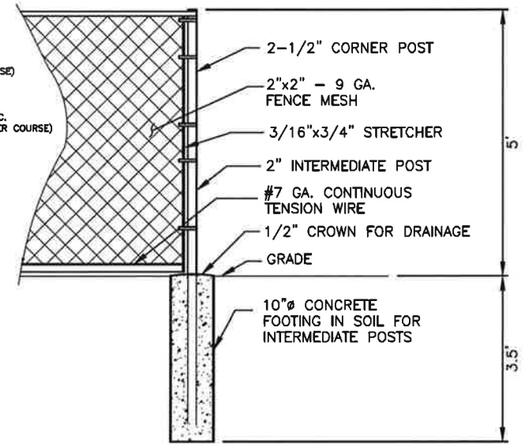


STRAIGHT UNIT **CAP UNIT**

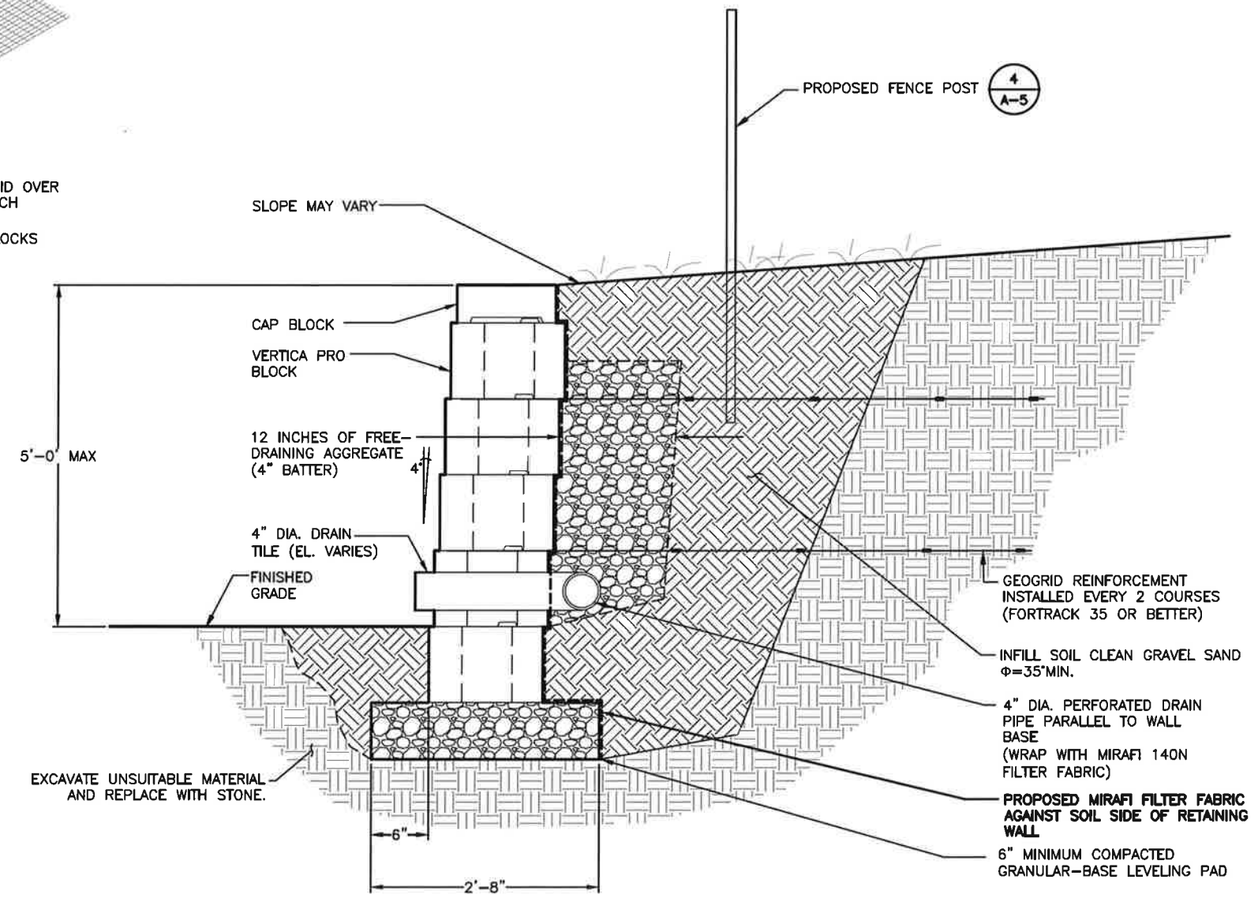
TYPICAL RETAINING WALL BLOCK DETAIL (2 / A-5)
SCALE: N.T.S



BITUMINOUS CURB DETAIL (5 / A-5)
SCALE: N.T.S



SAFETY FENCE DETAILS (4 / A-5)
SCALE: N.T.S



TYPICAL RETAINING WALL SECTION DETAIL (1 / A-5)
SCALE: N.T.S

PREPARED FOR: CELLCO PARTNERSHIP D.B.A.

verizon

HDG HUDSON Design Group LLC
45 BEECHWOOD DRIVE
N. ANDOVER, MA 01845
TEL: (978) 557-5553
FAX: (978) 336-5586

STATE OF CONNECTICUT
DEREK J. CREASER
No. 25[illegible]
LICENSED PROFESSIONAL ENGINEER

CHECKED BY: DJR

APPROVED BY: DJC

SUBMITTALS

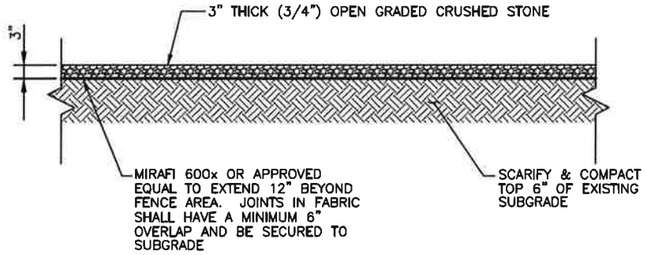
REV.	DATE	DESCRIPTION	BY
1	03/21/18	REVISED PER COMMENTS	JS
0	03/12/18	ISSUED FOR REVIEW	JS

SITE NAME:
BRIDGEPORT NE CT

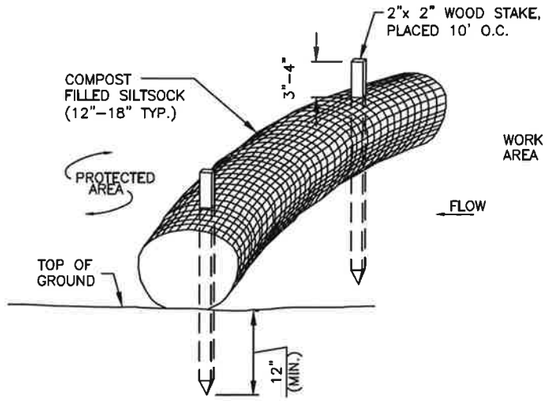
SITE ADDRESS:
541 BROADBRIDGE ROAD
BRIDGEPORT, CT 06610

SHEET TITLE
RETAINING WALL DETAIL

SHEET NUMBER
A-5



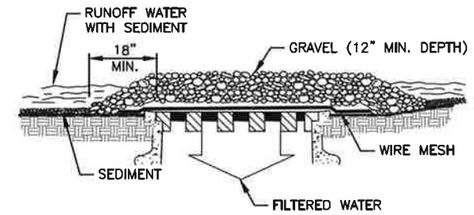
COMPOUND SURFACE DETAIL (1 / A-6)
22x34 SCALE: 1"=1'-0"
11x17 SCALE: 1/2"=1'-0"



NOTES:

1. SILTSOCK SHALL BE FILTREXX SILTSOXX, OR APPROVED EQUAL.
2. COMPOST MATERIAL SHALL BE DISPERSED ON SITE, AS DETERMINED BY THE ENGINEER.
3. SILTSOCK SHALL BE INSPECTED PERIODICALLY AND AFTER ALL STORM EVENTS, AND REPAIR OR REPLACEMENT SHALL BE PERFORMED PROMPTLY AS NEEDED.
4. SEE SPECIFICATIONS FOR SOCK SIZE, AND COMPOST FILL, REQUIREMENTS.

SILT SOCK DETAIL (WHERE APPLICABLE) (2 / A-6)
SCALE: N.T.S



CONSTRUCTION SEQUENCE:

1. A WIRE MESH SHOULD BE PLACED OVER THE DROP INLET OR CURB OPENING SO THAT THE ENTIRE OPENING AND A MINIMUM OF 12 INCHES AROUND THE OPENING ARE COVERED BY THE MESH. THE MESH MAY BE ORDINARY HARDWARE CLOTH OR WIRE MESH WITH OPENINGS UP TO 1/2 INCH.

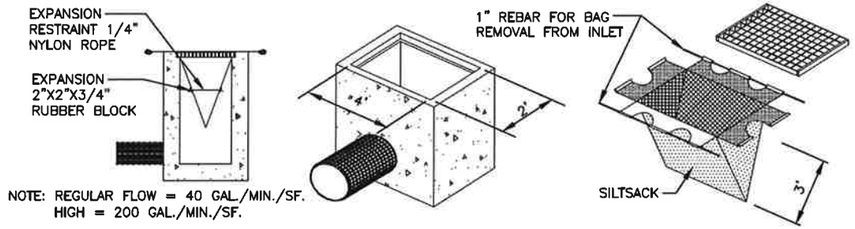
2. THE WIRE MESH SHOULD BE COVERED WITH CLEAN COARSE AGGREGATE SUCH AS SEWER STONE FOR A MINIMUM DEPTH OF 12 INCHES.

3) THE COARSE AGGREGATE SHOULD EXTEND AT LEAST 18 INCHES ON ALL SIDES OF THE DRAIN OPENING.

MAINTENANCE:

ALL STRUCTURES SHOULD BE INSPECTED AFTER EVERY RAIN STORM AND REPAIRS MADE AS NECESSARY. SEDIMENT SHOULD BE REMOVED FROM THE TRAPPING DEVICES AFTER THE SEDIMENT HAS REACHED A MAXIMUM OF ONE HALF THE DEPTH OF THE TRAP. THE SEDIMENT SHOULD BE DISPOSED OF IN A SUITABLE AREA AND PROTECTED FROM EROSION BY EITHER STRUCTURAL OR VEGETATIVE MEANS. THE TEMPORARY TRAPS SHOULD BE REMOVED AND THE AREA REPAIRED AS SOON AS THE CONTRIBUTING DRAINAGE AREA TO THE INLET HAS BEEN COMPLETELY STABILIZED.

STONE INLET PROTECTION DETAIL-ON SITE



SILKSACK DETAIL - ON OR OFF SITE

STONE INLET PROTECTION DETAIL (3 / A-6)
SCALE: N.T.S

PREPARED FOR: CELLCO PARTNERSHIP D.B.A.

