

STATE OF CONNECTICUT
CONNECTICUT SITING COUNCIL

Ten Franklin Square, New Britain, CT 06051

Phone: (860) 827-2935 Fax: (860) 827-2950

E-Mail: siting.council@ct.gov

www.ct.gov/csc

June 21, 2013

Tom Kincaid
Sprint
48 Spruce Street
Oakland, NJ 07436

RE: **EM-SPRINT-126-130531** – Sprint Spectrum L.P. notice of intent to modify an existing telecommunications facility located at 162 Birdseye Road, Shelton, Connecticut.

Dear Mr. Kincaid:

The Connecticut Siting Council (Council) hereby acknowledges your notice to modify this existing telecommunications facility, pursuant to Section 16-50j-73 of the Regulations of Connecticut State Agencies with the following conditions:

- Prior to antenna installation, the tower modifications depicted in the Structural Upgrade drawings prepared by Vertical Solutions dated March 15, 2013, and stamped by Michael Lassiter shall be implemented; and
- Within 45 days following completion of the antenna installation, a signed letter from a Professional Engineer duly licensed in the State of Connecticut shall be submitted to the Council to certify that the recommended modifications have been completed and the structure and foundation do not exceed 100 percent of the post-construction structural rating.
- Any deviation from the proposed modification as specified in this notice and supporting materials with the Council shall render this acknowledgement invalid;
- Any material changes to this modification as proposed shall require the filing of a new notice with the Council;
- Within 45 days after completion of construction, the Council shall be notified in writing that construction has been completed;
- The validity of this action shall expire one year from the date of this letter; and
- The applicant may file a request for an extension of time beyond the one year deadline provided that such request is submitted to the Council not less than 60 days prior to the expiration;

The proposed modifications including the placement of all necessary equipment and shelters within the tower compound are to be implemented as specified here and in your notice dated April 4, 2013. The modifications are in compliance with the exception criteria in Section 16-50j-72 (b) of the Regulations of Connecticut State Agencies as changes to an existing facility site that would not increase tower height, extend the boundaries of the tower site, increase noise levels at the tower site boundary by six decibels, and increase the total radio frequencies electromagnetic radiation power density measured at the tower site boundary to or above the standard adopted by the State Department of Environmental Protection pursuant to General Statutes § 22a-162. This facility has also been carefully modeled to ensure that radio frequency emissions are conservatively below State and federal standards applicable to the frequencies now used on this tower.

This decision is under the exclusive jurisdiction of the Council. Please be advised that the validity of this action shall expire one year from the date of this letter. Any additional change to this facility will require explicit notice to this agency pursuant to Regulations of Connecticut State Agencies Section 16-50j-73. Such notice shall include all relevant information regarding the proposed change with cumulative worst-case modeling of radio frequency exposure at the closest point of uncontrolled access to the tower base, consistent with Federal Communications Commission, Office of Engineering and Technology, Bulletin 65. Thank you for your attention and cooperation.

Very truly yours,

A handwritten signature in black ink, appearing to read "Melanie A. Bachman". The signature is fluid and cursive, with the first name "Melanie" being more prominent than the last name "Bachman".

Melanie A. Bachman
Acting Executive Director

MAB/CDM/cm

c: The Honorable Mark A. Lauretti, Mayor, City of Shelton
Richard Schultz, Planning Administrator, City of Shelton



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June 5, 2013

The Honorable Mark A. Lauretti
Mayor
City of Shelton
P. O. Box 364
Shelton, CT 06484

RE: **EM-SPRINT-126-130531** – Sprint Spectrum L.P. notice of intent to modify an existing telecommunications facility located at 62 Birdseye Road, Shelton, Connecticut.

Dear Mayor Lauretti:

The Connecticut Siting Council (Council) received a request to modify an existing telecommunications facility, pursuant to Regulations of Connecticut State Agencies Section 16-50j-72, a copy of which has already been provided to you.

If you have any questions or comments regarding the proposal, please call me or inform the Council by June 19, 2013.

Thank you for your cooperation and consideration.

Very truly yours,

Melanie Bachman
Acting Executive Director

MB/cm

c: Richard Schultz, Planning Administrator, City of Shelton

EM-SPRINT-126-130531



Together with Nextel

48 Spruce Street
Oakland, NJ 07436

Phone: (201)-951-3869

Tom Kincaid

Real Estate Consultant

ORIGINAL

RECEIVED
MAY 31 2013

CONNECTICUT
SITING COUNCIL

April 04, 2013

Hand Delivered

Ms. Linda Roberts
Executive Director
Connecticut Siting Council
10 Franklin Square
New Britain, CT 06051

RE: Sprint Spectrum L.P. notice of intent to modify an existing telecommunications facility located at 162 Birdseye Road, Shelton, CT 06484. Known to Sprint Spectrum L.P. as site CT73XC004.

