Robinson+Cole

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Also admitted in Massachusetts

August 12, 2016

Via Federal Express

Melanie A. Bachman
Acting Executive Director
Connecticut Siting Council
10 Franklin Square
New Britain, CT 06051

Re: **Docket No. 462 – 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 At 15 Great Pasture Road, Danbury, 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 for the approved telecommunications facility at 15 Great Pasture Road in Danbury, Connecticut incorporating the Council's conditions of approval. Also enclosed are four (4) full size (24" x 36") sets of D&M plans.

2. Mat Foundation and Pile Details.

3. Geotechnical and Geophysical Testing Report prepared by DET and dated February 2016.

4. Structural Design Report for the approved 140' monopole tower prepared by Sabre Industries and dated July 13, 2016.

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Together, this information constitutes the final D&M Plan submission for the approved 15 Great Pasture Road in Danbury.

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:
Mayor Mark D. Boughton, City of Danbury
Anthony Befera, Verizon Wireless
Brian Paul, Verizon Wireless
Elizabeth Jamieson, Verizon Wireless

verizon

DEVELOPMENT AND MANAGEMENT PLAN

BETHEL W2

15 GREAT PASTURE ROAD

DANBURY, CT 06810

SITE DIRECTIONS

FROM: 99 EAST RIVER DRIVE, EAST HARTFORD, CONNECTICUT **TO:** 15 GREAT PASTURE ROAD, DANBURY, CONNECTICUT

1.	Head NORTHEAST on E RIVER DR toward DARLIN ST	0.3 mi.
2.	Turn LEFT to stay on E RIVER DR	0.08 mi
3.	Take the 1st LEFT onto CONNECTICUT BLVD	0.1 mi.
4.	Turn LEFT to merge onto I-84	54.2 mi
5.	Merge onto NEWTOWN RD	1.7 mi.
6.	Turn LEFT onto OLD SHELTER ROCK RD	0.6 mi.
7.	OLD SHELTER RD becomes CROSS ST	0.2 mi.
8.	Turn LEFT onto SHELTER ROCK RD	0.04 mi.
9.	Turn SLIGHT RIGHT onto SHELTER ROCK LN	0.4 mi.
10.	Turn LEFT onto GREAT PASTURE RD	0.2 mi.

GENERAL NOTES

1. PROPOSED ANTENNA LOCATIONS AND HEIGHTS PROVIDED BY CELLCO PARTNERSHIP.

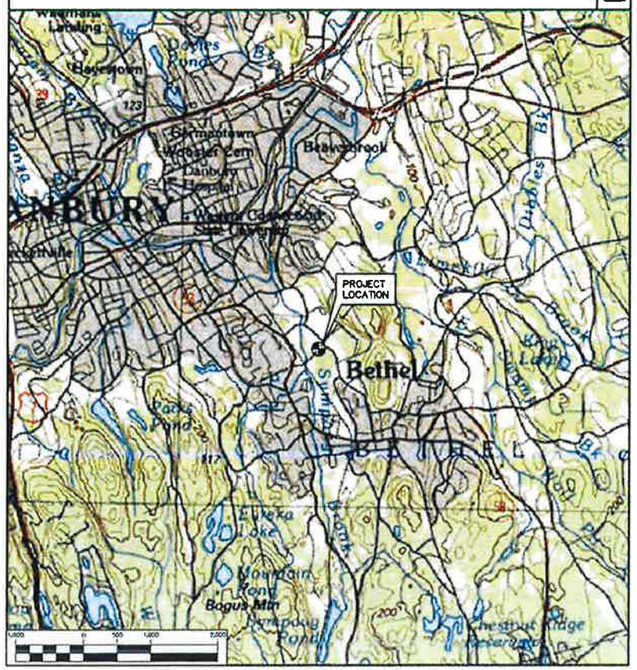
SITE INFORMATION

THE SCOPE OF WORK SHALL INCLUDE:

1. THE CONSTRUCTION OF A 50'x50' FENCED WIRELESS COMMUNICATIONS COMPOUND.
2. A TOTAL OF UP TO TWELVE (12) DIRECTIONAL PANEL ANTENNAS ARE PROPOSED TO BE MOUNTED AT A CENTERLINE ELEVATION OF 120'-0"± AGL ON A 120'-0"± PROPOSED STEEL MONOPOLE TOWER.
3. POWER AND TELCO UTILITIES SHALL BE ROUTED UNDERGROUND FROM EXISTING UTILITY DEMARCS LOCATED ON OR ADJACENT TO THE SUBJECT PROPERTY, TO THE PROPOSED UTILITY BACKBOARD LOCATED ADJACENT TO THE PROPOSED FENCED COMPOUND. FINAL DEMARC LOCATION AND UTILITY ROUTING TO PROPOSED BACKBOARD WILL BE VERIFIED/DETERMINED BY LOCAL UTILITY COMPANIES. UTILITIES WILL BE ROUTED UNDERGROUND FROM UTILITY BACKBOARD TO THE PROPOSED 12'x26' CONC. EQUIPMENT PAD AT GRADE WITHIN THE PROPOSED 50'x50' FENCED COMPOUND AREA.
4. THE PROPOSED WIRELESS FACILITY INSTALLATION WILL BE DESIGNED IN ACCORDANCE WITH THE 2003 INTERNATIONAL BUILDING CODE AS MODIFIED BY THE 2009 CONNECTICUT SUPPLEMENT.
5. THERE WILL NOT BE ANY LIGHTING UNLESS REQUIRED BY THE FCC OR THE FAA.
6. THERE WILL NOT BE ANY SIGNS OR ADVERTISING ON THE ANTENNAS OR EQUIPMENT.

VICINITY MAP

SCALE: 1" = 1000'



PROJECT SUMMARY

SITE NAME:	BETHEL W2
SITE ADDRESS:	15 GREAT PASTURE ROAD DANBURY, CT 06810
PROPERTY OWNER:	EPPOLITI INDUSTRIAL REALTY INC. 37 DANBURY ROAD #203 RIDGEFIELD, CT 06877
LESSEE/TENANT:	CELLCO PARTNERSHIP d.b.a. VERIZON WIRELESS 99 EAST RIVER DRIVE EAST HARTFORD, CT 06108
VERIZON SITE ACQUISITION CONTACT:	ALEKSEY TYURIN CELLCO PARTNERSHIP (860) 803-8213
LEGAL/REGULATORY COUNSEL:	KENNETH C. BALDWIN, ESQ. ROBINSON & COLE (860) 275-8345
TOWER COORDINATES:	LATITUDE: 41°-22'-58.813" LONGITUDE: 73°-25'-19.811" PROPOSED GROUND ELEVATION: 387.1'± A.M.S.L. SITE COORDINATES AND GROUND ELEVATION AND REFERENCED FROM FAA-1A SURVEY CERTIFICATION AS PREPARED BY MARTINEZ COUCH AND ASSOCIATES LLC, DATED FEBRUARY 17, 2015.

SHEET INDEX

SHT. NO.	DESCRIPTION	REV. NO.
T-1	TITLE SHEET	1
C-1	PARTIAL SITE/ SURVEY PLAN	1
C-1A	SITE UTILITY PLAN	1
C-2	COMPOUND PLAN, ELEVATION AND ANTENNA MOUNTING CONFIGURATION	1
C-3	SITE CONSTRUCTION, S&E CONTROL NOTES & DETAILS	1
C-4	DRAINAGE CONTROL AND SITE DETAILS	1
C-5	SITE DETAILS	1
C-6	EQUIPMENT PAD AND ICE CANOPY DETAILS	1

REV	DATE	DRAWN BY	CHK'D BY	DESCRIPTION
1	04/12/16	KAMJR	DMD	D&M PLANS - ISSUED FOR CLIENT REVIEW
				D&M PLANS

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Cellco Partnership d/b/a Verizon Wireless
WIRELESS COMMUNICATIONS FACILITY

BETHEL W2
15 GREAT PASTURE ROAD
DANBURY, CT 06810

DATE: 04/12/16
SCALE: AS NOTED
JOB NO. 14216.000

TITLE SHEET

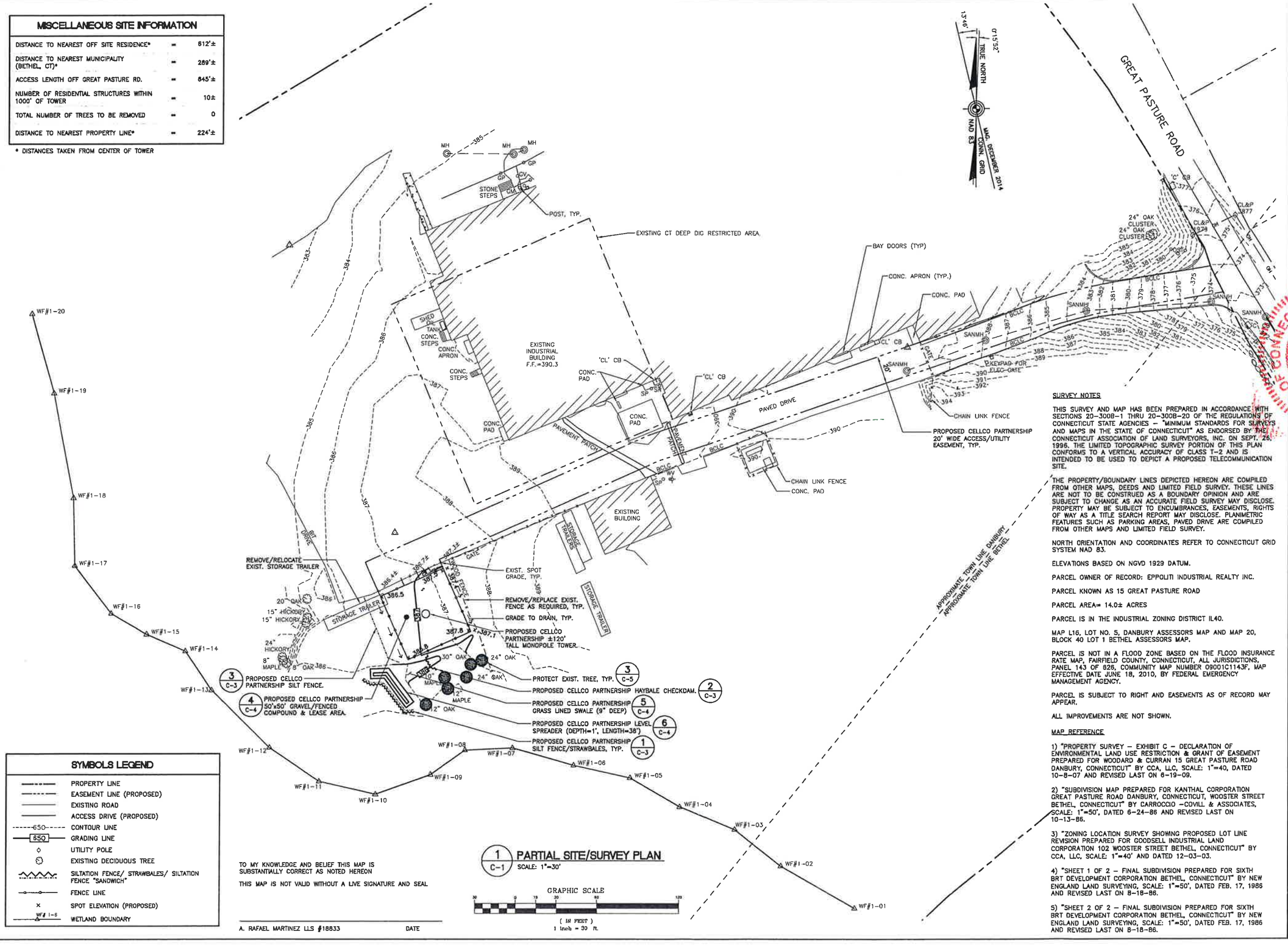
T-1

Sheet No. 1 of 8

MISCELLANEOUS SITE INFORMATION

DISTANCE TO NEAREST OFF SITE RESIDENCE*	=	612'±
DISTANCE TO NEAREST MUNICIPALITY (BETHEL, CT)*	=	289'±
ACCESS LENGTH OFF GREAT PASTURE RD.	=	845'±
NUMBER OF RESIDENTIAL STRUCTURES WITHIN 1000' OF TOWER	=	10±
TOTAL NUMBER OF TREES TO BE REMOVED	=	0
DISTANCE TO NEAREST PROPERTY LINE*	=	224'±

* DISTANCES TAKEN FROM CENTER OF TOWER



SYMBOLS LEGEND

- PROPERTY LINE
- EASEMENT LINE (PROPOSED)
- EXISTING ROAD
- ACCESS DRIVE (PROPOSED)
- 650 CONTOUR LINE
- 650 GRADING LINE
- UTILITY POLE
- EXISTING DECIDUOUS TREE
- SILTATION FENCE/ STRAWBALES/ SILTATION FENCE "SANDWICH"
- FENCE LINE
- SPOT ELEVATION (PROPOSED)
- WF# 1-6 WETLAND BOUNDARY

TO MY KNOWLEDGE AND BELIEF THIS MAP IS SUBSTANTIALLY CORRECT AS NOTED HEREON

THIS MAP IS NOT VALID WITHOUT A LIVE SIGNATURE AND SEAL

A. RAFAEL MARTINEZ LLS #18833 DATE

1 C-1 PARTIAL SITE/SURVEY PLAN
SCALE: 1"=30'

GRAPHIC SCALE
30 0 15 30 60 120
(IN FEET)
1 inch = 30 ft.

SURVEY NOTES

THIS SURVEY AND MAP HAS BEEN PREPARED IN ACCORDANCE WITH SECTIONS 20-300B-1 THRU 20-300B-20 OF THE REGULATIONS OF CONNECTICUT STATE AGENCIES – "MINIMUM STANDARDS FOR SURVEYS AND MAPS IN THE STATE OF CONNECTICUT" AS ENDORSED BY THE CONNECTICUT ASSOCIATION OF LAND SURVEYORS, INC. ON SEPT. 26, 1996. THE LIMITED TOPOGRAPHIC SURVEY PORTION OF THIS PLAN CONFORMS TO A VERTICAL ACCURACY OF CLASS T-2 AND IS INTENDED TO BE USED TO DEPICT A PROPOSED TELECOMMUNICATION SITE.

THE PROPERTY/BOUNDARY LINES DEPICTED HEREON ARE COMPILED FROM OTHER MAPS, DEEDS AND LIMITED FIELD SURVEY. THESE LINES ARE NOT TO BE CONSTRUED AS A BOUNDARY OPINION AND ARE SUBJECT TO CHANGE AS AN ACCURATE FIELD SURVEY MAY DISCLOSE. PROPERTY MAY BE SUBJECT TO ENCUMBRANCES, EASEMENTS, RIGHTS OF WAY AS A TITLE SEARCH REPORT MAY DISCLOSE. PLANIMETRIC FEATURES SUCH AS PARKING AREAS, PAVED DRIVE ARE COMPILED FROM OTHER MAPS AND LIMITED FIELD SURVEY.

NORTH ORIENTATION AND COORDINATES REFER TO CONNECTICUT GRID SYSTEM NAD 83.

ELEVATIONS BASED ON NGVD 1929 DATUM.

PARCEL OWNER OF RECORD: EPPOLITI INDUSTRIAL REALTY INC.

PARCEL KNOWN AS 15 GREAT PASTURE ROAD

PARCEL AREA= 14.0± ACRES

PARCEL IS IN THE INDUSTRIAL ZONING DISTRICT IL40.

MAP L16, LOT NO. 5, DANBURY ASSESSORS MAP AND MAP 20, BLOCK 40 LOT 1 BETHEL ASSESSORS MAP.

PARCEL IS NOT IN A FLOOD ZONE BASED ON THE FLOOD INSURANCE RATE MAP, FAIRFIELD COUNTY, CONNECTICUT, ALL JURISDICTIONS, PANEL 143 OF 826, COMMUNITY MAP NUMBER 09001C1143F, MAP EFFECTIVE DATE JUNE 18, 2010, BY FEDERAL EMERGENCY MANAGEMENT AGENCY.

PARCEL IS SUBJECT TO RIGHT AND EASEMENTS AS OF RECORD MAY APPEAR.

ALL IMPROVEMENTS ARE NOT SHOWN.

MAP REFERENCE

1) "PROPERTY SURVEY – EXHIBIT C – DECLARATION OF ENVIRONMENTAL LAND USE RESTRICTION & GRANT OF EASEMENT PREPARED FOR WOODARD & CURRAN 15 GREAT PASTURE ROAD DANBURY, CONNECTICUT" BY CCA, LLC, SCALE: 1"=40, DATED 10-8-07 AND REVISED LAST ON 6-19-09.

2) "SUBDIVISION MAP PREPARED FOR KANTHAL CORPORATION GREAT PASTURE ROAD DANBURY, CONNECTICUT, WOOSTER STREET BETHEL, CONNECTICUT" BY CARROCCIO –COVILL & ASSOCIATES, SCALE: 1"=50', DATED 6-24-86 AND REVISED LAST ON 10-13-86.

3) "ZONING LOCATION SURVEY SHOWING PROPOSED LOT LINE REVISION PREPARED FOR GOODSELL INDUSTRIAL LAND CORPORATION 102 WOOSTER STREET BETHEL, CONNECTICUT" BY CCA, LLC, SCALE: 1"=40' AND DATED 12-03-03.

4) "SHEET 1 OF 2 – FINAL SUBDIVISION PREPARED FOR SIXTH BRT DEVELOPMENT CORPORATION BETHEL, CONNECTICUT" BY NEW ENGLAND LAND SURVEYING, SCALE: 1"=50', DATED FEB. 17, 1986 AND REVISED LAST ON 8-18-86.

5) "SHEET 2 OF 2 – FINAL SUBDIVISION PREPARED FOR SIXTH BRT DEVELOPMENT CORPORATION BETHEL, CONNECTICUT" BY NEW ENGLAND LAND SURVEYING, SCALE: 1"=50', DATED FEB. 17, 1986 AND REVISED LAST ON 8-18-86.

REV.	DATE	DRAWN BY	CHK'D BY	DESCRIPTION
1	06/05/15	HAIR	DMD	DAM PLANS – ISSUED FOR CLIENT REVIEW
0	05/10/15	KAMUR	DMD	DAM PLANS

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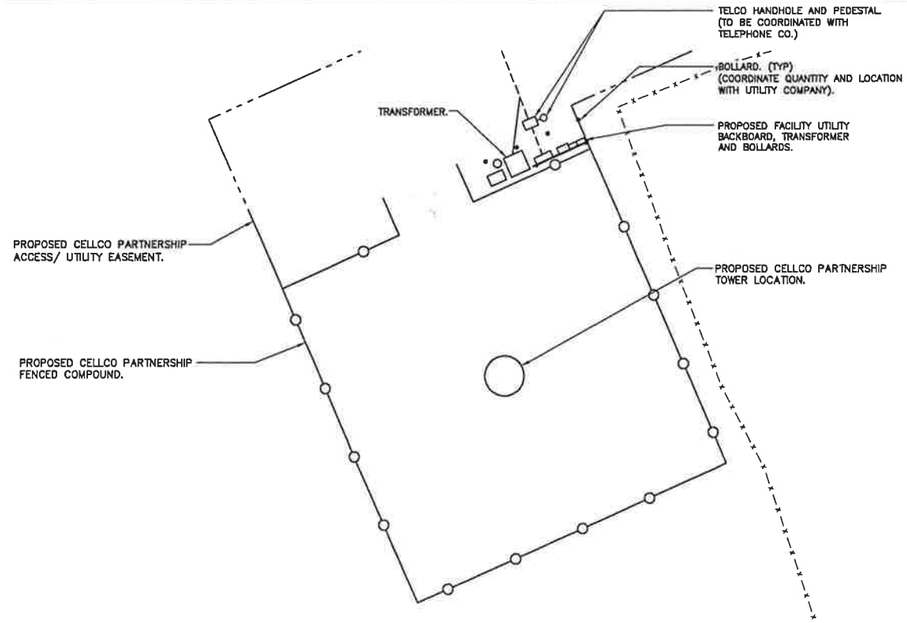
DANBURY, CT 06810

DATE:	04/12/15
SCALE:	AS NOTED
JOB NO.	14216.000

PARTIAL SITE/ SURVEY PLAN

C-1

Sheet No. 2 of 8



2 / C-1A **PARTIAL SITE UTILITY PLAN**
SCALE: 1"=10'-0"

TRUE NORTH

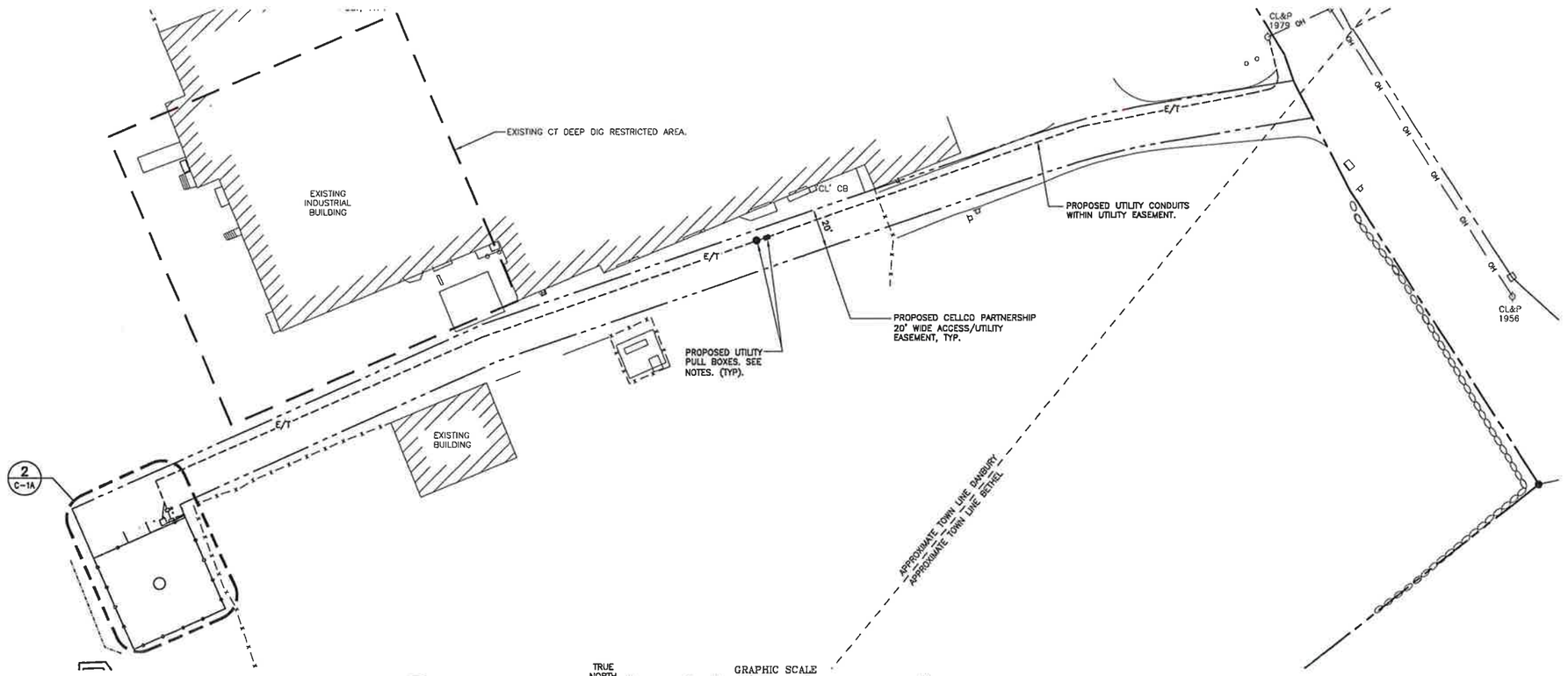
GRAPHIC SCALE
(IN FEET)
1 inch = 10 ft.

UTILITY NOTES:

1. COORDINATE WITH OWNER FOR ALL EASEMENT DOCUMENTS.
2. UTILITY ROUTING SHOWN ON THIS PLAN IS SCHEMATIC. CONTRACTOR SHALL COORDINATE FINAL ROUTING AND CONNECTION POINT WITH RESPECTIVE UTILITY COMPANIES PRIOR TO PERFORMING ANY UTILITY TRENCH WORK. ALL UTILITY CONDUITS AND PULL BOXES SHALL BE LOCATED WITHIN THE PROPOSED ACCESS/UTILITY EASEMENT.
3. UTILITY PULL BOXES/SILOS TO BE TRAFFIC RATED AND INSTALLED IN APPROXIMATE LOCATIONS SHOWN ON THIS PLAN, BUT NOT TO EXCEED 450' INTERVALS. CONTRACTOR TO COORDINATE FINAL PULL BOX LOCATIONS WITH RESPECTIVE LOCAL UTILITY COMPANIES.
4. CONTRACTOR SHALL COORDINATE ALL PERMITS AND PROCEDURES FOR CONDUIT INSTALLATION ALONG STREET.
5. PLAN IS FOR UTILITY ROUTING INFORMATION ONLY. SOME OTHER ELEMENTS NOT SHOWN FOR CLARITY. REFER TO CIVIL DRAWINGS FOR ALL OTHER EXISTING AND PROPOSED SITE INFORMATION.

SYMBOLS LEGEND

- PROPERTY LINE
- ACCESS/ UTILITY EASEMENT LINE (PROPOSED)
- E/T — ELECTRICAL/TELCO CONDUIT RUN (UNDERGROUND)
- UTILITY PULL BOX/SILO
- UTILITY POLE



1 / C-1A **SITE UTILITY PLAN**
SCALE: 1"=30'

TRUE NORTH

GRAPHIC SCALE
(IN FEET)
1 inch = 30 ft.

NO.	DATE	DRAWN BY	CHK'D BY	DESCRIPTION
0	05/10/16	KAMJR	DMD	DAM PLANS – ISSUED FOR CLIENT REVIEW

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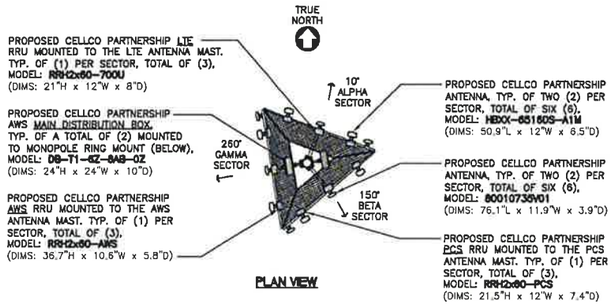
DATE: 04/12/16
SCALE: AS NOTED
JOB NO. 14216.000

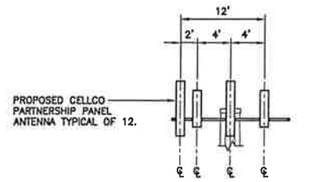
SITE UTILITY PLAN

C-1A

Sheet No. 3 of 8



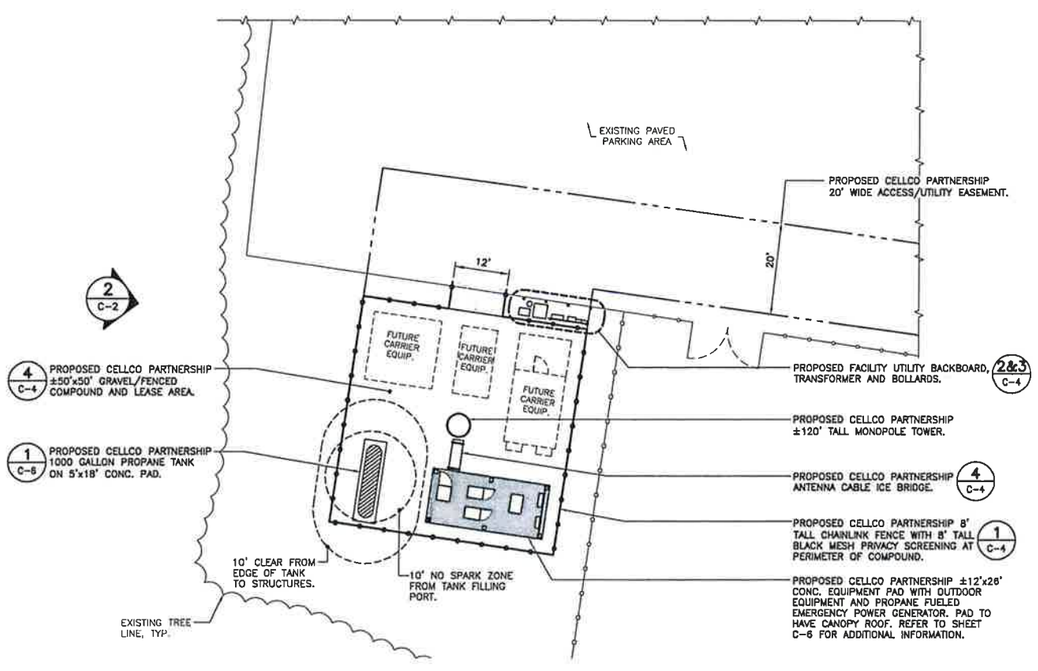
PLAN VIEW



TYPICAL SECTOR ELEVATION

3 / C-2 ANTENNA MOUNTING CONFIGURATION

SCALE: 1/8" = 1'



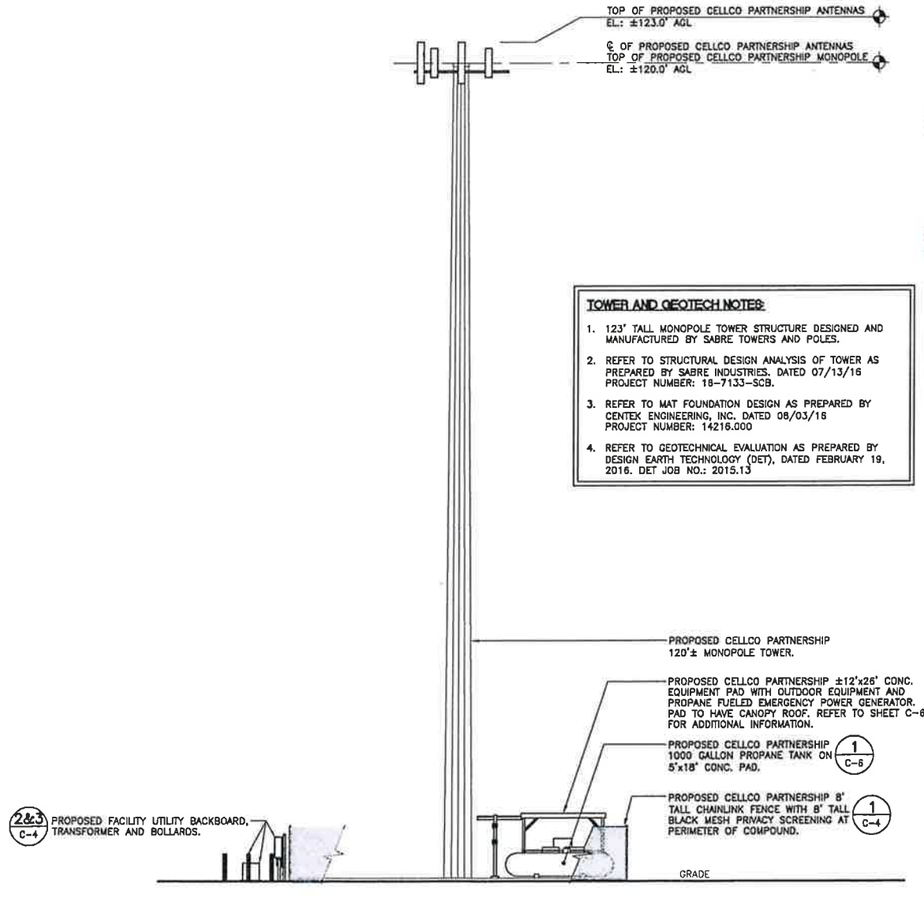
1 / C-2 COMPOUND PLAN

SCALE: 1" = 15'

APPROXIMATE NORTH

GRAPHIC SCALE

(IN FEET)
1 inch = 15 ft



TOWER AND GEOTECH NOTES:

1. 123' TALL MONOPOLE TOWER STRUCTURE DESIGNED AND MANUFACTURED BY SABRE TOWERS AND POLES.
2. REFER TO STRUCTURAL DESIGN ANALYSIS OF TOWER AS PREPARED BY SABRE INDUSTRIES. DATED 07/13/15 PROJECT NUMBER: 15-7133-SCB.
3. REFER TO MAT FOUNDATION DESIGN AS PREPARED BY CENTEK ENGINEERING, INC. DATED 08/03/15 PROJECT NUMBER: 14216.000
4. REFER TO GEOTECHNICAL EVALUATION AS PREPARED BY DESIGN EARTH TECHNOLOGY (DET), DATED FEBRUARY 19, 2016. DET JOB NO.: 2015.13

2 / C-2 WEST ELEVATION

SCALE: 1" = 10'

GRAPHIC SCALE

(IN FEET)
1 inch = 10 ft

REV.	DATE	DRAWN BY	CHK'D BY	DESCRIPTION
0	08/10/15	RAMJR	DMD	D&M PLANS - ISSUED FOR CLIENT REVIEW
1	08/20/15	THAR	DMD	D&M PLANS

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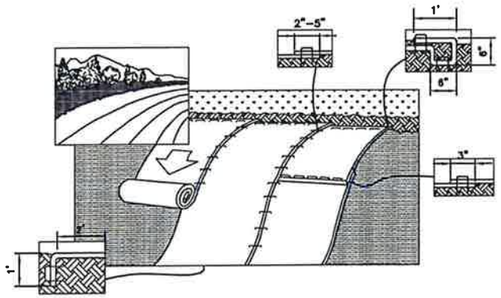
COMPOUND PLAN, ELEVATION AND ANTENNA MOUNTING CONFIG.