verizon

HUDSON Design Group LLC
45 BEECHWOOD DRIVE
N. ANDOVER, MA 01845
TEL: (978) 557-5553
FAX: (978) 336-5586

STATE OF CONNECTICUT
DEREK J. CREASER
No. 21558
LICENSED PROFESSIONAL ENGINEER

CHECKED BY: DJR

APPROVED BY: DJC

SUBMITTALS

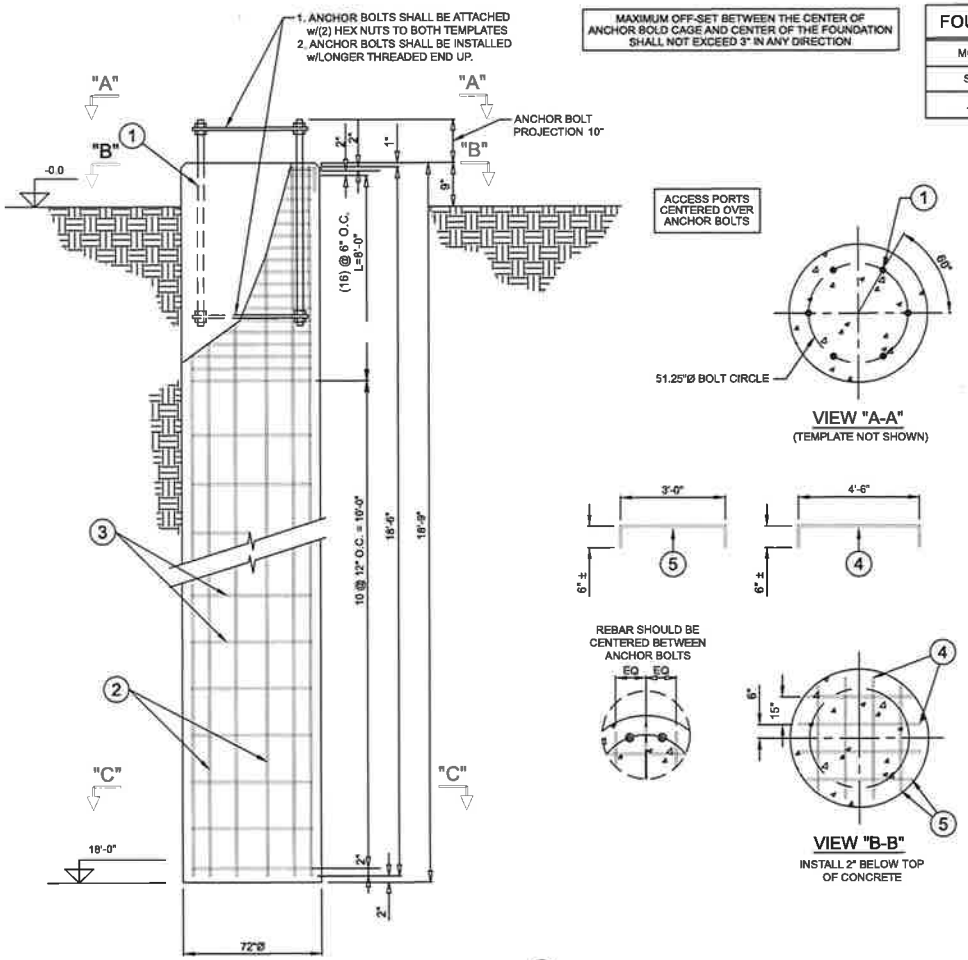
REV.	DATE	DESCRIPTION	BY
1	03/21/18	REVISED PER COMMENTS	JS
0	03/12/18	ISSUED FOR REVIEW	JS

SITE NAME:
BRIDGEPORT NE CT

SITE ADDRESS:
541 BROADBRIDGE ROAD
BRIDGEPORT, CT 06610

SHEET TITLE
SITE SURFACE AND EROSION CONTROL DETAILS

SHEET NUMBER
A-6



MAXIMUM OFF-SET BETWEEN THE CENTER OF ANCHOR BOLD CAGE AND CENTER OF THE FOUNDATION SHALL NOT EXCEED 3" IN ANY DIRECTION

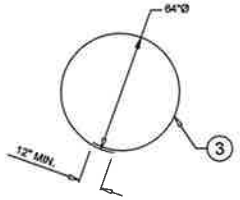
FOUNDATION LOADING	
MOMENT	626.0 kip-ft
SHEAR	12.0 kips
AXIAL	16.1 kips

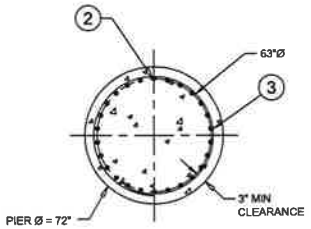
ACCESS PORTS CENTERED OVER ANCHOR BOLTS

VIEW "A-A"
(TEMPLATE NOT SHOWN)

REBAR SHOULD BE CENTERED BETWEEN ANCHOR BOLTS

VIEW "B-B"
INSTALL 2" BELOW TOP OF CONCRETE





SECTION "C-C"

MATERIAL LIST

ITEM	QTY.	DESCRIPTION
1	6	1 3/4"Ø x 6'-0" (A615-GR.75) ANCHOR BOLTS
2	26	#8 REBAR x 18'-6" (ASTM A615-GR.60)
3	29	#5 REBAR x 18'-0" (ASTM A615-GR.60)
4	4	#4 REBAR x 5'-6" (ASTM A615-GR.60)
5	4	#4 REBAR x 4'-0" (ASTM A615-GR.60)

VOL. CONCRETE @ 4000 psi (TYPE II CEMENT)	20.0 yd^3
STEEL (ASTM A615-GR.60)	1900.0 lbs

GENERAL NOTES:

1. FOUNDATION DESIGN IS BASED ON THE FOLLOWING: EEI JOB# 18280-D01.
SOIL REPORT BY HUDSON DESIGN GROUP, LLC, DATE - 10/02/17.

2. FOUNDATION EMBEDMENT IS SHOWN FROM THE GROUND LEVEL AT THE TIME OF SOIL INVESTIGATION AS DEPICTED IN THE SOIL REPORT. SHOULD THE ACTUAL SOIL CONDITIONS DIFFER FROM THOSE IN THE REPORT, THE GEOTECHNICAL ENGINEER AND FOUNDATION DESIGNER SHOULD BE NOTIFIED IN ORDER TO RE-EVALUATE THE FOUNDATION DESIGN.
IT IS RECOMMENDED TO USE A STEEL CAISSON PIPE TO PREVENT SOIL DISTURBANCE AND REDUCE THE EFFECT OF DRILLING ON THE ADJACENT BUILDING.
FOUNDATION INSTALLER SHALL VERIFY IF THERE ARE NO ANY UNDERGROUND UTILITIES AT THE LOCATION OF DRILLING.

3. SOIL REPORT SHOULD BE CONSULTED PRIOR TO CONSTRUCTION. STEEL CASING OR SLURRY METHOD MAY BE REQUIRED TO PREVENT SOIL FROM CAVING DURING CONSTRUCTION. THE CASING SHOULD BE REMOVED AFTER COMPLETION OF CONCRETING OR, IF LEFT IN THE GROUND, ALL VOIDS AROUND THE CASING SHALL BE FILLED WITH PRESSURIZED GROUT.

4. THE CONTRACTOR IS SOLELY RESPONSIBLE FOR ALL CONSTRUCTION MEANS, METHODS, TECHNIQUES, SEQUENCES,AND PROCEDURES.

5. SPECIAL INSPECTION IS REQUIRED IN ACCORDANCE WITH 2015 IBC and CT BC.
5.1. SOIL.
5.1.a. FOUNDATION EXCAVATION SHALL BE INSPECTED PRIOR TO INSTALLATION OF REINFORCEMENT.
5.1.b. VERIFY DEPTH AND DIAMETER OF THE EXCAVATION.
5.1.c. VERIFY ACTUAL SOIL CONDITIONS AGAINST THE GEOTECHNICAL REPORT.
5.2. REINFORCING STEEL.
5.2.a. VERIFY GRADE, LENGTH, DIAMETER, AND QUANTITY OF REBARS AND COMPLIANCE WITH THE DRAWINGS.
5.2.b. VERIFY GRADE, LENGTH, DIAMETER, AND QUANTITY OF ANCHOR BOLTS AND BOLT PATTERN ON THE TEMPLATES.
5.3. CONCRETE.
5.3.a. VERIFY STRENGTH, SLUMP, AIR, TEMPERATURE OF CONCRETE, AND DESIGN MIX.

6. REINFORCING STEEL.
6.1. REINFORCING STEEL SHALL CONFORM TO ASTM A615-97, Fy=60 ksi.
6.2. ALL REINFORCEMENT SHALL BE ASSEMBLED USING STEEL WIRE. WELDING IS NOT PERMITTED.
6.3. MINIMUM SPLICE LENGTH FOR LONGITUDINAL BARS: No. 6 BARS AND SMALLER - 44 x Ø*bar*;No. 7 BARS AND LARGER 55 x Ø*bar*.
6.4. HORIZONTAL STIRRUPS SHALL BE STAGGERED ALONG THE REBAR CAGE WITH NO MORE THAN 50% OF SPLICES IN ONE PLACE.

7. CONCRETE.
7.1. MIX DESIGN AND CONSTRUCTION PROCEDURE SHALL BE IN COMPLIANCE WITH ACI 318, ACI 336.3R,AND ALL APPLICABLE STATE AND LOCAL CODES.
7.2. MINIMUM COMPRESSIVE STRENGTH - 4000 psi AT 28 DAYS AND TYPE II CEMENT SHALL BE USED UNLESS STATED OTHERWISE.
7.3. SLUMP: DRILLED PIER - 7" (±1"). MAT FOUNDATION - 3" (±1").
7.4. CONCRETE SHALL BE DEPOSITED AS NEARLY AS PRACTICAL IN ITS FINAL POSITION TO AVOID SEGREGATION DUE TO REHANDLING OR FLOWING.
7.5. CONCRETE SHALL BE THOROUGHLY CONSOLIDATED BY ALL SUITABLE MEANS DURING PLACEMENT AND SHALL BE THOROUGHLY WORKED AROUND REINFORCEMENT AND EMBEDDED FIXTURES AND INTO CORNERS OF FORMS.

8. ANCHOR BOLT INSTALLATION. ANCHOR BOLT ORIENTATION SHALL BE VERIFIED WITH THE SITE PLANS AND MONOPOLE DRAWING FOR PROPER ACCESS PORT ORIENTATION AND ANCHOR BOLT ALIGNMENT PRIOR TO CONCRETE PLACEMENT.

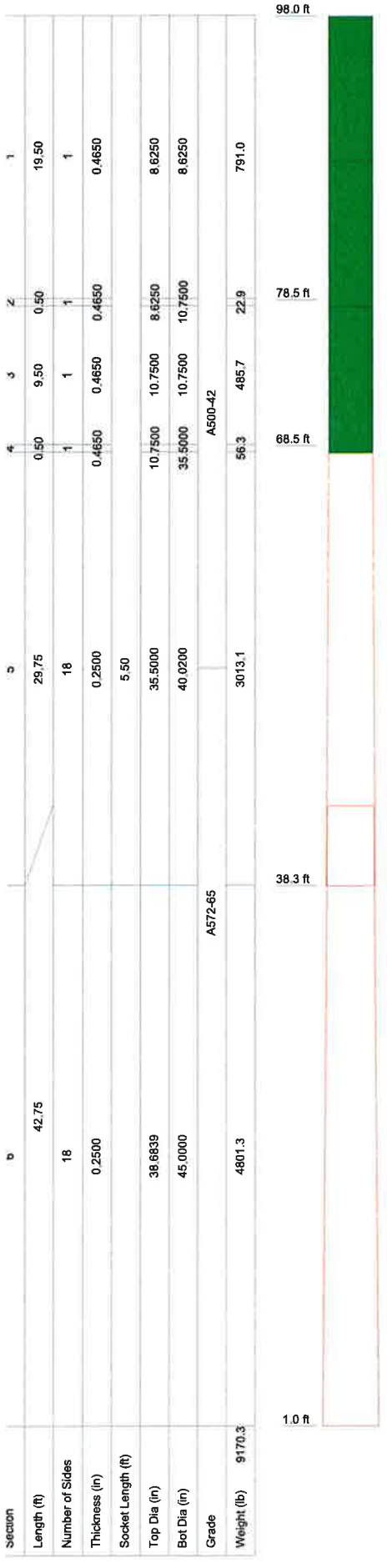
03-16-2018

ENGINEERED ENDEAVORS
The Experienced Point of View
15175 Kinsman Road * Burton, OH 44062
Ph. 440.970.5004 * www.engend.com*

REV	DESCRIPTION	DATE	DWN	CHK
1	REVISED TOWER DESIGN	03/16/2018	BF	BF
0	COMPLETED DRAWING	02/09/2018	BF	BF

Verizon Wireless
100-ft Monopole
Bridgeport NE
Bridgeport, CT

SCALE: N.T.S. | PROJECT NO. 18280-D01
SHEET 1 of 1 | DRAWING NO. 18280D-100.0



Section	1	2	3	4	5	6
Length (ft)	19.50	0.50	9.50	0.50	29.75	42.75
Number of Sides	1	1	1	1	18	18
Thickness (in)	0.4650	0.4650	0.4650	0.4650	0.2500	0.2500
Socket Length (ft)					5.50	
Top Dia (in)	8.6250	8.6250	10.7500	10.7500	35.5000	38.6839
Bot Dia (in)	8.6250	10.7500	10.7500	35.5000	40.0200	45.0000
Grade						
Weight (lb)	791.0	22.9	485.7	56.3	3013.1	4801.3

Total Weight (lb): 9170.3

DESIGNED APPURTENANCE LOADING

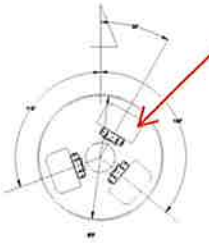
TYPE	ELEVATION	TYPE	ELEVATION
36" X 10' AMS	98 - 88	36" X 10' AMS	78 - 68
36" X 10' AMS	88 - 78		