Dear Ms. Roberts:

In order to accommodate technological changes, implement Code Division Multiple Access ("CDMA") and/or Long Term Evolution ("LTE") capabilities, and enhance system performance in the state of Connecticut, Sprint Spectrum L.P. plans to modify the equipment configurations at many of its existing cell sites. Please accept this letter and attachments as notification, pursuant to R.C.S.A. Section 16-50j-73, of construction which constitutes an exempt modification pursuant to R.C.S.A. Section 16-50j-72(b)(2). In compliance with R.C.S.A. Section 16-50j-73, a copy of this letter and its attachments is being sent to the chief elected official of the municipality in which affected cell site is located.

CDMA employs Spread-Spectrum technology and special coding scheme to allow multiple users to be multiplexed over the same physical channel. LTE is a new high-performance air interface for cellular mobile communications. It is designed to increase the capacity and speed of mobile telephone networks.

As part of the project the new multi-mode 800/1900 antenna will replace existing antennas. These antennas will provide more flexibility for optimization by allowing fast and easy electrical tilt adjustment from remote location and will enable the transmission of multiple technologies from a single antenna. As Sprint Nextel's network evolves to meet the demands of its customers, it is essential for Sprint Nextel to install modern

equipment and antennas in order to provide reliable wireless voice and data services. The proposed equipment will include multi-mode radios that will allow Sprint Nextel to transmit at different frequencies using different technologies, including LTE technology. Likewise, the proposed antennas are quad-pole multi-band high gain antennas that will allow Sprint to operate using its multiple frequency bands and technologies, including LTE technology. The proposed equipment and antennas will improve the reliability, coverage and capacity of Sprint Nextel's voice and data networks across Sprint Nextel's various FCC licensed frequency bands and significantly increase the data speeds of Sprint Nextel's network by utilizing the latest LTE technology. Without the proposed modifications Sprint Nextel will be unable to provide reliable wireless voice and data service using the latest technologies.

Sprint Spectrum L.P. will have an interim (testing) period during the modification/installation prior to the final configuration. This antenna configuration is shown on the attached drawings of the planned modifications. Also included is the power density calculation reflecting the change in Sprint's operations at the site and documentation of the structural sufficiency of the tower to accommodate the revised antenna configuration.

The changes to the facility do not constitute modification as defined Connecticut General Statutes ("C.G.S.") Section 16-50i(d) because the general physical characteristics of the facility will not be significantly changed or altered. Rather, the planned changes to the facility fall squarely within those activities explicitly provided for the R.C.S.A. Section 16-50j-72(b)(2).

1. The height of the overall structure will not be affected.
2. The proposed changes will not extend the site boundaries. There will be no effect on the site compound.
3. The proposed changes will not increase the noise level at the existing facility by 6 decibels or more.
4. Radio Frequency power density may increase due to the use of one or more CDMA transmissions. Moreover, LTE will utilize additional radio frequencies newly licensed by the FCC for cellular mobile communications. However, the changes will not increase the calculated "worst case" power density for the combined operations at the site to a level at or above the applicable standard for uncontrolled environments as calculated for a mixed frequency site.

For the foregoing reasons Sprint Spectrum L.P. respectfully submits that the proposed changes at the referenced site constitute exempt modifications under R.C.S.A. Section 16-50j-72(b)(2).

Please feel free to call me at (845)-499-4712 or email JPalumbo@Transcendwireless.com with questions concerning this matter.
Thank you for your consideration.

Sincerely,

Jennifer Palumbo
Real Estate Consultant



EBI Consulting

environmental | engineering | due diligence

RADIO FREQUENCY EMISSIONS ANALYSIS REPORT EVALUATION OF HUMAN EXPOSURE POTENTIAL TO NON-IONIZING EMISSIONS

Sprint Existing Facility

Site ID: CT73XC004

Shelton North
162 Birdseye Road
Shelton, CT 06484

September 17, 2012

September 17, 2012

Sprint
Attn: RF Engineering Manager
1 International Boulevard, Suite 800
Mahwah, NJ 07495

Re: Emissions Values for Site **CT73XC004 - Shelton North**

EBI Consulting was directed to analyze the proposed upgrades to the existing Sprint facility located at 162 Birdseye Road, Shelton, CT, for the purpose of determining whether the emissions from the proposed Sprint equipment upgrades on this property are within specified federal limits.