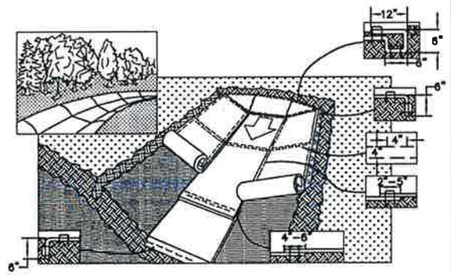
C-2

Sheet No. 4 of 8

EROSION CONTROL BLANKET STABILIZATION



4 / C-3 TYPICAL EROSION MAT INSTALLATION ON SLOPE
NOT TO SCALE



5 / C-3 TYPICAL EROSION MAT INSTALLATION IN CHANNEL
NOT TO SCALE

STABILIZATION CRITERIA

1. CONTRACTOR SHALL IMPLEMENT EROSION CONTROL BLANKET SLOPE STABILIZATION & SWALE CONSTRUCTION WHEN STABLE EARTH CUTS ARE PREVALENT (IN LOCATIONS WITHOUT LEDGE OR LARGE AMOUNTS OF SUBGRADE ROCK)

STABILIZATION PRODUCT SPECIFICATION

NORTH AMERICAN GREEN, PRODUCT NUMBER S150BN, 12 MONTH BIODEGARDABLE.

EROSION MAT ON SLOPES

1. PREPARE SOIL BEFORE INSTALLING BLANKETS, INCLUDING ANY NECESSARY APPLICATION OF LIME, FERTILIZER, AND SEED.

   NOTE: WHEN USING CELL-O-SEED DO NOT SEED PREPARED AREA. CELL-O-SEED MUST BE INSTALLED WITH PAPER SIDE DOWN.

2. BEGIN AT THE TOP OF THE SLOPE BY ANCHORING THE BLANKET IN A 6" DEEP BY 6" WIDE TRENCH WITH APPROXIMATELY 12" OF BLANKET EXTENDED BEYOND THE UP-SLOPE PORTION OF THE TRENCH. ANCHOR THE BLANKET WITH A ROW OF STAPLES/STAKES APPROXIMATELY 12" APART IN THE BOTTOM OF THE TRENCH. BACKFILL AND COMPACT THE TRENCH AFTER STAPLING. APPLY SEED TO COMPACTED SOIL AND FOLD REMAINING 12" PORTION OF BLANKET BACK OVER SEED AND COMPACTED SOIL. SECURE BLANKET OVER COMPACTED SOIL WITH A ROW OF STAPLE/STAKES SPACED APPROXIMATELY 12" APART ACROSS THE WIDTH OF THE BLANKET.

3. ROLL THE BLANKET DOWN OR HORIZONTALLY ACROSS THE SLOPE. BLANKET WILL UNROLL WITH APPROPRIATE SIDE AGAINST THE SOIL SURFACE. ALL ROLLED EROSION CONTROL BLANKETS MUST BE SECURELY FASTENED TO SOIL SURFACE BY PLACING STAPLES/STAKES IN APPROPRIATE LOCATIONS AS SHOWN IN THE STAPLE PATTERN GUIDE. WHEN USING THE DOT SYSTEM[TM], STAPLES/STAKES SHOULD BE PLACED THROUGH EACH OF THE COLORED DOTS CORRESPONDING TO THE APPROPRIATE STAPLE PATTERN.

4. THE EDGES OF PARALLEL BLANKETS MUST BE STAPLED WITH APPROXIMATELY A 2"-5" OVERLAP DEPENDING ON BLANKET TYPE.

5. CONSECUTIVE ROLLED EROSION CONTROL BLANKET SPLICED DOWN THE SLOPE MUST BE PLACED END OVER END (SINGLE STYLE) WITH AN APPROXIMATE 3" OVERLAP. STAPLE THROUGH OVERLAPPED AREA, APPROXIMATELY 12" APART ACROSS ENTIRE BLANKET WIDTH.

   * IN LOOSE SOIL CONDITIONS, THE USE OF STAPLE OR STAKE LENGTHS GREATER THAN 8" MAY BE NECESSARY TO PROPERLY SECURE THE BLANKET.

6. THE EDGE OF THE BLANKET IS TO EXTEND A MINIMUM 24 INCHES BEYOND THE TOE OF THE SLOPE AND ANCHORED BY PLACING THE STAPLES/STAKES IN A 12 INCH DEEP x 6 INCH WIDE ANCHOR TRENCH. ANCHOR THE BLANKET WITH A ROW OF STAPLES/STAKES SPACED APPROXIMATELY 12 INCH APART IN THE TRENCH. BACKFILL AND COMPACT THE TRENCH AFTER STAPLING (STONE OR SOIL MAY BE USED AS BACKFILL).

7. REFER TO MANUFACTURERS STAPLE GUIDE FOR CORRECT STAPLE PATTERN. MINIMUM 4 SPIKES PER ONE SQ. FT.

EROSION MAT IN CHANNEL

1. PREPARE SOIL BEFORE INSTALLING BLANKETS, INCLUDING ANY NECESSARY APPLICATION OF LIME, FERTILIZER, AND SEED.

2. BEGIN AT THE TOP OF THE CHANNEL BY ANCHORING THE BLANKET IN A 6" DEEP BY 6" WIDE TRENCH WITH APPROXIMATELY 12" OF BLANKET EXTENDED BEYOND THE UP-SLOPE PORTION OF THE TRENCH. ANCHOR THE BLANKET WITH A ROW OF STAPLES/STAKES APPROXIMATELY 12" APART IN THE BOTTOM OF THE TRENCH. BACKFILL AND COMPACT THE TRENCH AFTER STAPLING. APPLY SEED TO COMPACTED SOIL AND FOLD REMAINING 12" PORTION OF BLANKET BACK OVER SEED AND COMPACTED SOIL. SECURE BLANKET OVER COMPACTED SOIL WITH A ROW OF STAPLE/STAKES SPACED APPROXIMATELY 12" APART ACROSS THE WIDTH OF THE BLANKET.

3. ROLL CENTER BLANKET IN DIRECTION OF WATER FLOW IN BOTTOM OF CHANNEL. BLANKETS WILL UNROLL WITH APPROPRIATE SIDE AGAINST THE SOIL SURFACE. ALL BLANKETS MUST BE SECURELY FASTENED TO SOIL SURFACE BY PLACING STAPLES/STAKES IN APPROPRIATE LOCATIONS AS SHOWN IN THE STAPLE PATTERN GUIDE. WHEN USING THE DOT SYSTEM[TM], STAPLES/STAKES SHOULD BE PLACED THROUGH EACH OF THE COLORED DOTS CORRESPONDING TO THE APPROPRIATE STAPLE PATTERN.

4. PLACE CONSECUTIVE BLANKETS END OVER END (SHINGLE STYLE) WITH A 4"-6" OVERLAP. USE A DOUBLE ROW OF STAPLES STAGGERED 4" APART AND 4" ON CENTER TO SECURE BLANKETS.

5. FULL LENGTH EDGE OF BLANKETS AT TOP OF SIDE SLOPES MUST BE ANCHORED WITH A ROW OF STAPLES/STAKES APPROXIMATELY 12" APART IN A 6" DEEP BY 6" WIDE TRENCH. BACKFILL AND COMPACT THE TRENCH AFTER STAPLING.

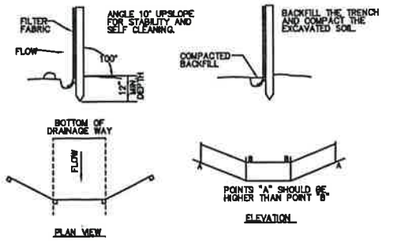
6. ADJACENT BLANKETS MUST BE OVERLAPPED APPROXIMATELY 2"- 5" AND STAPLED TO ENSURE PROPER SEAM ALIGNMENT. PLACE THE EDGE OF THE OVERLAPPING BLANKET (BLANKET BEING INSTALLED ON TOP) EVEN WITH THE COLORED SEAM STITCH[TM] ON THE BLANKET BEING OVERLAPPED.

7. THE TERMINAL END OF THE BLANKETS MUST BE ANCHORED WITH A ROW OF STAPLES/STAKES APPROXIMATELY 12" APART IN A 6" DEEP BY 6" WIDE TRENCH. BACKFILL AND COMPACT THE TRENCH AFTER STAPLING.

8. REFER TO MANUFACTURERS STAPLE GUIDE FOR CORRECT STAPLE PATTERN. MINIMUM 4 SPIKES PER ONE SQ. FT. THE CONTRACTOR SHALL MAINTAIN THE BLANKET UNTIL ALL WORK ON THE CONTRACT HAS BEEN COMPLETED AND ACCEPTED. MAINTENANCE SHALL CONSIST OF THE REPAIR OF AREAS WHERE DAMAGED BY ANY CAUSE. ALL DAMAGED AREAS SHALL BE REPAIRED TO REESTABLISH THE CONDITIONS AND GRADE OF THE SOIL PRIOR TO APPLICATION OF THE COVERING AND SHALL BE REFERTILIZED, RESEEDED, AND REMULCHED AS DIRECTED.

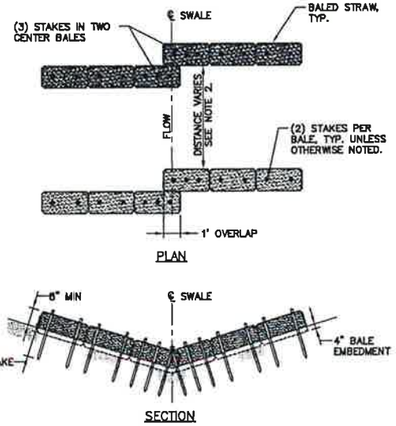
MAINTENANCE

THE CONTRACTOR SHALL MAINTAIN THE BLANKET UNTIL ALL WORK ON THE CONTRACT HAS BEEN COMPLETED AND ACCEPTED. MAINTENANCE SHALL CONSIST OF THE REPAIR OF AREAS WHERE DAMAGED BY ANY CAUSE. ALL DAMAGED AREAS SHALL BE REPAIRED TO RE-ESTABLISH THE CONDITIONS AND GRADE OF THE SOIL PRIOR TO APPLICATION OF THE COVERING AND SHALL BE REFERTILIZED, RESEEDED, AND REMULCHED AS DIRECTED.



SOURCE: U.S. DEPARTMENT OF AGRICULTURE, SOIL CONSERVATION SERVICE, STORRS, CONNECTICUT

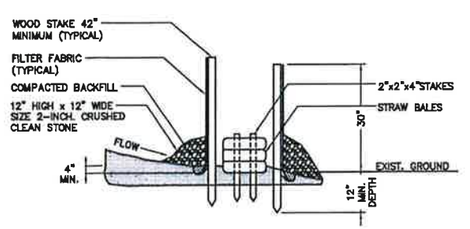
3 / C-3 SILTATION FENCE DETAIL
NOT TO SCALE



NOTES:

1. CHECKDAM SHALL BE INSTALLED IN LOCATIONS INDICATED ON SITE PLAN (SHEET C-1A) IN DRAINAGE SWALE WITH BED WIDTHS OF 2 FEET OR LESS.
2. THE DISTANCE BETWEEN STRAW BALE CHECKDAMS SHALL BE DETERMINED BY THE SLOPE OF THE SWALE. CHECKDAMS SHALL BE SET AT EVERY 2 FEET DROP IN SWALE ELEVATION.
3. BALES SHALL BE INSPECTED PERIODICALLY AND AFTER ALL STORM EVENTS AND REPAIR OR REPLACEMENT SHALL BE PERFORMED PROMPTLY AS NEEDED.
4. INSTALL 3 STAKES PER BALE WITHIN SWALE BED AREAS.

2 / C-3 TYP. STRAW BALE CHECKDAM (NARROW SWALE)
NOT TO SCALE



1 / C-3 SILTATION FENCE/STRAW BALE SILTATION FENCE "SANDWICH" EROSION CONTROL
NOT TO SCALE

GENERAL CONSTRUCTION / PRE-CONSTRUCTION NOTES

1. PRIOR TO COMMENCEMENT OF ANY CONSTRUCTION ACTIVITIES, A MANDITORY ON-SITE PRE-CONSTRUCTION MEETING SHALL BE CONDUCTED WITH THE VERIZON WIRELESS CONSTRUCTION MANAGER, CONTRACTOR'S CONSTRUCTION MANAGER, THE PROJECT EROSION AND SEDIMENTATION CONTROL/ENVIRONMENTAL MONITOR AND THE ENGINEER OF RECORD.

GENERAL CONSTRUCTION SEQUENCE

THIS IS A GENERAL CONSTRUCTION SEQUENCE OUTLINE SOME ITEMS OF WHICH MAY NOT APPLY TO PARTICULAR SITES.

1. CUT AND STUMP AREAS OF PROPOSED CONSTRUCTION.
2. INSTALL TEMPORARY SEDIMENT AND EROSION CONTROL MEASURES AS REQUIRED.
3. REMOVE AND STOCKPILE TOPSOIL. STOCKPILE SHALL BE SEEDED TO PREVENT EROSION.
4. CONSTRUCT CLOSED DRAINAGE SYSTEM. PRECEPT CULVERT INLETS AND CATCH BASINS WITH SEDIMENTATION BARRIERS.
5. CONSTRUCT ROADWAYS AND PERFORM SITE GRADING, PLACING HAY BALES AND SILTATION FENCES AS REQUIRED TO CONTROL SOIL EROSION.
6. INSTALL UNDERGROUND UTILITIES.
7. BEGIN TEMPORARY AND PERMANENT SEEDING AND MULCHING. ALL CUT AND FILL SLOPES SHALL BE SEEDED OR MULCHED IMMEDIATELY AFTER THEIR CONSTRUCTION. NO AREA SHALL BE LEFT UNSTABILIZED FOR A TIME PERIOD OF MORE THAN 30 DAYS.
8. DAILY, OR AS REQUIRED, CONSTRUCT, INSPECT, AND IF NECESSARY, RECONSTRUCT TEMPORARY BERMS, DRAINS, DITCHES, SILT FENCES AND SEDIMENT TRAPS INCLUDING MULCHING AND SEEDING.
9. BEGIN EXCAVATION FOR AND CONSTRUCTION OF TOWERS AND PLATFORMS.
10. FINISH PAVING ALL ROADWAYS, DRIVES, AND PARKING AREAS.
11. COMPLETE PERMANENT SEEDING AND LANDSCAPING.
12. NO FLOW SHALL BE DIVERTED TO ANY WETLANDS UNTIL A HEALTHY STAND OF GRASS HAS BEEN ESTABLISHED IN REGARDED AREAS.
13. AFTER GRASS HAS BEEN FULLY GERMINATED IN ALL SEEDED AREAS, REMOVE ALL TEMPORARY EROSION CONTROL MEASURES.

SOIL EROSION AND SEDIMENT CONTROL SEQUENCE

1. ALL SOIL EROSION AND SEDIMENT CONTROL MEASURES, SUCH AS CONSTRUCTION ENTRANCE / ANTI TRACKING PAD, SILTATION FENCE, AND SILTATION FENCE / HAY BALE SHALL BE IN PLACE PRIOR TO ANY GRADING ACTIVITY, INSTALLATION OF PROPOSED STRUCTURES OR UTILITIES. MEASURES SHALL BE LEFT IN PLACE AND MAINTAINED UNTIL CONSTRUCTION IS COMPLETED AND/OR AREA IS STABILIZED.
2. THE ENTRANCE TO THE PROJECT SITE IS TO BE PROTECTED BY STONE ANTI TRACKING PAD OF ASTM C-33, SIZE NO. 2 OR 3, OR D.O.T. 2" CRUSHED GRAVEL. THE STONE ANTI TRACKING PAD IS TO BE MAINTAINED AT ALL TIMES DURING THE CONSTRUCTION PERIOD.
3. LAND DISTURBANCE WILL BE KEPT TO A MINIMUM AND RESTABILIZATIONS WILL BE SCHEDULED AS SOON AS PRACTICAL.
4. ALL SOIL EROSION AND SEDIMENT CONTROL WORK SHALL BE DONE IN STRICT ACCORDANCE WITH THE CONNECTICUT GUIDELINES FOR EROSION AND SEDIMENT CONTROL INCLUDING THE LATEST DATE FROM THE COUNCIL ON SOIL AND WATER CONSERVATION.
5. ANY ADDITIONAL EROSION/SEDIMENTATION CONTROL DEEMED NECESSARY BY TOWN STAFF DURING CONSTRUCTION, SHALL BE INSTALLED BY THE DEVELOPER. IN ADDITION, THE DEVELOPER SHALL BE RESPONSIBLE FOR THE REPAIR/REPLACEMENT/MAINTENANCE OF ALL EROSION CONTROL MEASURES UNTIL ALL DISTURBED AREAS ARE STABILIZED TO THE SATISFACTION OF THE TOWN STAFF.
6. IN ALL AREAS, REMOVAL OF TREES, BUSHES AND OTHER VEGETATION AS WELL AS DISTURBANCE OF THE SOIL IS TO BE KEPT TO AN ABSOLUTE MINIMUM WHILE ALLOWING PROPER DEVELOPMENT OF THE SITE. DURING CONSTRUCTION, EXPOSE AS SMALL AN AREA OF SOIL AS POSSIBLE FOR AS SHORT A TIME AS POSSIBLE.
7. SILTATION FENCE SHALL BE PLACED AS INDICATED BEFORE A CUT SLOPE HAS BEEN CREATED. SEDIMENT DEPOSITS SHOULD BE PERIODICALLY REMOVED FROM THE UPSTREAM SIDES OF SILTATION FENCE. THIS MATERIAL IS TO BE SPREAD AND STABILIZED IN AREAS NOT SUBJECT TO EROSION, OR TO BE USED IN AREAS WHICH ARE NOT TO BE PAVED OR BUILT ON. SILTATION FENCE IS TO BE REPLACED AS NECESSARY TO PROVIDE PROPER FILTERING ACTION. THE FENCE IS TO REMAIN IN PLACE AND BE MAINTAINED TO INSURE EFFICIENT SILTATION CONTROL UNTIL ALL AREAS ABOVE THE EROSION CHECKS ARE STABILIZED AND VEGETATION HAS BEEN ESTABLISHED.
8. SWALE DISCHARGE AREA WILL BE PROTECTED WITH RIP RAP SPLASH PAD/ ENERGY DISSIPATER.
9. ALL FILL AREAS SHALL BE COMPACTED SUFFICIENTLY FOR THEIR INTENDED PURPOSE AND AS REQUIRED TO REDUCE SLIPPING, EROSION OR EXCESS SATURATION.
10. THE SOIL SHALL NOT BE PLACED WHILE IN A FROZEN OR MUDDY CONDITION, WHEN THE SUBGRADE IS EXCESSIVELY WET, OR IN A CONDITION THAT MAY OTHERWISE BE DETRIMENTAL TO PROPER GRADING OR PROPOSED SODDING OR SEEDING.
11. AFTER CONSTRUCTION IS COMPLETE AND GROUND IS STABLE, REMOVE SILTS IN THE RIP RAP ENERGY DISSIPATERS. REMOVE OTHER EROSION AND SEDIMENT DEVICES.

CONSTRUCTION SPECIFICATIONS - SILT FENCE

1. THE GEOTEXTILE FABRIC SHALL MEET THE DESIGN CRITERIA FOR SILT FENCES.
2. THE FABRIC SHALL BE EMBEDDED A MINIMUM OF 8 INCHES INTO THE GROUND AND THE SOIL COMPACTED OVER THE EMBEDDED FABRIC.
3. WOVEN WIRE FENCE SHALL BE FASTENED SECURELY TO THE FENCE POSTS WITH WIRE TIES OR STAPLES.
4. FILTER CLOTH SHALL BE FASTENED SECURELY TO THE WOVEN WIRE FENCE WITH TIES SPACED EVERY 24 INCHES AT THE TOP, MID-SECTION AND BOTTOM.
5. WHEN TWO SECTIONS OF FILTER CLOTH ADJOIN EACH OTHER, THEY SHALL BE OVERLAPPED BY 6 INCHES, FOLDED, AND STAPLED.
6. FENCE POSTS SHALL BE A MINIMUM OF 36 INCHES LONG AND DRIVEN A MINIMUM OF 16 INCHES INTO THE GROUND. WOOD POSTS SHALL BE OF SOUND QUALITY HARDWOOD AND SHALL HAVE A MINIMUM CROSS SECTIONAL AREA OF 3.0 SQUARE INCHES.
7. MAINTENANCE SHALL BE PERFORMED AS NEEDED TO PREVENT BUILD UP IN THE SILT FENCE DUE TO DEPOSITION OF SEDIMENT.

MAINTENANCE - SILT FENCE

1. SILT FENCES SHALL BE INSPECTED IMMEDIATELY AFTER EACH RAINFALL AND AT LEAST DAILY DURING PROLONGED RAINFALL. ANY REPAIRS THAT ARE REQUIRED SHALL BE MADE IMMEDIATELY.
2. IF THE FABRIC ON A SILT FENCE SHOULD DECOMPOSE OR BECOME INEFFECTIVE DURING THE EXPECTED LIFE OF THE FENCE, THE FABRIC SHALL BE REPLACED PROMPTLY.
3. SEDIMENT SHOULD BE INSPECTED AFTER EVERY STORM EVENT. THE DEPOSITS SHOULD BE REMOVED WHEN THEY REACHED APPROXIMATELY ONE-HALF THE HEIGHT OF THE BARRIER.
4. SEDIMENT DEPOSITS THAT ARE REMOVED OR LEFT IN PLACE AFTER THE FABRIC HAS BEEN REMOVED SHALL BE GRADED TO CONFORM WITH THE EXISTING TOPOGRAPHY AND VEGETATED.

NO.	DATE	DRAWN BY	CHK'D BY	DESCRIPTION
0	05/10/16	KMARK	DMD	DRAFT PLANS - ISSUED FOR CLIENT REVIEW
1	06/16	HAR	DMD	DRAFT PLANS

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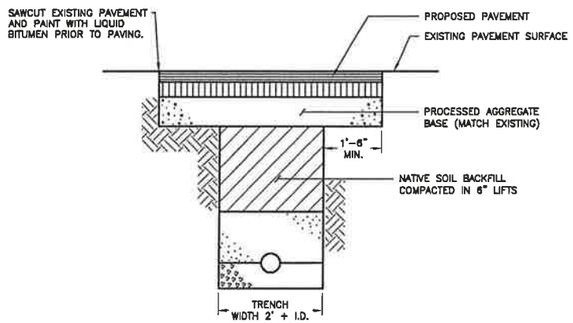
JOB NO. 14218.000

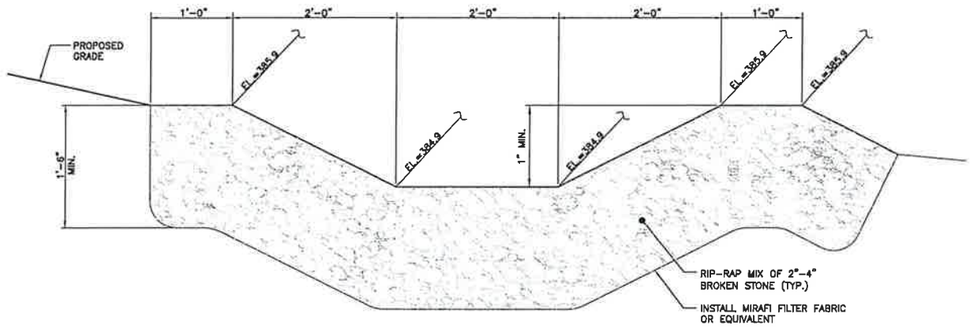
SITE CONSTRUCTION, S&E CONTROL NOTES & DETAILS

C-3
Sheet No. 5 of 5



7 C-4 TYPICAL TRENCH AND PAVEMENT REPAIR DETAIL

NOT TO SCALE



6 C-4 LEVEL SPREADER SECTION

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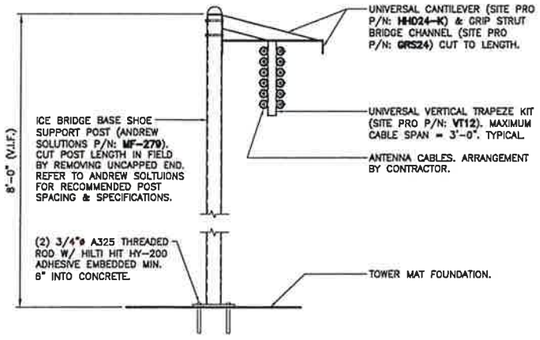

4 C-4 ICE BRIDGE DETAIL

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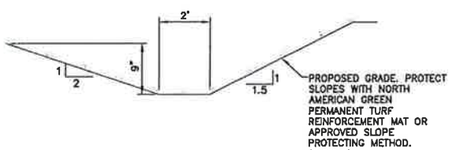

5 C-4 TYPICAL SWALE SECTION

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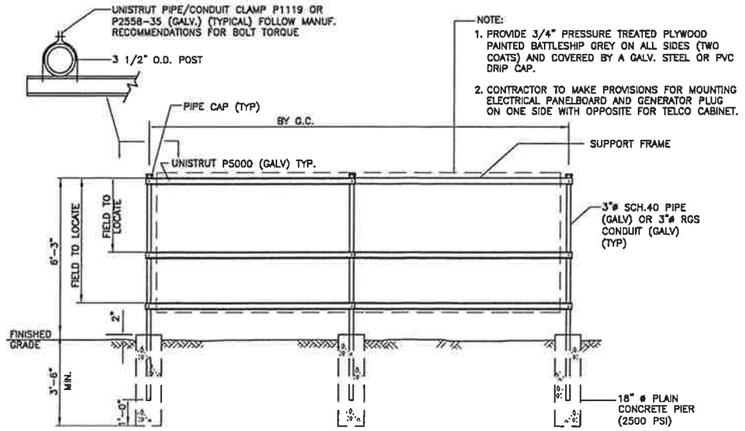

3 C-4 UTILITY SUPPORT FRAME (TYP)

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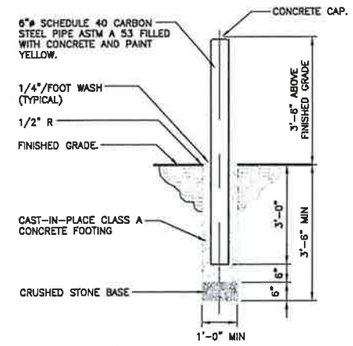
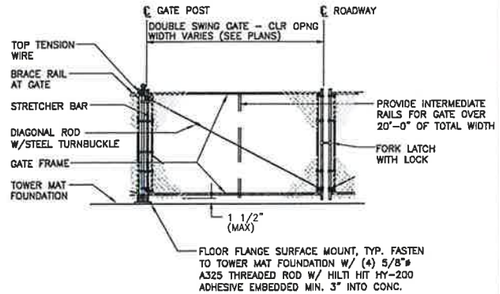


2 C-4 BOLLARD DETAIL

NOT TO SCALE

WOVEN WIRE FENCE NOTES

1. GATE POST, CORNER, TERMINAL OR PULL POST 2 1/2" ø SCHEDULE 40 FOR GATE WIDTHS UP THRU 8 FEET OR 12 FEET FOR DOUBLE SWING GATE PER ASTM-F1083.
2. LINE POST: 2" ø SCHEDULE 40 PIPE PER ASTM-F1083.
3. GATE FRAME: 1 1/2" ø SCHEDULE 40 PIPE PER ASTM-F1083.
4. TOP RAIL & BRACE RAIL: 1 1/2" ø SCHEDULE 40 PIPE PER ASTM-F1083.
5. FABRIC: 12 GA. CORE WIRE SIZE 1-1/4" MESH, CONFORMING TO ASTM-A392.
6. TIE WIRE: MINIMUM 11 GA. GALVANIZED STEEL AT POSTS AND RAILS A SINGLE WRAP OF FABRIC TIE AND AT TENSION WIRE BY HOG RINGS SPACED MAX 24" INTERVALS.
7. TENSION WIRE: 7 GA. GALVANIZED STEEL.
8. GATE LATCH: DROP DOWN LOCKABLE FORK LATCH AND LOCK, KEYED ALIKE FOR ALL SITES IN A GIVEN MTA.
9. LOCAL ORDINANCE OF BARBED WIRE PERMIT REQUIREMENT SHALL BE COMPLIED WITH IF REQUIRED.
10. HEIGHT = 8' VERTICAL
11. PRIVACY SCREENING: 8' TALL BLACK MESH PRIVACY SCREENING (95% SIGHT BLOCK)



1A C-4 WOVEN WIRE SWING GATE-DOUBLE

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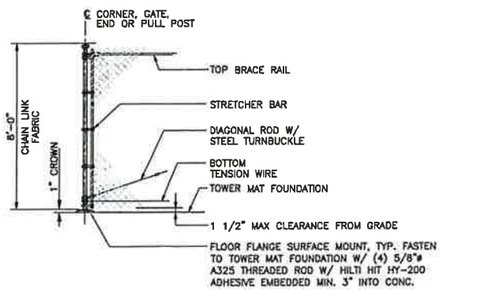

TYPICAL SECTION

1 C-4 WOVEN WIRE FENCE DETAIL

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		DMD	DESCRIPTION
		DMD	DBM PLANS - ISSUED FOR CLIENT REVIEW
		DBM PLANS	

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DRAINAGE CONTROL AND SITE DETAILS

C-4

Sheet No. 6 of 8

ENVIRONMENTAL NOTES

EASTERN BOX TURTLE, WOOD TURTLE AND WETLAND PROTECTION PROGRAM

EASTERN BOX TURTLE AND WOOD TURTLE, BOTH STATE SPECIAL CONCERN SPECIES AFFORDED PROTECTION UNDER THE CONNECTICUT ENDANGERED SPECIES ACT, ARE KNOWN TO OCCUR WITHIN THE VICINITY OF THE SITE. THE FOLLOWING RARE SPECIES PROTECTIVE MEASURES SATISFY REQUIREMENTS FROM THE CONNECTICUT DEPARTMENT OF ENERGY & ENVIRONMENTAL PROTECTION ("CTDEEP") WILDLIFE DIVISION IN ACCORDANCE WITH THEIR LETTER DATED FEBRUARY 8, 2015. THE RARE SPECIES PORTION OF THIS PROTECTION PLAN IS VALID UNTIL MAY 24, 2017, AT WHICH POINT IF CONSTRUCTION HAS NOT BEEN INITIATED A NEW NATURAL DIVERSITY DATA BASE REVIEW REQUEST FROM CTDEEP IS REQUIRED.

IN ADDITION, THE PROPOSED PROJECT IS LOCATED IN CLOSE PROXIMITY TO WETLAND RESOURCE AREAS. AS A RESULT, THE FOLLOWING PROTECTIVE MEASURES INCLUDE PROTOCOLS TO BE FOLLOWED TO HELP AVOID POTENTIAL DEGRADATION OF NEARBY WETLAND/WATERCOURSE RESOURCES DURING CONSTRUCTION ACTIVITIES.