MATERIAL STRENGTH

GRADE	Fy	Fu	GRADE	Fy	Fu
A500-42	42000 psi	58000 psi	A572-65	65000 psi	80000 psi

TOWER DESIGN NOTES

1. Tower is located in Fairfield County, Connecticut.
2. Tower designed for Exposure C to the TIA-222-G Standard.
3. Tower designed for a 110 mph basic wind in accordance with the TIA-222-G Standard.
4. Tower is also designed for a 50 mph basic wind with 0.75 in ice. Ice is considered to increase in thickness with height.
5. Deflections are based upon a 60 mph wind.
6. Tower Structure Class II.
7. Topographic Category 1 with Crest Height of 0.00 ft
8. TOWER RATING: 42.9%



Antenna layout for Verizon Wireless

ALL REACTIONS ARE FACTORED

AXIAL 25082 lb

SHEAR 2865 lb — *MOMENT 144 kip-ft*

50 mph WIND - 0.7500 in ICE

AXIAL 16121 lb

SHEAR 11993 lb — *MOMENT 626 kip-ft*

REACTIONS - 110 mph WIND

03-16-2018

Engineered Endeavors
15175 Kinsman Road
Burton, OH
Consulting Engineers
Phone: 440.970.5004
FAX: www.engend.com

Job: *18280-D01. R1*			
Project: *100' Monopole. Bridgeport NE CT*			
Client: Verizon Wireless	Drawn by: bfayman	App'd:	
Code: TIA-222-G	Date: 03/16/18	Scale: N	
Path:		Dwg No.	

tnxTower	Job	Page
	18280-D01. R1	1 of 13
Engineered Endeavors 15175 Kinsman Road Burton, OH Phone: 440.970.5004 FAX: www.engend.com	**Project** 100' Monopole. Bridgeport NE CT	**Date** 08:51:32 03/16/18
	Client Verizon Wireless	**Designed by** bfayman

Tower Input Data

There is a pole section.
This tower is designed using the TIA-222-G standard.
The following design criteria apply:

Tower is located in Fairfield County, Connecticut.
Basic wind speed of 110 mph.
Structure Class II.
Exposure Category C.
Topographic Category 1.
Crest Height 0.00 ft.
Nominal ice thickness of 0.7500 in.
Ice thickness is considered to increase with height.
Ice density of 56.00 pcf.
A wind speed of 50 mph is used in combination with ice.
Temperature drop of 50 °F.
Deflections calculated using a wind speed of 60 mph.
A non-linear (P-delta) analysis was used.
Pressures are calculated at each section.
Stress ratio used in pole design is 1.
Local bending stresses due to climbing loads, feed line supports, and appurtenance mounts are not considered.

Options

	Consider Moments - Legs		Distribute Leg Loads As Uniform		Use ASCE 10 X-Brace Ly Rules
	Consider Moments - Horizontals		Assume Legs Pinned		Calculate Redundant Bracing Forces
	Consider Moments - Diagonals	√	Assume Rigid Index Plate		Ignore Redundant Members in FEA
	Use Moment Magnification	√	Use Clear Spans For Wind Area		SR Leg Bolts Resist Compression
√	Use Code Stress Ratios		Use Clear Spans For KL/r		All Leg Panels Have Same Allowable
√	Use Code Safety Factors - Guys		Retension Guys To Initial Tension		Offset Girt At Foundation
	Escalate Ice	√	Bypass Mast Stability Checks	√	Consider Feed Line Torque
	Always Use Max Kz	√	Use Azimuth Dish Coefficients		Include Angle Block Shear Check
	Use Special Wind Profile	√	Project Wind Area of Appurt.		Use TIA-222-G Bracing Resist. Exemption
	Include Bolts In Member Capacity		Autocalc Torque Arm Areas		Use TIA-222-G Tension Splice Exemption
	Leg Bolts Are At Top Of Section		Add IBC .6D+W Combination		Poles
	Secondary Horizontal Braces Leg		Sort Capacity Reports By Component		Include Shear-Torsion Interaction
	Use Diamond Inner Bracing (4 Sided)		Triangulate Diamond Inner Bracing		Always Use Sub-Critical Flow
	SR Members Have Cut Ends		Treat Feed Line Bundles As Cylinder		Use Top Mounted Sockets
	SR Members Are Concentric				

Tapered Pole Section Geometry

Section	Elevation ft	Section Length ft	Splice Length ft	Number of Sides	Top Diameter in	Bottom Diameter in	Wall Thickness in	Bend Radius in	Pole Grade
L1	98.00-78.50	19.50	0.00	Round	8.6250	8.6250	0.4650		A500-42 (42000 psi)

Section	Elevation ft	Section Length ft	Splice Length ft	Number of Sides	Top Diameter in	Bottom Diameter in	Wall Thickness in	Bend Radius in	Pole Grade
L2	78.50-78.00	0.50	0.00	Round	8.6250	10.7500	0.4650		A500-42 (42000 psi)
L3	78.00-68.50	9.50	0.00	Round	10.7500	10.7500	0.4650		A500-42 (42000 psi)
L4	68.50-68.00	0.50	0.00	Round	10.7500	35.5000	0.4650		A500-42 (42000 psi)
L5	68.00-38.25	29.75	5.50	18	35.5000	40.0200	0.2500	1.0000	A572-65 (65000 psi)
L6	38.25-1.00	42.75		18	38.6839	45.0000	0.2500	1.0000	A572-65 (65000 psi)

Tapered Pole Properties

Section	Tip Dia. in	Area in^2	I in^4	r in	C in	I/C in^3	J in^4	It/Q in^2	w in	w/t
L1	8.6250	11.9205	99.5386	2.8897	4.3125	23.0814	199.0771	5.9567	0.0000	0
	8.6250	11.9205	99.5386	2.8897	4.3125	23.0814	199.0771	5.9567	0.0000	0
L2	8.6250	11.9205	99.5386	2.8897	4.3125	23.0814	199.0771	5.9567	0.0000	0
	10.7500	15.0247	199.0731	3.6400	5.3750	37.0369	398.1462	7.5079	0.0000	0
L3	10.7500	15.0247	199.0731	3.6400	5.3750	37.0369	398.1462	7.5079	0.0000	0
	10.7500	15.0247	199.0731	3.6400	5.3750	37.0369	398.1462	7.5079	0.0000	0
L4	10.7500	15.0247	199.0731	3.6400	5.3750	37.0369	398.1462	7.5079	0.0000	0
	35.5000	51.1805	7854.0869	12.3878	17.7500	442.4838	15708.1738	25.5750	0.0000	0
L5	36.0476	27.9709	4390.9829	12.5138	18.0340	243.4836	8787.7436	13.9881	5.8080	23.232
	40.6374	31.5575	6305.9592	14.1184	20.3302	310.1775	12620.2159	15.7817	6.6035	26.414
L6	40.1062	30.4973	5691.5194	13.6440	19.6514	289.6237	11390.5279	15.2516	6.3684	25.473
	45.6942	35.5091	8983.8709	15.8863	22.8600	392.9952	17979.5629	17.7579	7.4800	29.92

Tower Elevation ft	Gusset Area (per face) ft^2	Gusset Thickness in	Gusset Grade	Adjust. Factor A_f	Adjust. Factor A_r	Weight Mult.	Double Angle Stitch Bolt Spacing Diagonals in	Double Angle Stitch Bolt Spacing Horizontals in	Double Angle Stitch Bolt Spacing Redundants in
L1 98.00-78.50				0	1	1			
L2 78.50-78.00				0	1	1			
L3 78.00-68.50				0	1	1			
L4 68.50-68.00				0	1	1			
L5 68.00-38.25				1	1	1			
L6 38.25-1.00				1	1	1			

Feed Line/Linear Appurtenances - Entered As Area

Description	Face or Leg	Allow Shield	Component Type	Placement ft	Total Number		C_AA_A ft^2/ft	Weight plf
AVA5-50 (7/8 LOW DENSI.FOAM)	C	No	Inside Pole	92.00 - 4.00	18	No Ice	0.00	0.30
						1/2" Ice	0.00	0.30
						1" Ice	0.00	0.30
AVA5-50 (7/8 LOW DENSI.FOAM)	C	No	Inside Pole	82.00 - 4.00	18	No Ice	0.00	0.30
						1/2" Ice	0.00	0.30
						1" Ice	0.00	0.30
AVA5-50 (7/8 LOW DENSI.FOAM)	C	No	Inside Pole	72.00 - 4.00	18	No Ice	0.00	0.30
						1/2" Ice	0.00	0.30
						1" Ice	0.00	0.30

Feed Line/Linear Appurtenances Section Areas

Tower Section	Tower Elevation ft	Face	A_R ft^2	A_F ft^2	C_AA_A In Face ft^2	C_AA_A Out Face ft^2	Weight lb
L1	98.00-78.50	A	0.000	0.000	0.000	0.000	0.00
		B	0.000	0.000	0.000	0.000	0.00
		C	0.000	0.000	0.000	0.000	91.80
L2	78.50-78.00	A	0.000	0.000	0.000	0.000	0.00
		B	0.000	0.000	0.000	0.000	0.00
		C	0.000	0.000	0.000	0.000	5.40
L3	78.00-68.50	A	0.000	0.000	0.000	0.000	0.00
		B	0.000	0.000	0.000	0.000	0.00
		C	0.000	0.000	0.000	0.000	121.50
L4	68.50-68.00	A	0.000	0.000	0.000	0.000	0.00
		B	0.000	0.000	0.000	0.000	0.00
		C	0.000	0.000	0.000	0.000	8.10
L5	68.00-38.25	A	0.000	0.000	0.000	0.000	0.00
		B	0.000	0.000	0.000	0.000	0.00
		C	0.000	0.000	0.000	0.000	481.95
L6	38.25-1.00	A	0.000	0.000	0.000	0.000	0.00
		B	0.000	0.000	0.000	0.000	0.00
		C	0.000	0.000	0.000	0.000	554.85

Feed Line/Linear Appurtenances Section Areas - With Ice

Tower Section	Tower Elevation ft	Face or Leg	Ice Thickness in	A_R ft^2	A_F ft^2	C_AA_A In Face ft^2	C_AA_A Out Face ft^2	Weight lb
L1	98.00-78.50	A	1.655	0.000	0.000	0.000	0.000	0.00
		B		0.000	0.000	0.000	0.000	0.00
		C		0.000	0.000	0.000	0.000	91.80
L2	78.50-78.00	A	1.635	0.000	0.000	0.000	0.000	0.00
		B		0.000	0.000	0.000	0.000	0.00
		C		0.000	0.000	0.000	0.000	5.40
L3	78.00-68.50	A	1.625	0.000	0.000	0.000	0.000	0.00
		B		0.000	0.000	0.000	0.000	0.00
		C		0.000	0.000	0.000	0.000	121.50
L4	68.50-68.00	A	1.613	0.000	0.000	0.000	0.000	0.00
		B		0.000	0.000	0.000	0.000	0.00

Tower Section	Tower Elevation ft	Face or Leg	Ice Thickness in	A_R ft²	A_F ft²	C_AA_A In Face ft²	C_AA_A Out Face ft²	Weight lb
		C		0.000	0.000	0.000	0.000	8.10
L5	68.00-38.25	A	1.572	0.000	0.000	0.000	0.000	0.00
		B		0.000	0.000	0.000	0.000	0.00
		C		0.000	0.000	0.000	0.000	481.95
L6	38.25-1.00	A	1.426	0.000	0.000	0.000	0.000	0.00
		B		0.000	0.000	0.000	0.000	0.00
		C		0.000	0.000	0.000	0.000	554.85

Feed Line Center of Pressure

Section	Elevation ft	CP_X in	CP_Z in	CP_X Ice in	CP_Z Ice in
L1	98.00-78.50	0.0000	0.0000	0.0000	0.0000
L2	78.50-78.00	0.0000	0.0000	0.0000	0.0000
L3	78.00-68.50	0.0000	0.0000	0.0000	0.0000
L4	68.50-68.00	0.0000	0.0000	0.0000	0.0000
L5	68.00-38.25	0.0000	0.0000	0.0000	0.0000
L6	38.25-1.00	0.0000	0.0000	0.0000	0.0000

Shielding Factor Ka

Tower Section	Feed Line Record No.	Description	Feed Line Segment Elev.	K_a No Ice	K_a Ice