All information used in this report was analyzed as a percentage of current Maximum Permissible Exposure (% MPE) as listed in the FCC OET Bulletin 65 Edition 97-01 and ANSI/IEEE Std C95.1. The FCC regulates Maximum Permissible Exposure in units of microwatts per square centimeter ($\mu\text{W}/\text{cm}^2$). The number of $\mu\text{W}/\text{cm}^2$ calculated at each sample point is called the power density. The exposure limit for power density varies depending upon the frequencies being utilized. Wireless Carriers and Paging Services use different frequency bands each with different exposure limits, therefore it is necessary to report results and limits in terms of percent MPE rather than power density.

All results were compared to the FCC (Federal Communications Commission) radio frequency exposure rules, 47 CFR 1.1307(b)(1) – (b)(3), to determine compliance with the Maximum Permissible Exposure (MPE) limits for General Population/Uncontrolled environments as defined below.

General population/uncontrolled exposure limits apply to situations in which the general public may be exposed or in which persons who are exposed as a consequence of their employment may not be made fully aware of the potential for exposure or cannot exercise control over their exposure. Therefore, members of the general public would always be considered under this category when exposure is not employment related, for example, in the case of a telecommunications tower that exposes persons in a nearby residential area.

Public exposure to radio frequencies is regulated and enforced in units of microwatts per square centimeter ($\mu\text{W}/\text{cm}^2$). The general population exposure limit for the cellular band is approximately $567 \mu\text{W}/\text{cm}^2$, and the general population exposure limit for the PCS band is $1000 \mu\text{W}/\text{cm}^2$. Because each carrier will be using different frequency bands, and each frequency band has different exposure limits, it is necessary to report percent of MPE rather than power density.

Occupational/controlled exposure limits apply to situations in which persons are exposed as a consequence of their employment and in which those persons who are exposed have been made fully aware of the potential for exposure and can exercise control over their exposure. Occupational/controlled exposure limits also apply where exposure is of a transient nature as a result of incidental passage through a location where exposure levels may be above general population/uncontrolled limits (see below), as long as the exposed person has been made fully aware of the potential for exposure and can exercise control over his or her exposure by leaving the area or by some other appropriate means.

Additional details can be found in FCC OET 65.

CALCULATIONS

Calculations were done for the proposed upgrades to the existing Sprint Wireless antenna facility located at 162 Birdseye Road, Shelton, CT, using the equipment information listed below. All calculations were performed per the specifications under FCC OET 65. All calculations were performed assuming the main lobe of the antenna was focused at the base of the tower to present a worst case scenario. Actual values seen from this site will be dramatically less than those shown in this report. For this report the sample point is the top of a 6 foot person standing at the base of the tower.

For all calculations, all emissions were calculated using the following assumptions:

- 1) 2 CDMA Carriers (1900 MHz) were considered for each sector of the proposed installation.
- 2) 1 CDMA Carrier (850 MHz) was considered for each sector of the proposed installation
- 3) All radios at the proposed installation were considered to be running at full power and were uncombined in their RF transmissions paths per carrier prescribed configuration. Per FCC OET Bulletin No. 65 - Edition 97-01 recommendations to achieve the maximum anticipated value at each sample point, all power levels emitting from the proposed antenna installation are increased by a factor of 2.56 to account for possible in-phase reflections from the surrounding environment. This is rarely the case, and if so, is never continuous.
- 4) For the following calculations the sample point was the top of a six foot person standing at the base of the tower. The actual gain in this direction was used per the manufactures supplied specifications.
- 5) The antenna used in this modeling is the RFS APXVSP18-C-A20. This is based on feedback from the carrier with regards to anticipated antenna selection. This antenna has a 15.9 dBd gain value at its main lobe at 1900 MHz and 13.4 dBd at its main lobe for 850 MHz. All calculations were performed assuming the main lobe of the antenna was focused at the base of the tower to present a worst case scenario.

- 6) The antenna mounting height centerline of the proposed antennas is **118.3 feet** above ground level (AGL)
- 7) Emissions values for additional carriers were taken from the Connecticut Siting Council active database. Values in this database are provided by the individual carriers themselves.

All calculation were done with respect to uncontrolled / general public threshold limits



EBI Consulting

environmental | engineering | due diligence

Summary

All calculations performed for this analysis yielded results that were within the allowable limits for general public exposure to RF Emissions.

The anticipated Maximum Composite contributions from the Sprint facility are **17.743% (5.914% from each sector)** of the allowable FCC established general public limit considering all three sectors simultaneously sampled at the ground level.