BOG TURTLE, A FEDERALLY THREATENED AND STATE ENDANGERED SPECIES, IS KNOWN TO OCCUR IN THE VICINITY OF THE PROJECT AREA. ALTHOUGH IT IS UNLIKELY THAT BOG TURTLE WOULD BE ENCOUNTERED DURING CONSTRUCTION, THE TURTLE AND WETLAND PROTECTION MEASURES CONTAINED HEREIN WILL AFFORD PROTECTION TO BOG TURTLE AND ITS NEARBY HABITAT.

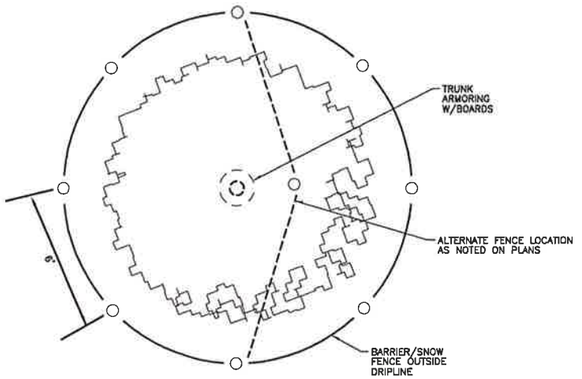
IT IS OF THE UTMOST IMPORTANCE THAT THE CONTRACTOR COMPLIES WITH THE REQUIREMENT FOR IMPLEMENTATION OF THESE PROTECTIVE MEASURES AND THE EDUCATION OF ITS EMPLOYEES AND SUBCONTRACTORS PERFORMING WORK ON THE PROJECT SITE. THE RARE SPECIES PORTION OF THIS PROTECTION PLAN SHALL BE IMPLEMENTED IF WORK WILL OCCUR DURING THE TURTLE'S ACTIVE PERIODS (APRIL 1 TO NOVEMBER 15). THE WETLAND PROTECTION PORTION OF THIS PLAN SHALL BE IMPLEMENTED REGARDLESS OF THE TIME OF YEAR. ALL-POINTS TECHNOLOGY CORPORATION, P.C. ("APT") WILL SERVE AS THE ENVIRONMENTAL MONITOR FOR THIS PROJECT TO ENSURE THAT THESE PROTECTION MEASURES ARE IMPLEMENTED PROPERLY AND WILL PROVIDE AN EDUCATION SESSION ON RARE SPECIES THAT MAY BE ENCOUNTERED AND THE PROJECT'S PROXIMITY TO SENSITIVE WETLAND RESOURCES PRIOR TO THE START OF CONSTRUCTION ACTIVITIES. THE CONTRACTOR SHALL CONTACT DEAN GUSTAFSON, SENIOR ENVIRONMENTAL SCIENTIST AT APT, AT LEAST 5 BUSINESS DAYS PRIOR TO THE PRE-CONSTRUCTION MEETING. MR. GUSTAFSON CAN BE REACHED BY PHONE AT (860) 663-1697 EXT. 201 OR VIA EMAIL AT DGUSTAFSON@ALLPOINTSTECH.COM.

THE PROPOSED PROTECTION PROGRAM CONSISTS OF SEVERAL COMPONENTS: EDUCATION OF ALL CONTRACTORS AND SUB-CONTRACTORS PRIOR TO INITIATION OF WORK ON THE SITE; PROTECTIVE MEASURES; PERIODIC INSPECTION OF THE CONSTRUCTION PROJECT; AND, REPORTING.

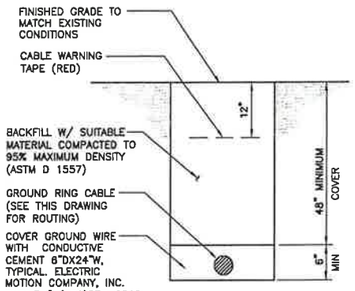
1. ISOLATION MEASURES & SEDIMENTATION AND EROSION CONTROLS
   - a. PLASTIC NETTING USED IN A VARIETY OF EROSION CONTROL PRODUCTS (I.E., EROSION CONTROL BLANKETS, FIBER ROLLS [WATTLES], REINFORCED SILT FENCE) HAS BEEN FOUND TO ENTANGLE WILDLIFE, INCLUDING REPTILES, AMPHIBIANS, BIRDS AND SMALL MAMMALS, BUT PARTICULARLY SNAKES. NO PERMANENT EROSION CONTROL PRODUCTS OR REINFORCED SILT FENCE WILL BE USED ON THE VERIZON WIRELESS PROJECT. TEMPORARY EROSION CONTROL PRODUCTS WILL USE EITHER EROSION CONTROL BLANKETS AND FIBER ROLLS COMPOSED OF PROCESSED FIBERS MECHANICALLY BOUND TOGETHER TO FORM A CONTINUOUS MATRIX (NETLESS) OR NETTING COMPOSED OF PLANAR WOVEN NATURAL BIODEGRADABLE FIBER TO AVOID/MINIMIZE WILDLIFE ENTANGLEMENT.
   - b. INSTALLATION OF SEDIMENTATION AND EROSION CONTROLS, REQUIRED FOR EROSION CONTROL COMPLIANCE AND CREATION OF A BARRIER TO POSSIBLE MIGRATING/DISPERSING TURTLES, SHALL BE PERFORMED BY THE CONTRACTOR FOLLOWING CLEARING ACTIVITIES AND PRIOR TO ANY EARTHWORK. THE ENVIRONMENTAL MONITOR WILL INSPECT THE WORK ZONE AREA PRIOR TO AND FOLLOWING EROSION CONTROL BARRIER INSTALLATION TO ENSURE THE AREA IS FREE OF EASTERN BOX TURTLE AND WOOD TURTLE AND DOCUMENT BARRIERS HAVE BEEN SATISFACTORILY INSTALLED. THE INTENT OF THE BARRIER IS TO SEGREGATE THE MAJORITY OF THE WORK ZONE AND ISOLATE IT FROM FORAGING/MIGRATING/DISPERSING TURTLES, SNAKES AND OTHER HERPETOFAUNA. OFTENTIMES COMPLETE ISOLATION OF A WORK ZONE IS NOT FEASIBLE DUE TO ACCESSIBILITY NEEDS AND LOCATIONS OF STAGING/MATERIAL STORAGE AREAS, ETC. IN ADDITION, THE PROJECT'S LOCATION ON A CLOSED AND CAPPED LANDFILL LIMITS THE DEPTH OF SOIL DISTURBANCE SO AS NOT TO BREACH THE CAP, ALTHOUGH THE BARRIERS MAY NOT COMPLETELY ISOLATE THE WORK ZONE, THEY WILL BE POSITIONED TO DEFLECT MIGRATING/DISPERSAL ROUTES AWAY FROM THE WORK ZONE TO MINIMIZE POTENTIAL ENCOUNTERS WITH TURTLES, SNAKES AND OTHER HERPETOFAUNA.
   - c. THE CONTRACTOR IS RESPONSIBLE FOR DAILY INSPECTIONS OF THE SEDIMENTATION AND EROSION CONTROLS FOR TEARS OR BREECHES AND ACCUMULATION LEVELS OF SEDIMENT, PARTICULARLY FOLLOWING STORM EVENTS THAT GENERATE A DISCHARGE. APT WILL PROVIDE PERIODIC INSPECTIONS OF THE SEDIMENTATION AND EROSION CONTROLS THROUGHOUT THE DURATION OF CONSTRUCTION ACTIVITIES ONLY AS IT PERTAINS TO PROTECTION OF RARE SPECIES AND NEARBY WETLANDS. THIRD PARTY MONITORING OF SEDIMENTATION AND EROSION CONTROLS WILL BE PERFORMED BY OTHER PARTIES, AS NECESSARY, UNDER APPLICABLE LOCAL, STATE AND/OR FEDERAL REGULATIONS.
   - d. THE EXTENT OF THE SEDIMENTATION AND EROSION CONTROLS WILL BE AS SHOWN ON THE SITE PLANS. THE CONTRACTOR SHALL HAVE ADDITIONAL SEDIMENTATION AND EROSION CONTROLS STOCKPILED ON SITE SHOULD FIELD OR CONSTRUCTION CONDITIONS WARRANT EXTENDING THE CONTROLS AS DIRECTED BY APT.
   - e. NO EQUIPMENT, VEHICLES OR CONSTRUCTION MATERIALS SHALL BE STORED OUTSIDE OF THE SEDIMENTATION AND EROSION CONTROLS WITHIN 100 FEET OF WETLANDS OR WATERCOURSES.
   - f. ALL SEDIMENTATION AND EROSION CONTROLS SHALL BE REMOVED WITHIN 30 DAYS OF COMPLETION OF WORK AND PERMANENT STABILIZATION OF SITE SOILS SO THAT REPTILE AND AMPHIBIAN MOVEMENT BETWEEN UPLANDS AND WETLANDS IS NOT RESTRICTED.
2. CONTRACTOR EDUCATION
   - a. PRIOR TO WORK ON SITE, THE CONTRACTOR SHALL ATTEND AN EDUCATIONAL SESSION AT THE PRE-CONSTRUCTION MEETING WITH APT. THIS ORIENTATION AND EDUCATIONAL SESSION WILL CONSIST OF AN INTRODUCTORY MEETING WITH APT PROVIDING PHOTOS OF EASTERN BOX TURTLE, WOOD TURTLE AND BOG TURTLE EMPHASIZING THE NON-AGGRESSIVE NATURE OF THESE SPECIES, THE ABSENCE OF NEED TO DESTROY ANIMALS THAT MIGHT BE ENCOUNTERED AND THE NEED TO FOLLOW PROTECTIVE MEASURES AS DESCRIBED IN SECTION 4 BELOW. WORKERS WILL ALSO BE PROVIDED INFORMATION REGARDING THE IDENTIFICATION OF OTHER TURTLES, SNAKES AND COMMON HERPETOFAUNA SPECIES THAT COULD BE ENCOUNTERED.
   - b. THE EDUCATION SESSION WILL ALSO FOCUS ON MEANS TO DISCRIMINATE BETWEEN THE SPECIES OF CONCERN AND OTHER NATIVE SPECIES TO AVOID UNNECESSARY "FALSE ALARMS". ENCOUNTERS WITH ANY SPECIES OF TURTLES OR SNAKES WILL BE DOCUMENTED.
   - c. THE CONTRACTOR WILL BE PROVIDED WITH CELL PHONE AND EMAIL CONTACTS FOR APT PERSONNEL TO IMMEDIATELY REPORT ANY ENCOUNTERS WITH EASTERN BOX TURTLE, WOOD TURTLE, BOG TURTLE OR OTHER SPECIES. EDUCATIONAL POSTER MATERIALS WILL BE PROVIDED BY APT AND DISPLAYED ON THE JOB SITE TO MAINTAIN WORKER AWARENESS AS THE PROJECT PROGRESSES.
3. PETROLEUM MATERIALS STORAGE AND SPILL PREVENTION
   - a. CERTAIN PRECAUTIONS ARE NECESSARY TO STORE PETROLEUM MATERIALS, REFUEL AND CONTAIN AND PROPERLY CLEAN UP ANY INADVERTENT FUEL OR PETROLEUM (I.E., OIL, HYDRAULIC FLUID, ETC.) SPILL TO AVOID POSSIBLE IMPACT TO NEARBY HABITATS.
   - b. A SPILL CONTAINMENT KIT CONSISTING OF A SUFFICIENT SUPPLY OF ABSORBENT PADS AND ABSORBENT MATERIAL WILL BE MAINTAINED BY THE CONTRACTOR AT THE CONSTRUCTION SITE THROUGHOUT THE DURATION OF THE PROJECT. IN ADDITION, A WASTE DRUM WILL BE KEPT ON SITE TO CONTAIN ANY USED ABSORBENT PADS/MATERIAL FOR PROPER AND TIMELY DISPOSAL OFF SITE IN ACCORDANCE WITH APPLICABLE LOCAL, STATE AND FEDERAL LAWS.
   - c. THE FOLLOWING PETROLEUM AND HAZARDOUS MATERIALS STORAGE AND REFUELING RESTRICTIONS AND SPILL RESPONSE PROCEDURES WILL BE ADHERED TO BY THE CONTRACTOR.
     - c.a. PETROLEUM AND HAZARDOUS MATERIALS STORAGE AND REFUELING
       - c.a.a. REFUELING OF VEHICLES OR MACHINERY SHALL OCCUR A MINIMUM OF 100 FEET FROM WETLANDS OR WATERCOURSES AND SHALL TAKE PLACE ON AN IMPERVIOUS PAD WITH SECONDARY CONTAINMENT DESIGNED TO CONTAIN FUELS.
       - c.a.b. ANY FUEL OR HAZARDOUS MATERIALS THAT MUST BE KEPT ON SITE SHALL BE STORED ON AN IMPERVIOUS SURFACE UTILIZING SECONDARY CONTAINMENT A MINIMUM OF 100 FEET FROM WETLANDS OR WATERCOURSES.
     - c.b. INITIAL SPILL RESPONSE PROCEDURES
       - c.b.a. STOP OPERATIONS AND SHUT OFF EQUIPMENT.
       - c.b.b. REMOVE ANY SOURCES OF SPARK OR FLAME.
       - c.b.c. CONTAIN THE SOURCE OF THE SPILL.
       - c.b.d. DETERMINE THE APPROXIMATE VOLUME OF THE SPILL.
       - c.b.e. IDENTIFY THE LOCATION OF NATURAL FLOW PATHS TO PREVENT THE RELEASE OF THE SPILL TO SENSITIVE NEARBY WATERWAYS OR WETLANDS.
       - c.b.f. ENSURE THAT FELLOW WORKERS ARE NOTIFIED OF THE SPILL.
     - c.c. SPILL CLEAN UP & CONTAINMENT
       - c.c.a. OBTAIN SPILL RESPONSE MATERIALS FROM THE ON-SITE SPILL RESPONSE KIT. PLACE ABSORBENT MATERIALS DIRECTLY ON THE RELEASE AREA.
       - c.c.b. LIMIT THE SPREAD OF THE SPILL BY PLACING ABSORBENT MATERIALS AROUND THE PERIMETER OF THE SPILL.
       - c.c.c. ISOLATE AND ELIMINATE THE SPILL SOURCE.
       - c.c.d. CONTACT THE APPROPRIATE LOCAL, STATE AND/OR FEDERAL AGENCIES, AS NECESSARY.
       - c.c.e. CONTACT A DISPOSAL COMPANY TO PROPERLY DISPOSE OF CONTAMINATED MATERIALS.
     - c.d. REPORTING
       - c.d.a. COMPLETE AN INCIDENT REPORT.
       - c.d.b. SUBMIT A COMPLETED INCIDENT REPORT TO THE TOWN OF CHESHIRE.
4. SPECIES PROTECTIVE MEASURES
   - a. PRIOR TO THE START OF CONSTRUCTION EACH DAY, THE CONTRACTOR SHALL SEARCH THE ENTIRE WORK AREA FOR TURTLES.
   - b. IF A TURTLE IS FOUND, IT SHALL BE IMMEDIATELY MOVED, UNHARMED, BY CAREFULLY GRASPED IN BOTH HANDS, ONE ON EACH SIDE OF THE SHELL, BETWEEN THE TURTLE'S FORELIMBS AND THE HIND LIMBS, AND PLACED JUST OUTSIDE OF THE ISOLATION BARRIER IN THE SAME APPROXIMATE DIRECTION IT WAS WALKING.
   - c. SPECIAL CARE SHALL BE TAKEN BY THE CONTRACTOR DURING EARLY MORNING AND EVENING HOURS SO THAT POSSIBLE BASKING OR FORAGING TURTLES ARE NOT HARMED BY CONSTRUCTION ACTIVITIES.
5. HERBICIDE AND PESTICIDE RESTRICTIONS
   - a. THE USE OF HERBICIDES AND PESTICIDES AT THE PROPOSED SOLAR FACILITY SHALL BE AVOIDED WHEN POSSIBLE. IN THE EVENT HERBICIDES AND/OR PESTICIDES ARE REQUIRED AT THE PROPOSED FACILITY, THEIR USE WILL BE USED IN ACCORDANCE WITH INTEGRATED PEST MANAGEMENT ("IPM") PRINCIPLES WITH PARTICULAR ATTENTION TO MINIMIZE APPLICATIONS WITHIN 100 FEET OF WETLAND OR WATERCOURSE RESOURCES. NO APPLICATIONS OF HERBICIDES OR PESTICIDES ARE ALLOWED WITHIN ACTUAL WETLAND OR WATERCOURSE RESOURCES.
6. REPORTING
   - a. DAILY COMPLIANCE MONITORING REPORTS (BRIEF NARRATIVE AND APPLICABLE PHOTOS) DOCUMENTING EACH APT INSPECTION WILL BE SUBMITTED BY APT TO VERIZON WIRELESS FOR COMPLIANCE VERIFICATION. ANY OBSERVATIONS OF TURTLES WILL BE INCLUDED IN THE REPORTS.
   - b. FOLLOWING COMPLETION OF THE CONSTRUCTION PROJECT, APT WILL PROVIDE A COMPLIANCE MONITORING SUMMARY REPORT TO VERIZON WIRELESS DOCUMENTING IMPLEMENTATION OF THE RARE SPECIES AND WETLAND PROTECTION PROGRAM, MONITORING AND ANY SPECIES OBSERVATIONS. VERIZON WIRELESS WILL PROVIDE A COPY OF THE COMPLIANCE MONITORING SUMMARY REPORT TO THE CONNECTICUT SITING COUNCIL FOR COMPLIANCE VERIFICATION.
   - c. ANY OBSERVATIONS OF EASTERN BOX TURTLE, WOOD TURTLE OR BOG TURTLE WILL BE REPORTED TO CTDEEP BY APT, WITH PHOTO-DOCUMENTATION (IF POSSIBLE) AND WITH SPECIFIC INFORMATION ON THE LOCATION AND DISPOSITION OF THE ANIMAL.

TREE PROTECTION NOTES

1. ALL TREES SHOWN TO BE RETAINED WITHIN THE LIMITS OF CONSTRUCTION ON THE PLANS, SHALL BE PROTECTED DURING CONSTRUCTION WITH FENCING.
2. TREE PROTECTION FENCES SHALL BE INSTALLED PRIOR TO THE COMMENCEMENT OF ANY SITE PREPARATION WORK (CLEARING, GRUBBING, OR GRADING) AND SHALL BE MAINTAINED THROUGHOUT CONSTRUCTION.
3. FENCES SHALL COMPLETELY SURROUND THE TREE OR CLUSTERS OF TREES, LOCATED AT THE OUTERMOST LIMITS OF THE TREE BRANCHES (DRIPLINE) OR CRITICAL ROOT ZONE, WHICHEVER IS GREATER; AND SHALL BE MAINTAINED THROUGHOUT THE CONSTRUCTION PROJECT IN ORDER TO PREVENT THE FOLLOWING:
   - 3A. SOIL COMPACTION IN CRITICAL ROOT ZONE AREA RESULTING FROM STORAGE OF EQUIPMENT OR MATERIAL.
   - 3B. CRITICAL ROOT ZONE DISTURBANCES DUE TO GRADE CHANGES OR TRENCHING.
   - 3C. WOUNDS TO EXPOSED ROOTS, TRUNK, OR LIMBS BY MECHANICAL EQUIPMENT
   - 3D. OTHER ACTIVITIES DETRIMENTAL TO TREES SUCH AS CONCRETE TRUCK CLEANING, AND FIRES.
4. WHERE ANY OF THE ABOVE EXCEPTIONS RESULT IN A FENCE THAT IS CLOSER THAN 5 FEET TO A TREE TRUNK, THE TRUNK SHALL BE PROTECTED BY STRAPPED-ON PLANKING TO A HEIGHT OF 8 FEET (OR TO THE LIMITS OF LOWER BRANCHING) IN ADDITION TO THE REDUCED FENCING PROVIDED.
5. WHERE ANY OF THE ABOVE EXCEPTIONS RESULT IN AREAS OF UNPROTECTED ROOT ZONES UNDER THE DRIPLINE OR CRITICAL ROOT ZONE WHICHEVER IS GREATER, THOSE AREAS SHOULD BE COVERED WITH 4 INCHES OF ORGANIC MULCH TO MINIMIZE SOIL COMPACTION.
6. ALL GRADING WITHIN CRITICAL ROOT ZONE AREAS SHALL BE DONE BY HAND OR WITH SMALL EQUIPMENT TO MINIMIZE ROOT DAMAGE. PRIOR TO GRADING, RELOCATE PROTECTIVE FENCING TO 2 FEET BEHIND THE GRADE CHANGE AREA.
7. ANY ROOTS EXPOSED BY CONSTRUCTION ACTIVITY SHALL BE PRUNED FLUSH WITH THE SOIL AND BACKFILLED WITH GOOD QUALITY TOP SOIL WITHIN TWO DAYS. IF EXPOSED ROOT AREAS CANNOT BE BACKFILLED WITHIN 2 DAYS, AN ORGANIC MATERIAL WHICH REDUCES SOIL TEMPERATURE AND MINIMIZES WATER LOSS DUE TO EVAPORATION SHALL BE PLACED TO COVER THE ROOTS UNTIL BACKFILL CAN OCCUR.
8. PRIOR TO EXCAVATION OR GRADE CUTTING WITHIN TREE DRIPLINES, A CLEAN CUT SHALL BE MADE WITH A ROCK SAW OR SIMILAR EQUIPMENT, IN A LOCATION AND TO A DEPTH APPROVED BY THE FORESTRY MANAGER, TO MINIMIZE DAMAGE TO REMAINING ROOTS.
9. TREES MOST HEAVILY IMPACTED BY CONSTRUCTION ACTIVITIES WILL BE WATERED DEEPLY ONCE A WEEK DURING PERIODS OF HOT, DRY WEATHER. TREE CROWNS ARE TO BE SPRAYED WITH WATER PERIODICALLY TO REDUCE DUST ACCUMULATION ON LEAVES.
10. NO LANDSCAPE TOPSOIL DRESSING GREATER THAN FOUR (4) INCHES SHALL BE PERMITTED WITHIN THE DRIPLINE OR CRITICAL ROOT ZONE OF TREES, WHICHEVER IS GREATER. NO TOPSOIL IS PERMITTED ON ROOT FLARES OF ANY TREE.

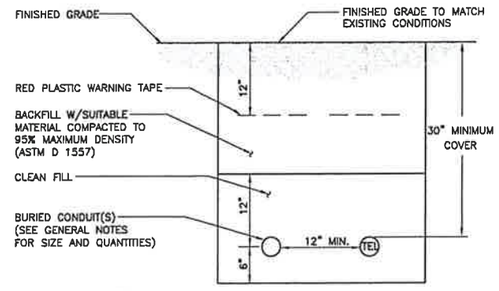


3 C-5 TREE PROTECTION DETAIL
NOT TO SCALE



NOTES:
1. BACK FILL SHALL NOT CONTAIN ASHES, CINDERS, SHELLS, FROZEN MATERIAL, LOOSE DEBRIS OR STONES LARGER THAN 2" IN MAXIMUM DIMENSION.
2. WHERE EXISTING UTILITIES ARE LIKELY TO BE ENCOUNTERED, CONTRACTOR SHALL HAND DIG AND PROTECT EXISTING UTILITIES.

2 C-5 TYPICAL BURIAL GROUND CABLE DETAIL
NOT TO SCALE



NOTES:
1. THE CLEAN FILL SHALL PASS THROUGH A 3/8" MESH SCREEN AND SHALL NOT CONTAIN SHARP STONES. OTHER BACKFILL SHALL NOT CONTAIN ASHES, CINDERS, SHELLS, FROZEN MATERIAL, LOOSE DEBRIS OR STONES LARGER THAN 2" IN MAXIMUM DIMENSION.
2. WHERE EXISTING UTILITIES ARE LIKELY TO BE ENCOUNTERED, CONTRACTOR SHALL HAND DIG AND PROTECT EXISTING UTILITIES.

1 C-5 TYPICAL ELECTRICAL/TEL TRENCH DETAIL
NOT TO SCALE

NO.	DATE	DRAWN BY	CHK'D BY	DESCRIPTION
1	05/10/16	HMR	DMD	DAA PLANS – ISSUED FOR CLIENT REVIEW
0	04/12/16	KAMJR	DMD	DAA PLANS

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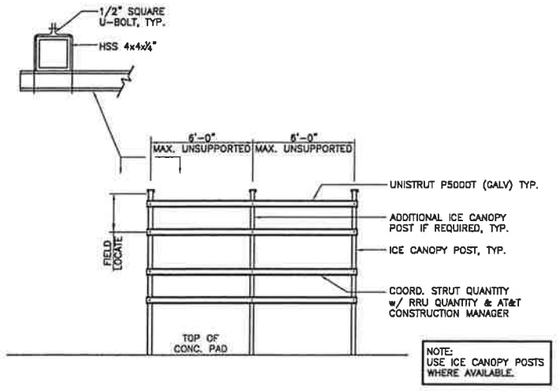
DANBURY, CT 06810

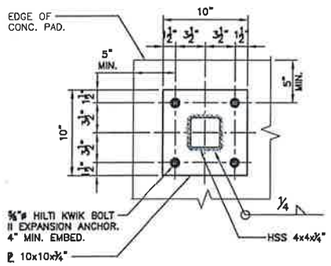
DATE: 04/12/16
SCALE: AS NOTED
JOB NO. 14216.000

SITE DETAILS

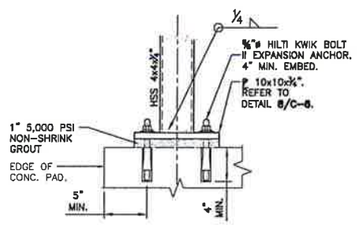
C-5
Sheet No. 7 of 8



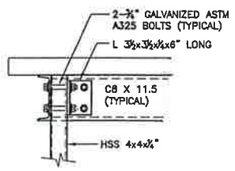
9 C-6 **TYPICAL EQUIPMENT MOUNTING FRAME DETAIL**
NOT TO SCALE



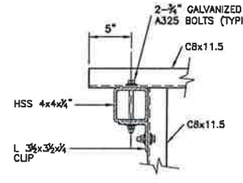
8 C-6 **CANOPY POST BASE PLATE**
SCALE: 1-1/2" = 1'-0"



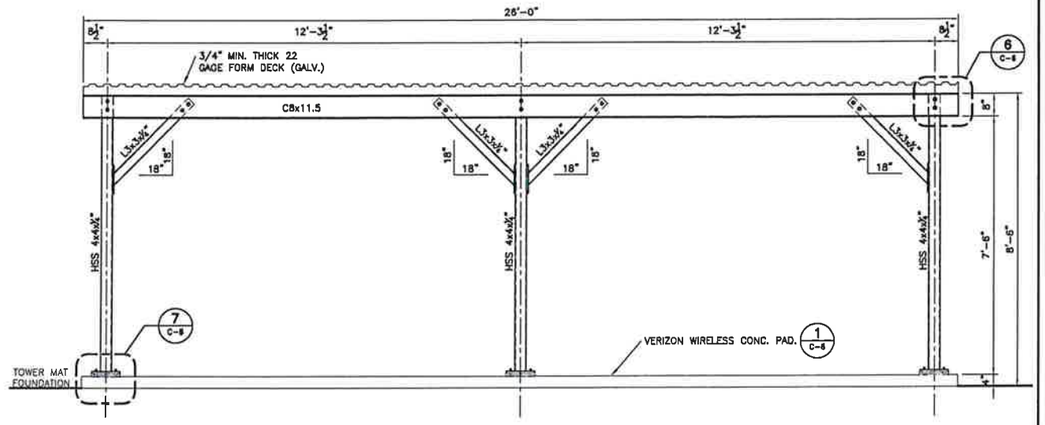
7 C-6 **CANOPY POST CONNECTION**
SCALE: 1-1/2" = 1'-0"



6 C-6 **CANOPY FRAME CONNECTION**
SCALE: 1" = 1'-0"



5 C-6 **CANOPY FRAME CONNECTION**
SCALE: 1-1/2" = 1'-0"



3 C-6 **NORTH CANOPY ELEVATION**
SCALE: 1/2" = 1'-0"

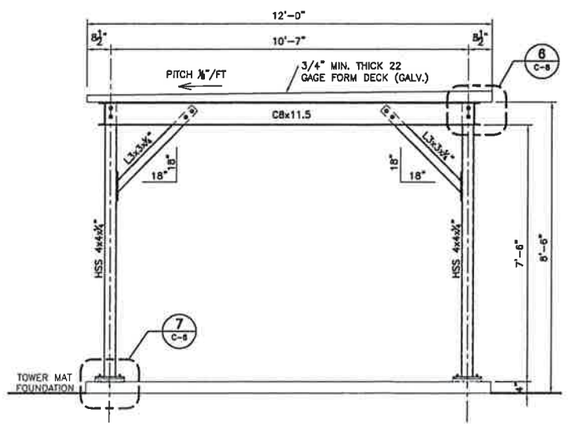
PLAN NOTES AND LEGEND

1. VERIFY ALL DIMENSIONS, ELEVATIONS, EXISTING FRAMING MEMBER SIZES AND GENERAL CONDITIONS PRIOR TO COMMENCEMENT OF WORK. NOTIFY ENGINEER OF RECORD OF ANY DISCREPANCIES BETWEEN THESE DRAWINGS AND EXISTING CONDITIONS.

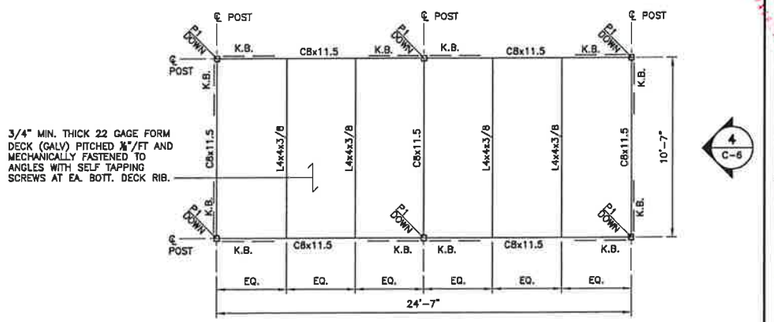
P1 INDICATES HSS4x4x1/4 ASTM A500 GR. B (F_y = 46ksi) STEEL POST.

INDICATES SPAN DIRECTION.

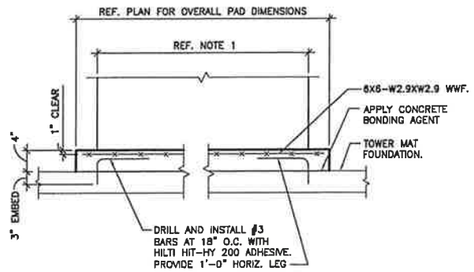
K.B. INDICATES L3x3x1/4 ASTM A36 (Fy=36 KSI) STEEL ANGLE



4 C-6 **EAST CANOPY ELEVATION**
1/2" = 1'-0"



2 C-6 **PLAN - ROOF FRAMING**
SCALE: 1/4" = 1'-0"
APPROXIMATE NORTH



NOTES:

1. ATTACHMENT OF EQUIPMENT TO PAD SHALL BE PER MANUFACTURER'S REQUIREMENTS.
2. COORDINATE WITH CIVIL, MECHANICAL, ELECTRICAL AND PLUMBING DRAWINGS FOR QUANTITY, SIZE AND LOCATION OF EQUIPMENT.