Discrete Tower Loads

Description	Face or Leg	Offset Type	Offsets: Horz Lateral ft / Vert ft / ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft²	C_AA_A Side ft²	Weight lb
36" X 10' AMS	C	None		0.00	98.00 - 88.00	No Ice	18.38	18.38	1000.00
						1/2" Ice	22.68	22.68	1263.82
						1" Ice	23.42	23.42	1537.64
36" X 10' AMS	C	None		0.00	88.00 - 78.00	No Ice	18.38	18.38	1000.00
						1/2" Ice	22.68	22.68	1263.82
						1" Ice	23.42	23.42	1537.64
36" X 10' AMS	C	None		0.00	78.00 - 68.00	No Ice	18.38	18.38	1000.00
						1/2" Ice	22.68	22.68	1263.82
							23.42	23.42	1537.64

Description	*Face or Leg*	*Offset Type*	*Offsets: Horz Lateral Vert* *ft* *ft* *ft*	*Azimuth Adjustment* °	*Placement* *ft*	C_AA_A *Front* ft^2	C_AA_A *Side* ft^2	*Weight* *lb*
					1" Ice			

Load Combinations

Comb. No.	*Description*
1	Dead Only
2	1.2 Dead+1.6 Wind 0 deg - No Ice
3	0.9 Dead+1.6 Wind 0 deg - No Ice
4	1.2 Dead+1.6 Wind 30 deg - No Ice
5	0.9 Dead+1.6 Wind 30 deg - No Ice
6	1.2 Dead+1.6 Wind 60 deg - No Ice
7	0.9 Dead+1.6 Wind 60 deg - No Ice
8	1.2 Dead+1.6 Wind 90 deg - No Ice
9	0.9 Dead+1.6 Wind 90 deg - No Ice
10	1.2 Dead+1.6 Wind 120 deg - No Ice
11	0.9 Dead+1.6 Wind 120 deg - No Ice
12	1.2 Dead+1.6 Wind 150 deg - No Ice
13	0.9 Dead+1.6 Wind 150 deg - No Ice
14	1.2 Dead+1.6 Wind 180 deg - No Ice
15	0.9 Dead+1.6 Wind 180 deg - No Ice
16	1.2 Dead+1.6 Wind 210 deg - No Ice
17	0.9 Dead+1.6 Wind 210 deg - No Ice
18	1.2 Dead+1.6 Wind 240 deg - No Ice
19	0.9 Dead+1.6 Wind 240 deg - No Ice
20	1.2 Dead+1.6 Wind 270 deg - No Ice
21	0.9 Dead+1.6 Wind 270 deg - No Ice
22	1.2 Dead+1.6 Wind 300 deg - No Ice
23	0.9 Dead+1.6 Wind 300 deg - No Ice
24	1.2 Dead+1.6 Wind 330 deg - No Ice
25	0.9 Dead+1.6 Wind 330 deg - No Ice
26	1.2 Dead+1.0 Ice+1.0 Temp
27	1.2 Dead+1.0 Wind 0 deg+1.0 Ice+1.0 Temp
28	1.2 Dead+1.0 Wind 30 deg+1.0 Ice+1.0 Temp
29	1.2 Dead+1.0 Wind 60 deg+1.0 Ice+1.0 Temp
30	1.2 Dead+1.0 Wind 90 deg+1.0 Ice+1.0 Temp
31	1.2 Dead+1.0 Wind 120 deg+1.0 Ice+1.0 Temp
32	1.2 Dead+1.0 Wind 150 deg+1.0 Ice+1.0 Temp
33	1.2 Dead+1.0 Wind 180 deg+1.0 Ice+1.0 Temp
34	1.2 Dead+1.0 Wind 210 deg+1.0 Ice+1.0 Temp
35	1.2 Dead+1.0 Wind 240 deg+1.0 Ice+1.0 Temp
36	1.2 Dead+1.0 Wind 270 deg+1.0 Ice+1.0 Temp
37	1.2 Dead+1.0 Wind 300 deg+1.0 Ice+1.0 Temp
38	1.2 Dead+1.0 Wind 330 deg+1.0 Ice+1.0 Temp
39	Dead+Wind 0 deg - Service
40	Dead+Wind 30 deg - Service
41	Dead+Wind 60 deg - Service
42	Dead+Wind 90 deg - Service
43	Dead+Wind 120 deg - Service
44	Dead+Wind 150 deg - Service

Comb. No.	Description
45	Dead+Wind 180 deg - Service
46	Dead+Wind 210 deg - Service
47	Dead+Wind 240 deg - Service
48	Dead+Wind 270 deg - Service
49	Dead+Wind 300 deg - Service
50	Dead+Wind 330 deg - Service

Maximum Member Forces

Section No.	Elevation ft	Component Type	Condition	Gov. Load Comb.	Axial lb	Major Axis Moment kip-ft	Minor Axis Moment kip-ft
L1	98 - 78.5	Pole	Max Tension	30	0.00	0.00	0.00
			Max. Compression	26	-5591.18	0.00	0.00
			Max. Mx	8	-3324.48	-28.67	0.00
			Max. My	2	-3324.48	0.00	28.67
			Max. Vy	8	2911.09	-28.67	0.00
			Max. Vx	2	-2911.09	0.00	28.67
			Max. Torque	4			-0.00
L2	78.5 - 78	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	26	-5742.01	0.00	0.00
			Max. Mx	8	-3419.19	-30.15	0.00
			Max. My	2	-3419.19	0.00	30.15
			Max. Vy	8	2983.45	-30.15	0.00
			Max. Vx	2	-2983.45	0.00	30.15
			Max. Torque	4			-0.00
L3	78 - 68.5	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	26	-8697.49	0.00	0.00
			Max. Mx	8	-5297.84	-65.06	0.00
			Max. My	2	-5297.84	0.00	65.06
			Max. Vy	8	4359.77	-65.06	0.00
			Max. Vx	2	-4359.77	0.00	65.06
			Max. Torque	4			-0.00
L4	68.5 - 68	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	26	-8904.09	0.00	0.00
			Max. Mx	8	-5437.54	-67.26	0.00
			Max. My	2	-5437.54	0.00	67.26
			Max. Vy	8	4448.54	-67.26	0.00
			Max. Vx	2	-4448.54	0.00	67.26
			Max. Torque	4			-0.00
L5	68 - 38.25	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	26	-14140.36	0.00	0.00
			Max. Mx	8	-8804.36	-209.47	0.00
			Max. My	2	-8804.36	0.00	209.47
			Max. Vy	8	7323.68	-209.47	0.00
			Max. Vx	2	-7323.68	0.00	209.47
			Max. Torque	4			-0.00
L6	38.25 - 1	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	26	-25082.29	0.00	0.00
			Max. Mx	8	-16116.66	-625.94	0.00
			Max. My	2	-16116.66	0.00	625.94
			Max. Vy	8	11998.11	-625.94	0.00
			Max. Vx	2	-11998.11	0.00	625.94
			Max. Torque	4			-0.00

Maximum Reactions

Location	Condition	Gov. Load Comb.	Vertical lb	Horizontal, X lb	Horizontal, Z lb
Pole	Max. Vert	26	25082.29	0.00	0.00
	Max. H_x	21	12090.54	11992.66	0.00
	Max. H_z	2	16120.72	0.00	11992.66
	Max. M_x	2	625.94	0.00	11992.66
	Max. M_z	8	625.94	-11992.66	0.00
	Max. Torsion	12	0.00	-5996.33	-10385.95
	Min. Vert	5	12090.54	-5996.33	10385.95
	Min. H_x	8	16120.72	-11992.66	0.00
	Min. H_z	14	16120.72	0.00	-11992.66
	Min. M_x	14	-625.94	0.00	-11992.66
	Min. M_z	20	-625.94	11992.66	0.00
	Min. Torsion	4	-0.00	-5996.33	10385.95

Tower Mast Reaction Summary

Load Combination	Vertical lb	$Shear_x$ lb	$Shear_z$ lb	Overturning Moment, M_x kip-ft	Overturning Moment, M_z kip-ft	Torque kip-ft
Dead Only	13433.93	0.00	0.00	0.00	0.00	0.00
1.2 Dead+1.6 Wind 0 deg - No Ice	16120.72	0.00	-11992.66	-625.94	0.00	0.00
0.9 Dead+1.6 Wind 0 deg - No Ice	12090.54	0.00	-11992.66	-624.10	0.00	0.00
1.2 Dead+1.6 Wind 30 deg - No Ice	16120.72	5996.33	-10385.95	-542.08	-312.97	0.00
0.9 Dead+1.6 Wind 30 deg - No Ice	12090.54	5996.33	-10385.95	-540.49	-312.05	0.00
1.2 Dead+1.6 Wind 60 deg - No Ice	16120.72	10385.95	-5996.33	-312.97	-542.08	-0.00
0.9 Dead+1.6 Wind 60 deg - No Ice	12090.54	10385.95	-5996.33	-312.05	-540.49	-0.00
1.2 Dead+1.6 Wind 90 deg - No Ice	16120.72	11992.66	0.00	0.00	-625.94	0.00
0.9 Dead+1.6 Wind 90 deg - No Ice	12090.54	11992.66	0.00	0.00	-624.10	0.00
1.2 Dead+1.6 Wind 120 deg - No Ice	16120.72	10385.95	5996.33	312.97	-542.08	0.00
0.9 Dead+1.6 Wind 120 deg - No Ice	12090.54	10385.95	5996.33	312.05	-540.49	0.00
1.2 Dead+1.6 Wind 150 deg - No Ice	16120.72	5996.33	10385.95	542.08	-312.97	-0.00
0.9 Dead+1.6 Wind 150 deg - No Ice	12090.54	5996.33	10385.95	540.49	-312.05	-0.00
1.2 Dead+1.6 Wind 180 deg - No Ice	16120.72	0.00	11992.66	625.94	0.00	0.00
0.9 Dead+1.6 Wind 180 deg - No Ice	12090.54	0.00	11992.66	624.10	0.00	0.00
1.2 Dead+1.6 Wind 210 deg - No Ice	16120.72	-5996.33	10385.95	542.08	312.97	0.00
0.9 Dead+1.6 Wind 210 deg - No Ice	12090.54	-5996.33	10385.95	540.49	312.05	0.00
1.2 Dead+1.6 Wind 240 deg - No Ice	16120.72	-10385.95	5996.33	312.97	542.08	-0.00
0.9 Dead+1.6 Wind 240 deg -	12090.54	-10385.95	5996.33	312.05	540.49	-0.00

Load Combination	Vertical	$Shear_x$	$Shear_z$	Overturning Moment, M_x	Overturning Moment, M_z	Torque
	lb	lb	lb	kip-ft	kip-ft	kip-ft
No Ice						
1.2 Dead+1.6 Wind 270 deg - No Ice	16120.72	-11992.66	0.00	0.00	625.94	0.00
0.9 Dead+1.6 Wind 270 deg - No Ice	12090.54	-11992.66	0.00	0.00	624.10	0.00
1.2 Dead+1.6 Wind 300 deg - No Ice	16120.72	-10385.95	-5996.33	-312.97	542.08	0.00
0.9 Dead+1.6 Wind 300 deg - No Ice	12090.54	-10385.95	-5996.33	-312.05	540.49	0.00
1.2 Dead+1.6 Wind 330 deg - No Ice	16120.72	-5996.33	-10385.95	-542.08	312.97	-0.00
0.9 Dead+1.6 Wind 330 deg - No Ice	12090.54	-5996.33	-10385.95	-540.49	312.05	-0.00
1.2 Dead+1.0 Ice+1.0 Temp	25082.29	0.00	0.00	0.00	0.00	0.00
1.2 Dead+1.0 Wind 0 deg+1.0 Ice+1.0 Temp	25082.29	0.00	-2864.85	-143.96	0.00	0.00
1.2 Dead+1.0 Wind 30 deg+1.0 Ice+1.0 Temp	25082.29	1432.43	-2481.04	-124.67	-71.98	0.00
1.2 Dead+1.0 Wind 60 deg+1.0 Ice+1.0 Temp	25082.29	2481.04	-1432.43	-71.98	-124.67	0.00
1.2 Dead+1.0 Wind 90 deg+1.0 Ice+1.0 Temp	25082.29	2864.85	0.00	0.00	-143.96	0.00
1.2 Dead+1.0 Wind 120 deg+1.0 Ice+1.0 Temp	25082.29	2481.04	1432.43	71.98	-124.67	0.00
1.2 Dead+1.0 Wind 150 deg+1.0 Ice+1.0 Temp	25082.29	1432.43	2481.04	124.67	-71.98	0.00
1.2 Dead+1.0 Wind 180 deg+1.0 Ice+1.0 Temp	25082.29	0.00	2864.85	143.96	0.00	0.00
1.2 Dead+1.0 Wind 210 deg+1.0 Ice+1.0 Temp	25082.29	-1432.43	2481.04	124.67	71.98	0.00
1.2 Dead+1.0 Wind 240 deg+1.0 Ice+1.0 Temp	25082.29	-2481.04	1432.43	71.98	124.67	0.00
1.2 Dead+1.0 Wind 270 deg+1.0 Ice+1.0 Temp	25082.29	-2864.85	0.00	0.00	143.96	0.00
1.2 Dead+1.0 Wind 300 deg+1.0 Ice+1.0 Temp	25082.29	-2481.04	-1432.43	-71.98	124.67	0.00
1.2 Dead+1.0 Wind 330 deg+1.0 Ice+1.0 Temp	25082.29	-1432.43	-2481.04	-124.67	71.98	0.00
Dead+Wind 0 deg - Service	13433.93	0.00	-2030.77	-107.00	0.00	0.00
Dead+Wind 30 deg - Service	13433.93	1015.39	-1758.70	-92.66	-53.50	0.00
Dead+Wind 60 deg - Service	13433.93	1758.70	-1015.39	-53.50	-92.66	0.00
Dead+Wind 90 deg - Service	13433.93	2030.77	0.00	0.00	-107.00	0.00
Dead+Wind 120 deg - Service	13433.93	1758.70	1015.39	53.50	-92.66	0.00
Dead+Wind 150 deg - Service	13433.93	1015.39	1758.70	92.66	-53.50	0.00
Dead+Wind 180 deg - Service	13433.93	0.00	2030.77	107.00	0.00	0.00
Dead+Wind 210 deg - Service	13433.93	-1015.39	1758.70	92.66	53.50	0.00
Dead+Wind 240 deg - Service	13433.93	-1758.70	1015.39	53.50	92.66	0.00
Dead+Wind 270 deg - Service	13433.93	-2030.77	0.00	0.00	107.00	0.00
Dead+Wind 300 deg - Service	13433.93	-1758.70	-1015.39	-53.50	92.66	0.00
Dead+Wind 330 deg - Service	13433.93	-1015.39	-1758.70	-92.66	53.50	0.00