1 C-6 **SLAB ON CONCRETE DETAIL**
N.T.S.

DRAWN BY	DATE	DESCRIPTION
HWR	05/06/16	DAA PLANS
KAW/JW	05/10/16	DAA PLANS – ISSUED FOR CLIENT REVIEW
DND		
DND		

PROFESSIONAL ENGINEER SEAL

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WIRELESS COMMUNICATIONS FACILITY
BETHEL W2
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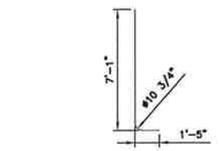
DANBURY, CT 06810

DATE:	04/12/16
SCALE:	AS NOTED
JOB NO.	14216.000

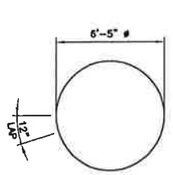
EQUIPMENT PAD AND ICE CANOPY DETAILS

C-6

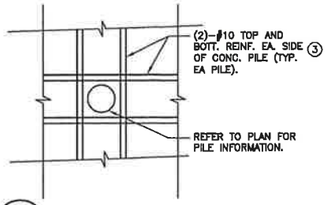
Sheet No. 8 of 8



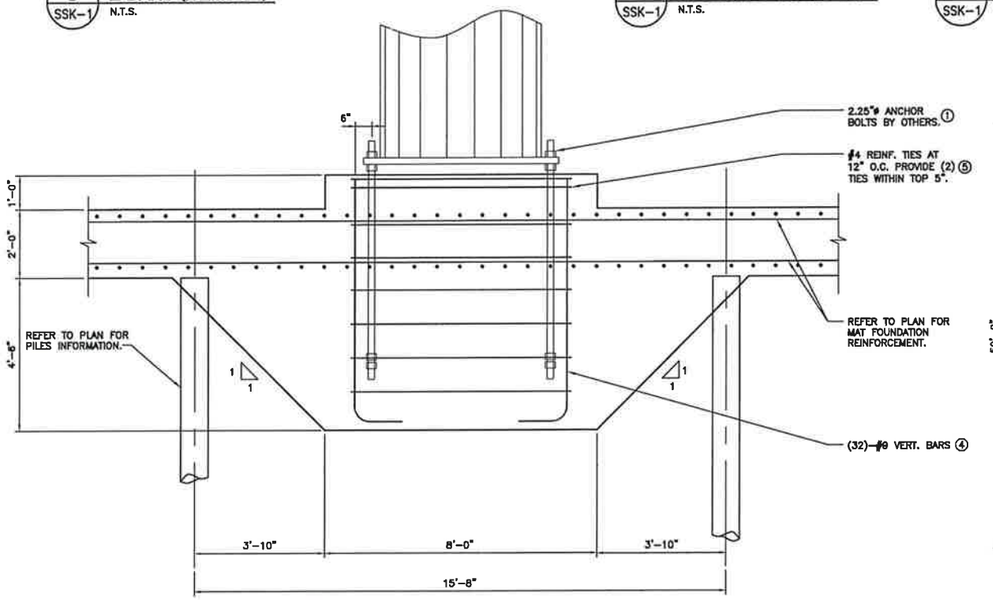
5 SSK-1 **L BARS (ITEMS #4)** N.T.S.



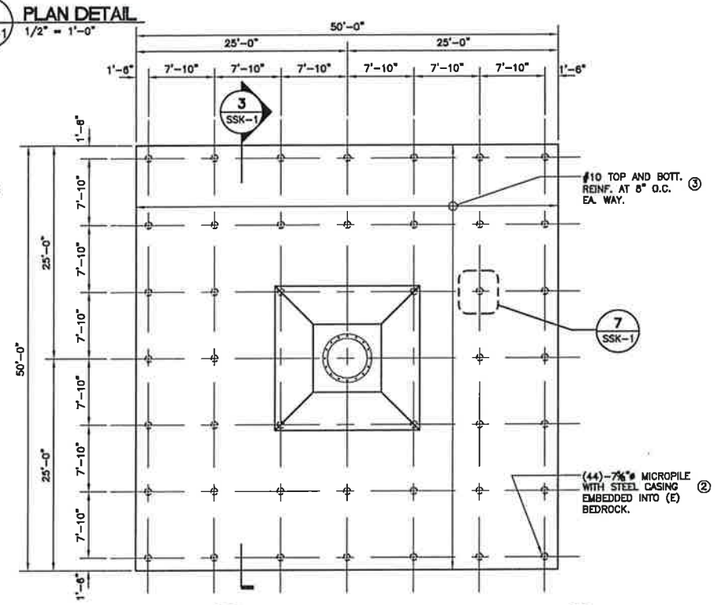
6 SSK-1 **HORZ. TIES (ITEMS #5)** N.T.S.



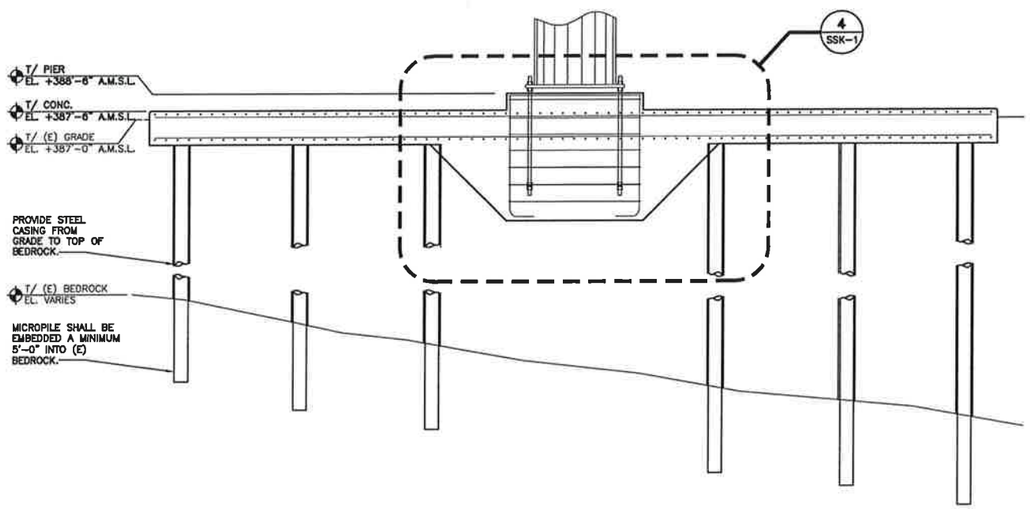
7 SSK-1 **PLAN DETAIL** 1/2" = 1'-0"



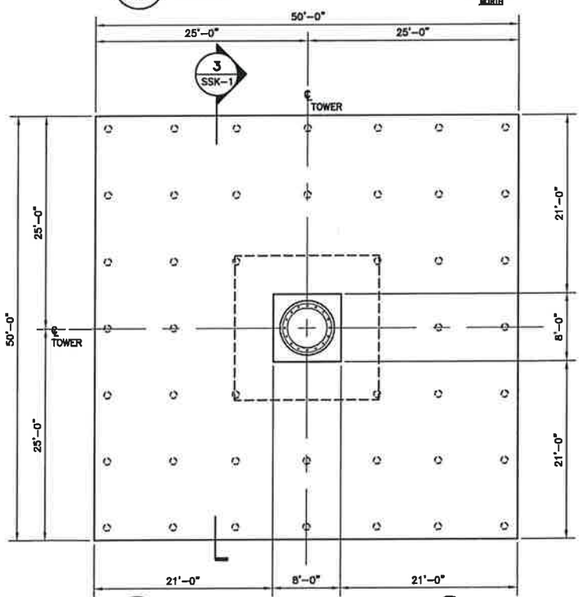
4 SSK-1 **MAT FOUNDATION REINF. PLAN** SCALE: 1/2" = 1'-0"



2 SSK-1 **MAT FOUNDATION REINF. PLAN** SCALE: 1/8" = 1'-0" APPROXIMATE NORTH



3 SSK-1 **MAT FOUNDATION REINF. PLAN** SCALE: 1/4" = 1'-0"



1 SSK-1 **MAT FOUNDATION PLAN** SCALE: 1/8" = 1'-0" APPROXIMATE NORTH

DESIGN BASIS

GOVERNING CODE: 2003 INTERNATIONAL BUILDING CODE (IBC) AS MODIFIED BY THE 2009 CONNECTICUT SUPPLEMENT.

1. DESIGN CRITERIA:
   - WIND SPEED OF 85 MPH (FASTEST MILE) AND 74 MPH (FASTEST MILE) CONCURRENT WITH 0.5" OF RADIAL ICE PER EIA/TIA 222 F-96.
   - WIND SPEED OF 100 MPH (3 SECOND GUST) AND 50 MPH (3 SECOND GUST) CONCURRENT WITH 0.75" OF RADIAL ICE PER TIA-222-G.
   - SEISMIC LOAD: PER ASCE 7-95 MINIMUM DESIGN LOADS FOR BUILDINGS AND OTHER STRUCTURES (DOES NOT GOVERN).

GENERAL NOTES

1. FOUNDATION DESIGN IS BASED ON TOWER STRUCTURE DESIGN CALCULATIONS PREPARED BY ENGINEERED SABRE INDUSTRIES, JOB No. 16-7133-SCB, FOR VERIZON WIRELESS, DATED JULY 13, 2016.
2. PILE DESIGN IS BASED ON GEOTECHNICAL REPORT PREPARED BY DESIGN EARTH TECHNOLOGIES, DATED FEBRUARY 19, 2016 WITH A MAXIMUM ALLOWABLE ROCK BEARING PRESSURE OF 10 TONS/SF (20KSF).
3. THE TOWER FOUNDATION MUST BEAR ON COMPETENT (SOUND) ROCK. BEDROCK BEARING SURFACE SHALL BE LEVEL, CLEANED OF ANY SOIL, LOOSE ROCK FRAGMENTS AND ANY UNSUITABLE BEARING MATERIAL. THE FINISHED BEARING SURFACE IS TO BE INSPECTED BY THE DESIGN ENGINEER FOR APPROVAL.
4. DRILLED HOLES SHALL BE CLEAR OF DEBRIS BEFORE GROUTING.
5. ALL WORK SHALL BE SUBJECT TO SPECIAL INSPECTION RETAINED BY THE OWNER/CONTRACTOR AS PER THE 2005 CONNECTICUT STATE BUILDING CODE WITH 2009 SUPPLEMENT.
6. MICROPILES SHALL BE DESIGNED AND INSTALLED BY A RESPONSIBLE PROFESSIONAL EXPERIENCED IN MICROPILE WORK.
7. AN INDEPENDENT QUALIFIED INPESTION/TESTING AGENCY SHALL BE RETAINED BY THE OWNER FOR THE PURPOSE OF INSPECTING, TESTING AND DOCUMENTING ALL FIELD WORK PREFORMED BY THE PILE CONTRACTOR. ALL INSPECTION REPORTS AND DOCUMENTS SHALL BE SUBMITTED TO THE ENGINEER OF RECORD (CENTEK ENGINEERING INC.) FOR REVIEW.

FOUNDATION DESIGN REACTIONS

BASE REACTION TYPE	TIA/EIA-222-F	TIA-222-G
SHEAR (kips)	38.00	45.89
AXIAL (kips)	47.56	57.21
BASE MOMENT (ft-kips)	3940.84	4952.27

NOTE:
1. REACTIONS SHOWN TAKEN FROM TOWER DESIGN AS PREPARED BY ENGINEERED SABRE INDUSTRIES. REFER TO GENERAL NOTE #1.

MATERIAL LIST

ITEM	QTY.	LENGTH	DESCRIPTION
①	18	7'-0"	2.625"ø A615-GR.75 ANCHOR BOLTS w/ (4) H.H.N. AND ANCHOR PLATES (x2) AS PROVIDED BY OTHERS.
②	44	VARIES	7⅞"ø MICROPILES (TO RESIST 55 KIP MINIMUM AXIAL LOAD) OR ENGINEER APPROVED EQUAL. REFER TO GEOTECHNICAL REPORT (GENERAL NOTE #2) FOR PILE LENGTHS.
③	824 312	20'-0" 25'-0"	#10 (ASTM A615-GR.60) EA. WAY TOP. PROVIDE ADDITIONAL BAR EA. SIDE OF PILE.
④	32	8'-8"	#9 (ASTM A615-GR.60) L SHAPE BAR. REFER TO 5/SSK-1.
⑤	10	21'-2"	#4 TIE (ASTM A615-GR.60). PROVIDE (2) TIES WITHIN TOP 5". REFER TO 6/SSK-1.

CONCRETE	(cu.yd)	217	4000psi TYPE II CEMENT

PILE LOAD CALCULATION

LOAD TYPE (PER PILE)	AXIAL FORCE (kips)
DEAD/EQUIPMENT LOAD	33.6
TOWER LOAD	10.0
DOWN DRAG LOAD	6.7
TOTAL REQUIRED LOAD	50.3
MINIMUM PILE CAPACITY	55.0

PROFESSIONAL ENGINEER	NO.	DATE	DRAWN BY	CHK'D BY	DESCRIPTION
		08/20/16	LVP	CFC	FOR D&M APPROVAL

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DANBURY, CT 06810

DATE: 07/28/16
SCALE: AS NOTED
JOB NO. 14216.000

MAT FOUNDATION AND PILE DETAILS

SSK-1

Sheet No. 1 of 2

TEST BORING LOG B-1

Jaime Lloret DRILLER Larry Marek, Jr. INSPECTOR SOILS ENGINEER	TEST BORING REPORT ASSOCIATED BORINGS CO., INC. 110 MARGARET CIRCLE, NAUGATUCK, CT 06770 Tel (203) 729-8435 Fax (203) 725-8156	SHEET 1 OF 1 CME-55 DRILLING EQUIPMENT Design Earth Technology CLIENT
Surface Elevation	PROJECT NAME: 15 Great Pasture Road PROJECT NUMBER LOCATION: Danbury, Connecticut	

			Auger	Casing	Sampler	Core Bar		
Date Started: 1/7/2016							Hole No.	B-1
Date Finished: 1/7/2016		Type	HSA		SS	NQ-2	Line & Station	
Groundwater Observations		Size I.D.	3 1/4 in		2 in		Offset	
AT 21' AFTER 0 HRS		Hammer			140 lb	Bit	N Coordinate	
AT AFTER HRS		Fall			30 in		E Coordinate	

DEPTH	Casing blows per foot	SAMPLE DEPTH IN FEET FROM - TO	NO.	PEN INCH	REC INCH	TYPE	BLOWS PER 6 INCHES ON SAMPLER 0-6	6-12	12-18	18-24	STRATA CHANGE DEPTH, ELEV.	FIELD IDENTIFICATION OF SOIL, REMARKS (INCL. COLOR, LOSS OF WASH WATER, ETC.)
												Brown and Black M-F Sand and Silt, Some C-F Gravel, Occasional Cobbles
5		5.0 - 7.0	1	24	8	D	3	6	7	8		
		7.0 - 9.0	2	24	4	D	4	4	3	4		
10		10.0 - 12.0	3	24	7	D	1	6	3	9	10	Void
		12.0 - 14.0	4	24	4	D	2	4	7	8	12	Brown and Black M-F Sand and Silt, Some C-F Gravel, Occasional Cobbles
15		15.0 - 17.0	5	24	9	D	11	13	12	13		
		17.0 - 17.5	6	6	8	D	50	X	X	X	17.5	Concrete [illegible] One hour to drill through
20		20.0 - 20.0	7	0	0	D	50/0"	X	X	X	18.5	Possible Fill, No Recovery
		22.0 - 22.5	8	6	4	D	50	X	X	X	22	[illegible] M-F Sand and Silt, Some C-F Gravel [illegible]
		24.0 - 29.0	1	60	60	C					24	Cored Run # 1 From 24.0 feet to 29.0 feet Recovery - 60" RQD - 49/60= 82%
25												
		29.0 - 34.0	2	60	50	C					29	Cored Run # 2 From 29.0 feet to 34.0 feet Recovery - 60" RQD - 50/60= 83%
30												
											34	End of Boring - 34.0
35												
40												

From Ground Surface to ___ Feet Used ___ Inch Casing Then ___ Inch Casing For ___ Feet

Footage in Earth 24.0 Footage in Rock 10.0 No. of Samples 8 Hole No. B-1

SAMPLE TYPE CODING: D = DRIVEN C = CORE A = AUGER UP = UNDISTURBED PISTON

PROPORTIONS USED: TRACE = 1-10% LITTLE = 10-20% SOME = 20-35% AND = 35-50%

GENERAL NOTES:

1. ALL WORK SHALL BE IN ACCORDANCE WITH TIA/EIA-222 REVISION "F" "STRUCTURAL STANDARDS FOR STEEL ANTENNA TOWERS AND SUPPORTING STRUCTURES".
2. THE CONTRACTOR IS SOLELY RESPONSIBLE TO DETERMINE CONSTRUCTION PROCEDURE AND SEQUENCE, AND TO ENSURE THE SAFETY OF THE EXISTING STRUCTURES AND ITS COMPONENT PARTS DURING CONSTRUCTION. THIS INCLUDES THE ADDITION OF WHATEVER SHORING, BRACING, UNDERPINNING, ETC. THAT MAY BE NECESSARY.
3. CONTRRACTOR TO MAINTAIN EXISTING SITE OPERATIONS, COORDINATE WORK WITH OWNER.
4. DRAWINGS INDICATE THE MINIMUM STANDARDS, BUT IF ANY WORK SHOULD BE INDICATED TO BE SUBSTANDARD TO ANY ORDINANCES, LAWS, CODES, RULES, OR REGULATIONS BEARING ON THE WORK, THE CONTRACTOR SHALL INCLUDE IN HIS WOPSRK AND SHALL EXECUTE THE WORK CORRECTLY IN ACCORDANCE WITH SUCH ORDINANCES, LAWS, CODES, RULES OR REGULATIONS WITH NO INCREASE IN COSTS.
5. THE CONTRACTOR SHALL FIELD VERIFY ALL DIMENSIONS, ELEVATIONS, ANGLES, AND EXISTING CONDITIONS AT THE SITE, PRIOR TO FABRICATION AND/OR INSTALLATION OF ANY WORK IN THE CONTRACT AREA.
6. CONTRACTOR SHALL BE RESPONSIBLE FOR ALL ON-SITE SAFETY FROM THE TIME THE JOB IS AWARDED UNTIL ALL WORK IS COMPLETE AND ACCEPTED BY THE OWNER.
7. TOWER INSTALLATION SHALL BE CONDUCTED BY FIELD CREWS EXPERIENCED IN THE ASSEMBLY AND ERECTION OF RADIO ANTENNAS AND SUPPORT STRUCTURES. ALL SAFETY PROCEDURES, RIGGING AND ERECTION METHODS SHALL BE STANDARD TO THE INDUSTRY AND IN COMPLIANCE WITH OSHA.
8. IF ANY FIELD CONDITIONS EXIST WHICH PRECLUDE COMPLIANCE WITH THE DRAWINGS, THE CONTRACTOR SHALL IMMEDIATELY NOTIFY THE ENGINEER AND SHALL PROCEED WITH AFFECTED WORK AFTER CONFLICT IS SATISFACTORILY RESOLVED.
9. CONTRACTOR SHALL BE RESPONSIBLE FOR MAINTAINING A MINIMUM SLOPE OF 1:1 FROM THE TOE OF THE EXISTING BUILDING FOOTING DURING ALL PHASES OF TOWER FOUNDATION WORK.

SITE NOTES

1. THE CONTRACTOR SHALL CONTACT "CALL BEFORE YOU DIG" TO HAVE EXISTING UTILITIES MARKED IN FIELD PRIOR TO EXCAVATION.
2. ACTIVE EXISTING UTILITIES, WHERE ENCOUNTERED IN THE WORK, SHALL BE PROTECTED AT ALL TIMES. THE ENGINEER SHALL BE NOTIFIED IMMEDIATELY, PRIOR TO PROCEEDING, SHOULD ANY UNCOVERED EXISTING UTILITY PRECLUDE COMPLETION OF THE WORK IN ACCORDANCE WITH THE CONTRACT DOCUMENTS.
3. ALL RUBBISH, STUMPS, DEBRIS, STICKS, STONES AND OTHER REFUSE SHALL BE REMOVED OFF SITE AND BE LEGALLY DISPOSED, AT NO ADDITIONAL COST.
4. THE SITE SHALL BE GRADED TO CAUSE SURFACE WATER TO FLOW AWAY FROM THE EQUIPMENT AND TOWER AREAS.
5. NO FILL OR EMBANKMENT MATERIAL SHALL BE PLACED ON FROZEN GROUND. FROZEN MATERIALS, SNOW OR ICE SHALL NOT BE PLACED IN ANY FILL OR EMBANKMENT.
6. THE SUBGRADE SHALL BE COMPACTED AND BROUGHT TO A SMOOTH UNIFORM GRADE PRIOR TO FINISHED SURFACE APPLICATION.
7. THE AREAS OF THE COMPOUND DISTURBED BY THE WORK SHALL BE RETURNED TO THEIR ORIGINAL CONDITION.
8. CONTRACTOR SHALL MINIMIZE DISTURBANCE TO EXISTING SITE DURING CONSTRUCTION. EROSION CONTROL MEASURES, SHALL BE IN CONFORMANCE WITH THE LOCAL GUIDELINES FOR EROSION AND SEDIMENT CONTROL.
9. IF ANY FIELD CONDITIONS EXIST WHICH PRECLUDE COMPLIANCE WITH THE DRAWINGS, THE CONTRACTOR SHALL IMMEDIATELY NOTIFY THE ENGINEER AND SHALL PROCEED WITH AFFECTED WORK AFTER CONFLICT IS SATISFACTORILY RESOLVED.
10. DIMENSIONS AND DETAILS SHALL BE CHECKED AGAINST THE PRE-MANUFACTURED EQUIPMENT BUILDING SHOP DRAWINGS.
11. THE CONTRACTOR SHALL VERIFY AND COORDINATE THE SIZE AND LOCATION OF ALL OPENINGS, SLEEVES AND ANCHOR BOLTS AS REQUIRED BY ALL TRADES.

EARTHWORK NOTES

1. COMPACTED GRAVEL FILL SHALL BE FURNISHED AND PLACED AS A FOUNDATION FOR STRUCTURES, WHERE SHOWN ON THE CONTRACT DRAWINGS OR DIRECTED BY THE ENGINEER.
2. CRUSHED STONE FILL SHALL BE PLACED IN 12" MAX. LIFTS AND CONSOLIDATED USING A HAND OPERATED VIBRATORY PLATE COMPACTOR WITH A MINIMUM OF 2 PAQSSES OF COMPACTOR PER LIFT.
3. COMPACTED GRAVEL FILL TO BE WELL GRADED BANK RUN GRAVEL MEETING THE FOLLOWING GRADATION REQUIREMENTS:

SIEVE DESIGNATION	% PASSING
1 ½"	100
No. 4	40–70
No. 100	5–20
No. 200	4–8

4. CRUSHED STONE TO BE UNIFORMLY GRADED, CLEAN, HARD PROCESS AGGREGATE MEETING THE FOLLOWING GRADATION REQUIREMENTS:

SIEVE DESIGNATION	% PASSING
1"	100
¾"	90–100
½"	0–15
⅜"	0–5

5. SELECT BACKFILL FOR FOUNDATION WALLS SHALL BE FREE OF ORGANIC MATERIAL, TOPSOIL, DEBRIS AAND BOULDERS LARGER THAN 6".
6. GRAVEL AND GRANULAR FILL SHALL BE INSTALLED IN 8" MAX. LIFTS. COMPACTED TO 95% MIN. AT MAX. DRY DENSITY.
7. NON WOVEN GEOTEXTILE FOR SEPARATION PURPOSES SHALL BE MIRAFI 140N, OR ENGINEER APPROVED EQUAL.

FOUNDATION CONSTRUCTION NOTES

1. ALL FOOTINGS SHALL BE PLACED ON SUITABLE, COMPACTED SOIL HAVING ADEQUATE BEARING CAPACITY AND FREE OF ORGANIC CONTENT, CLAY, OR OTHER UNSUITABLE MATERIAL. ADDITIONAL EXCAVATION MAY BE REQUIRED BELOW FOOTING ELEVATIONS INDICATED IF UNSUITABLE MATERIAL IS ENCOUNTERED.
2. SUBGRADE PREPARATION: IF UNSUITABLE SOIL IS ENCOUNTERED, REMOVE ALL UNSUITABLE MATERIALS FROM BELOW PROPOSED STRUCTURE FOUNDATIONS AND COMPACT EXPOSED SOIL SURFACES. PLACE AND COMPACT APPROVED GRAVEL FILL. PLACEMENT OF ALL COMPACTED FILL MUST BE UNDER SUPERVISION OF AN APPROVED TESTING LABORATORY. FILL SHALL BE COMPACTED IN LAYERS NOT TO EXCEED 10" BEFORE COMPACTION. DETERMINE MAXIMUM DRY DENSITY IN ACCORDANCE WITH ASTM D1557-70 AND MAKE ONE (1) FIELD DENSITY TEST IN ACCORDANCE WITH ASTM D2167-66 FOR EACH 50 CUBIC YARDS OF COMPACTED FILL. BUT NOT LESS THAN ONE (1) PER LAYER, TO INSURE COMPACTION TO 95% OF MAX. DRY DENSITY.
3. ALL SOIL SURROUNDING AND UNDER ALL FOOTINGS SHALL BE KEPT REASONABLY DRY AND PROTECTED FROM FREEZING AND FROST ACTION DURING THE COURSE OF CONSTRUCTION.
4. WHERE GROUNDWATER IS ENCOUNTERED, DEWATERING SHALL BE ACCOMPLISHED CONTINUOUSLY AND COMPLETELY DURING FOUNDATION CONSTRUCTION. PROVIDE CRUSHED STONE AS REQUIRED TO STABILIZE FOOTING SUBGRADE.
5. ALL FOOTINGS ARE TO REST ON FIRM SOIL, REGARDLESS OF ELEVATIONS SHOWN ON THE DRAWINGS, BUT IN NO CASE MAY FOOTING ELEVATIONS BE HIGHER THAN INDICATED ON THE FOUNDATION PLAN, UNLESS SPECIFICALLY DIRECTED BY THE ENGINEER.
6. FOUNDATION WATERPROOFING AND DAMPPROOFING (WHERE APPLICABLE) SHALL COMPLY WITH BUILDING CODE REQUIREMENTS UNLESS A MORE SUBSTANTIAL SYSTEM IS INDICATED OR SPECIFIED.

CONCRETE CONSTRUCTION NOTES

1. CONCRETE CONSTRUCTION SHALL CONFORM TO THE FOLLOWING STANDARDS:
   - ACI 211 – STANDARD PRACTICE FOR SELECTING PROPORTIONS FOR NORMAL AND HEAVYWEIGHT CONCRETE.
   - ACI 301 – SPECIFICATIONS FOR STRUCTURAL CONCRETE FOR BUILDINGS.
   - ACI 302 – GUIDE FOR CONCRETE FLOOR AND SLAB CONSTRUCTION
   - ACI 304 – RECOMMENDED PRACTICE FOR MEASURING, MIXING, TRANSPORTING, AND PLACING CONCRETE.
   - ACI 306.1 STANDARD SPECIFICATION FOR COLD WEATHER CONCRETING
   - ACI 318 – BUILDING CODE REQUIREMENTS FOR REINFORCED CONCRETE.
2. CONCRETE SHALL DEVELOP COMPRESSIVE STRENGTH IN 28 DAYS AS FOLLOWS:

   MONOPOLE FOUNDATION 4,000 PSI

   - PORTLAND CEMENT: ASTM C150, TYPE II, (540 LBS/CUBIC YARD)
   - AGGREGATE: ASTM C33, No. 67, TYPICAL
   - WATER: POTABLE WITH MAXIMUM WATER CEMENT RATIO OF .55
   - SLUMP: 3" TO 4"
   - ADMIXTURES: USE AIR ENTRAINING ADGENT CONFORMING TO ASTM C260 WITH 4 TO 6% TOTAL AIR. USE WATER REDUCING AGENT CONFORMING TO ASTM C494, TYPE A, IN ALL CONCRETE. CALCIUM CHLORIDE MAY NOT BE USED TO ACCELERATE THE CONCRETE SETTING TIME.
3. REINFORCING STEEL SHALL BE 60,000 PSI YIELD STRENGTH.
4. WELDED WIRE FABRIC SHALL CONFORM TO ASTM- A-185.
5. ALL DETAILING, FABRICATION, AND ERECTION OF REINFORCING BARS, UNLESS OTHERWISE NOTED, MUST FOLLOW THE LATEST ACI CODE AND LATEST ACI "MANUAL OF STANDARD PRACTICE FOR DETAILING REINFORCED CONCRETE STRUCTURES".
6. CONCRETE COVER OVER REINFORCING SHALL CONFORM TO THE FOLLOWING, UNLESS OTHERWISE SHOWN:

BOTTOM OF FOOTINGS	3 INCHES
SURFACES NOT EXPOSED TO EARTH OR WEATHER	1-1/2 INCHES
BARS BONDED TO GROUNDING SYSTEM	3 INCHES MIN

7. NO STEEL WIRE, METAL FORM TIES, OR ANY OTHER METAL SHALL REMAIN WITHIN THE REQUIRED COVER OF ANY CONCRETE SURFACE.
8. ALL REINFORCEMENT SHALL BE CONTINUOUS UNLESS OTHERWISE NOTED. SPLICES SHALL BE WELL STAGGERED. ADDITIONAL BARS AND SPECIAL BENDING DETAILS ARE REQUIRED AT INTERSECTING WALLS AND AT JOINTS. SUCH DETAILS SHALL COMPLY WITH ACI 315 RECOMMENDATIONS UNLESS OTHERWISE SHOWN.
9. NO TACK WELDING OF REINFORCING WILL BE PERMITTED.
10. NO CALCIUM CHLORIDE OR ADMIXTURES CONTAINING MORE THAN 1% CHLORIDE BY WEIGHT OF ADMIXTURE SHALL BE USED IN THE CONCRETE.
11. UNLESS OTHERWISE NOTED, ALL LAP SPLICES SHALL BE 48 BAR DIAMETERS.
12. SLAB ON GRADE FINISHES:

    EXTERIOR SLAB: NON-SLIP BROOM FINISH
    PITCH: 1/8" PER FOOT
13. INSPECTION AND TESTING OF CONCRETE WORK SHALL BE PERFORMED BY AN INDEPENDENT TESTING LABORATORY, PAID BY THE OWNER, AND APPROVED BY THE ARCHITECT. THE INSPECTOR SHALL OBSERVE CONDITION OF SOILS AND FORMWORK BEFORE FOOTINGS ARE PLACED, SIZE, SPACING AND LOCATION OF REINFORCEMENT, AND PLACEMENT OF CONCRETE.
14. THE TESTING COMPANY SHALL ALSO OBTAIN COMPRESSIVE STRENGTH TEST SPECIMENS AS DEFINED IN THE STATEMENT OF SPECIAL INSPECTIONS SUBMITTED BY THE ENGINEER OF RECORD (EOR).

REINFORCEMENT LAP SCHEDULE	
BAR SIZE	MINIMUM LAP (f'_c = 4000 psi)
#10	78"

REV.	DATE	DRAWN BY	CHK'D BY	DESCRIPTION
0	08/03/16	LVP	CFC	FOR D&M APPROVAL

PROFESSIONAL ENGINEER SEAL

Cellco Partnership d.b.a. verizon wireless

CENTEK engineering
Centered on Solutions™
(203) 488-0580
(203) 488-8587 Fax
63-2 North Branford Road
Branford, CT 06405
www.CentekEng.com

Cellco Partnership d/b/a Verizon Wireless
WIRELESS COMMUNICATIONS FACILITY
BETHEL W2
15 GREAT PASTURE ROAD
DANBURY, CT 06810

DATE: 07/28/16
SCALE: AS NOTED
JOB NO. 14216.000

GENERAL NOTES AND BORING REPORT

SSK-2

Sheet No. 2 of 2

DESIGN EARTH TECHNOLOGY

P.O. Box 187, Guilford, CT 06437
Phone/Fax: (203) 458-9806 ▪ Email: docdirt@aol.com

GEOTECHNICAL AND GEOPHYSICAL TESTING REPORT

PROPOSED VERIZON WIRELESS COMMUNICATIONS FACILITY
BETHEL W2
AT
15 GREAT PASTURE ROAD
DANBURY, CONNECTICUT

PREPARED FOR:

CENTEK ENGINEERING, Inc.

FEBRUARY 2016

DESIGN EARTH TECHNOLOGY

P.O. Box 187, Guilford, CT 06437
Phone/Fax: (203) 458-9806 ▪ Email: docdirt@aol.com

February 19, 2016

Mr. Carlo F. Centore, P.E.
Centek Engineering, Inc.
63-2 North Branford Road
Branford, CT 06405

Re: Proposed Verizon Wireless Communications Facility
Bethel - W2
15 Great Pasture Road
Danbury, Connecticut
DET Job No. 2015.13

Dear Mr. Centore:

Lawrence J. Marcik, Jr., P.E. dba **Design Earth Technology (DET)** has completed a geotechnical engineering investigation for the above referenced project. Included in this report is a summary of subsurface conditions, delineation of engineering characteristics of the foundation materials, and the implications of the conditions and characteristics with respect to the design and construction of the proposed communications tower (monopole) foundation. This report was prepared under our agreement dated December 24, 2015 and your subsequent authorization.

The purpose of this study is to develop geotechnical engineering recommendations for the proposed tower foundation design. The subsurface investigation and sampling program was conducted by **DET** for the sole purpose of obtaining subsurface information as part of a geotechnical investigation for the foundation design. No services were performed to evaluate subsurface environmental conditions; however, the client requested that as a courtesy, **DET** log any noticeable non-typical visual and/or odorous conditions from the soil samples.

SITE DESCRIPTION

The project site is located off of Great Pasture Road in Danbury, Connecticut. The project location is shown on the attached "Location Plan, Figure No. 1". The site is located at an existing industrial facility. This facility consists of a large main building with near-by smaller adjunct structures. There are many storage trailers, construction materials (i.e. blocks, bricks), staging equipment and old construction equipment located at the rear parking area of the main building. The site access is through a paved drive that has a chain link gate located near the front of the main building. The proposed communications tower site is located in the southwest corner of the developed portion of the site. The proposed compound area is not paved and has a dirt surface. The developed portion of the site has some relief with an elevation at Great Pasture Road of El. 374 and an elevation at the proposed tower site of El. 387. The proposed compound area is relatively flat. An important item observed is that the area of the proposed compound had been extensively filled (see photos Nos. 1 & 2 of the slope near the proposed tower site).

PROJECT DESCRIPTION

The proposed project consists of the installation of a new +/-120' monopole communications tower with tower foundation, support buildings and other facilities.

SUBSURFACE EXPLORATION

Associated Borings Company, Inc. performed the subsurface exploration work on January 7th & January 28th of 2016. Locations of the subsurface explorations are shown on Figure No. 2 and logs have been included in Appendix A. The subsurface exploration program consisted of a total of one (1) boring and seven (7) bedrock verification probes (Power Drill Soundings). All subsurface penetrations were conducted in the area of the proposed Verizon Wireless tower foundation. The center of tower location and compound corners were staked-out by others.

Boring B-1 was drilled just next to the proposed center of tower. The boring was advanced using hollow stem auger technique to 24' below existing ground where bedrock was encountered. Rock coring was performed from 24' to 34' below ground where bedrock coring was terminated.

Bedrock verification probes (Power Drill Soundings) were drilled in the vicinity of the proposed compound. All probes were advanced to refusal which is "assumed" to be possible bedrock, or boulders, or concrete pieces, or other man made obstructions. Probe refusals ranged from 14' to 31' below existing ground surface. Some probes were observed to be able to drill through pieces of concrete rubble, while some probes were observed not to be able to drill through pieces of concrete rubble.

The rock cores in borings B-1 were drilled using a standard NQ-2 size core bit resulting in the diameter of core sample being about ± 2". The coring was conducted using a standard wet core boring technique. Bedrock verification probes were drilled using solid stem auger technique.

Standard Penetration Tests (SPT's) of the soil were performed in boring B-1 with a split spoon sampler. The SPT's were taken at the following depths of: 5'-7', 7'-9', 10'-12', 12'-14', 15'-17', 17-17.5', 20'-20' and 22'-22.5'.

Logs of the bedrock verification probes (Power Drill Soundings) and boring are included in Appendix A. See attached photo No. 3 of the boring/coring process.

RESISTIVITY TESTING

In place soil resistivity testing was conducted by **DET** personnel on February 12, 2016 within the vicinity of the proposed tower facilities. Three test sections were performed on-site in approximate locations illustrated in Figure 2. Two test sections were tested up to an electrode "A" spacing of 40 feet and one test section was tested up to an electrode "A" spacing of 20 feet. Test results yielded resistivity values within acceptable ranges for the given soil/rock types and moisture conditions typically found in the New England geology. It should be noted, however, that resistivity measurements are strongly influenced by local variations in surface conductivity caused by soil/rock weathering, snow, frost, soil/rock moisture content, soil temperature, rugged topography, fill material and existing subsurface manmade conductive materials. Attempts were made (where possible) during field operations to minimize some of these effects on the test results. Results of the resistivity tests are summarized in Table No. 1 with detailed calculations shown in Appendix B. See attached photograph No 4 of a typical resistivity test.

LABORATORY TESTING

The laboratory testing program consisted of two Gradation Analysis and two (2) Unconfined Compressive Strength of Intact Rock Core Samples taken from boring B-1. These tests were conducted in general compliance with applicable ASTM standards. Notes: Not all ASTM procedures and reporting have been meet. Laboratory testing results are attached in Appendix C.

SUBSURFACE CONDITIONS

Based upon our review of the subsurface testing program, the site is covered with a somewhat deep layer of fill material (about 31' thick) underlain by bedrock. The deep layer of fill composed, in general of granular fill with possible debris (construction debris???). During the boring a 2' +/- void was encountered. The Bedrock Verification Probes also encountered some obstructions and voids during drilling.

The bedrock surface at the site is believed to be about 24 feet below grade (based upon auger refusal and start of bedrock coring). According to the "The Bedrock Geology of the Danbury quadrangle", by James W. Clarke, PhD, the bedrock at the site is classified as "Inwood Marble", white, medium-grained marble. This marble is a metamorphic type rock. The bedrock cores were not given to a geologist for verification of rock type. To assess the engineering properties of the bedrock, rock cores were conducted in boring B-1. The rock cores were reviewed by this writer to determine "Rock Quality Designation" (RQD). The RQD values were conducted to measure the rock core quality of fracture frequency. The results of RQD were 82 and 83 at boring B-1. The average of all RQD tests was 82.5. For specific results of RQD, see Appendix C. The bedrock Rock Quality Classification is Good.

Uni-axial compressive strength of rock core samples were conducted on two (2) rock core samples with strengths of 8300 psi and 9500 psi (avg. 8,900 psi). For specific compressive strength results, see Appendix C.

Groundwater was observed in boring B1 at 21' at the time of the boring. It should be noted, however, that groundwater levels vary depending upon season, precipitation and other conditions that may be different from those at the time of drilling.

GEOTECHNICAL DESIGN CONSIDERATIONS

Tower Foundation

The site of the proposed tower foundation is covered with a deep layer of fill material (about-31' thick). This fill material, in general, has erratic density, composition, settlement potential, presence of voids and material subject to decomposition. As a result of this deep "fill material deposit", removal of this unsuitable fill material and replacing with structural fill was considered but is not an economical option. The only option that the writer considers viable is the construction of a **deep type foundation system**.

The deep type foundation system that can address obstructions effectively is called a mini-pile (micro-piles) foundation system. Bored injected mini-piles are small diameter (6"to 10") drilled and cast in place, reinforced concrete, high load bearing piles. Drilling of these piles is

accomplished by rotary percussive methods, which can address obstructions (i.e. cobbles, boulders, wood/stumps, debris). It is estimated that these mini-piles would be about 30 to 40 feet deep. Static load tests would be required to verify load capacity. These rock-socketed mini-piles would achieve capacity through side friction in the rock socket and end bearing.

There are a few considerations when the mini-piles are designed by the structural engineer. The design load shall be distributed into the bedrock using the bond strength between the bedrock and the grout. This bond strength value can be estimated from the bedrock core samples at Ultimate Bond Strength of 150 psi. A minimum of 5' shall used as the uncased bond length into bedrock. Due to the relatively small cross sectional area of the mini-pile, load carrying capacity resulting from end bearing is generally considered to be negligible for mini-piles, the use of 10.0 tons/square foot net allowable bearing capacity could be used if end bearing is being considered. Corrosion of the mini-piles needs to be addressed in both the bonded and un-bonded zones. It is recommended in the un-bonded zone to have steel installation casing left in-place (from top of bedrock to within the upper horizontal foundation component). This produces a superior mini-pile that has a higher quality of installation. Mini-piles are very slender elements that can not resist lateral load effectively. The use of battered mini-piles is recommended for the lateral loads. The mini-piles shall not be designed to carry tensile or uplift loads. Because the fill material will continue to settle, the mini-pile design must address "negative" skin friction. Negative skin friction develops along the contact surface between pile and soil when the soil settles relative to the pile. The negative skin friction must be added into the dead load of the pile. A preliminary estimate of this negative skin friction load could be as much as 20 tons per pile.

At least one verification load test should be performed to confirm the ultimate bond stress. A minimum of one proof test should also be performed on one of the production pile.

Equipment Shelter

If the shelter is allowed to settle because of the deep fill material, a spread footing is considered appropriate, if minimal settlement is allowed for the shelter, a deep foundation with a mini-pile foundation system is to be used.

EARTHQUAKE DESIGN (SEISMIC)

Seismic design requirements for the State of Connecticut are based on the Connecticut State Building Code, which incorporates the Seismic design Category approach from the International Building Code. The seismic design Category determination is based on a few category factors. One such category is the "Site Classification (soil type)". From our test borings, we consider that the site subsurface conditions match the General Description of "Very Dense Soil and Soft Rock". The site classification is therefore "C".

The proposed deep foundation is to bear on bedrock. This bedrock will not liquefy during a seismic event and needs not be addressed in the foundation design.

GEOTECHNICAL CONSTRUCTION CONSIDERATIONS

General

This section provides comments related to foundation construction and other geotechnical aspects of the project. It will aid personnel responsible for preparation of Contract Plans and Specifications and those involved with the actual construction and construction monitoring. The contractor must evaluate potential construction problems on the basis of his own knowledge and experience in the area and on the basis of similar projects in other localities, taking into consideration their own proposed construction methods and procedures.

Excavation

Materials to be excavated near the ground surface are expected to be mostly granular fill material; hence excavation is not expected to be very difficult except for the obstructions (i.e. boulders, concrete pieces, stumps, etc.). Bedrock is relatively deep below the ground surface.

Excavation-Drilling (Fill Material & Bedrock)

The fill material may contain cobbles, boulders, wood/stumps and other fill debris. These fill items will make excavation very difficult. The drilling contractor needs to consider these issues when pricing and installing the proposed mini-piles.

Dewatering/Groundwater

Normal groundwater levels are expected to be about 21 feet below the ground surface. The drilling contractor for the mini-piles construction must address the groundwater in their construction installation procedures.

Materials

Gravel backfill is material used to backfill the foundation and is to be obtained from off-site borrow sources. This material shall consist of inert material that is hard, durable stone and coarse stone, free from loam and clay, surface coatings and deleterious materials. These materials shall conform to the following gradation requirements:

Sieve Size	Percent Finer by Weight
1-1 1/2"	100
¾"	45 – 80
¼"	25 – 60
No. 10	15 – 45
No. 40	5 – 25
No. 100	0 – 10
No. 200	0 – 5

Placement and Compaction of Foundation Backfill

A. All backfill materials shall be placed in horizontal layers not exceeding 6". Each layer shall be spread evenly and thoroughly blade mixed during spreading to ensure uniformity of material in each layer. Each layer shall be evenly compacted with an approved hand operated compactor, making a minimum of at least five (5) passes.

B. Gravel fill shall be compacted in individual layers (not exceeding 6") to 95% maximum dry density using ASTM D1557.

C. In no case shall fill be placed over frozen material or snow. No fill material shall be placed, spread, or compacted during unfavorable weather conditions where soil moisture precludes achievement of the specified compaction. When the work is interrupted by heavy rains or snow, fill operations shall not be resumed until the moisture content and the density of the previously placed fill are as specified.

LIMITATIONS

Explorations

The analysis and recommendations submitted in this report are based in part upon the data obtained from a limited number of subsurface explorations. The nature and extent of variations between these explorations may not become evident until construction excavation. If variations then appear evident, it will be necessary to re-evaluate the recommendations of this report at that time.

The soil profiles described and shown in this report are generalized and are intended to convey trends in subsurface conditions. The boundaries between strata and bedrock are approximate and generalized. They have been developed by data that is limited in number and widely spaced.

Water level readings have been observed in the drill hole at times and under conditions stated on the boring log and in this report. This data has been reviewed, analyzed, and interpretations made in the text of this report. However, it must be noted that fluctuations in the level of the groundwater may occur due to variations in rainfall, temperature, time of the year and other factors not evident at the time measurements were taken.

Designer Review

In the event that any changes in the design or location of the monopole the conclusions and recommendations contained in this report shall not be considered valid unless these changes are reviewed by this office and conclusions of this report modified.

Construction

It is recommended that Design Earth Technology retained to provide geotechnical field monitoring services based on familiarity with the subsurface conditions, design concepts and specifications, technical expertise, and experience in monitoring of site development construction.

Use of This Report
This report has been prepared for specific application and use of the proposed communications tower at 15 Great Pasture Road, Danbury, Connecticut in accordance with generally accepted soil and foundation engineering practices. No other warranty expressed or implied is made.

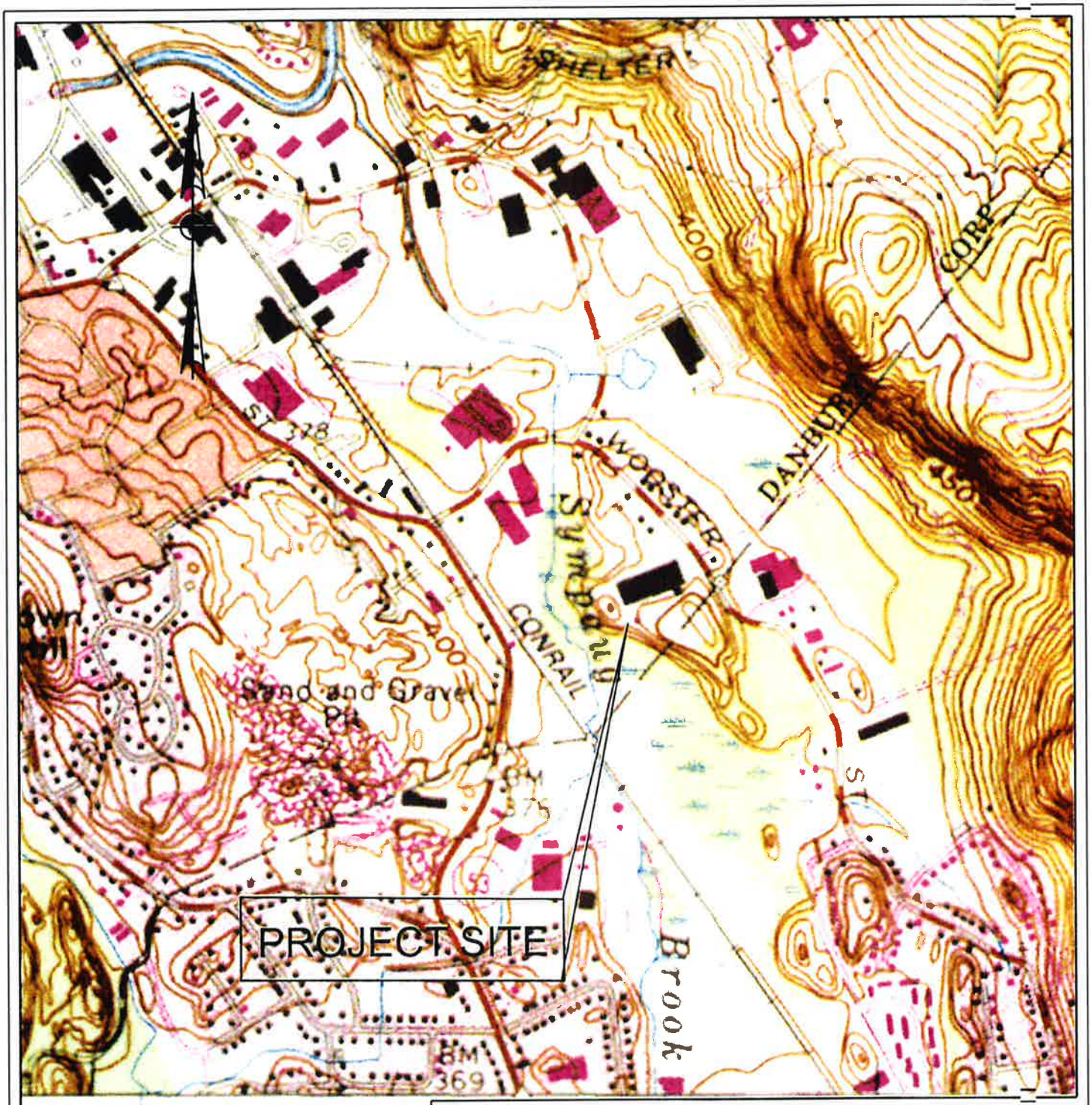
If you have any questions regarding the above information, please call.

Sincerely,

DESIGN EARTH TECHNOLOGY

Lawrence J. Marcik, Jr., P.E.

FIGURES



JOB TITLE: GEOTECHNICAL REPORT FOR A WIRELESS COMMUNICATIONS FACILITY - BETHEL W2 AT 15 GREAT PASTURE ROAD DANBURY, CONNECTICUT

PREPARED FOR:

CENTEK ENGINEERING, INC.

DATE: FEBRUARY 13, 2016

SCALE: NTS

PROJECT No.: 2015-13

DRAWN: LJM

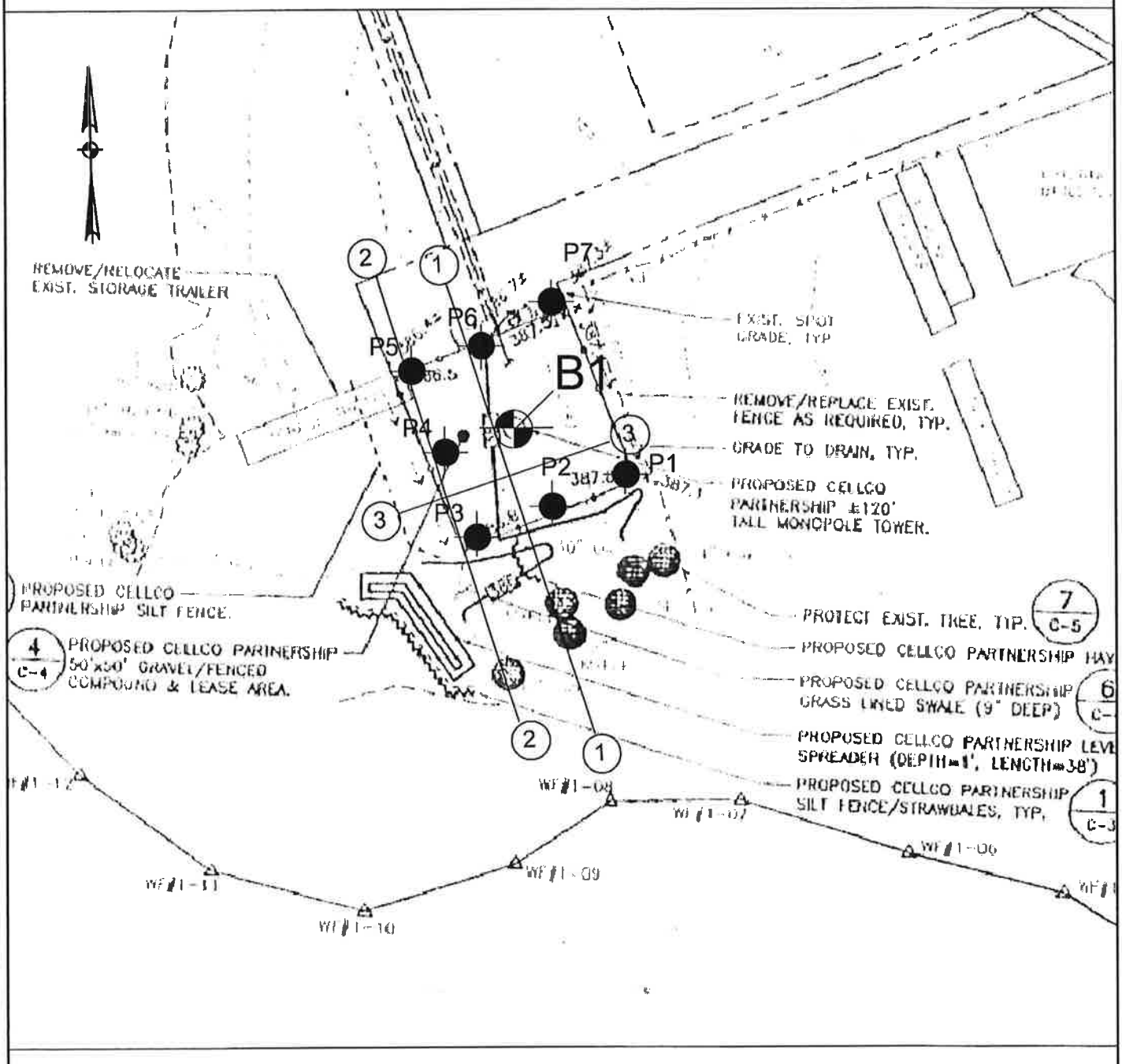
FIGURE No.: 1

SOURCE:
U.S.G.S. QUADRANGLE
DANBURY

DESIGN EARTH TECHNOLOGY
P.O. Box 187 • Guilford, CT 06437
Phone/Fax: (203) 458-9806
Email: dwedirt@aol.com

FIGURE TITLE: LOCATION PLAN

CAD FILE: Location Plan



LEGEND

B1 — TYPICAL BORING

P1 — TYPICAL PROBE

1 — SECTION NUMBER

JOB TITLE: GEOTECHNICAL REPORT FOR A WIRELESS COMMUNICATIONS FACILITY - BETHEL W2
AT
15 GREAT PASTURE ROAD
DANBURY, CONNECTICUT

PREPARED FOR:

CENTEK ENGINEERING, INC.

DATE: FEBRUARY 13, 2016

SCALE: 1" = 40' +/-

DRAWING TAKEN FROM PARTIAL SITE/SURVEY "C-1A" BY CENTEK DATED 4/17/15 LAST REV 6/30/15

DESIGN EARTH TECHNOLOGY
P.O. Box 187 • Guilford, CT 06437
Phone/Fax: (203) 458-9806
Email: docdirt@aol.com

PROJECT No.: 2015-13

DRAWN: LJM

FIGURE No.: 2

FIGURE TITLE: SKETCH OF LOCATIONS OF SUBSURFACE EXPLORATIONS

CAD FILE: Figures

TABLES

TABLE 1

PROPOSED COMMUNICATIONS TOWER
AT
15 Great Pasture Road
Danbury, CT

IN-SITU SOIL RESISTIVITY RESULTS[1]

Section No.

ELECTRODE SPACING (ft)	1	2	3	4
5	20,586	23,076	19,820	CNP
10	19,016	26,618	20,701	CNP
20	24,627	47,109	22,099	CNP
30	32,746	28,265	CNP	CNP
40	39,449	36,079	CNP	CNP

NOTES:
1. Resistivity values indicated are in OHM-CM
2. [1]Test completed using Wenner Four Probe Method with a Det 2/2 Auto Earth Tester as manufactured by Avo, Inc.
3. CNP= Could Not Perform Due to Site Limitations
4. 2" to 4" of Snow was on the ground during testing
5. Frost in the ground was minimal, if any, during testing

APPENDICES

APPENDIX A

Jaime Lloret		**TEST BORING REPORT**										SHEET 1 OF 1	
DRILLER		**ASSOCIATED BORINGS CO., INC.**											
Larry Marcik, Jr.		**119 MARGARET CIRCLE, NAUGATUCK, CT 06770**										CME-55	
INSPECTOR		**Tel (203) 729-5435 Fax (203) 729-5116**										DRILLING EQUIPMENT	
		PROJECT NAME: 15 Great Pasture Road										Design Earth Technology	
SOILS ENGINEER		PROJECT NUMBER:										CLIENT	
Surface Elevation:		LOCATION: Danbury, Connecticut											
Date Started: 1/7/2016				Auger		Casing		Sampler		Core Bar		Hole No. **B-1**	
Date Finished: 1/7/2016		Type		HSA				SS		NQ-2		Line & Station	
Groundwater Observations		Size I. D.		3 1/4 in				2 in				Offset	
AT 21 ' AFTER 0 HRS		Hammer						140 lb		Bit		N Coordinate	
AT ' AFTER HRS		Fall						30 in				E. Coordinate	

DEPTH	Casing blows per foot	SAMPLE DEPTH IN FEET FROM - TO	NO.	PEN. INCH	REC. INCH	TYPE	BLOWS PER 6 INCHES ON SAMPLER 0 - 6	6 - 12	12-18	18-24	STRATA CHANGE: DEPTH, ELEV.	FIELD IDENTIFICATION OF SOIL, REMARKS (INCL. COLOR, LOSS OF WASH WATER, ETC.)
												Brown and Black M-F Sand and Silt, Some C-F Gravel, Occasional Cobbles
5		5.0 - 7.0	1	24	8	D	3	5	7	5		
		7.0 - 9.0	2	24	4	D	4	4	3	4		
10		10.0 - 12.0	3	24	1	D	1	0	0	0	10	
												Void
		12.0 - 14.0	4	24	4	D	2	4	7	5	12	
												Brown and Black M-F Sand and Silt, Some C-F Gravel, Occasional Cobbles
15		15.0 - 17.0	5	24	6	D	11	15	13	13		
		17.0 - 17.5	6	6	6	D	50	X	X	X	17.5	
											19.5	Concrete fill. One hour to drill through.
20		20.0 - 20.0	7	0	0	D	50/0"	X	X	X		Possible Fill, No Recovery
		22.0 - 22.5	8	6	4	D	50	X	X	X	22	
		24.0 - 29.0	1	60	60	C					24	Br. M-F Sand and Silt, Some C-F Gravel Broken Rock (possible bedrock)
25												Cored Run # 1 From 24.0 feet to 29.0 feet Recovery - 60" RQD - 49/60= 82%
		29.0 - 34.0	2	60	60	C					29	
30												Cored Run # 2 From 29.0 feet to 34.0 feet Recovery - 60" RQD - 50/60= 83%
											34	
35												End of Boring - 34.0
40												

From Ground Surface to Feet Used Inch Casing Then Inch Casing For Feet

Footage in Earth 24.0 Footage in Rock 10.0 No. of Samples 8 Hole No. **B-1**

SAMPLE TYPE CODING: D = DRIVEN C = CORE A = AUGER UP = UNDISTURBED PISTON

PROPORTIONS USED: TRACE = 1-10% LITTLE = 10-20% SOME = 20-35% AND = 35-50%

Jaime Lloret DRILLER Larry Marcik, Jr. INSPECTOR	**TEST BORING REPORT** **ASSOCIATED BORINGS CO., INC.** **119 MARGARET CIRCLE, NAUGATUCK, CT 06770** **Tel (203) 729-5435 Fax (203) 729-5116**	SHEET 1 OF 1 CME-45B DRILLING EQUIPMENT Design Earth Technology CLIENT	
DATE; 1/28/2016	PROJECT NAME: 15 Great Pasture Road PROJECT NUMBER: LOCATION: Danbury, Connecticut		

POWER DRILL SOUNDING REPORT

Station	Offset	Elev	Probe #	From	To	Remarks: Soil Encountered, Groundwater Depth, Refusal Etc.
			P-1	0.0	28.0	Soil
						Refusal - 28.0 G.W.O. -.None
			P-2	0.0	23.0	Soil
						Refusal - 23.0 G.W.O. - None
			P-3	0.0	31.0	Soil
						Refusal - 31.0 G.W.O. - None
			P-4	0.0	24.0	Soil
						Refusal - 24.0 G.W.O. - None
			P-5	0.0	16.0	Soil - Concrete Rubble
						Refusal - 16.0 G.W.O. - None
			P-6	0.0	15.0	Soil - Concrete Rubble
						Refusal - 15.0 G.W.O. - None
			P-7	0.0	14.0	Soil - Concrete Rubble
						Refusal - 14.0 G.W.O. - None

PROPORTIONS USED: TRACE = 1-10% LITTLE = 10-20% SOME = 20-35% AND = 35-50%

APPENDIX B

RESISTIVITY DATA

SITE: 15 Great Pasture Road
Danbury, Connecticut

DATE: February 12, 2016

SIGNATURE:

A=(FT)	5	10	20	30	40
FORMULA □= (OHM-CM)	957.5*R	1915*R	3830*R	5745*R	7660*R
AREA 1 MEASURED R (OHM)	21.5	9.93	6.43	5.70	5.15
AREA 1 CALCULATED (OHM-CM)	20,586	19,016	24,627	32,746	39,449
AREA 2 MEASURED R (OHM)	24.1	13.9	12.3	4.92	4.71
AREA 2 CALCULATED (OHM-CM)	23,076	26,618	47,109	28,265	36,079
AREA 3 MEASURED R (OHM)	20.7	10.8	5.77	CNP	CNP
AREA 3 CALCULATED (OHM-CM)	19,820	20,701	22,099		
AREA 4 MEASURED R (OHM)	CNP	CNP	CNP	CNP	CNP
AREA 4 CALCULATED (OHM-CM)					

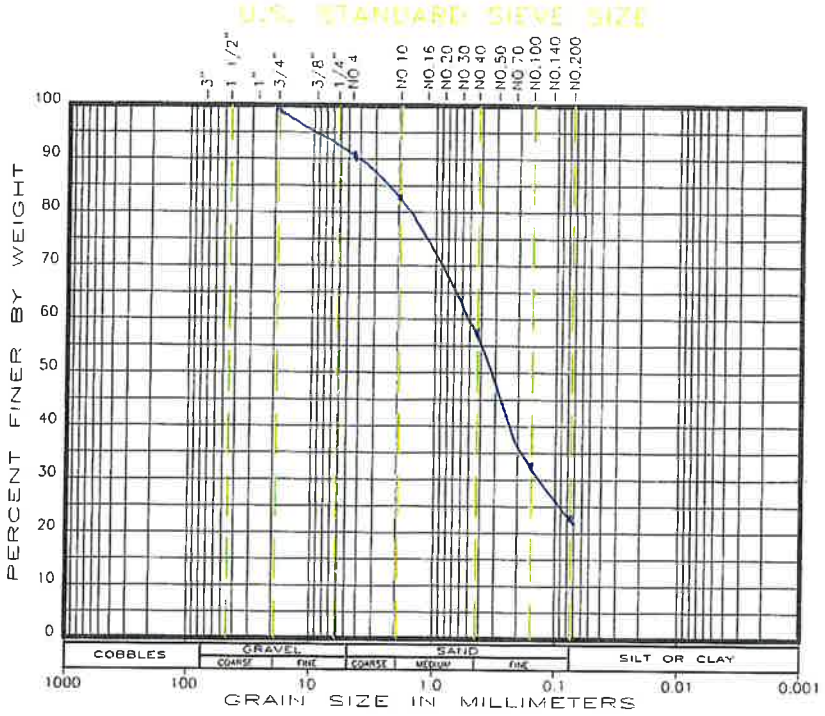
CNP- Could Not Perform Test Due to Site Limitations

Note: 1.The ground had about 2" to 4"of snow in the area tested

2. The ground had minimal frost depth, if any, in the area tested

APPENDIX C

REPORT OF GRADATION ANALYSIS



BORING NO. 1	SAMPLE NO. 1
ORIGIN OF MATERIAL: From Split Spoon Sampler	
VISUAL CLASSIFICATION: Medium to Fine Sand, Trace Fine Gravel, Trace Coarse Sand, Some Silt/Clay	
PROPOSED USE: Existing Fill Material	
ASTM METHOD USED: D422	
DEVIATION FROM ASTM METHOD: Washed through the Nos. 100 & 200 sieves	
DESCRIPTION OF SAMPLING PROCEDURE USED: Split Spoon Sampler	
DESCRIPTION OF ANY MEASUREMENT UNCERTAINTY: NONE	
REMARKS: 1. Depth of sample 5 to 7 feet	

SIEVE SIZE	% PASSING
1 ½"	100
¾"	100
No. 4	90
No. 10	83
No. 40	58
No. 100	32
No. 200	23

DESIGN EARTH TECHNOLOGY
P.O. Box 187 • Guilford, CT 06437
Phone/Fax: (203) 458-9806
Email: doedirt@aol.com

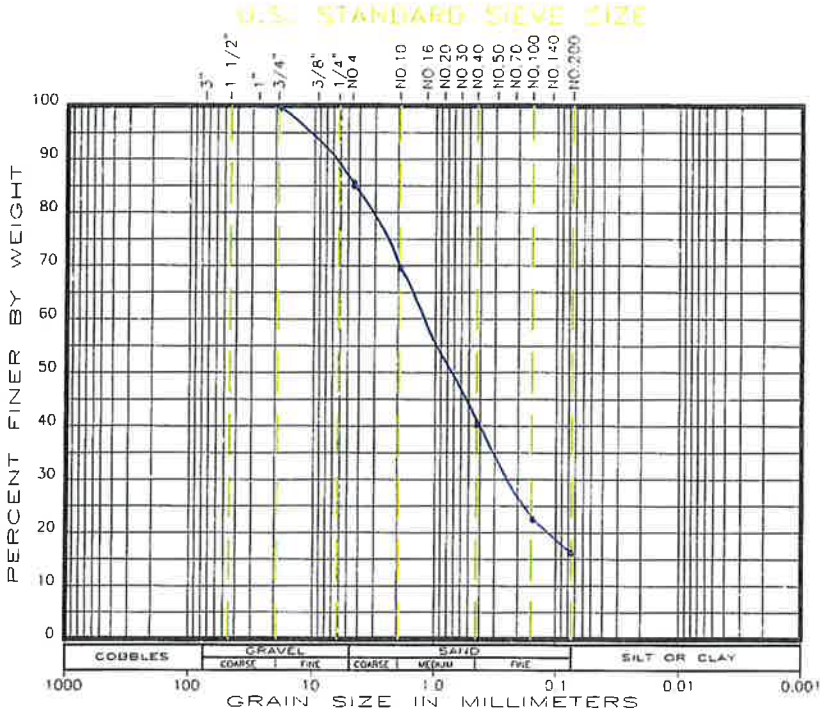
Date:	February 12, 2016	Project No.:	2015-13
Test By:	LJM, Jr.	Checked By:	LJM, Jr.
Project:	Proposed Verizon Wireless Comm. Facility		
	Bethel–W2, 15 Great Pasture Road		
	Danbury, Connecticut		
Prepared For:	Centek Engineering, Inc.		
			GA-1

RESPECTFULLY SUBMITTED,

STATE OF CONNECTICUT LAWRENCE J. MARCIK, JR. No.15255 LICENSED PROFESSIONAL ENGINEER

Lawrence J. Marcik, Jr., P.E.
DESIGN EARTH TECHNOLOGY

REPORT OF GRADATION ANALYSIS



BORING NO. 1	SAMPLE NO. 4
ORIGIN OF MATERIAL: From Split Spoon Sampler	
VISUAL CLASSIFICATION: Coarse to Fine Sand, little Fine Gravel, Little Silt/Clay	
PROPOSED USE: Existing Fill Material	
ASTM METHOD USED: D422	
DEVIATION FROM ASTM METHOD: Washed through the Nos. 100 & 200 sieves	
DESCRIPTION OF SAMPLING PROCEDURE USED: Split Spoon Sampler	
DESCRIPTION OF ANY MEASUREMENT UNCERTAINTY: NONE	
REMARKS: 1. Depth of sample 12 to 14 feet	

SIEVE SIZE	% PASSING
1 ½"	100
¾"	100
No. 4	85
No. 10	69
No. 40	40
No. 100	23
No. 200	16

DESIGN EARTH TECHNOLOGY
P.O. Box 187 • Guilford, CT 06437
Phone/Fax: (203) 458-9806
Email: doodirt@aol.com

Date:	February 12, 2016	Project No.:	2015-13
Test By:	LJM, Jr.	Checked By:	LJM, Jr.
Project:	Proposed Verizon Wireless Comm. Facility		
	Bethel–W2, 15 Great Pasture Road		
	Danbury, Connecticut		
Prepared For:	Centek Engineering, Inc.		
			GA-2

RESPECTFULLY SUBMITTED,

Lawrence J. Marcik, Jr., P.E.
DESIGN EARTH TECHNOLOGY

ROCK QUANTITY DESIGNATION

SUMMARY REPORT

PROJECT: Proposed Verizon Wireless Communication Tower, Bethel- W2, 15 Great Pasture Road, Danbury, CT

DET PROJECT NO.: 2015.13

MEASUREMENTS CONDUCTED BY: Lawrence J. Marcik, Jr., P.E.