Solution Summary

	Sum of Applied Forces			Sum of Reactions			
Load Comb.	PX lb	PY lb	PZ lb	PX lb	PY lb	PZ lb	% Error
1	0.00	-13433.93	0.00	0.00	13433.93	0.00	0.000%
2	0.00	-16120.72	-11992.66	0.00	16120.72	11992.66	0.000%
3	0.00	-12090.54	-11992.66	0.00	12090.54	11992.66	0.000%
4	5996.33	-16120.72	-10385.95	-5996.33	16120.72	10385.95	0.000%
5	5996.33	-12090.54	-10385.95	-5996.33	12090.54	10385.95	0.000%
6	10385.95	-16120.72	-5996.33	-10385.95	16120.72	5996.33	0.000%
7	10385.95	-12090.54	-5996.33	-10385.95	12090.54	5996.33	0.000%
8	11992.66	-16120.72	0.00	-11992.66	16120.72	0.00	0.000%
9	11992.66	-12090.54	0.00	-11992.66	12090.54	0.00	0.000%
10	10385.95	-16120.72	5996.33	-10385.95	16120.72	-5996.33	0.000%
11	10385.95	-12090.54	5996.33	-10385.95	12090.54	-5996.33	0.000%
12	5996.33	-16120.72	10385.95	-5996.33	16120.72	-10385.95	0.000%
13	5996.33	-12090.54	10385.95	-5996.33	12090.54	-10385.95	0.000%
14	0.00	-16120.72	11992.66	0.00	16120.72	-11992.66	0.000%
15	0.00	-12090.54	11992.66	0.00	12090.54	-11992.66	0.000%
16	-5996.33	-16120.72	10385.95	5996.33	16120.72	-10385.95	0.000%
17	-5996.33	-12090.54	10385.95	5996.33	12090.54	-10385.95	0.000%
18	-10385.95	-16120.72	5996.33	10385.95	16120.72	-5996.33	0.000%
19	-10385.95	-12090.54	5996.33	10385.95	12090.54	-5996.33	0.000%
20	-11992.66	-16120.72	0.00	11992.66	16120.72	0.00	0.000%
21	-11992.66	-12090.54	0.00	11992.66	12090.54	0.00	0.000%
22	-10385.95	-16120.72	-5996.33	10385.95	16120.72	5996.33	0.000%
23	-10385.95	-12090.54	-5996.33	10385.95	12090.54	5996.33	0.000%
24	-5996.33	-16120.72	-10385.95	5996.33	16120.72	10385.95	0.000%
25	-5996.33	-12090.54	-10385.95	5996.33	12090.54	10385.95	0.000%
26	0.00	-25082.29	0.00	0.00	25082.29	0.00	0.000%
27	0.00	-25082.29	-2864.85	0.00	25082.29	2864.85	0.000%
28	1432.43	-25082.29	-2481.03	-1432.43	25082.29	2481.04	0.000%
29	2481.03	-25082.29	-1432.43	-2481.04	25082.29	1432.43	0.000%
30	2864.85	-25082.29	0.00	-2864.85	25082.29	0.00	0.000%
31	2481.03	-25082.29	1432.43	-2481.04	25082.29	-1432.43	0.000%
32	1432.43	-25082.29	2481.03	-1432.43	25082.29	-2481.04	0.000%
33	0.00	-25082.29	2864.85	0.00	25082.29	-2864.85	0.000%
34	-1432.43	-25082.29	2481.03	1432.43	25082.29	-2481.04	0.000%
35	-2481.03	-25082.29	1432.43	2481.04	25082.29	-1432.43	0.000%
36	-2864.85	-25082.29	0.00	2864.85	25082.29	0.00	0.000%
37	-2481.03	-25082.29	-1432.43	2481.04	25082.29	1432.43	0.000%
38	-1432.43	-25082.29	-2481.03	1432.43	25082.29	2481.04	0.000%
39	0.00	-13433.93	-2030.77	0.00	13433.93	2030.77	0.000%
40	1015.39	-13433.93	-1758.70	-1015.39	13433.93	1758.70	0.000%
41	1758.70	-13433.93	-1015.39	-1758.70	13433.93	1015.39	0.000%
42	2030.77	-13433.93	0.00	-2030.77	13433.93	0.00	0.000%
43	1758.70	-13433.93	1015.39	-1758.70	13433.93	-1015.39	0.000%
44	1015.39	-13433.93	1758.70	-1015.39	13433.93	-1758.70	0.000%
45	0.00	-13433.93	2030.77	0.00	13433.93	-2030.77	0.000%
46	-1015.39	-13433.93	1758.70	1015.39	13433.93	-1758.70	0.000%
47	-1758.70	-13433.93	1015.39	1758.70	13433.93	-1015.39	0.000%
48	-2030.77	-13433.93	0.00	2030.77	13433.93	0.00	0.000%
49	-1758.70	-13433.93	-1015.39	1758.70	13433.93	1015.39	0.000%
50	-1015.39	-13433.93	-1758.70	1015.39	13433.93	1758.70	0.000%

Non-Linear Convergence Results

Load Combination	Converged?	Number of Cycles	Displacement Tolerance	Force Tolerance
1	Yes	4	0.00000001	0.00000001
2	Yes	4	0.00000001	0.00001705
3	Yes	4	0.00000001	0.00000001
4	Yes	4	0.00000001	0.00036490
5	Yes	4	0.00000001	0.00023594
6	Yes	4	0.00000001	0.00036490
7	Yes	4	0.00000001	0.00023594
8	Yes	4	0.00000001	0.00001705
9	Yes	4	0.00000001	0.00000001
10	Yes	4	0.00000001	0.00036490
11	Yes	4	0.00000001	0.00023594
12	Yes	4	0.00000001	0.00036490
13	Yes	4	0.00000001	0.00023594
14	Yes	4	0.00000001	0.00001705
15	Yes	4	0.00000001	0.00000001
16	Yes	4	0.00000001	0.00036490
17	Yes	4	0.00000001	0.00023594
18	Yes	4	0.00000001	0.00036490
19	Yes	4	0.00000001	0.00023594
20	Yes	4	0.00000001	0.00001705
21	Yes	4	0.00000001	0.00000001
22	Yes	4	0.00000001	0.00036490
23	Yes	4	0.00000001	0.00023594
24	Yes	4	0.00000001	0.00036490
25	Yes	4	0.00000001	0.00023594
26	Yes	4	0.00000001	0.00000001
27	Yes	4	0.00000001	0.00058967
28	Yes	4	0.00000001	0.00059613
29	Yes	4	0.00000001	0.00059613
30	Yes	4	0.00000001	0.00058967
31	Yes	4	0.00000001	0.00059613
32	Yes	4	0.00000001	0.00059613
33	Yes	4	0.00000001	0.00058967
34	Yes	4	0.00000001	0.00059613
35	Yes	4	0.00000001	0.00059613
36	Yes	4	0.00000001	0.00058967
37	Yes	4	0.00000001	0.00059613
38	Yes	4	0.00000001	0.00059613
39	Yes	4	0.00000001	0.00000001
40	Yes	4	0.00000001	0.00000001
41	Yes	4	0.00000001	0.00000001
42	Yes	4	0.00000001	0.00000001
43	Yes	4	0.00000001	0.00000001
44	Yes	4	0.00000001	0.00000001
45	Yes	4	0.00000001	0.00000001
46	Yes	4	0.00000001	0.00000001
47	Yes	4	0.00000001	0.00000001
48	Yes	4	0.00000001	0.00000001
49	Yes	4	0.00000001	0.00000001
50	Yes	4	0.00000001	0.00000001

Maximum Tower Deflections - Service Wind

Section No.	Elevation ft	Horz. Deflection in	Gov. Load Comb.	Tilt °	Twist °
L1	98 - 78.5	2.95	39	0.35	0.00

Section No.	Elevation ft	Horz. Deflection in	Gov. Load Comb.	Tilt °	Twist °
L2	78.5 - 78	1.63	39	0.25	0.00
L3	78 - 68.5	1.60	39	0.25	0.00
L4	68.5 - 68	1.20	39	0.14	0.00
L5	68 - 38.25	1.19	39	0.14	0.00
L6	43.753 - 1	0.55	39	0.11	0.00

Critical Deflections and Radius of Curvature - Service Wind

Elevation ft	Appurtenance	Gov. Load Comb.	Deflection in	Tilt °	Twist °	Radius of Curvature ft
98.00	36" X 10' AMS	39	2.95	0.35	0.00	20774
93.00	36" X 10' AMS	39	2.57	0.33	0.00	20774
88.00	36" X 10' AMS	39	2.22	0.31	0.00	10387
83.00	36" X 10' AMS	39	1.89	0.28	0.00	6929
78.00	36" X 10' AMS	39	1.60	0.25	0.00	6102
73.00	36" X 10' AMS	39	1.36	0.18	0.00	4957
68.00	36" X 10' AMS	39	1.19	0.14	0.00	8834

Maximum Tower Deflections - Design Wind

Section No.	Elevation ft	Horz. Deflection in	Gov. Load Comb.	Tilt °	Twist °
L1	98 - 78.5	17.03	2	1.99	0.00
L2	78.5 - 78	9.45	2	1.45	0.00
L3	78 - 68.5	9.30	2	1.43	0.00
L4	68.5 - 68	6.99	2	0.80	0.00
L5	68 - 38.25	6.91	2	0.80	0.00
L6	43.753 - 1	3.23	2	0.63	0.00

Critical Deflections and Radius of Curvature - Design Wind

Elevation ft	Appurtenance	Gov. Load Comb.	Deflection in	Tilt °	Twist °	Radius of Curvature ft
98.00	36" X 10' AMS	2	17.03	1.99	0.00	3661
93.00	36" X 10' AMS	2	14.89	1.88	0.00	3661
88.00	36" X 10' AMS	2	12.83	1.76	0.00	1830
83.00	36" X 10' AMS	2	10.94	1.62	0.00	1221
78.00	36" X 10' AMS	2	9.30	1.43	0.00	1075
73.00	36" X 10' AMS	2	7.93	1.05	0.00	871
68.00	36" X 10' AMS	2	6.91	0.80	0.00	1553