BORING IDENTIFICATION AND CORE RUN DEPTH (ft)	CORE RUN LENGTH (in)	CORE RECOVERY LENGTH And % (in/%)	RQD (%)
B-1 Run #1 24' – 29'	60"	60/100	82
B-1 Run #2 29' – 34'	60"	60/100	83

UNCONFINED COMPRESSIVE STRENGTH OF INTACT ROCK CORE SPECIMENS

SUMMARY REPORT

PROJECT: Proposed Verizon Wireless Communication Tower, Bethel- W2, 15 Great Pasture Road, Danbury, CT
DET PROJECT NO.: 2015.13
DATE OF TEST: February 19, 2016
ROCK TYPE: Metamorphic Type Rock
TEST CONDUCTED BY: Lawrence J. Marcik, Jr., P.E.

CORE IDENTIFICATION	LOCATION OF SAMPLE	CORE DIAMETER (in.)	LENGTH OF CORE (in.)	COMPRESSIVE STRENGTH (psi)	TYPE OF FRACTURE
A	B-1, Run #1 Depth ±25'	2.00	5.0	8,300	Columnar
B	B-1, Run #2 Depth ±30'	2.00	5.0	9,500	Columnar

Notes: Not all ASTM procedures and reporting have been meet.

PHOTOGRAPHS

PHOTOGRAPHS

PHOTO NO. 1 – SITE HAS BEEN FILLED OVER THE YEARS
VIEW OF THE SOUTHERN SLOPE

PHOTO NO. 2 – SITE HAS BEEN FILLED OVER THE YEARS
VIEW OF THE SOUTHERN SLOPE

PHOTO NO. 3– DRILLING BORING AT CENTER OF TOWER

PHOTO NO. 4 – TYPICAL RESISTIVITY FIELD TESTING

Sabre Industries™
Towers and Poles

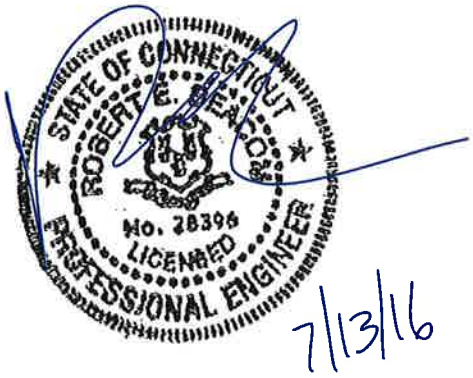
Structural Design Report

120' Extendible to 140' Monopole
Site: Bethel W2, CT
Site Number: 5-0157

Prepared for: VERIZON WIRELESS
by: Sabre Towers & Poles ™

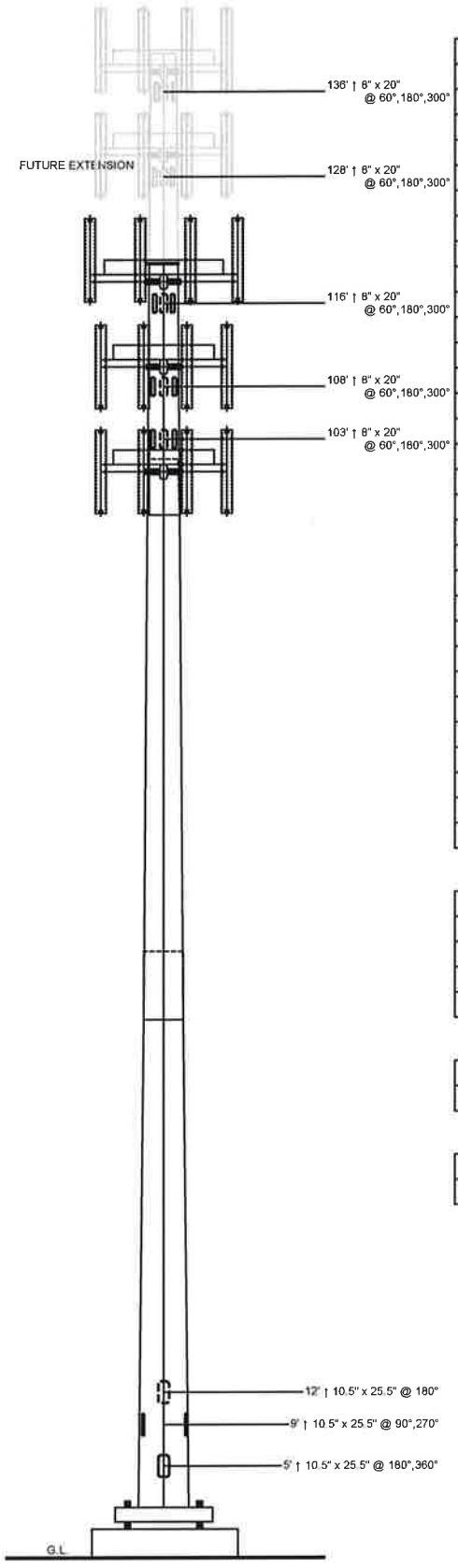
Job Number: 16-7133-SCB

July 13, 2016



7/13/16

Length (ft)	53' - 3"	53' - 6"						24' - 0"	20' - 0"
Number Of Sides		18							
Thickness (in)	3/8"	5/16"					1/4"		
Lap Splice (ft)			6' - 6"		5' - 3"				
Top Diameter (in)	44.83"	35.06"				31.42"	27"		
Bottom Diameter (in)	56.59"	46.89"				36.72"	31.42"		
Taper (in/ft)		0.221							
Grade		A572-65							
Weight (lbs)	13314	7793				3148	2331		
Overall Steel Height (ft)		119					20 (Extension)		



Designed Appurtenance Loading

Elev	Description	Tx-Line
140***	(3) 800 10510	(3) 1 5/8"
140***	(18) TMA	
140***	(2) DB-B1-6C-12AB-0Z	(2) DC/Fiber Trunks
140***	(12) RRH2x40-AWS	
140***	(9) 800 10766	(9) 1 5/8"
138***	L.P. Platform (Monopole Only) - 12' w/ Handrail	
130***	L.P. Platform (Monopole Only) - 12' w/ Handrail	
130***	(12) RRH2x40-AWS	
130***	(18) TMA	
130***	(3) 800 10510	(3) 1 5/8"
130***	(9) 800 10766	(9) 1 5/8"
130***	(2) DB-B1-6C-12AB-0Z	(2) DC/Fiber Trunks
120	(6) HBX-6517DS-VTM	(9) 1 5/8"
120	(3) RRH2x60-AWS	
120	(3) RRH2x60-1900A-4R	
120	(2) DB-B1-6C-12AB-0Z	(2) DC/Fiber Trunks
120	(6) 800 10766	(9) 1 5/8"
120	(3) RRH2x60-700	
118	L.P. Platform (Monopole Only) - 14' w/ Handrail	
110	L.P. Platform (Monopole Only) - 12' w/ Handrail	
110	(12) RRH2x40-AWS	
110	(18) TMA	
110	(3) 800 10510	(3) 1 5/8"
110	(9) 800 10766	(9) 1 5/8"
110	(2) DB-B1-6C-12AB-0Z	(2) DC/Fiber Trunks
100	L.P. Platform (Monopole Only) - 12' w/ Handrail	
100	(12) RRH2x40-AWS	
100	(18) TMA	
100	(3) 800 10510	(3) 1 5/8"
100	(9) 800 10766	(9) 1 5/8"
100	(2) DB-B1-6C-12AB-0Z	(2) DC/Fiber Trunks

Load Case Reactions

Description	Axial (kips)	Shear (kips)	Moment (ft-k)	Deflection (ft)	Sway (deg)
3s Gusted Wind	57.21	45.89	4952.27	9.02	6.45
3s Gusted Wind 0.9 Dead	42.95	45.76	4867.79	8.82	6.3
3s Gusted Wind&Ice	81.12	14.08	1566.09	2.91	2.07
Service Loads	47.65	9.22	988.59	1.81	1.29

Base Plate Dimensions

Shape	Diameter	Thickness	Bolt Circle	Bolt Qty	Bolt Diameter
Round	69"	2.25"	63.25"	16	2.25"

Anchor Bolt Dimensions

Length	Diameter	Hole Diameter	Weight	Type	Finish
84"	2.25"	2.625"	1937.6	A615-75	Galv-18"

Notes

1) Antenna Feed Lines Run Inside Pole
2) All dimensions are above ground level, unless otherwise specified.
3) Weights shown are estimates. Final weights may vary.
4) The Monopole was designed for a basic wind speed of 100 mph with 0" of radial ice, and 50 mph with 3/4" of radial ice, in accordance with ANSI/TIA-222-G, Structure Class II, Exposure Category C, Topographic Category 1.
5) Full Height Step Bolts
6) The Monopole was designed for a basic wind speed of 85 mph with 1/2" radial ice with reduction, in accordance with EIA/TIA-222-F.
7) ANSI/TIA-222-G load case reactions are shown in the table above. EIA/TIA -222-F load case reactions can be found in the calcuations toward the end of this design report.

*** These Appurtenances cannot be installed until the Monopole has been extended.

Sabre Industries™
Towers and Poles

Sabre Communications Corporation
7101 Southbridge Drive
P.O. Box 658
Sioux City, IA 51102-0658
Phone: (712) 258-6690
Fax: (712) 279-0814

Job:	16-7133-SCB
Customer:	VERIZON WIRELESS
Site Name:	Bethel W2, CT 5-0157
Description:	120' ext. 140' Monopole
Date:	7/13/2016 By: REB

(USA) - Monopole Spatial Analysis (c)2015 Guymast Inc.

Tel:(416)736-7453 Fax:(416)736-4372 Web:www.guymast.com

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Sabre Towers and Poles on: 12 jul 2016 at: 18:11:55

120' ext. 140' Monopole / Bethel W2, CT

222-G:

* All pole diameters shown on the following pages are across corners.
See profile drawing for widths across flats.

POLE GEOMETRY

ELEV ft	SECTION NAME	No.of SIDES	OUTSIDE DIAM in	THICK -NESS in	RESISTANCES ϕ*Pn kip	ϕ*Mn ft-kip	SPLICE TYPE	...OVERLAP... LENGTH ft	RATIO
139.0									
			27.42	0.250	1548.8	851.0			
	A	18							
			31.90	0.250	1723.1	1104.6			
119.0									
			31.90	0.250	1723.1	1104.6			
	B	18							
			36.10	0.250	1865.3	1355.6			
100.2									
			36.10	0.250	1865.3	1355.6			
	B/C	18					SLIP	5.25	1.74
			36.79	0.312	2546.8	1880.1			
95.0									
			36.79	0.312	2546.8	1880.1			
	C	18							
			46.14	0.312	2953.6	2744.2			
53.2									
			46.14	0.312	2953.6	2744.2			
	C/D	18					SLIP	6.50	1.69
			46.99	0.375	3829.2	3613.9			
46.7									
			46.99	0.375	3829.2	3613.9			
	D	18							
			57.47	0.375	4346.6	5032.1			
0.0									

POLE ASSEMBLY

SECTION NAME	BASE ELEV ft	.....BOLTS AT BASE OF SECTION..... NUMBER	TYPE	DIAM in	STRENGTH ksi	THREADS IN SHEAR PLANE	CALC BASE ELEV ft
A	119.000	0	A325	0.00	92.0	0	119.000
B	95.000	0	A325	0.00	92.0	0	95.000
C	46.750	0	A325	0.00	92.0	0	46.750
D	0.000	0	A325	0.00	92.0	0	0.000

POLE SECTIONS

SECTION NAME	No.of SIDES	LENGTH ft	OUTSIDE.DIAMETER BOT * in	TOP * in	THICK- NESS in	MAT- ERIAL ID	FLANGE.ID BOT	TOP	FLANGE.WELD ..GROUP.ID.. BOT	TOP
A	18	20.00	31.90	27.42	0.250	1	0	0	0	0
B	18	24.00	37.29	31.90	0.250	2	0	0	0	0
C	18	53.50	47.61	35.60	0.312	3	0	0	0	0
D	18	53.25	57.47	45.52	0.375	4	0	0	0	0

* - Diameter of circumscribed circle

MATERIAL TYPES

TYPE OF SHAPE	TYPE NO	NO OF ELEM.	ORIENT & deg	HEIGHT in	WIDTH in	.THICKNESS. WEB in	FLANGE in	IRREGULARITY .PROJECTION. % OF AREA	ORIENT deg
PL	1	1	0.0	31.90	0.25	0.250	0.250	0.00	0.0
PL	2	1	0.0	37.29	0.25	0.250	0.250	0.00	0.0
PL	3	1	0.0	47.61	0.31	0.312	0.312	0.00	0.0
PL	4	1	0.0	57.47	0.38	0.375	0.375	0.00	0.0

& - With respect to vertical

MATERIAL PROPERTIES

MATERIAL TYPE NO.	ELASTIC MODULUS ksi	UNIT WEIGHT pcf	.. STRENGTH .. Fu ksi	Fy ksi	THERMAL COEFFICIENT /deg
1	29000.0	490.0	80.0	65.0	0.00001170
2	29000.0	490.0	80.0	65.0	0.00001170
3	29000.0	490.0	80.0	65.0	0.00001170
4	29000.0	490.0	80.0	65.0	0.00001170

* Only 3 condition(s) shown in full
* RRUs/TMAs were assumed to be behind antennas

* Some concentrated wind loads may have been derived from full-scale wind tunnel testing

LOADING CONDITION A

100 mph wind with no ice. Wind Azimuth: 0♦

LOADS ON POLE

LOAD TYPE	ELEV ft	APPLY..LOAD..AT RADIUS ft	AZI	LOAD AZI	.....FORCES..... HORIZ kip	DOWN kip	.....MOMENTS..... VERTICAL ft-kip	TORSNAL ft-kip
C	139.000	0.00	0.0	0.0	6.2138	2.1991	0.0000	0.0000
C	137.000	0.00	0.0	0.0	0.0000	2.0846	0.0000	0.0000
C	137.000	0.00	0.0	0.0	1.0429	2.0208	0.0000	0.0000
C	129.000	0.00	0.0	0.0	0.0000	1.9629	0.0000	0.0000
C	129.000	0.00	0.0	0.0	5.9240	4.2199	0.0000	0.0000
C	119.000	0.00	0.0	0.0	4.4672	1.8044	0.0000	0.0000
C	117.000	0.00	0.0	0.0	0.0000	2.6564	0.0000	0.0000
C	117.000	0.00	0.0	0.0	1.4865	2.2764	0.0000	0.0000
C	109.000	0.00	0.0	0.0	0.0000	1.6585	0.0000	0.0000
C	109.000	0.00	0.0	0.0	5.7193	4.2199	0.0000	0.0000
C	99.000	0.00	0.0	0.0	0.0000	1.5064	0.0000	0.0000
C	99.000	0.00	0.0	0.0	5.6057	4.2199	0.0000	0.0000
D	139.000	0.00	180.0	0.0	0.0882	0.0887	0.0000	0.0000
D	100.250	0.00	180.0	0.0	0.1053	0.1124	0.0000	0.0000
D	100.250	0.00	180.0	0.0	0.1074	0.2595	0.0000	0.0000
D	95.000	0.00	180.0	0.0	0.1074	0.2595	0.0000	0.0000
D	95.000	0.00	180.0	0.0	0.1098	0.1518	0.0000	0.0000
D	81.083	0.00	180.0	0.0	0.1098	0.1518	0.0000	0.0000
D	81.083	0.00	180.0	0.0	0.1146	0.1641	0.0000	0.0000
D	67.167	0.00	180.0	0.0	0.1146	0.1641	0.0000	0.0000
D	67.167	0.00	180.0	0.0	0.1180	0.1765	0.0000	0.0000
D	53.250	0.00	180.0	0.0	0.1180	0.1765	0.0000	0.0000
D	53.250	0.00	180.0	0.0	0.1194	0.4053	0.0000	0.0000
D	46.750	0.00	180.0	0.0	0.1194	0.4053	0.0000	0.0000
D	46.750	0.00	180.0	0.0	0.1180	0.2294	0.0000	0.0000

D	35.062	0.00	180.0	0.0	0.1180	0.2294	0.0000	0.0000
D	35.062	0.00	180.0	0.0	0.1161	0.2419	0.0000	0.0000
D	23.375	0.00	180.0	0.0	0.1161	0.2419	0.0000	0.0000
D	23.375	0.00	180.0	0.0	0.1102	0.2544	0.0000	0.0000
D	0.000	0.00	180.0	0.0	0.1107	0.2668	0.0000	0.0000

LOADING CONDITION M

100 mph wind with no ice. Wind Azimuth: 0◆

LOADS ON POLE

LOAD TYPE	ELEV ft	APPLY..LOAD..AT RADIUS ft	AZI	LOAD AZI	.....FORCES..... HORIZ kip	DOWN kip	.....MOMENTS..... VERTICAL ft-kip	TORSNAL ft-kip
C	139.000	0.00	0.0	0.0	6.2138	1.6493	0.0000	0.0000
C	137.000	0.00	0.0	0.0	0.0000	1.5634	0.0000	0.0000
C	137.000	0.00	0.0	0.0	1.0429	1.5156	0.0000	0.0000
C	129.000	0.00	0.0	0.0	0.0000	1.4721	0.0000	0.0000
C	129.000	0.00	0.0	0.0	5.9240	3.1649	0.0000	0.0000
C	119.000	0.00	0.0	0.0	4.4672	1.3533	0.0000	0.0000
C	117.000	0.00	0.0	0.0	0.0000	1.9923	0.0000	0.0000
C	117.000	0.00	0.0	0.0	1.4865	1.7073	0.0000	0.0000
C	109.000	0.00	0.0	0.0	0.0000	1.2439	0.0000	0.0000
C	109.000	0.00	0.0	0.0	5.7193	3.1649	0.0000	0.0000
C	99.000	0.00	0.0	0.0	0.0000	1.1298	0.0000	0.0000
C	99.000	0.00	0.0	0.0	5.6057	3.1649	0.0000	0.0000
D	139.000	0.00	180.0	0.0	0.0882	0.0665	0.0000	0.0000
D	100.250	0.00	180.0	0.0	0.1053	0.0843	0.0000	0.0000
D	100.250	0.00	180.0	0.0	0.1074	0.1947	0.0000	0.0000
D	95.000	0.00	180.0	0.0	0.1074	0.1947	0.0000	0.0000
D	95.000	0.00	180.0	0.0	0.1100	0.1138	0.0000	0.0000
D	53.250	0.00	180.0	0.0	0.1182	0.1324	0.0000	0.0000
D	53.250	0.00	180.0	0.0	0.1194	0.3040	0.0000	0.0000
D	46.750	0.00	180.0	0.0	0.1194	0.3040	0.0000	0.0000
D	46.750	0.00	180.0	0.0	0.1187	0.1721	0.0000	0.0000
D	11.687	0.00	180.0	0.0	0.1108	0.1908	0.0000	0.0000
D	11.687	0.00	180.0	0.0	0.1107	0.2001	0.0000	0.0000
D	0.000	0.00	180.0	0.0	0.1107	0.2001	0.0000	0.0000

LOADING CONDITION Y

50 mph wind with 0.75 ice. Wind Azimuth: 0◆

LOADS ON POLE

LOAD TYPE	ELEV ft	APPLY..LOAD..AT RADIUS ft	AZI	LOAD AZI	.....FORCES..... HORIZ kip	DOWN kip	.....MOMENTS..... VERTICAL ft-kip	TORSNAL ft-kip
C	139.000	0.00	0.0	0.0	1.5960	4.2651	0.0000	0.0000
C	137.000	0.00	0.0	0.0	0.0000	2.0846	0.0000	0.0000
C	137.000	0.00	0.0	0.0	0.7059	2.5373	0.0000	0.0000
C	129.000	0.00	0.0	0.0	0.0000	1.9629	0.0000	0.0000
C	129.000	0.00	0.0	0.0	1.9450	6.7833	0.0000	0.0000
C	119.000	0.00	0.0	0.0	1.1726	3.3371	0.0000	0.0000
C	117.000	0.00	0.0	0.0	0.0000	2.6564	0.0000	0.0000
C	117.000	0.00	0.0	0.0	0.2331	2.8567	0.0000	0.0000
C	109.000	0.00	0.0	0.0	0.0000	1.6585	0.0000	0.0000
C	109.000	0.00	0.0	0.0	1.8627	6.7409	0.0000	0.0000
C	99.000	0.00	0.0	0.0	0.0000	1.5064	0.0000	0.0000
C	99.000	0.00	0.0	0.0	1.8173	6.7170	0.0000	0.0000
D	139.000	0.00	180.0	0.0	0.0286	0.1517	0.0000	0.0000
D	100.250	0.00	180.0	0.0	0.0333	0.1889	0.0000	0.0000
D	100.250	0.00	180.0	0.0	0.0338	0.3380	0.0000	0.0000
D	95.000	0.00	180.0	0.0	0.0338	0.3380	0.0000	0.0000

D	95.000	0.00	180.0	0.0	0.0344	0.2327	0.0000	0.0000
D	81.083	0.00	180.0	0.0	0.0344	0.2327	0.0000	0.0000
D	81.083	0.00	180.0	0.0	0.0356	0.2499	0.0000	0.0000
D	67.167	0.00	180.0	0.0	0.0356	0.2499	0.0000	0.0000
D	67.167	0.00	180.0	0.0	0.0365	0.2665	0.0000	0.0000
D	53.250	0.00	180.0	0.0	0.0365	0.2665	0.0000	0.0000
D	53.250	0.00	180.0	0.0	0.0367	0.4980	0.0000	0.0000
D	46.750	0.00	180.0	0.0	0.0367	0.4980	0.0000	0.0000
D	46.750	0.00	180.0	0.0	0.0360	0.3246	0.0000	0.0000
D	0.000	0.00	180.0	0.0	0.0332	0.3585	0.0000	0.0000

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Sabre Towers and Poles on: 12 jul 2016 at: 18:11:55

120' ext. 140' Monopole / Bethel W2, CT

MAXIMUM POLE DEFORMATIONS CALCULATED(w.r.t. wind direction)

MAST ELEV ft	DEFLECTIONS (ft) HORIZONTAL ALONG	HORIZONTAL ACROSS	DOWN	ROTATIONS (deg) TILT ALONG	TILT ACROSS	TWIST
139.0	9.02H	0.06E	0.77H	6.45H	0.04E	0.00N
134.0	8.46H	0.05E	0.71H	6.44H	0.04E	0.00N
129.0	7.91H	0.05E	0.65H	6.41H	0.04E	0.00N
124.0	7.36H	0.05E	0.58H	6.34H	0.04E	0.00N
119.0	6.82H	0.04E	0.52H	6.24H	0.04E	0.00N
112.7	6.15H	0.04E	0.45H	6.07H	0.04E	0.00N
106.5	5.51H	0.03E	0.39H	5.85H	0.04E	0.00N
100.2	4.89H	0.03E	0.32H	5.57H	0.03E	0.00N
95.0	4.40H	0.03E	0.28H	5.36H	0.03E	0.00N
81.1	3.19H	0.02E	0.17H	4.64H	0.03E	0.00N
67.2	2.17H	0.01E	0.10H	3.81H	0.02E	0.00N
53.2	1.35H	0.01E	0.05H	2.93H	0.02E	0.00X
46.7	1.04H	0.01E	0.03H	2.58H	0.02E	0.00X
35.1	0.58H	0.00E	0.01H	1.92H	0.01E	0.00X
23.4	0.26H	0.00E	0.00H	1.27H	0.01E	0.00X
11.7	0.06H	0.00E	0.00H	0.63H	0.00E	0.00X
0.0	0.00A	0.00A	0.00A	0.00A	0.00A	0.00A

MAXIMUM POLE FORCES CALCULATED(w.r.t. to wind direction)

MAST ELEV ft	TOTAL AXIAL kip	SHEAR.w.r.t.WIND.DIR ALONG kip	SHEAR.w.r.t.WIND.DIR ACROSS kip	MOMENT.w.r.t.WIND.DIR ALONG ft-kip	MOMENT.w.r.t.WIND.DIR ACROSS ft-kip	TORSION ft-kip
139.0						

	4.27 Z	6.29 P	-0.03 H	0.18 P	-0.07 H	0.01 H
	9.67 Z	7.78 P	-0.03 H	-37.59 E	0.07 H	0.01 R
134.0						
	9.67 j	7.79 U	-0.13 X	-37.62 F	-0.09 W	-0.02 E
	10.46 j	8.24 U	-0.13 X	-80.99 H	0.63 X	-0.07 X
129.0						
	19.21 j	14.31 H	-0.18 X	-81.00 E	0.59 X	0.07 N
	20.03 j	14.78 H	-0.18 X	-160.29 H	1.46 X	-0.16 X
124.0						
	20.03 b	14.76 H	0.26 N	-160.41 H	1.41 X	-0.16 X
	20.87 b	15.24 H	0.26 N	-242.17 H	2.68 X	-0.29 X
119.0						
	24.22 a	19.86 H	-0.17 X	-242.15 H	-2.77 N	0.31 N
	30.82 a	21.96 H	-0.17 X	-386.05 H	3.66 X	-0.40 X
112.7						
	30.82 a	21.87 H	-0.18 X	-386.09 H	3.63 X	-0.40 X
	40.34 a	28.22 H	-0.18 X	-553.17 H	4.73 X	-0.51 X
106.5						
	40.34 a	28.24 H	0.23 N	-553.19 H	4.75 X	-0.51 X
	41.50 a	28.89 H	0.23 N	-747.43 H	-6.11 N	0.65 N
100.2						
	41.50 a	29.00 H	0.21 N	-747.34 H	6.09 X	-0.65 X
	51.50 a	35.16 H	0.21 N	-938.53 H	-7.15 N	0.75 N
95.0						
	51.50 a	35.05 H	0.26 E	-938.54 H	-7.19 N	0.75 N
	54.74 a	36.58 H	0.26 E	-1477.79 H	-9.40 N	0.95 N
81.1						
	54.74 a	36.54 E	0.28 E	-1477.78 H	-9.40 N	0.95 N
	58.21 a	38.13 E	0.28 E	-2034.16 H	-12.71 E	1.11 N
67.2						
	58.21 a	38.14 E	0.28 E	-2034.16 H	-12.71 E	1.11 N
	61.92 a	39.77 E	0.28 E	-2607.81 H	-16.76 E	-1.24 X
53.2						
	61.92 a	39.76 E	0.26 E	-2607.80 H	-16.75 E	-1.24 X
	65.16 a	40.54 E	0.26 E	-2881.80 H	-18.44 E	1.27 N
46.7						
	65.16 a	40.56 E	0.26 E	-2881.71 H	-18.48 E	-1.27 X
	69.00 a	41.94 E	0.26 E	-3384.16 H	-21.58 E	-1.33 X
35.1						
	69.00 a	41.94 E	0.28 E	-3384.12 H	-21.58 E	-1.33 X
	72.94 a	43.29 E	0.28 E	-3897.36 H	-24.84 E	-1.37 X
23.4						
	72.94 a	43.30 E	0.27 E	-3897.35 H	-24.84 E	-1.37 X
	76.98 a	44.59 E	0.27 E	-4420.47 H	-28.06 E	-1.39 X
11.7						
	76.98 a	44.59 E	0.28 E	-4420.47 H	-28.06 E	-1.39 X
	81.12 a	45.89 E	0.28 E	-4952.27 H	-31.31 E	-1.39 X
base reaction	81.12 a	-45.89 E	-0.28 E	4952.27 H	31.31 E	1.39 X

COMPLIANCE WITH 4.8.2 & 4.5.4

ELEV ft	AXIAL	BENDING	SHEAR + TORSIONAL		TOTAL	SATISFIED	D/t(w/t)	MAX ALLOWED
139.00								
	0.00Z	0.00P	0.01P	0.00Z		YES	17.28A	45.2

	0.01Z	0.04E	0.01P	0.05E	YES	18.06A	45.2
134.00							
	0.01j	0.04F	0.01U	0.05F	YES	18.06A	45.2
	0.01j	0.08H	0.01U	0.09L	YES	18.84A	45.2
129.00							
	0.01j	0.08E	0.02H	0.09E	YES	18.84A	45.2
	0.01j	0.15H	0.02H	0.16H	YES	19.62A	45.2
124.00							
	0.01b	0.15H	0.02H	0.16H	YES	19.62A	45.2
	0.01b	0.22H	0.02H	0.23H	YES	20.40A	45.2
119.00							
	0.01a	0.22H	0.02H	0.23H	YES	20.40A	45.2
	0.02a	0.33H	0.02H	0.34H	YES	21.37A	45.2
112.75							
	0.02a	0.33H	0.02H	0.34H	YES	21.37A	45.2
	0.02a	0.44H	0.03H	0.45H	YES	22.35A	45.2
106.50							
	0.02a	0.44H	0.03H	0.45H	YES	22.35A	45.2
	0.02a	0.55H	0.03H	0.57H	YES	23.32A	45.2
100.25							
	0.02a	0.41H	0.02H	0.42H	YES	18.30A	45.2
	0.02a	0.49H	0.03H	0.50H	YES	18.96A	45.2
95.00							
	0.02a	0.50H	0.03H	0.51H	YES	18.68A	45.2
	0.02a	0.68H	0.03H	0.70H	YES	20.41A	45.2
81.08							
	0.02a	0.68H	0.03E	0.70H	YES	20.41A	45.2
	0.02a	0.83H	0.03E	0.85H	YES	22.15A	45.2
67.17							
	0.02a	0.83H	0.03E	0.85H	YES	22.15A	45.2
	0.02a	0.95H	0.03E	0.97H	YES	23.88A	45.2
53.25							
	0.02a	0.74H	0.02E	0.76H	YES	19.61A	45.2
	0.02a	0.78H	0.02E	0.79H	YES	20.28A	45.2
46.75							
	0.02a	0.80H	0.02E	0.81H	YES	19.99A	45.2
	0.02a	0.85H	0.02E	0.87H	YES	21.20A	45.2
35.06							
	0.02a	0.85H	0.02E	0.87H	YES	21.20A	45.2
	0.02a	0.90H	0.02E	0.92H	YES	22.42A	45.2
23.37							
	0.02a	0.90H	0.02E	0.92H	YES	22.42A	45.2
	0.02a	0.95H	0.02E	0.96H	YES	23.63A	45.2
11.69							
	0.02a	0.95H	0.02E	0.96H	YES	23.63A	45.2
	0.02a	0.98H	0.02E	1.00H	YES	24.85A	45.2
0.00							

MAXIMUM LOADS ONTO FOUNDATION(w.r.t. wind direction)

DOWN	SHEAR.w.r.t.WIND.DIR		MOMENT.w.r.t.WIND.DIR		TORSION
	ALONG	ACROSS	ALONG	ACROSS	
kip	kip	kip	ft-kip	ft-kip	ft-kip
81.12	45.89	0.28	-4952.27	-31.31	-1.39
a	E	E	H	E	X

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120' ext. 140' Monopole / Bethel W2, CT

********** Service Load Condition **********

* Only 1 condition(s) shown in full
* RRUs/TMAs were assumed to be behind antennas

* Some concentrated wind loads may have been derived from full-scale wind tunnel testing

LOADING CONDITION A

60 mph wind with no ice. Wind Azimuth: 0♦

LOADS ON POLE

LOAD TYPE	ELEV ft	APPLY..LOAD..AT RADIUS ft	AZI	LOAD AZI	.....FORCES..... HORIZ kip	DOWN kip	.....MOMENTS..... VERTICAL ft-kip	TORSNAL ft-kip
C	139.000	0.00	0.0	0.0	1.2509	1.8326	0.0000	0.0000
C	137.000	0.00	0.0	0.0	0.0000	1.7372	0.0000	0.0000
C	137.000	0.00	0.0	0.0	0.2100	1.6840	0.0000	0.0000
C	129.000	0.00	0.0	0.0	0.0000	1.6357	0.0000	0.0000
C	129.000	0.00	0.0	0.0	1.1926	3.5166	0.0000	0.0000
C	119.000	0.00	0.0	0.0	0.8993	1.5037	0.0000	0.0000
C	117.000	0.00	0.0	0.0	0.0000	2.2136	0.0000	0.0000
C	117.000	0.00	0.0	0.0	0.2993	1.8970	0.0000	0.0000
C	109.000	0.00	0.0	0.0	0.0000	1.3821	0.0000	0.0000
C	109.000	0.00	0.0	0.0	1.1514	3.5166	0.0000	0.0000
C	99.000	0.00	0.0	0.0	0.0000	1.2553	0.0000	0.0000
C	99.000	0.00	0.0	0.0	1.1285	3.5166	0.0000	0.0000
D	139.000	0.00	180.0	0.0	0.0178	0.0739	0.0000	0.0000
D	100.250	0.00	180.0	0.0	0.0212	0.0937	0.0000	0.0000
D	100.250	0.00	180.0	0.0	0.0216	0.2163	0.0000	0.0000
D	95.000	0.00	180.0	0.0	0.0216	0.2163	0.0000	0.0000
D	95.000	0.00	180.0	0.0	0.0221	0.1265	0.0000	0.0000
D	81.083	0.00	180.0	0.0	0.0221	0.1265	0.0000	0.0000
D	81.083	0.00	180.0	0.0	0.0231	0.1368	0.0000	0.0000
D	67.167	0.00	180.0	0.0	0.0231	0.1368	0.0000	0.0000
D	67.167	0.00	180.0	0.0	0.0238	0.1471	0.0000	0.0000
D	53.250	0.00	180.0	0.0	0.0238	0.1471	0.0000	0.0000
D	53.250	0.00	180.0	0.0	0.0240	0.3378	0.0000	0.0000
D	46.750	0.00	180.0	0.0	0.0240	0.3378	0.0000	0.0000
D	46.750	0.00	180.0	0.0	0.0238	0.1912	0.0000	0.0000
D	35.062	0.00	180.0	0.0	0.0238	0.1912	0.0000	0.0000
D	35.062	0.00	180.0	0.0	0.0234	0.2016	0.0000	0.0000
D	23.375	0.00	180.0	0.0	0.0234	0.2016	0.0000	0.0000
D	23.375	0.00	180.0	0.0	0.0222	0.2120	0.0000	0.0000
D	0.000	0.00	180.0	0.0	0.0223	0.2223	0.0000	0.0000

MAXIMUM POLE DEFORMATIONS CALCULATED(w.r.t. wind direction)

MAST ELEV ft	.....DEFLECTIONS (ft)..... HORIZONTAL ..... ALONG	ACROSS	DOWN	.....ROTATIONS (deg)..... TILT ..... ALONG	ACROSS	TWIST
139.0	1.81A	-0.01C	0.03C	1.29A	-0.01C	0.00C

134.0	1.70A	-0.01C	0.03C	1.29A	-0.01C	0.00C
129.0	1.59A	-0.01C	0.03C	1.28A	-0.01C	0.00C
124.0	1.48A	-0.01C	0.03C	1.26A	-0.01C	0.00C
119.0	1.37A	-0.01C	0.02C	1.24A	-0.01C	0.00C
112.7	1.23A	-0.01C	0.02C	1.21A	-0.01C	0.00C
106.5	1.10A	0.00C	0.02C	1.17A	-0.01C	0.00C
100.2	0.98A	0.00C	0.02C	1.11A	-0.01C	0.00C
95.0	0.88A	0.00C	0.01C	1.07A	0.00C	0.00C
81.1	0.64A	0.00C	0.01C	0.92A	0.00C	0.00C
67.2	0.43A	0.00C	0.01C	0.76A	0.00C	0.00C
53.2	0.27A	0.00C	0.00B	0.58A	0.00C	0.00C
46.7	0.21A	0.00C	0.00B	0.51A	0.00C	0.00C
35.1	0.12A	0.00C	0.00B	0.38A	0.00C	0.00C
23.4	0.05A	0.00C	0.00B	0.25A	0.00C	0.00C
11.7	0.01A	0.00C	0.00A	0.12A	0.00C	0.00C
0.0	0.00A	0.00A	0.00A	0.00A	0.00A	0.00A

MAXIMUM POLE FORCES CALCULATED(w.r.t. to wind direction)

MAST ELEV ft	TOTAL AXIAL kip	SHEAR.w.r.t.WIND.DIR ALONG kip	ACROSS kip	MOMENT.w.r.t.WIND.DIR ALONG ft-kip	ACROSS ft-kip	TORSION ft-kip
139.0	1.83 H	1.27 I	0.01 L	0.03 H	0.02 L	0.00 L
	5.63 H	1.57 I	0.01 L	-7.60 I	-0.03 L	0.00 I
134.0	5.64 H	1.57 I	-0.01 B	-7.59 A	-0.02 I	0.00 I
	6.02 H	1.66 I	-0.01 B	-16.26 I	0.06 B	0.00 F
129.0	11.18 C	2.87 I	-0.02 B	-16.21 I	0.08 B	0.00 C
	11.58 C	2.96 I	-0.02 B	-32.03 I	0.15 B	0.00 C
124.0	11.58 A	2.95 A	-0.02 L	-32.03 I	0.15 B	0.00 B
	11.99 A	3.05 A	-0.02 L	-48.21 I	0.19 C	0.00 C
119.0	13.50 A	3.95 A	-0.02 B	-48.23 I	0.20 C	0.00 C
	18.14 A	4.38 A	-0.02 B	-76.73 I	0.31 C	-0.01 C
112.7	18.14 A	4.37 A	-0.03 C	-76.74 I	0.32 C	-0.01 C
	23.60 A	5.65 A	-0.03 C	-109.91 A	0.53 C	-0.01 C
106.5	23.60 H	5.65 A	-0.03 C	-109.92 I	0.53 C	-0.01 C
	24.17 H	5.78 A	-0.03 C	-148.55 A	0.71 C	-0.01 C
100.2	24.17 H	5.78 A	-0.03 C	-148.53 A	0.72 C	-0.01 C
	30.08 H	7.02 A	-0.03 C	-186.49 A	0.90 C	-0.02 C
95.0	30.08 H	7.02 A	-0.04 C	-186.49 A	0.89 C	-0.02 C
	31.84 H	7.33 A	-0.04 C	-293.80 A	1.42 C	-0.03 C
81.1						

	31.84 H	7.33 A	-0.04 C	-293.80 A	1.42 C	-0.03 C
	33.74 H	7.66 A	-0.04 C	-404.77 A	1.93 C	-0.03 C
67.2						
	33.74 H	7.66 A	-0.04 C	-404.77 A	1.93 C	-0.03 C
	35.79 H	7.99 A	-0.04 C	-519.27 A	2.44 C	-0.04 C
53.2						
	35.79 H	7.99 B	-0.03 C	-519.26 A	2.43 C	-0.04 C
	37.99 H	8.15 B	-0.03 C	-573.99 A	2.61 C	-0.04 C
46.7						
	37.99 H	8.15 B	0.03 E	-573.98 A	2.61 C	-0.04 C
	40.22 H	8.43 B	-0.03 C	-674.34 A	2.90 C	-0.04 C
35.1						
	40.22 H	8.42 B	-0.03 C	-674.34 A	2.90 C	-0.04 C
	42.58 H	8.70 B	-0.03 C	-777.00 A	3.26 C	-0.05 C
23.4						
	42.58 H	8.70 B	-0.03 C	-777.00 A	3.26 C	-0.05 C
	45.09 H	8.96 B	-0.03 C	-881.83 A	3.62 C	-0.05 C
11.7						
	45.09 H	8.96 B	-0.03 C	-881.83 A	3.62 C	-0.05 C
	47.65 H	9.22 B	-0.03 C	-988.59 A	3.99 C	-0.05 C
base reaction	47.65 H	-9.22 B	0.03 C	988.59 A	-3.99 C	0.05 C

COMPLIANCE WITH 4.8.2 & 4.5.4

ELEV ft	AXIAL	BENDING	SHEAR + TORSIONAL	TOTAL	SATISFIED	D/t(w/t)	MAX ALLOWED
139.00							
	0.00H	0.00H	0.00I	0.00H	YES	17.28A	45.2
	0.00H	0.01I	0.00I	0.01I	YES	18.06A	45.2
134.00							
	0.00H	0.01A	0.00I	0.01A	YES	18.06A	45.2
	0.00H	0.02I	0.00I	0.02I	YES	18.84A	45.2
129.00							
	0.01C	0.02I	0.00I	0.02I	YES	18.84A	45.2
	0.01C	0.03I	0.00I	0.04I	YES	19.62A	45.2
124.00							
	0.01A	0.03I	0.00A	0.04I	YES	19.62A	45.2
	0.01A	0.04I	0.00A	0.05I	YES	20.40A	45.2
119.00							
	0.01A	0.04I	0.00A	0.05I	YES	20.40A	45.2
	0.01A	0.06I	0.00A	0.07I	YES	21.37A	45.2
112.75							
	0.01A	0.06I	0.00A	0.07I	YES	21.37A	45.2
	0.01A	0.09A	0.01A	0.10A	YES	22.35A	45.2
106.50							
	0.01H	0.09I	0.01A	0.10I	YES	22.35A	45.2
	0.01H	0.11A	0.01A	0.12A	YES	23.32A	45.2
100.25							
	0.01H	0.08A	0.00A	0.09A	YES	18.30A	45.2
	0.01H	0.10A	0.01A	0.11A	YES	18.96A	45.2
95.00							
	0.01H	0.10A	0.01A	0.11A	YES	18.68A	45.2
	0.01H	0.14A	0.01A	0.15A	YES	20.41A	45.2
81.08							
	0.01H	0.14A	0.01A	0.15A	YES	20.41A	45.2

	0.01H	0.17A	0.01A	0.18A	YES	22.15A	45.2
67.17							
	0.01H	0.17A	0.01A	0.18A	YES	22.15A	45.2
	0.01H	0.19A	0.01A	0.20A	YES	23.88A	45.2
53.25							
	0.01H	0.15A	0.00B	0.16A	YES	19.61A	45.2
	0.01H	0.16A	0.00B	0.17A	YES	20.28A	45.2
46.75							
	0.01H	0.16A	0.00B	0.17A	YES	19.99A	45.2
	0.01H	0.17A	0.00B	0.18A	YES	21.20A	45.2
35.06							
	0.01H	0.17A	0.00B	0.18A	YES	21.20A	45.2
	0.01H	0.18A	0.00B	0.19A	YES	22.42A	45.2
23.37							
	0.01H	0.18A	0.00B	0.19A	YES	22.42A	45.2
	0.01H	0.19A	0.00B	0.20A	YES	23.63A	45.2
11.69							
	0.01H	0.19A	0.00B	0.20A	YES	23.63A	45.2
	0.01H	0.20A	0.00B	0.21A	YES	24.85A	45.2
0.00							

MAXIMUM LOADS ONTO FOUNDATION(w.r.t. wind direction)

DOWN	SHEAR.w.r.t.WIND.DIR ALONG	ACROSS	MOMENT.w.r.t.WIND.DIR ALONG	ACROSS	TORSION
kip	kip	kip	ft-kip	ft-kip	ft-kip
47.65	9.22	-0.03	-988.59	3.99	-0.05
H	B	C	A	C	C

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222-F

POLE_GEOMETRY

ELEV ft	SECTION NAME	No.of SIDES	OUTSIDE DIAM in	THICK -NESS in	.CAPACITIES. AXIAL kip	MOMENT ft-kip	SPLICE TYPE	...OVERLAP... LENGTH ft	RATIO
139.0									
			27.42	0.250	1103.8	606.4			
	A	18							
			31.90	0.250	1286.1	824.5			
119.0									
			31.90	0.250	1286.1	824.5			
	B	18							
			36.10	0.250	1456.8	1058.8			
100.2									
			36.10	0.250	1456.8	1058.8			
	B/C	18					SLIP	5.25	1.74
			36.79	0.312	1852.6	1367.6			
95.0									
			36.79	0.312	1852.6	1367.6			
	C	18							
			46.14	0.312	2327.6	2162.6			

```
53.2 ..................................................
                        46.14   0.312  2327.6  2162.6
     C/D           18                                    SLIP      6.50   1.69
                        46.99   0.375  2840.7  2680.9
46.7 ..................................................
                        46.99   0.375  2840.7  2680.9
     D             18
                        57.47   0.375  3474.3  4022.3
 0.0 ..................................................
```

POLE ASSEMBLY

SECTION NAME	BASE ELEV	BOLTS AT BASE OF SECTION: NUMBER	TYPE	DIAM	STRENGTH	THREADS IN SHEAR PLANE	CALC BASE ELEV
	ft			in	ksi		ft
A	119.000	0	A325	0.00	92.0	0	119.000
B	95.000	0	A325	0.00	92.0	0	95.000
C	46.750	0	A325	0.00	92.0	0	46.750
D	0.000	0	A325	0.00	92.0	0	0.000

POLE SECTIONS

SECTION NAME	No.of SIDES	LENGTH	OUTSIDE.DIAMETER BOT *	OUTSIDE.DIAMETER TOP *	THICK-NESS	MAT-ERIAL ID	FLANGE.ID BOT	FLANGE.ID TOP	FLANGE.WELD ..GROUP.ID.. BOT	FLANGE.WELD ..GROUP.ID.. TOP
		ft	in	in	in					
A	18	20.00	31.90	27.42	0.250	1	0	0	0	0
B	18	24.00	37.29	31.90	0.250	2	0	0	0	0
C	18	53.50	47.61	35.60	0.312	3	0	0	0	0
D	18	53.25	57.47	45.52	0.375	4	0	0	0	0

* - Diameter of circumscribed circle

MATERIAL TYPES

TYPE OF SHAPE	TYPE NO	NO OF ELEM.	ORIENT &	HEIGHT	WIDTH	.THICKNESS. WEB	.THICKNESS. FLANGE	IRREGULARITY .PROJECTION. % OF AREA	IRREGULARITY ORIENT
			deg	in	in	in	in		deg
PL	1	1	0.0	31.90	0.25	0.250	0.250	0.00	0.0
PL	2	1	0.0	37.29	0.25	0.250	0.250	0.00	0.0
PL	3	1	0.0	47.61	0.31	0.312	0.312	0.00	0.0
PL	4	1	0.0	57.47	0.38	0.375	0.375	0.00	0.0

& - With respect to vertical

MATERIAL PROPERTIES

MATERIAL TYPE NO.	ELASTIC MODULUS	UNIT WEIGHT	.. STRENGTH .. Fu	Fy	THERMAL COEFFICIENT
	ksi	pcf	ksi	ksi	/deg
1	29000.0	490.0	80.0	65.0	0.00001170
2	29000.0	490.0	80.0	65.0	0.00001170
3	29000.0	490.0	80.0	65.0	0.00001170
4	29000.0	490.0	80.0	65.0	0.00001170

LOADING CONDITION A

85 mph + 0" ice

LOADS ON POLE
==========

LOAD TYPE	ELEV ft	APPLY..LOAD..AT RADIUS ft	AZI	LOAD AZI	.....FORCES..... HORIZ kip	DOWN kip	.....MOMENTS..... VERTICAL ft-kip	TORSNAL ft-kip
C	139.000	0.00	0.0	0.0	5.0500	1.8300	0.0000	0.0000
C	137.000	0.00	0.0	0.0	0.0000	1.7300	0.0000	0.0000
C	137.000	0.00	0.0	0.0	0.8470	1.6800	0.0000	0.0000
C	129.000	0.00	0.0	0.0	0.0000	1.6300	0.0000	0.0000
C	129.000	0.00	0.0	0.0	4.7900	3.5200	0.0000	0.0000
C	119.000	0.00	0.0	0.0	4.4800	1.5000	0.0000	0.0000
C	117.000	0.00	0.0	0.0	0.0000	2.2200	0.0000	0.0000
C	117.000	0.00	0.0	0.0	1.1920	1.9000	0.0000	0.0000
C	109.000	0.00	0.0	0.0	0.0000	1.3800	0.0000	0.0000
C	109.000	0.00	0.0	0.0	4.5620	3.5200	0.0000	0.0000
C	99.000	0.00	0.0	0.0	0.0000	1.2600	0.0000	0.0000
C	99.000	0.00	0.0	0.0	4.4400	3.5200	0.0000	0.0000
D	139.000	0.00	180.0	0.0	0.0648	0.0739	0.0000	0.0000
D	100.250	0.00	180.0	0.0	0.0758	0.0937	0.0000	0.0000
D	100.250	0.00	180.0	0.0	0.0769	0.2163	0.0000	0.0000
D	95.000	0.00	180.0	0.0	0.0769	0.2163	0.0000	0.0000
D	95.000	0.00	180.0	0.0	0.0780	0.1265	0.0000	0.0000
D	81.083	0.00	180.0	0.0	0.0780	0.1265	0.0000	0.0000
D	81.083	0.00	180.0	0.0	0.0803	0.1368	0.0000	0.0000
D	67.167	0.00	180.0	0.0	0.0803	0.1368	0.0000	0.0000
D	67.167	0.00	180.0	0.0	0.0814	0.1471	0.0000	0.0000
D	53.250	0.00	180.0	0.0	0.0814	0.1471	0.0000	0.0000
D	53.250	0.00	180.0	0.0	0.0811	0.3378	0.0000	0.0000
D	46.750	0.00	180.0	0.0	0.0811	0.3378	0.0000	0.0000
D	46.750	0.00	180.0	0.0	0.0789	0.1912	0.0000	0.0000
D	35.062	0.00	180.0	0.0	0.0789	0.1912	0.0000	0.0000
D	35.062	0.00	180.0	0.0	0.0782	0.2016	0.0000	0.0000
D	23.375	0.00	180.0	0.0	0.0782	0.2016	0.0000	0.0000
D	23.375	0.00	180.0	0.0	0.0823	0.2120	0.0000	0.0000
D	0.000	0.00	180.0	0.0	0.0863	0.2223	0.0000	0.0000

SUPPRESS PRINTING
==========

INPUT LOADS	...FOR THIS LOADING.. DISPL	INTRNL FORCES	MEMBER LOADS	.....MAXIMUMS..... ALL	DISPL	INTRNL FORCES	MEMBER LOADS
no	yes	yes	yes	no	no	no	no

==========

LOADING CONDITION B ==========

85 mph + 0.5" ice (Reduction Allowed)

LOADS ON POLE
==========

LOAD TYPE	ELEV ft	APPLY..LOAD..AT RADIUS ft	AZI	LOAD AZI	.....FORCES..... HORIZ kip	DOWN kip	.....MOMENTS..... VERTICAL ft-kip	TORSNAL ft-kip
C	139.000	0.00	0.0	0.0	4.5300	2.4500	0.0000	0.0000
C	137.000	0.00	0.0	0.0	0.0000	1.7300	0.0000	0.0000
C	137.000	0.00	0.0	0.0	1.4600	1.8400	0.0000	0.0000
C	129.000	0.00	0.0	0.0	0.0000	1.6300	0.0000	0.0000
C	129.000	0.00	0.0	0.0	4.9700	4.2800	0.0000	0.0000
C	119.000	0.00	0.0	0.0	3.2300	1.9600	0.0000	0.0000
C	117.000	0.00	0.0	0.0	0.0000	2.2200	0.0000	0.0000
C	117.000	0.00	0.0	0.0	0.8925	2.0700	0.0000	0.0000
C	109.000	0.00	0.0	0.0	0.0000	1.3800	0.0000	0.0000
C	109.000	0.00	0.0	0.0	4.7200	4.2700	0.0000	0.0000
C	99.000	0.00	0.0	0.0	0.0000	1.2600	0.0000	0.0000
C	99.000	0.00	0.0	0.0	4.5800	4.2600	0.0000	0.0000
D	139.000	0.00	180.0	0.0	0.0504	0.0914	0.0000	0.0000

D	100.250	0.00	180.0	0.0	0.0585	0.1157	0.0000	0.0000
D	100.250	0.00	180.0	0.0	0.0592	0.2390	0.0000	0.0000
D	95.000	0.00	180.0	0.0	0.0592	0.2390	0.0000	0.0000
D	95.000	0.00	180.0	0.0	0.0600	0.1502	0.0000	0.0000
D	81.083	0.00	180.0	0.0	0.0600	0.1502	0.0000	0.0000
D	81.083	0.00	180.0	0.0	0.0617	0.1624	0.0000	0.0000
D	67.167	0.00	180.0	0.0	0.0617	0.1624	0.0000	0.0000
D	67.167	0.00	180.0	0.0	0.0624	0.1746	0.0000	0.0000
D	53.250	0.00	180.0	0.0	0.0624	0.1746	0.0000	0.0000
D	53.250	0.00	180.0	0.0	0.0621	0.3667	0.0000	0.0000
D	46.750	0.00	180.0	0.0	0.0621	0.3667	0.0000	0.0000
D	46.750	0.00	180.0	0.0	0.0604	0.2210	0.0000	0.0000
D	35.062	0.00	180.0	0.0	0.0604	0.2210	0.0000	0.0000
D	35.062	0.00	180.0	0.0	0.0598	0.2330	0.0000	0.0000
D	23.375	0.00	180.0	0.0	0.0598	0.2330	0.0000	0.0000
D	23.375	0.00	180.0	0.0	0.0629	0.2450	0.0000	0.0000
D	0.000	0.00	180.0	0.0	0.0659	0.2570	0.0000	0.0000

SUPPRESS PRINTING
==========

...FOR THIS LOADING..			...MAXIMUMS...			
INPUT LOADS	DISPL	INTRNL FORCES	MEMBER LOADS	ALL	DISPL	INTRNL FORCES	MEMBER LOADS
no	yes	yes	yes	no	no	no	no

16-7133-SCB-F

LOADING CONDITION A ========== Iterations: Mast 4 ======

85 mph + 0" ice

SHELL STRESSES
==========

ELEV	LONGITUDINAL				TRANSVERSE			
	DUE TO AXIAL	DUE TO MOMENT	TOTAL	AT AZI	DUE TO SHEAR	DUE TO TORSION	TOTAL	AT AZI
ft	ksi	ksi	ksi	deg	ksi	ksi	ksi	deg
139.00								
	0.09	0.00	0.09	180.0	0.57	0.00	0.57	270.0
	0.25	2.39	2.64	180.0	0.68	0.00	0.68	90.0
134.00								
	0.25	2.39	2.64	180.0	0.67	0.00	0.67	90.0
	0.26	4.70	4.96	180.0	0.68	0.00	0.68	90.0
129.00								
	0.48	4.69	5.18	180.0	1.19	0.00	1.19	90.0
	0.48	8.57	9.05	180.0	1.18	0.00	1.18	90.0
124.00								
	0.48	8.57	9.05	180.0	1.18	0.00	1.18	90.0
	0.48	12.01	12.49	180.0	1.17	0.00	1.17	90.0
119.00								
	0.54	12.02	12.56	180.0	1.60	0.00	1.60	90.0
	0.70	17.82	18.52	180.0	1.68	0.00	1.68	90.0
112.75								
	0.70	17.82	18.52	180.0	1.69	0.00	1.69	90.0
	0.87	23.65	24.53	180.0	2.07	0.00	2.07	90.0
106.50								

	0.87	23.66	24.53	180.0	2.06	0.00	2.06	90.0
	0.86	29.57	30.43	180.0	2.02	0.00	2.02	90.0
100.25								
	0.69	23.78	24.47	180.0	1.63	0.00	1.63	90.0
	0.83	27.97	28.80	180.0	1.90	0.00	1.90	90.0
95.00								
	0.84	28.76	29.60	180.0	1.93	0.00	1.93	90.0
	0.82	38.34	39.16	180.0	1.84	0.00	1.84	90.0
81.08								
	0.82	38.34	39.16	180.0	1.83	0.00	1.83	90.0
	0.81	45.24	46.05	180.0	1.76	0.00	1.76	90.0
67.17								
	0.81	45.24	46.05	180.0	1.76	0.00	1.76	90.0
	0.80	50.24	51.04	180.0	1.70	0.00	1.70	90.0
53.25								
	0.67	42.04	42.71	180.0	1.42	0.00	1.42	90.0
	0.68	43.58	44.27	180.0	1.40	0.00	1.40	90.0
46.75								
	0.69	44.78	45.48	180.0	1.42	0.00	1.42	90.0
	0.70	47.03	47.72	180.0	1.38	0.00	1.38	90.0
35.06								
	0.70	47.03	47.72	180.0	1.38	0.00	1.38	90.0
	0.70	48.71	49.41	180.0	1.35	0.00	1.35	90.0
23.37								
	0.70	48.71	49.41	180.0	1.35	0.00	1.35	90.0
	0.70	49.96	50.67	180.0	1.32	0.00	1.32	90.0
11.69								
	0.70	49.96	50.67	180.0	1.32	0.00	1.32	90.0
	0.71	50.87	51.58	180.0	1.29	0.00	1.29	90.0
0.00								

SHELL STRESS RATIOS

ELEV	LONGITUDINAL				TRANSVERSE			
	DUE TO AXIAL	DUE TO MOMENT	TOTAL	AT AZI	DUE TO SHEAR	DUE TO TORSION	TOTAL	AT AZI
ft				deg				deg
139.00								
	0.00	0.00	0.00	180.0	0.01	0.00	0.01	270.0
	0.00	0.05	0.05	180.0	0.01	0.00	0.01	90.0
134.00								
	0.00	0.05	0.05	180.0	0.01	0.00	0.01	90.0
	0.01	0.09	0.10	180.0	0.01	0.00	0.01	90.0
129.00								
	0.01	0.09	0.10	180.0	0.02	0.00	0.02	90.0
	0.01	0.16	0.17	180.0	0.02	0.00	0.02	90.0
124.00								
	0.01	0.16	0.17	180.0	0.02	0.00	0.02	90.0
	0.01	0.23	0.24	180.0	0.02	0.00	0.02	90.0
119.00								
	0.01	0.23	0.24	180.0	0.03	0.00	0.03	90.0
	0.01	0.34	0.36	180.0	0.03	0.00	0.03	90.0
112.75								
	0.01	0.34	0.36	180.0	0.03	0.00	0.03	90.0
	0.02	0.45	0.47	180.0	0.04	0.00	0.04	90.0
106.50								
	0.02	0.45	0.47	180.0	0.04	0.00	0.04	90.0
	0.02	0.57	0.59	180.0	0.04	0.00	0.04	90.0
100.25								
	0.01	0.46	0.47	180.0	0.03	0.00	0.03	90.0

	0.02	0.54	0.55	180.0	0.04	0.00	0.04	90.0
95.00								
	0.02	0.55	0.57	180.0	0.04	0.00	0.04	90.0
	0.02	0.74	0.75	180.0	0.04	0.00	0.04	90.0
81.08								
	0.02	0.74	0.75	180.0	0.04	0.00	0.04	90.0
	0.02	0.87	0.89	180.0	0.03	0.00	0.03	90.0
67.17								
	0.02	0.87	0.89	180.0	0.03	0.00	0.03	90.0
	0.02	0.97	0.98	180.0	0.03	0.00	0.03	90.0
53.25								
	0.01	0.81	0.82	180.0	0.03	0.00	0.03	90.0
	0.01	0.84	0.85	180.0	0.03	0.00	0.03	90.0
46.75								
	0.01	0.86	0.87	180.0	0.03	0.00	0.03	90.0
	0.01	0.90	0.92	180.0	0.03	0.00	0.03	90.0
35.06								
	0.01	0.90	0.92	180.0	0.03	0.00	0.03	90.0
	0.01	0.94	0.95	180.0	0.03	0.00	0.03	90.0
23.37								
	0.01	0.94	0.95	180.0	0.03	0.00	0.03	90.0
	0.01	0.96	0.97	180.0	0.03	0.00	0.03	90.0
11.69								
	0.01	0.96	0.98	180.0	0.03	0.00	0.03	90.0
	0.01	0.98	0.99	180.0	0.02	0.00	0.02	90.0
0.00								

EXTREME FIBRE STRESSES IN LAP SPLICE

ELEV	CONTACT.PRESSURE		HOOP.STRESSES		BENDING.STRESSES	
	MAX	AZI	MAX	AZI	MAX	AZI
ft	ksi	deg	ksi	deg	ksi	deg
100.25	0.30	0.0	21.55	90.0	29.57	180.0
95.00	0.29	180.0	21.56	90.0	28.76	180.0
53.25	0.54	0.0	39.05	90.0	50.24	180.0
46.75	0.52	180.0	39.06	90.0	44.78	180.0