Compression Checks

Pole Design Data

Section No.	Elevation	Size	L	L_u	Kl/r	A	P_u	ϕP_n	Ratio $\frac{P_u}{\phi P_n}$
	ft		ft	ft		in^2	lb	lb	
L1	98 - 78.5 (1)	TP8.625x8.625x0.465	19.50	0.00	0.0	11.9205	-3324.48	450593.00	0.007
L2	78.5 - 78 (2)	TP10.75x8.625x0.465	0.50	0.00	0.0	11.9205	-3373.13	450593.00	0.007
L3	78 - 68.5 (3)	TP10.75x10.75x0.465	9.50	0.00	0.0	15.0247	-5297.84	567935.00	0.009
L4	68.5 - 68 (4)	TP35.5x10.75x0.465	0.50	0.00	0.0	15.0247	-5369.53	567935.00	0.009
L5	68 - 38.25 (5)	TP40.02x35.5x0.25	29.75	0.00	0.0	30.8941	-8804.36	1974840.00	0.004
L6	38.25 - 1 (6)	TP45x38.6839x0.25	42.75	0.00	0.0	35.5091	-16116.70	2115940.00	0.008

Pole Bending Design Data

Section No.	Elevation	Size	M_{ux}	ϕM_{nx}	Ratio $\frac{M_{ux}}{\phi M_{nx}}$	M_{uy}	ϕM_{ny}	Ratio $\frac{M_{uy}}{\phi M_{ny}}$
	ft		kip-ft	kip-ft		kip-ft	kip-ft	
L1	98 - 78.5 (1)	TP8.625x8.625x0.465	28.67	97.64	0.294	0.00	97.64	0.000
L2	78.5 - 78 (2)	TP10.75x8.625x0.465	28.67	97.64	0.294	0.00	97.64	0.000
L3	78 - 68.5 (3)	TP10.75x10.75x0.465	65.06	155.05	0.420	0.00	155.05	0.000
L4	68.5 - 68 (4)	TP35.5x10.75x0.465	65.06	155.05	0.420	0.00	155.05	0.000
L5	68 - 38.25 (5)	TP40.02x35.5x0.25	209.47	1583.33	0.132	0.00	1583.33	0.000
L6	38.25 - 1 (6)	TP45x38.6839x0.25	625.94	1951.51	0.321	0.00	1951.51	0.000

Pole Shear Design Data

Section No.	Elevation	Size	Actual V_u	ϕV_n	Ratio $\frac{V_u}{\phi V_n}$	Actual T_u	ϕT_n	Ratio $\frac{T_u}{\phi T_n}$
	ft		lb	lb		kip-ft	kip-ft	
L1	98 - 78.5 (1)	TP8.625x8.625x0.465	2911.10	225297.00	0.013	0.00	145.41	0.000
L2	78.5 - 78 (2)	TP10.75x8.625x0.465	2983.45	283968.00	0.011	0.00	145.41	0.000
L3	78 - 68.5 (3)	TP10.75x10.75x0.465	4359.77	283968.00	0.015	0.00	233.33	0.000
L4	68.5 - 68 (4)	TP35.5x10.75x0.465	4448.54	967312.00	0.005	0.00	233.33	0.000
L5	68 - 38.25 (5)	TP40.02x35.5x0.25	7323.70	987419.00	0.007	0.00	3170.54	0.000
L6	38.25 - 1 (6)	TP45x38.6839x0.25	11998.10	1057970.00	0.011	0.00	3907.78	0.000

Pole Interaction Design Data

Section No.	Elevation	Ratio $\frac{P_u}{\phi P_n}$	Ratio $\frac{M_{ux}}{\phi M_{nx}}$	Ratio $\frac{M_{uy}}{\phi M_{ny}}$	Ratio $\frac{V_u}{\phi V_n}$	Ratio $\frac{T_u}{\phi T_n}$	Comb. Stress Ratio	Allow. Stress Ratio	Criteria
	ft								

Section No.	Elevation ft	Ratio $\frac{P_u}{\phi P_n}$	Ratio $\frac{M_{ux}}{\phi M_{nx}}$	Ratio $\frac{M_{uy}}{\phi M_{ny}}$	Ratio $\frac{V_u}{\phi V_n}$	Ratio $\frac{T_u}{\phi T_n}$	Comb. Stress Ratio	Allow. Stress Ratio	Criteria
L1	98 - 78.5 (1)	0.007	0.294	0.000	0.013	0.000	0.301 ✔	1.000	4.8.2 ✔
L2	78.5 - 78 (2)	0.007	0.294	0.000	0.011	0.000	0.301 ✔	1.000	4.8.2 ✔
L3	78 - 68.5 (3)	0.009	0.420	0.000	0.015	0.000	0.429 ✔	1.000	4.8.2 ✔
L4	68.5 - 68 (4)	0.009	0.420	0.000	0.005	0.000	0.429 ✔	1.000	4.8.2 ✔
L5	68 - 38.25 (5)	0.004	0.132	0.000	0.007	0.000	0.137 ✔	1.000	4.8.2 ✔
L6	38.25 - 1 (6)	0.008	0.321	0.000	0.011	0.000	0.328 ✔	1.000	4.8.2 ✔

Section Capacity Table

Section No.	Elevation ft	Component Type	Size	Critical Element	P lb	ϕP_{allow} lb	% Capacity	Pass Fail
L1	98 - 78.5	Pole	TP8.625x8.625x0.465	1	-3324.48	450593.00	30.1	Pass
L2	78.5 - 78	Pole	TP10.75x8.625x0.465	2	-3373.13	450593.00	30.1	Pass
L3	78 - 68.5	Pole	TP10.75x10.75x0.465	3	-5297.84	567935.00	42.9	Pass
L4	68.5 - 68	Pole	TP35.5x10.75x0.465	4	-5369.53	567935.00	42.9	Pass
L5	68 - 38.25	Pole	TP40.02x35.5x0.25	5	-8804.36	1974840.00	13.7	Pass
L6	38.25 - 1	Pole	TP45x38.6839x0.25	6	-16116.70	2115940.00	32.8	Pass
							Summary	
						Pole (L3)	42.9	Pass
						RATING =	**42.9**	**Pass**

Anchor Rod and Base Plate Design

Designed per:TIA-222-G

EEI Job #:	18280-D01. R1
Site Name:	Bridgeport NE
Structure:	100-ft Flag Monopole

Client:	Verizon Wireless
Site #:	
Location:	Bridgeport, CT

Base Reactions	
Moment, M_u =	626 ft-kip
Shear, V_u =	12 kip
Vertical, P_u =	16.1 kip

Base Plate Properties	
Base Plate Material =	A572GR50
Outside Diameter =	56.25 in
Inside Diameter =	35 in
Weight =	781 lbf

Pole Properties at Base	
Pole Diameter =	45 in
Pole Thickness =	0.25 in
Yield Strength =	65 ksi
Monopole Shape =	18-Sided

Effective Base Plate Bend Line	
Desantis' Bend Line =	33.75 in
% Reduction =	60 %
Reduced Bend Line =	20.25 in
Brinker's Bend Line =	21.49 in
Effective Bend Line =	20.25 in

Anchor Rod Properties & Bolt Circle Diam	
Anchor Material =	A615GR75
Anchor Diameter =	1.75 in
Minimum Bolt Circle Ø =	51.19 in
Actual Bolt Circle Ø =	51.25 in
Spacing =	26.83 in
Anchor Length =	6 ft
No. of Anchors =	6
Weight =	324 lbs

Base Plate Thickness	
Section Modulus:	Plastic
Φ_b =	0.9
Minimum Thickness =	1.17 in
Actual Thickness =	1.75 in
M_{ub} =	314 in-k
ΦM_n =	698 in-kip
Usage ratio, % =	45.0%

Anchor Rod Inter. Eq. 1 (4.9.9)	
P_{ub} =	100 kip
V_{ub} =	2.00 kip
η =	0.5
Φ_t =	0.80
$\Phi_t R_{nt}$ =	152 kip
Inter. Eq. 1 =	0.69

Setting Template Properties	
Outside Diameter =	55.25 in
Inside Diameter =	47.25 in
Thickness =	0.375 in
Template Hole Ø =	1.875 in
Template Weight =	66.7 lbs
Bottom Template Must Be Bolted	

Anchor Rod Inter. Eq. 2 (4.9.9)	
L_{ar} =	2.25 in
V_{ub} =	2.00 kip
P_{ub} =	100 kip
M_{ub} =	2.93 kip-in
$\Phi_v R_{nv}$ =	81 kip
$\Phi_t R_{nt}$ =	152 kip
$\Phi_f R_{nm}$ =	42 kip-in
Inter. Eq. 2 =	0.69

Summary Table	
Anchor Material =	A615GR75
Anchor Diameter =	1.75 in
No. of Anchors =	6
Actual Bolt Circle Ø =	51.25 in
Anchor Length =	6 ft
Base Plate Material =	A572GR50
Actual Thickness =	1.75 in
Outside Diameter =	56.25 in
Inside Diameter =	35 in

10975 Kinsman Road
Newbury, OH 44065

Telephone: (440) 564-5484
Email: sales@engend.com

Stiffened or Unstiffened, Interior Flange Plate - Any Bolt Material TIA Rev G

Site Data

BU#: *18280-D01*
Site Name: *Bridgeport NE*
App #:

Reactions		
Moment:	65.1	ft-kips
Axial:	5.4	kips
Shear:	4.4	kips
Exterior Flange Run, T+q:	33	kips

Bolt Threads:
X-Excluded
φVn=φ(0.55*Ab*Fu)
φ=0.75, φ*Vn (kips):
38.88

Manufacturer:	Other

Elevation: 68 feet

Bolt Data			
Qty:	12		
Diam:	1	Bolt Fu:	120
Bolt Material:	A325	Bolt Fy:	92
N/A:	100	<-- Disregard	
N/A:	75	<-- Disregard	
Circle:	32	in	

Interior Flange Bolt Results

Maximum Bolt Tension, Tu:	33.0 Kips, Ext. Flange Tu+q
Adjusted φ*Tn (due to Vu=Vu/Qty), I	54.5 Kips
Bolt Stress Ratio:	60.5% **Pass**

Plate Data		
Plate Outer Diam:	35	in
Plate Inner Diam:	12	in (Hole @ Ctr)
Thick:	1.25	in
Grade:	50	ksi
Effective Width:	7.00	in

Interior Flange Plate Results Flexural Check

Controlling Bolt Axial Force:	33.0 Kips, Ext. Flange Tu+q
Plate Stress:	18.1 ksi
Allowable Plate Stress, φ*Fy:	45.0 ksi
Plate Stress Ratio:	40.2% **Pass**

Stiffener Data (Welding at Both Sides)		
Config:	0	*
Weld Type:	Fillet	
Groove Depth:	0.375	<-- Disregard
Groove Angle:	45	<-- Disregard
Fillet H. Weld:	0.3125	in
Fillet V. Weld:	0.3125	in
Width:	3	in
Height:	18	in
Thick:	0.75	in
Notch:	0.5	in
Grade:	36	ksi
Weld str.:	70	ksi

n/a

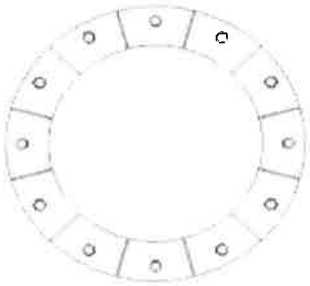
Stiffener Results

Horizontal Weld :	n/a
Vertical Weld:	n/a
Plate Flex+Shear, fb/Fb+(fv/Fv)^2:	n/a
Plate Tension+Shear, ft/Ft+(fv/Fv)^2:	n/a
Plate Comp. (AISC Bracket):	n/a

Pole Results

Pole Punching Shear Check:	n/a

Pole Data		
Pole OuterDiam:	35.5	in
Thick:	0.25	in
Pole Inner Diam:	35	in
Grade:	65	ksi
# of Sides:	0	"0" IF Round
Fu	80	ksi



* 0 = none, 1 = every bolt, 2 = every 2 bolts, 3 = 2 per bolt

** Note: for complete joint penetration groove welds the groove depth must be exactly 1/2 the stiffener thickness for calculation purposes

ENGINEERED
ENDEAVORS
INCORPORATED

The Experienced Point of View

DESIGN CALCULATIONS
FOR A
DRILLED PIER FOUNDATION

Verizon Wireless

100' Monopole

Bridgeport NE

Bridgeport, CT

EEI Project Number 18280-D01, Rev.1

March 16, 2018

15175 Kinsman Road * Burton, OH 44062
Phone: (440) 970-5004
www.engend.com

FOUNDATION DESIGN CALCULATIONS FOR A DRILLED PIER FOUNDATION

CUSTOMER: Verizon Wireless

DATE: 03/16/18

LOCATION: Bridgeport, CT

STRUCTURE: 100' Monopole

SITE NAME: Bridgeport NE

JOB NUMBER: 18280-D01

SITE NUMBER:

STATUS: Rev.1

FOUNDATION DESIGN LOADS

	MOMENT	SHEAR	AXIAL LOAD
UNITS	*ft-kips* *in-lbs*	*kips* *lbs*	*kips* *lbs*
DESIGN LOADING	626.0 7512000.0	12.0 12000.0	16.1 16100.0

PIER PROPERTIES

ANCHOR BOLT CIRCLE 51.3 in

ANCHOR BOLT DESCRIPTION: (6) 1 3/4" BOLTS AT6 ft 0 in

MINIMUM DIAMETER 71.3 in

ACTUAL DIAMETER 72.0 in

PIER AREA 4071.5 in^2

MOMENT OF INERTIA 1319167.3 in^4

SOIL INFORMATION

SOIL DESCRIPTION	DEPTH *ft*	DEPTH *in*	K_H VALUE *pci*	ϕ *degrees*	γ *pcf/pci*	COHESION *psf/psi*	E_{50} *in/in*
SAND/BOULDERS	1.0 17.5	12 210		32	125 0.072		
BEDROCK	17.5 20.0	210 240		40	140 0.081		

GROUNDWATER NOT ENCOUNTERED
DISREGARD UPPER 36in OF SOIL

ACTUAL EMBEDMENT La = 18.0 ft
TOTAL LENGTH L = 18.8 ft

CONCRETE VOLUME **V = 19.6 yds^3**

CONCRETE REINFORCEMENT

	BAR SIZE	BAR WEIGHT	QUANTITY	LENGTH	WEIGHT
VERTICAL BARS	# 8	2.670 lbs/ft	26	18.5 ft	1284.3 lbs
HORIZONTAL TIES	# 5	1.043 lbs/ft	29	18.50 ft	554.7 lbs
TOTAL					**1839.0 lbs**

PIER STRUCTURAL DESIGN

MAXIMUM BENDING MOMENT **798.0 ft-kips**

PIER DIAMETER			72 in
CONCRETE			3 ksi
REINFORCEMENT			60 ksi
REBAR	# 8	QUANTITY	26
DESIGN REBAR		QUANTITY	12
MINIMUM REINFORCEMENT RATIO:			0.0050
ACTUAL REINFORCEMENT RATIO:			0.0050
CONCRETE COVER			4 in
REBAR LAYOUT RADIUS			30.6875 in

BAR AREA	0.79 in^2
BAR AREA	1.71 in^2
REBAR SPACING	7.42 in
HORIZONTAL TIES	19.75

NUMBER	ANGLE	COORDINATE	EDGE DISTANCE
	degrees	*in*	*in*
1		30.69	5.31
2	30	26.58	9.42
3	60	15.34	20.66
4	90		36.00
5	120	-15.34	51.34
6	150	-26.58	62.58
7	180	-30.69	66.69
8	210	-26.58	62.58
9	240	-15.34	51.34
10	270		36.00
11	300	15.34	20.66
12	330	26.58	9.42

LOCATION OF NEUTRAL AXIS **c = 11.200 in**
COMPRESSION ZONE **a = 9.520 in**

COMPRESSION ZONE

REBAR	e	FORCE
		kips
1	0.0016	73.92
2	0.0005	19.25
12	0.0005	19.25
CONCRETE		812.97
COMPRESSION		**925.39 kips**

TENSION ZONE

REBAR	e	FORCE
		kips
3	0.0025	102.70
4	0.0066	102.70
5	0.0108	102.70
6	0.0138	102.70
7	0.0149	102.70
8	0.0138	102.70
9	0.0108	102.70
10	0.0066	102.70
11	0.0025	102.70
TENSION		**924.30 kips**

MAXIMUM MOMENT CAPACITY

MOMENT DUE TO COMPRESSION

REBAR	FORCE	ARM	MOMENT
	kips	*in*	*ft-kips*
1	73.92	30.69	189.02
2	19.25	26.58	42.63
12	19.25	26.58	42.63
CONCRETE	812.97	29.65	2008.94
			2283.24

MOMENT DUE TO TENSION

REBAR	FORCE	ARM	MOMENT
	kips	*in*	*ft-kips*
3	102.70	15.34	-131.32
4	102.70		
5	102.70	-15.34	131.32
6	102.70	-26.58	227.45
7	102.70	-30.69	262.63
8	102.70	-26.58	227.45
9	102.70	-15.34	131.32
10	102.70		
11	102.70	15.34	-131.32
			717.53

DESIGN MOMENT **2700.69 ft-kips**

EEI Project No. 18280. Rev.1

Date 03-16-2018

Base Moment, kip-ft	626.0	Pier Diameter, ft	6.0
Shear Force, kips	12.0	Groundwater, ft	N/A
Vertical Force, kips	16.1	Pier Embedment. ft	18.0
		Disregard, ft	3.0

Soil Properties Information

Soil Layer	Depth, ft	γ	ϕ	C, psf	Kp
SAND	17.50	125.0	32.0		3.25
BEDROCK	20.0	140.0	40.0		4.60

Zero Line, ft	13.3	Force Imbalance	2.175%
Resisting Moment, k-ft	2,632.22	Overturning Moment, k-ft	797.60

Safety Factor 3.30

GEOTECHNICAL EVALUATION of SUBSURFACE CONDITIONS

for

BRIDGEPORT NE, CT

541 Broadbridge Road
Bridgeport, CT 06610

Prepared for:

verizon

99 East River Drive
East Hartford, CT 08108

Dated: October 2, 2017

Prepared by:

HUDSON Design Group LLC

45 Beachwood Drive
North Andover, MA 01845
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STATE OF CONNECTICUT
MARK A. MODZELEWSKI
PEN.0028625
LICENSED PROFESSIONAL ENGINEER

10/2/17

PROJECT LOCATION & DESCRIPTION

The site and project of concern is located at 541 Broadbridge Road, in Bridgeport CT. The proposed personal cellular communications antenna tower and compound will be located approximately 180 feet northeast of the edge of main road and at the east end of a shopping plaza. The proposed project can be generally located at 41° 13' 19.49" N and 73° 10' 02.50" W on the Bridgeport, CT USGS quadrangle (1984 Rev), viewed in Google Earth or other internet based geographic mapping software.

The proposed Verizon Wireless communications facility and antenna tower will consist of an 8'x19' lease area, 8'x19' crushed stone surface compound with chain-link perimeter security fence, exterior mounted communications equipment, a small cabinet style emergency electrical generator, and additional supporting infrastructure. The proposed cellular communications antenna tower will consist of a 100' flagpole (stealth) with two (2) Verizon panel antennas per sector located at 82' and 92' above ground level. The proposed flagpole style of antenna tower can accommodate an additional commercial carrier.

The property is owned by Beardsly Plaza Limited Partnership and the communications compound and designated access areas will be leased by Verizon Wireless. Others had completed the site design or layout.

PROJECT PURPOSE

The purpose of this Geotechnical Evaluation of Subsurface Conditions is to determine the subsurface soil conditions and properties to be used in the structural analysis and design of the proposed cellular communication antenna tower foundation. The soil investigation and report were completed for Verizon Wireless.

The Geotechnical Evaluation was completed in accordance with standard practice, ANSI /TIA-222-G Structural Standards for Steel Antennas Towers and Supporting Structures (2009), International Building Code (IBC) 2009, and CT State Building Code (2016), as applicable.

METHODS OF INVESTIGATION

Hudson Design Group (HDG) completed a limited document review consisting of USDA-NRCS Soil Survey data, USGS Bridgeport, CT topographic map or quadrangle, and USGS Bedrock Geologic Map of Connecticut (1985) for the area of interest. The field or on-site investigation consisted of one primary soil boring near the proposed antenna tower.

The soil boring and rock coring were performed in general accordance with ASTM D 1586 and D 2113-08, respectively. The soil borings were completed with a Mobile B-53 rubber tired drill vehicle with safety hammer rigging system. The primary soil boring

included Standard Penetration Testing (SPT) with split spoon soil sampling to refusal or bedrock.

Those present during the Geotechnical field or on site investigation of 9/19/17 included Trent Roe and Rick Posa of New England Boring Company (NEBC). No field or laboratory tests were completed on the recovered soil samples or rock core for this project.

RESULTS

USDA SOIL DATA

Based on review of the USDA, Natural Resource Conservation Service (NRCS) Soil Survey for Fairfield County, CT, HDG determined that the reported soils located within the proposed communications compound consist primarily of Hollis-Chatfield Rock Outcrop Complex, with 3% to 15% natural terrain ground slopes, Map unit 75C. Surrounding soils include Urban Land (307) and Sutton Fine sandy loam (50B).

The hydrologic soil group rating or classification for the Hollis-Chatfield Rock Outcrop Complex soil is D. Group D soils having a very slow infiltration rate (high runoff potential) when thoroughly wet. These consist primarily of clays that have a high shrink-swell potential, a high water table, a claypan or clay layer at or near the surface, and soils that are shallow over nearly impervious material. The reported depth to water table and any restrictive layer are greater than 78 inches and 15 inches below grade, respectively.

Based on further on-line or internet based review of the USDA-NRCS soil survey data, the soil of interest at the proposed cellular communications facility with the Hollis-Chatfield Rock Outcrop Complex has a reported sand, silt, clay, and organic content of 57%, 33%, 5% and 5%, respectively. The surface soil was classified or rated as OL, organic low plasticity, according to the Unified Soil Classification (USC) system.

USGS BEDROCK DATA

Based on review of the USGS Bedrock Geological Map of Connecticut (1985) for the area of interest, the anticipated bedrock appears to be within the western uplands and Connecticut Valley Synclinorium and Hartland Tectonic Belt. Based on the bedrock mapping color legend and identification labels, Ohb, the bedrock is reported as the Beardsley (Horneblend) Member and is likely Harrison Gneiss from the Ordovician Geologic Period. Gneiss bedrock is reported as metamorphized granite. The depth to bedrock is not listed on the USGS bedrock map.

SOIL BORING

Based on soil boring B-1, the soil encountered was classified by the driller as brown fine sand, some gravel, trace of silt, with few cobbles. Cobbles and boulders were present from 7.5 feet to 17.5 feet below grade. Bedrock is apparently at 17.5 feet below grade No groundwater or wet soil was encountered for the date and location of testing. Soil

boring B-1 was completed 35 feet south of the proposed antenna tower due to obstructions.

Due to the existence of boulders and cobbles within the soil matrix, very limited Standard Penetration Testing (SPT) data are available. However, based on the field boring data from 3 feet to 7 feet below grade the blowcounts and corresponding standard penetration number, N, correction for system energy or efficiency and overburden, N_{corr}, the following empirical soil properties and shallow bearing capacity are estimated for the granular soil.

Table 1. Empirically estimated soil properties and mat foundation bearing capacity.

Depth (ft)	**Ncorr**	**Soil Description**	**Density** (pcf) **(moist)**	**Ø** (deg)	**Tanδ**	**Pp** (psf/ ft)	**qa net** (tsf)
5	66	Fine Sand, some gravel, few cobbles, boulders at 7.5'	125	32	0.42	115	4

Ncorr = Blowcount corrected for overburden and hammer energy efficiency
Density = Moist or Buoyant soil density per on-site conditions (lbs/ft³ = pcf)
Ø = soil internal friction angle.
Tanδ = Coefficient of lateral sliding for cement concrete on specific soil.
Pp = Allowable lateral passive pressure per foot of depth.
qa net = empirically estimated net allowable soil bearing capacity (tons/ft² = tsf).

It shall be understood that the bearing capacity of a shallow mat foundation on granular soil is dependent on depth of embedment, foundation dimensions, soil density, and moist or saturated soil conditions. As such, an assumed 8'x8' foundation at the depth of embedment listed above with **moist** soil conditions were used in Meyerhof's shallow bearing capacity equation. If saturated soil (buoyant) conditions can exist, the mat foundation design bearing capacity listed above should be reduced by half.

However, since the proposed flagpole antenna tower is very close to the existing commercial building, the soil contains cobbles and boulders with bedrock at 17.5 feet, and very little room for a standard or larger pad or mat foundation exists, HDG highly recommends use of a drilled pier or caisson foundation socketed into bedrock for the proposed antenna tower. The properties and capacities for the soil and rock with a drilled shaft foundation are listed in the tables below.

Table 2. Estimated soil properties for a drilled caisson (deep foundation).