LOADS ONTO FOUNDATION(w.r.t. NORTH-EAST-DOWN coordinates)

TOTAL	.....SHEAR.....		.....MOMENT.....		TORSION
AXIAL	NORTH	EAST	NORTH	EAST	
kip	kip	kip	ft-kip	ft-kip	ft-kip
47.56	-36.16	0.00	3940.84	0.00	0.00

LOADS ONTO FOUNDATION(w.r.t. wind direction)

DOWN	SHEAR.w.r.t.WIND.DIR		MOMENT.w.r.t.WIND.DIR		TORSION
	ALONG	ACROSS	ALONG	ACROSS	
kip	kip	kip	ft-kip	ft-kip	ft-kip
47.56	36.16	0.00	-3940.84	0.00	0.00

LOADING CONDITION B ========== Iterations: Mast 5 ======

85 mph + 0.5" ice (Reduction Allowed)

SHELL STRESSES
==========

ELEV	LONGITUDINAL				TRANSVERSE			
	DUE TO AXIAL	DUE TO MOMENT	TOTAL	AT AZI	DUE TO SHEAR	DUE TO TORSION	TOTAL	AT AZI
ft	ksi	ksi	ksi	deg	ksi	ksi	ksi	deg
139.00								
	0.12	0.00	0.12	0.0	0.51	0.00	0.51	90.0
	0.29	2.34	2.63	180.0	0.68	0.00	0.68	270.0
134.00								
	0.29	2.34	2.63	180.0	0.67	0.00	0.67	270.0
	0.30	4.67	4.97	180.0	0.67	0.00	0.67	90.0
129.00								
	0.56	4.67	5.23	180.0	1.20	0.00	1.20	90.0
	0.56	8.60	9.16	180.0	1.18	0.00	1.18	270.0
124.00								
	0.56	8.60	9.16	180.0	1.18	0.00	1.18	270.0
	0.56	12.07	12.63	180.0	1.16	0.00	1.16	270.0
119.00								
	0.64	12.07	12.71	180.0	1.48	0.00	1.48	270.0
	0.81	17.38	18.19	180.0	1.53	0.00	1.53	270.0
112.75								
	0.81	17.38	18.19	180.0	1.54	0.00	1.54	270.0
	1.01	22.76	23.77	180.0	1.92	0.00	1.92	270.0
106.50								
	1.01	22.76	23.77	180.0	1.92	0.00	1.92	270.0
	0.99	28.28	29.27	180.0	1.87	0.00	1.87	270.0
100.25								
	0.80	22.74	23.54	180.0	1.51	0.00	1.51	270.0
	0.96	26.71	27.67	180.0	1.79	0.00	1.79	270.0
95.00								
	0.97	27.46	28.43	180.0	1.81	0.00	1.81	270.0
	0.95	36.50	37.45	180.0	1.71	0.00	1.71	270.0
81.08								
	0.95	36.50	37.45	180.0	1.71	0.00	1.71	270.0
	0.93	42.94	43.87	180.0	1.63	0.00	1.63	270.0
67.17								
	0.93	42.94	43.87	180.0	1.63	0.00	1.63	270.0
	0.92	47.52	48.44	180.0	1.57	0.00	1.57	270.0
53.25								
	0.77	39.76	40.53	180.0	1.32	0.00	1.32	270.0
	0.79	41.15	41.94	180.0	1.29	0.00	1.29	270.0
46.75								
	0.80	42.28	43.08	180.0	1.31	0.00	1.31	270.0
	0.80	44.27	45.07	180.0	1.27	0.00	1.27	270.0
35.06								
	0.80	44.27	45.07	180.0	1.27	0.00	1.27	270.0
	0.81	45.71	46.52	180.0	1.23	0.00	1.23	270.0
23.37								
	0.81	45.71	46.52	180.0	1.23	0.00	1.23	270.0
	0.81	46.74	47.55	180.0	1.20	0.00	1.20	270.0
11.69								
	0.81	46.74	47.55	180.0	1.20	0.00	1.20	270.0
	0.82	47.44	48.26	180.0	1.17	0.00	1.17	270.0
0.00								

SHELL STRESS RATIOS
==========

ELEV	LONGITUDINAL				TRANSVERSE			
	DUE TO	DUE TO	TOTAL	AT	DUE TO	DUE TO	TOTAL	AT

ft	AXIAL	MOMENT		AZI deg	SHEAR	TORSION		AZI deg
139.00	0.00	0.00	0.00	0.0	0.01	0.00	0.01	90.0
	0.01	0.04	0.05	180.0	0.01	0.00	0.01	270.0
134.00	0.01	0.04	0.05	180.0	0.01	0.00	0.01	270.0
	0.01	0.09	0.10	180.0	0.01	0.00	0.01	90.0
129.00	0.01	0.09	0.10	180.0	0.02	0.00	0.02	90.0
	0.01	0.17	0.18	180.0	0.02	0.00	0.02	270.0
124.00	0.01	0.17	0.18	180.0	0.02	0.00	0.02	270.0
	0.01	0.23	0.24	180.0	0.02	0.00	0.02	270.0
119.00	0.01	0.23	0.24	180.0	0.03	0.00	0.03	270.0
	0.02	0.33	0.35	180.0	0.03	0.00	0.03	270.0
112.75	0.02	0.33	0.35	180.0	0.03	0.00	0.03	270.0
	0.02	0.44	0.46	180.0	0.04	0.00	0.04	270.0
106.50	0.02	0.44	0.46	180.0	0.04	0.00	0.04	270.0
	0.02	0.54	0.56	180.0	0.04	0.00	0.04	270.0
100.25	0.02	0.44	0.45	180.0	0.03	0.00	0.03	270.0
	0.02	0.51	0.53	180.0	0.03	0.00	0.03	270.0
95.00	0.02	0.53	0.55	180.0	0.03	0.00	0.03	270.0
	0.02	0.70	0.72	180.0	0.03	0.00	0.03	270.0
81.08	0.02	0.70	0.72	180.0	0.03	0.00	0.03	270.0
	0.02	0.83	0.84	180.0	0.03	0.00	0.03	270.0
67.17	0.02	0.83	0.84	180.0	0.03	0.00	0.03	270.0
	0.02	0.91	0.93	180.0	0.03	0.00	0.03	270.0
53.25	0.01	0.76	0.78	180.0	0.03	0.00	0.03	270.0
	0.02	0.79	0.81	180.0	0.02	0.00	0.02	270.0
46.75	0.02	0.81	0.83	180.0	0.03	0.00	0.03	270.0
	0.02	0.85	0.87	180.0	0.02	0.00	0.02	270.0
35.06	0.02	0.85	0.87	180.0	0.02	0.00	0.02	270.0
	0.02	0.88	0.89	180.0	0.02	0.00	0.02	270.0
23.37	0.02	0.88	0.89	180.0	0.02	0.00	0.02	270.0
	0.02	0.90	0.91	180.0	0.02	0.00	0.02	270.0
11.69	0.02	0.90	0.92	180.0	0.02	0.00	0.02	270.0
	0.02	0.91	0.93	180.0	0.02	0.00	0.02	270.0
0.00								

EXTREME FIBRE STRESSES IN LAP SPLICE

ELEV	CONTACT.PRESSURE MAX	CONTACT.PRESSURE AZI	HOOP.STRESSES MAX	HOOP.STRESSES AZI	BENDING.STRESSES MAX	BENDING.STRESSES AZI
ft	ksi	deg	ksi	deg	ksi	deg
100.25	0.29	0.0	20.61	90.0	28.28	180.0
95.00	0.28	180.0	20.62	90.0	27.46	180.0

53.25	0.51	0.0	36.93	90.0	47.52	180.0
46.75	0.49	180.0	36.94	90.0	42.28	180.0

LOADS ONTO FOUNDATION(w.r.t. NORTH-EAST-DOWN coordinates)

TOTAL AXIAL	.....SHEAR..... NORTH	EAST	.....MOMENT..... NORTH	EAST	TORSION
kip	kip	kip	ft-kip	ft-kip	ft-kip
54.92	-32.71	0.00	3674.80	0.00	0.00

LOADS ONTO FOUNDATION(w.r.t. wind direction)

DOWN	SHEAR.w.r.t.WIND.DIR ALONG	ACROSS	MOMENT.w.r.t.WIND.DIR ALONG	ACROSS	TORSION
kip	kip	kip	ft-kip	ft-kip	ft-kip
54.92	32.71	0.00	-3674.80	0.00	0.00

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16-7133-SCB-F

MAXIMUM POLE DEFORMATIONS CALCULATED(w.r.t. NORTH-EAST-DOWN coordinates)

MAST ELEV	.....DEFLECTIONS (FT)..... HORIZONTAL			DOWN	.....ROTATIONS (DEG)..... TILT			TWIST
FT	NORTH	EAST	TOTAL		NORTH	EAST	TOTAL	
139.0	-7.24A	0.00A	7.24A	0.50A	-5.17A	0.00A	5.17A	0.00A
134.0	-6.79A	0.00A	6.79A	0.46A	-5.16A	0.00A	5.16A	0.00A
129.0	-6.35A	0.00A	6.35A	0.42A	-5.13A	0.00A	5.13A	0.00A
124.0	-5.90A	0.00A	5.90A	0.38A	-5.08A	0.00A	5.08A	0.00A
119.0	-5.47A	0.00A	5.47A	0.34A	-5.00A	0.00A	5.00A	0.00A
112.7	-4.93A	0.00A	4.93A	0.29A	-4.87A	0.00A	4.87A	0.00A
106.5	-4.41A	0.00A	4.41A	0.25A	-4.69A	0.00A	4.69A	0.00A
100.2	-3.92A	0.00A	3.92A	0.21A	-4.47A	0.00A	4.47A	0.00A
95.0	-3.52A	0.00A	3.52A	0.18A	-4.29A	0.00A	4.29A	0.00A
81.1	-2.55A	0.00A	2.55A	0.11A	-3.71A	0.00A	3.71A	0.00A
67.2	-1.73A	0.00A	1.73A	0.06A	-3.05A	0.00A	3.05A	0.00A
53.2	-1.08A	0.00A	1.08A	0.03A	-2.34A	0.00A	2.34A	0.00A
46.7	-0.83A	0.00A	0.83A	0.02A	-2.06A	0.00A	2.06A	0.00A
35.1	-0.46A	0.00A	0.46A	0.01A	-1.53A	0.00A	1.53A	0.00A
23.4	-0.20A	0.00A	0.20A	0.00A	-1.01A	0.00A	1.01A	0.00A

11.7	-0.05A	0.00A	0.05A	0.00B	-0.50A	0.00A	0.50A	0.00A
0.0	0.00A	0.00A	0.00A	0.00A	0.00A	0.00A	0.00A	0.00A

MAXIMUM POLE DEFORMATIONS CALCULATED(w.r.t. wind direction)

MAST ELEV ft	DEFLECTIONS (ft) HORIZONTAL ALONG	HORIZONTAL ACROSS	DOWN	ROTATIONS (deg) TILT ALONG	TILT ACROSS	TWIST
139.0	7.24A	0.00A	0.50A	5.17A	0.00A	0.00A
134.0	6.79A	0.00A	0.46A	5.16A	0.00A	0.00A
129.0	6.35A	0.00A	0.42A	5.13A	0.00A	0.00A
124.0	5.90A	0.00A	0.38A	5.08A	0.00A	0.00A
119.0	5.47A	0.00A	0.34A	5.00A	0.00A	0.00A
112.7	4.93A	0.00A	0.29A	4.87A	0.00A	0.00A
106.5	4.41A	0.00A	0.25A	4.69A	0.00A	0.00A
100.2	3.92A	0.00A	0.21A	4.47A	0.00A	0.00A
95.0	3.52A	0.00A	0.18A	4.29A	0.00A	0.00A
81.1	2.55A	0.00A	0.11A	3.71A	0.00A	0.00A
67.2	1.73A	0.00A	0.06A	3.05A	0.00A	0.00A
53.2	1.08A	0.00A	0.03A	2.34A	0.00A	0.00A
46.7	0.83A	0.00A	0.02A	2.06A	0.00A	0.00A
35.1	0.46A	0.00A	0.01A	1.53A	0.00A	0.00A
23.4	0.20A	0.00A	0.00A	1.01A	0.00A	0.00A
11.7	0.05A	0.00A	0.00B	0.50A	0.00A	0.00A
0.0	0.00A	0.00A	0.00A	0.00A	0.00A	0.00A

MAXIMUM POLE FORCES CALCULATED(w.r.t. NORTH-EAST-DOWN coordinates)

MAST ELEV ft	TOTAL AXIAL kip	SHEAR NORTH kip	SHEAR EAST kip	MOMENT NORTH ft-kip	MOMENT EAST ft-kip	TORSION ft-kip
139.0	2.45 B	-5.06 A	0.00 A	0.03 A	0.00 B	0.00 B
	6.48 B	-6.25 B	0.00 A	30.22 A	0.00 A	0.00 A
134.0	6.49 B	-6.20 A	0.00 B	30.26 A	0.00 A	0.00 B
	6.97 B	-6.53 A	0.00 B	64.27 A	0.00 B	0.00 A
129.0	12.88 B	-11.48 B	0.00 B	64.21 A	0.00 B	0.00 A
	13.38 B	-11.74 B	0.00 B	126.86 B	0.00 B	0.00 A
124.0	13.37 B	-11.72 B	0.00 B	126.85 B	0.00 B	0.00 A
	13.88 B	-12.05 A	0.00 A	191.31 B	0.00 B	0.00 A
119.0	15.85 B	-16.52 A	0.00 A	191.39 B	0.00 B	0.00 A
	20.80 B	-18.15 A	0.00 A	308.28 A	0.00 A	0.00 A
112.7	20.79 B	-18.24 A	0.00 A	308.26 A	0.00 A	0.00 A

	27.13 B	-23.25 A	0.00 A	444.73 A	0.00 A	0.00 A
106.5						
	27.12 B	-23.22 A	0.00 A	444.79 A	0.00 A	0.00 A
	27.83 B	-23.69 A	0.00 A	602.23 A	0.00 A	0.00 A
100.2						
	27.83 B	-23.72 A	0.00 A	602.17 A	0.00 A	0.00 A
	34.60 B	-28.56 A	0.00 A	755.97 A	0.00 A	0.00 A
95.0						
	34.60 B	-28.53 A	0.00 A	756.10 A	0.00 A	0.00 A
	36.69 B	-29.61 A	0.00 A	1188.72 A	0.00 A	0.00 A
81.1						
	36.69 B	-29.58 A	0.00 A	1188.73 A	0.00 A	0.00 A
	38.94 B	-30.70 A	0.00 A	1633.59 A	0.00 A	0.00 A
67.2						
	38.94 B	-30.70 A	0.00 A	1633.59 A	0.00 A	0.00 A
	41.37 B	-31.83 A	0.00 A	2090.43 A	0.00 A	0.00 A
53.2						
	41.37 B	-31.82 A	0.00 A	2090.38 A	0.00 A	0.00 A
	43.75 B	-32.35 A	0.00 A	2307.84 A	0.00 A	0.00 A
46.7						
	43.75 B	-32.35 A	0.00 A	2307.83 A	0.00 A	0.00 A
	46.34 B	-33.27 A	0.00 A	2705.17 A	0.00 A	0.00 A
35.1						
	46.34 B	-33.27 A	0.00 A	2705.16 A	0.00 A	0.00 A
	49.06 B	-34.18 A	0.00 A	3109.85 A	0.00 A	0.00 A
23.4						
	49.06 B	-34.19 A	0.00 A	3109.85 A	0.00 A	0.00 A
	51.96 B	-35.16 A	0.00 A	3521.75 A	0.00 A	0.00 A
11.7						
	51.96 B	-35.16 A	0.00 A	3521.75 A	0.00 A	0.00 A
	54.92 B	-36.16 A	0.00 A	3940.84 A	0.00 A	0.00 A
base reaction	54.92 B	36.16 A	0.00 A	-3940.84 A	0.00 A	0.00 A

MAXIMUM POLE FORCES CALCULATED(w.r.t. to wind direction)

MAST ELEV ft	TOTAL AXIAL kip	SHEAR.w.r.t.WIND.DIR ALONG kip	ACROSS kip	MOMENT.w.r.t.WIND.DIR ALONG ft-kip	ACROSS ft-kip	TORSION ft-kip
139.0						
	2.45 B	5.06 A	0.00 A	-0.03 A	0.00 B	0.00 B
	6.48 B	6.25 B	0.00 A	-30.22 A	0.00 A	0.00 A
134.0						
	6.49 B	6.20 A	0.00 B	-30.26 A	0.00 A	0.00 B
	6.97 B	6.53 A	0.00 B	-64.27 A	0.00 B	0.00 A
129.0						
	12.88 B	11.48 B	0.00 B	-64.21 A	0.00 B	0.00 A
	13.38 B	11.74 B	0.00 B	-126.86 B	0.00 B	0.00 A
124.0						
	13.37 B	11.72 B	0.00 B	-126.85 B	0.00 B	0.00 A
	13.88 B	12.05 A	0.00 A	-191.31 B	0.00 B	0.00 A
119.0						
	15.85 B	16.52 A	0.00 A	-191.39 B	0.00 B	0.00 A
	20.80 B	18.15 A	0.00 A	-308.28 A	0.00 A	0.00 A
112.7						
	20.79 B	18.24 A	0.00 A	-308.26 A	0.00 A	0.00 A
	27.13 B	23.25 A	0.00 A	-444.73 A	0.00 A	0.00 A

106.5						
	27.12 B	23.22 A	0.00 A	-444.79 A	0.00 A	0.00 A
	27.83 B	23.69 A	0.00 A	-602.23 A	0.00 A	0.00 A
100.2						
	27.83 B	23.72 A	0.00 A	-602.17 A	0.00 A	0.00 A
	34.60 B	28.56 A	0.00 A	-755.97 A	0.00 A	0.00 A
95.0						
	34.60 B	28.53 A	0.00 A	-756.10 A	0.00 A	0.00 A
	36.69 B	29.61 A	0.00 A	-1188.72 A	0.00 A	0.00 A
81.1						
	36.69 B	29.58 A	0.00 A	-1188.73 A	0.00 A	0.00 A
	38.94 B	30.70 A	0.00 A	-1633.59 A	0.00 A	0.00 A
67.2						
	38.94 B	30.70 A	0.00 A	-1633.59 A	0.00 A	0.00 A
	41.37 B	31.83 A	0.00 A	-2090.43 A	0.00 A	0.00 A
53.2						
	41.37 B	31.82 A	0.00 A	-2090.38 A	0.00 A	0.00 A
	43.75 B	32.35 A	0.00 A	-2307.84 A	0.00 A	0.00 A
46.7						
	43.75 B	32.35 A	0.00 A	-2307.83 A	0.00 A	0.00 A
	46.34 B	33.27 A	0.00 A	-2705.17 A	0.00 A	0.00 A
35.1						
	46.34 B	33.27 A	0.00 A	-2705.16 A	0.00 A	0.00 A
	49.06 B	34.18 A	0.00 A	-3109.85 A	0.00 A	0.00 A
23.4						
	49.06 B	34.19 A	0.00 A	-3109.85 A	0.00 A	0.00 A
	51.96 B	35.16 A	0.00 A	-3521.75 A	0.00 A	0.00 A
11.7						
	51.96 B	35.16 A	0.00 A	-3521.75 A	0.00 A	0.00 A
	54.92 B	36.16 A	0.00 A	-3940.84 A	0.00 A	0.00 A
base reaction	54.92 B	-36.16 A	0.00 A	3940.84 A	0.00 A	0.00 A

MAXIMUM SHELL STRESSES

ELEV	LONGITUDINAL				TRANSVERSE			
	DUE TO AXIAL	DUE TO MOMENT	TOTAL	AT AZI	DUE TO SHEAR	DUE TO TORSION	TOTAL	AT AZI
ft	ksi	ksi	ksi	deg	ksi	ksi	ksi	deg
139.00								
	0.12 B	0.00 A	0.12 B	0.0	0.57 A	0.00 B	0.57 A	270.0
	0.29 B	2.39 A	2.64 A	180.0	0.68 B	0.00 A	0.68 B	270.0
134.00								
	0.29 B	2.39 A	2.64 A	180.0	0.67 A	0.00 A	0.67 A	90.0
	0.30 B	4.70 A	4.97 B	180.0	0.68 A	0.00 A	0.68 A	90.0
129.00								
	0.56 B	4.69 A	5.23 B	180.0	1.20 B	0.00 A	1.20 B	90.0
	0.56 B	8.60 B	9.16 B	180.0	1.18 B	0.00 A	1.18 B	270.0
124.00								
	0.56 B	8.60 B	9.16 B	180.0	1.18 B	0.00 A	1.18 B	270.0
	0.56 B	12.07 B	12.63 B	180.0	1.17 A	0.00 A	1.17 A	90.0
119.00								

	0.64	12.07	12.71	180.0	1.60	0.00	1.60	90.0
	B	B	B		A	A	A	
	0.81	17.82	18.52	180.0	1.68	0.00	1.68	90.0
	B	A	A		A	A	A	
112.75								
	0.81	17.82	18.52	180.0	1.69	0.00	1.69	90.0
	B	A	A		A	A	A	
	1.01	23.65	24.53	180.0	2.07	0.00	2.07	90.0
	B	A	A		A	A	A	
106.50								
	1.01	23.66	24.53	180.0	2.06	0.00	2.06	90.0
	B	A	A		A	A	A	
	0.99	29.57	30.43	180.0	2.02	0.00	2.02	90.0
	B	A	A		A	A	A	
100.25								
	0.80	23.78	24.47	180.0	1.63	0.00	1.63	90.0
	B	A	A		A	A	A	
	0.96	27.97	28.80	180.0	1.90	0.00	1.90	90.0
	B	A	A		A	A	A	
95.00								
	0.97	28.76	29.60	180.0	1.93	0.00	1.93	90.0
	B	A	A		A	A	A	
	0.95	38.34	39.16	180.0	1.84	0.00	1.84	90.0
	B	A	A		A	A	A	
81.08								
	0.95	38.34	39.16	180.0	1.83	0.00	1.83	90.0
	B	A	A		A	A	A	
	0.93	45.24	46.05	180.0	1.76	0.00	1.76	90.0
	B	A	A		A	A	A	
67.17								
	0.93	45.24	46.05	180.0	1.76	0.00	1.76	90.0
	B	A	A		A	A	A	
	0.92	50.24	51.04	180.0	1.70	0.00	1.70	90.0
	B	A	A		A	A	A	
53.25								
	0.77	42.04	42.71	180.0	1.42	0.00	1.42	90.0
	B	A	A		A	A	A	
	0.79	43.58	44.27	180.0	1.40	0.00	1.40	90.0
	B	A	A		A	A	A	
46.75								
	0.80	44.78	45.48	180.0	1.42	0.00	1.42	90.0
	B	A	A		A	A	A	
	0.80	47.03	47.72	180.0	1.38	0.00	1.38	90.0
	B	A	A		A	A	A	
35.06								
	0.80	47.03	47.72	180.0	1.38	0.00	1.38	90.0
	B	A	A		A	A	A	
	0.81	48.71	49.41	180.0	1.35	0.00	1.35	90.0
	B	A	A		A	A	A	
23.37								
	0.81	48.71	49.41	180.0	1.35	0.00	1.35	90.0
	B	A	A		A	A	A	
	0.81	49.96	50.67	180.0	1.32	0.00	1.32	90.0
	B	A	A		A	A	A	
11.69								
	0.81	49.96	50.67	180.0	1.32	0.00	1.32	90.0
	B	A	A		A	A	A	
	0.82	50.87	51.58	180.0	1.29	0.00	1.29	90.0
	B	A	A		A	A	A	
0.00								

MAXIMUM SHELL STRESS RATIOS

ELEV	LONGITUDINAL				TRANSVERSE			
	DUE TO	DUE TO	TOTAL	AT	DUE TO	DUE TO	TOTAL	AT
ft	AXIAL	MOMENT		AZI	SHEAR	TORSION		AZI

139.00								
	0.00	0.00	0.00	0.0	0.01	0.00	0.01	270.0
	B	A	B		A	B	A	
	0.01	0.05	0.05	180.0	0.01	0.00	0.01	270.0
	B	A	A		B	A	B	
134.00								
	0.01	0.05	0.05	180.0	0.01	0.00	0.01	90.0
	B	A	A		A	A	A	
	0.01	0.09	0.10	180.0	0.01	0.00	0.01	90.0
	B	A	B		A	A	A	
129.00								
	0.01	0.09	0.10	180.0	0.02	0.00	0.02	90.0
	B	A	B		B	A	B	
	0.01	0.17	0.18	180.0	0.02	0.00	0.02	270.0
	B	B	B		B	A	B	
124.00								
	0.01	0.17	0.18	180.0	0.02	0.00	0.02	270.0
	B	B	B		B	A	B	
	0.01	0.23	0.24	180.0	0.02	0.00	0.02	90.0
	B	B	B		A	A	A	
119.00								
	0.01	0.23	0.24	180.0	0.03	0.00	0.03	90.0
	B	B	B		A	A	A	
	0.02	0.34	0.36	180.0	0.03	0.00	0.03	90.0
	B	A	A		A	A	A	
112.75								
	0.02	0.34	0.36	180.0	0.03	0.00	0.03	90.0
	B	A	A		A	A	A	
	0.02	0.45	0.47	180.0	0.04	0.00	0.04	90.0
	B	A	A		A	A	A	
106.50								
	0.02	0.45	0.47	180.0	0.04	0.00	0.04	90.0
	B	A	A		A	A	A	
	0.02	0.57	0.59	180.0	0.04	0.00	0.04	90.0
	B	A	A		A	A	A	
100.25								
	0.02	0.46	0.47	180.0	0.03	0.00	0.03	90.0
	B	A	A		A	A	A	
	0.02	0.54	0.55	180.0	0.04	0.00	0.04	90.0
	B	A	A		A	A	A	
95.00								
	0.02	0.55	0.57	180.0	0.04	0.00	0.04	90.0
	B	A	A		A	A	A	
	0.02	0.74	0.75	180.0	0.04	0.00	0.04	90.0
	B	A	A		A	A	A	
81.08								
	0.02	0.74	0.75	180.0	0.04	0.00	0.04	90.0
	B	A	A		A	A	A	
	0.02	0.87	0.89	180.0	0.03	0.00	0.03	90.0
	B	A	A		A	A	A	
67.17								
	0.02	0.87	0.89	180.0	0.03	0.00	0.03	90.0
	B	A	A		A	A	A	
	0.02	0.97	0.98	180.0	0.03	0.00	0.03	90.0
	B	A	A		A	A	A	
53.25								
	0.01	0.81	0.82	180.0	0.03	0.00	0.03	90.0
	B	A	A		A	A	A	
	0.02	0.84	0.85	180.0	0.03	0.00	0.03	90.0
	B	A	A		A	A	A	
46.75								
	0.02	0.86	0.87	180.0	0.03	0.00	0.03	90.0
	B	A	A		A	A	A	
	0.02	0.90	0.92	180.0	0.03	0.00	0.03	90.0
	B	A	A		A	A	A	

35.06								
	0.02	0.90	0.92	180.0	0.03	0.00	0.03	90.0
	B	A	A		A	A	A	
	0.02	0.94	0.95	180.0	0.03	0.00	0.03	90.0
	B	A	A		A	A	A	
23.37								
	0.02	0.94	0.95	180.0	0.03	0.00	0.03	90.0
	B	A	A		A	A	A	
	0.02	0.96	0.97	180.0	0.03	0.00	0.03	90.0
	B	A	A		A	A	A	
11.69								
	0.02	0.96	0.98	180.0	0.03	0.00	0.03	90.0
	B	A	A		A	A	A	
	0.02	0.98	0.99	180.0	0.02	0.00	0.02	90.0
	B	A	A		A	A	A	
0.00								

MAX EXTREME FIBRE STRESSES IN LAP SPLICE

ELEV	CONTACT.PRESSURE		.HOOP.STRESSES.		BENDING.STRESSES	
	MAX	AZI	MAX	AZI	MAX	AZI
ft	ksi	deg	ksi	deg	ksi	deg
100.25	0.30 A	0.0	21.55 A	90.0	29.57 A	180.0
95.00	0.29 A	180.0	21.56 A	90.0	28.76 A	180.0
53.25	0.54 A	0.0	39.05 A	90.0	50.24 A	180.0
46.75	0.52 A	180.0	39.06 A	90.0	44.78 A	180.0

MAXIMUM LOADS ONTO FOUNDATION(w.r.t. NORTH-EAST-DOWN coordinates)

TOTAL	.....SHEAR.....		.....MOMENT.....		TORSION
AXIAL	NORTH	EAST	NORTH	EAST	
kip	kip	kip	ft-kip	ft-kip	ft-kip
54.92	-36.16	0.00	3940.84	0.00	0.00
B	A	A	A	A	A

MAXIMUM LOADS ONTO FOUNDATION(w.r.t. wind direction)

DOWN	SHEAR.w.r.t.WIND.DIR		MOMENT.w.r.t.WIND.DIR		TORSION
	ALONG	ACROSS	ALONG	ACROSS	
kip	kip	kip	ft-kip	ft-kip	ft-kip
54.92	36.16	0.00	-3940.84	0.00	0.00
B	A	A	A	A	A

Sabre Industries™
Towers and Poles

SO#: 16-7133-SCB
Site Name: Bethel W2, CT
Date: 7/13/2016

Round Flange Plate and Bolts per ANSI/TIA 222-G
Elevation = 119 feet

Pole Data

Diameter:	31.42	in
Thickness:	0.25	in
Yield (Fy):	65	ksi
# of Sides:	18	"0" IF Round
Strength (Fu):	80	ksi

Reactions

Moment, Mu:	242.17	ft-kips
Axial, Pu:	16.29	kips
Shear, Vu:	19.86	kips

Bolt Data

Quantity:	6	
Diameter:	1	in
Bolt Material:	A325	
Strength (Fu):	120	ksi
Yield (Fy):	92	ksi
BC Diam. (in):	35	BC Override:

Flange Bolt Results

Allowable Φ*Rnt:	54.54 kips
Adjusted Φ*Rnt (due to shear):	54.34 kips
Maximum Bolt Tension:	52.64 kips
Bolt Interaction Ratio:	**96.9%** Pass

Plate Data

Diameter (in):	37.5	Dia. Override:
Thickness:	1.5	in
Center Hole Diam.:	20	in
Yield (Fy):	50	ksi
Single-Rod B-eff:	8.16	in
Drain Hole:	1	in. diameter
Drain Location:	14.75	in. center of pole to center of drain hole

Flange Plate Results

Compression Side Plate (Mu/Z):	12.3 ksi
Allowable Φ*Fy:	45.0 ksi
Compr. Plate Interaction Ratio:	**27.4%** Pass

Sabre Industries™
Towers and Poles

SO#: 16-7133-SCB
Site Name: Bethel W2, CT
Date: 7/13/2016

Round Base Plate and Anchor Rods, per ANSI/TIA 222-G

Pole Data

Diameter:	56.590	in (flat to flat)
Thickness:	0.375	in
Yield (Fy):	65	ksi
# of Sides:	18	"0" IF Round
Strength (Fu):	80	ksi

Reactions

Moment, Mu:	4952.27	ft-kips
Axial, Pu:	57.21	kips
Shear, Vu:	45.89	kips

Anchor Rod Data

Quantity:	16		
Diameter:	2.25	in	
Rod Material:	A615		
Strength (Fu):	100	ksi	
Yield (Fy):	75	ksi	
BC Diam. (in):	63.25	BC Override:	

Anchor Rod Results

Maximum Rod (Pu+ Vu/η):	244.2 Kips	
Allowable Φ*Rnt:	260.0 Kips	(per 4.9.9)
Anchor Rod Interaction Ratio:	**93.9%** Pass	

Plate Data

Diameter (in):	69	Dia. Override:	
Thickness:	2.25	in	
Yield (Fy):	50	ksi	
Eff Width/Rod:	11.23	in	
Drain Hole:	2.625	in. diameter	
Drain Location:	26.25	in. center of pole to center of drain hole	
Center Hole:	44.5	in. diameter	

Base Plate Results

Base Plate (Mu/Z):	35.6 ksi	
Allowable Φ*Fy:	45.0 ksi	(per AISC)
Base Plate Interaction Ratio:	**79.2%** Pass	