Depth (ft)	**Ncorr (avg)**	**Soil Density** (pcf) **(moist)**	**Ø** (deg)	**Allowable Skin Friction[1] (compression)** (psf)	**Allowable Tip Bearing Capacity[2]** (tsf)
5	66	125	32	50	2.5

Ncorr = Blowcount corrected for overburden and hammer rigging energy efficiency
Soil Density = **Moist or Buoyant** soil density per on-site conditions (lbs/ft³ = pcf)
Ø = soil internal friction angle
1 based on Meyerhof fs = $K\sigma'_{ov}(\tan\delta)$ where $\delta = 2/3\phi$
2 based on q = $\sigma'_{ov}(Nq^*-1)/3$, up to limiting value (FOS = 3)

ROCK CORING

Upon reaching refusal due to the presence of competent bedrock at 17.5 feet, two (2), 5-foot NQ rock cores were completed within the bedrock at B-1. The rock coring was completed from 17.5 feet to 27.5 feet below ground. The upper 5 foot core (17.5'-22.5') had full 60 inch recovery, but the lower 5 foot core (22.5'-27.7') had 45 inch recovery due to 15 inch core section remaining intact to the bedrock.

From HDGs review of the rock core photographs and drillers log, the bedrock appears to be very light gray granite with no visible grain banding typical of gneiss. The rock core demonstrates little decomposition, minimal weathering, with no visible oxide stains. The lower core is absent the lower 15 inches, and one 12 inch section is diagonally fractured or split essential down the middle of the core; it is not known if the fracture is natural or due to the coring process.

Based on the quantity and summing of rock sections 4-inches in length or greater, the upper and lower cores have a Rock Quality Designation (RQD) of 83% and 40%, with rock quality classifications of GOOD and POOR, respectively. It should be understood that the lower core RQD may not be accurate due to the lower 15 inch section of core remaining intact or attached to the parent bedrock. HDGs estimation of RQD was performed in accordance with ASTM D 6032-08 and based on review of the drillers rock core photographs.

From review of the USGS Bedrock map and data, reported bedrock core descriptions and review of digital rock core photographs from the driller, HDG estimates the bedrock as listed below and correlated to presumptive values.

Table 3. Maximum presumptive properties and strengths for cored bedrock*.

Estimated Rock Type	RQD	Vertical Compressive Strength (psf)	Lateral Bearing Pressure (psf/ft)	Lateral Sliding Coefficient	Allowable Shaft Resistance[2] (psi)
Crystalline Bedrock (1)	83 & 40	12,000	1,200	0.70	50

1 Based on International Building Code, Chapter 18, Soils and Foundations (2009).
2 Based on NAVFAC DM 7.2, Section 6. Deep Foundations on Rock, Ultimate Rock Socket resistance.

CONCLUSIONS & RECOMMENDATIONS

Based on the USDA-NRCS Soil Survey data, USGS Geologic Bedrock map and descriptions, on-site investigations and empirical relations, the estimated soil and rock properties and bearing capacities are listed in the tables above. In the event an empirical relation could not be established or determined, a presumptive value will be listed and stated as such and be according to the International Building Code (2009) and Connecticut Building Code amendments (2016), as applicable.

SOIL

Since spatial constraints will not allow for a mat foundation, HDG recommends a rock socketed caisson (deep foundation) with the estimated soil properties and capacities

listed in Table 2. However, as the soil appears to contain multiple cobbles and boulders, it is suggested to ignore the soil to shaft resistance due to high disturbance and lack of good shaft to soil interface during and after construction. Please note that the bearing capacities or soil strengths listed in the tables above are for static vertical conditions.

BEDROCK

Based on boring B-1 and rock core results from 17.5 feet to 27.5 feet below grade, HDG has provided the presumed rock compressive strength from the International Building Code (IBC) in Table 3. In addition, the estimated allowable shaft to rock resistance is also listed and is based on Naval Facilities Engineering Command (NAVFAC) DM 7.2.

Alternatives to use of the presumptive values for the bedrock for foundation design are to complete laboratory tests on core specimens such as ASTM D 7012-13, Standard Test Method for Compressive Strength and Elastic Moduli of Intact Rock Core Specimens under Varying States of Stress and Temperatures and ASTM D3967-08, Standard Test Method for Splitting Tensile Strength of Intact Rock Core Specimens.

FOUNDATION DESIGN & ALTERNATIVES

HDG recommends a steel-reinforced cement concrete drilled shaft or caisson foundation socketed into bedrock for the proposed flagpole antenna tower. The drilled shaft should be socketed into competent bedrock at least as deep as the caisson's diameter. In addition, it is recommended that the upper 3 to 5 feet of socket depth be ignored or not relied upon for shaft resistance. Alternatives to a rock socketed drilled shaft foundation include a drilled shaft foundation with steel reinforcement or dowels sufficiently anchored and epoxy grouted into competent bedrock.

The proposed cement concrete foundation should be designed in accordance with ANSI /TIA-222-G Structural Standards for Steel Antennas Towers and Supporting Structures (2009), International Building Code (IBC) 2009, and CT State Building Code (2016), as applicable.

ADDITIONAL DESIGN CRITERIA

As previously described, HDG suggests disregarding or minimal reliance on soil to shaft skin friction due to presence and interference of cobbles and boulders. It is likely that the controlling design condition will be foundation pullout, and therefore the foundation shaft to bedrock resistance is the only opposing force mechanism, other than foundation weight. A minimum design factor of safety (FOS) of 2 is recommended and should be confirmed by the designer.

Based on review of the UBC United States Seismic Zones Map, the project location is within the Zone 2A (0.15g) Seismic Zone (ground acceleration). The frost design depth for this location is 42 inches below finished grade. Regardless of the foundation design, typical maximum allowable settlement is 1-inch and should be verified during the foundation design process.

Although groundwater was not detected or reported for the date and location of drillers investigation, permanent measures to facilitate groundwater drainage below the foundation bottom should be implemented to the greatest extent practicable. Temporary measures for adequate de-watering and maintaining the groundwater table well below the proposed antenna tower foundation subgrade or base elevation shall be completed prior to foundation excavation and be maintained throughout foundation construction.

All backfill should be placed in layers not exceeding 12-inches in uncompacted thickness and compacted in place to 95% of maximum dry density and optimum moisture content established by the Modified Proctor Test, ASTM D 1557-12, for the specific backfill material or soil. Soil used in backfilling shall be moist (not saturated) and free of organics, cobbles, rocks, and refuse, and be well graded.

The overall project general contractor and subcontractor (as applicable) selected for antenna tower foundation construction should contact the Verizon project manager, Hudson Design Group Project manager, and Foundation Designer in writing regarding any requested design changes prior to completing any foundation fabrication or foundation construction modifications on their own.

LIMITATIONS

As applicable, our recommendations are based on limited field observations, investigations, analysis, empirical relationships, and field or laboratory testing completed to date and limited to contractual arrangements for authorized tasks. It is important to understand that the soil investigation completed is very limited in scope and breadth and that subsurface soil conditions can vary greatly, or remain consistent with the soils identified in the soil logs during the investigation and incorporated into the calculations or estimates and report. It shall be understood that the soil boring and core were completed 35 feet south of the proposed tower location, and soil conditions and depth of bedrock may vary from those reported in the drillers bore log.

If during the construction of the foundation soil conditions are found to be greatly different from those identified in the soil logs, HDG shall not be held liable or responsible in any way for foundation design modifications or limitations that may be required as a result of differing or unforeseen conditions. Furthermore, the opinions and estimated values are based on professional experience, formal education, and a standard level of care and due-diligence practiced within the profession. No guarantee or warranty of work is explicitly or implicitly implied. This report is solely for the use of our client.

(603) 437-1610 **New England Boring Contractors** Fax: (603) 437-0034
P.O. Box 165
Derry, NH 03038

Boring # HDG-541 **Project**: Hudson Design Group Cell Tower **Project #** C07281

Project Address: 541 Broadbridge **City:** Bridgeport **State:** CT **Zip:**

Date Start: 09/19/17 **Date End:** 09/19/17 **Location:** See Plan

Casing: HW	**Sampler:**	140 lbs	**Sampler:**
Size: 4"	S/S	Fall: 30"	1-3/8 in. I.D.
Hammer: 300lbs Fall: 24"	Core barrel: NQ 2"		30 in.

GROUNDWATER OBSERVATION

Date: 9/19/17	**Depth:** ~7'6" after coring	**Casing:**	**Stabilization Period**

DP	S./#	DEPTH	PEN	REC	BLOWS/6"	S/C	SAMPLE DESCRIPTION
-						3"	ASPHALT
-	S-1	1' – 2'3"	15"	10"	21-52-100/3"		Dry, very dense, light brown FINE SAND, some gravel, some coarse sand, trace inorganic silt, few cobbles.
-	S-2	3' – 5'	24"	16"	28-16-21-38		Dry, dense, light brown FINE SAND, some gravel, some coarse sand, trace inorganic silt, few cobbles.
5'0"	S-3	5' – 7'	24"	14"	37-42-25-34		Dry, very dense, light brown FINE SAND, some gravel, some coarse sand, trace inorganic silt, few cobbles.
-						7'	
-	S-4	7' – 7'6"	6"	4"	90/6"		COBBLES encountered, began coring at 7'6".
-	C-1	7'6" – 12'6"	60"	36"	Coring times Minute per ft. 3-6-6-5-2		3" to 7" COBBLES
10'0"							
-	C-2	12'6" – 17'6"	60"	26"	4-5-4-5-8		13" BOULDER/gravels. Percent Recovery 43%
15'0"							
-	C-3	17'6" – 22'6"	60"	60"	8-7-9-5-6		Gray COMPETENT BEDROCK. Percent Recovery 100%
20'0"							
-	C-4	22'6" – 27'6"	60"	*45"	5-6-6-6-7		Gray COMPETENT BEDROCK. Percent Recovery 75% * Lost 15" of recovery in hole, tried unsuccessfully to retrieve it.
25'0"							

Drillers. Trent Roe **Helper:** Rick Posa **Inspector:** M. McClusky

Remarks: Mobile B53 rig used. No water prior to coring. Hole was drilled 35' S., of proposed mark due to utilities and dumpster.

S/#: Sample **PEN:** Penetration **REC:** Recovery **S/C:** Strata Change

HDG | HUDSON Design Group LLC

April 5, 2018

Robert Stein, Chairman
Connecticut Siting Council
Ten Franklin Square
New Britain, CT 06051

Re: Docket No. 472 - Cellco Partnership d/b/a Verizon Wireless
Bridgeport NE Facility
541 Broadbridge Road
Bridgeport, CT 06610

CSC Docket NO. 472

Dear Chairman Stein:

This letter addresses the location of the natural gas service to the back-up generator as discussed in the Connecticut Siting Council's (Council) Finding of Fact no. 79, on page 2 of the Opinion and in Condition no. 2 c) of the Decision and Order all dated September 5, 2017.

On February 12, 2018 I met on site with Mr. Brian Early from Southern Connecticut Gas (SCG) to review options for providing natural gas service to the proposed Verizon Wireless (VZW) back up generator as shown on the Development & Management (D&M) Plans.

Mr. Early reviewed with me the existing natural gas service on site, the available gas pressures and capacity and the location of the existing gas meters serving the uses in the building.

The existing gas line is located along the back (north) side of the shopping center extending underground from Huntington Turnpike to the gas meters and pressure regulators located along this back wall of the building. Each tenant of the shopping center appears to have their own gas meter.

I asked Mr. Early if VZW could bring their own dedicated gas service to their back-up generator as was discussed at the CSC hearing and his response was that the gas company does not normally bring more than one service line onto a property unless there are special circumstances such as inadequate pressure, where a dedicated high-pressure line would need to be run or there is insufficient capacity to handle the additional needs. The VZW back-up generator does not need a dedicated high-pressure line and the capacity of the gas line feeding the Property is sufficient for VZW's needs.

Mr. Early has recommended that we manifold off of the existing two-meter set near the northeast corner of the building and add a third gas meter in this same location. VZW will run its gas line along the wall of the building to the facility compound and back-up generator as shown on the D&M Plan.

P: 978.557.5553 F: 978.336.5586 A: 45 Beechwood Drive, North Andover, MA 01845
p: 413.588.8139 f: 413.517.0590 a: 116 Pleasant Street, Ste 302, Easthampton, MA 01027
p: 203.208.3919 a: 110 Washington Avenue, North Haven, CT 06473

EXISTING GAS SERVICE AND METERS

If you have any additional questions please feel free to contact me.

Very truly yours,

Douglas J Roberts

Douglas J. Roberts
Sr. Project Manager
Hudson Design Group LLC