The anticipated composite MPE value for this site assuming all carriers present is **94.713%** of the allowable FCC established general public limit sampled at the ground level. This is based upon values listed in the Connecticut Siting Council database for existing carrier emissions

FCC guidelines state that if a site is found to be out of compliance (over allowable thresholds), that carriers over a 5% contribution to the composite value will require measures to bring the site into compliance. For this facility, the composite values calculated were within the allowable 100% threshold standard per the federal government

Scott Heffernan

RF Engineering Director

EBI Consulting

21 B Street

Burlington, MA 01803



PASS
(Shaft, 100% capacity)



March 14, 2013

Mr. Dwayne Lyerly
SBA Communications Corporation
5900 Broken Sound Parkway NW
Boca Raton, FL 33487
(919) 557- 0555

Vertical Solutions, Inc.
PO Box 579
Holly Springs, NC 27540
(888) 321-6167
operations@verticalsolutions-inc.com

Subject

Rigorous Structural Analysis

Carrier Designation

Sprint/Nextel, Reconfiguration - Final
Site Number: CT73XC004
Site Name: N/A

SBA Designation

Site Number: CT46133-A
Site Name: Shelton-North

Engineering Firm Designation

Vertical Solutions Project: 130074, Revision 0

Site Data

162 Birdseye Rd, Shelton, Fairfield County, CT 06484
Latitude: N41° 19' 32.80"±; Longitude: W73° 08' 55.30"±
Elevation: 593 ft±,
118-ft Self-Supporting Pole Structure (Monopole)

Dear Mr. Lyerly,

To your request, we present our structural analysis.

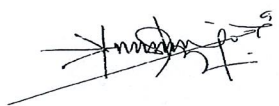
Our work indicates that with the proposed appurtenance configuration, the tower and foundation **will** satisfy the structural strength requirements of TIA/EIA-222-F, *Structural Standards for Steel Antenna Towers and Antenna Supporting Structures* (industry standard) and the *2005 Connecticut State Building Code* (local building code) for:

- 85-mph fastest-mile basic wind speed
- 74-mph fastest-mile basic wind speed with 1/2-in radial ice

All equipment and modifications proposed in this report shall be installed in accordance with the attached drawings for the determined available structural capacity to be effective.

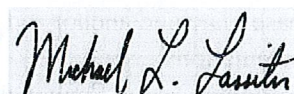
We trust you find our work satisfactory. Please do not hesitate to call should you have any questions.

Sincerely,


Kingsley C. Igboanugo, P.E.
Civil Engineer

Reviewed by: JHW




Michael L. Lassiter, S.E., P.E., C.W.I.
Structural Engineer, Civil Engineer, Certified Weld Inspector
& President
CT License No. 25064

MAR 18 2013

Table 1: Existing, Proposed and Reserved Appurtenance Configuration

Elevation (AGL, ft)	Carrier	Mount	Equipment	Coax	Location ¹
120	Sprint / Nextel [NV]	Platform w/ Handrails ²	(6) 76"x14"x7" Panels (12) RRUs 24"x13"x7" (12) Combiners 12"x6"x2" (3) RRU Filters 24"x13"x7" (1) GPS	(4) 1 5/8 (1) 1/2	Inside
	Sprint / Nextel [iDEN]		(6) Decibel DB844H90E-XY	(6) 1 1/4	Inside
108	AT&T	Low Profile Platform	(3) Kathrein 800-10121 (3) Powerwave P65-16-XLH-RR (6) Powerwave LGP-21401 (3) REC/RETs (6) Ericsson RRUS-11 (1) Raycap DC6-48-60-18-8CF	(6) 1 1/4 (1) 1/2 (1) 3/8 (2) 5/8	Inside
91	Verizon	Low Profile Platform	(3) Antel BXA-70063/4CF (6) Antel LPA-80063/4CF (3) Antel BXA-171063/12BF (6) RFS FD9R6004/2C-3L diplexers	(18) 1 5/8	Inside

1. See attached QP-P document for coax configuration layout.

2. Platform mounted at 118-ft.

Table 2: Tower Structure Results, Percent Capacity Utilized

Elevation (ft)	Shaft	Result	Connections	Result
118 to 77.0	98	O. K.	-	-
77.0 to 40.8	93	O. K.	-	-
40.8 to 0	100	O. K.	91	O. K.

Table 3: Foundation Results, Percent Capacity Utilized

Component	Capacity	Analysis	Percent Utilized ¹	Result
Bearing (psf)	6000	2367	39	O. K.
Moment (kip-ft)	2298	2190	95	O. K.
Sliding (kip)	47	24	51	O. K.

Attachments:

- Project History
- Coax configuration, QP-P
- Program input and output – wind
- Tower improvement calculations
- Sheet BPL, base plate and anchor rod plan and calculations
- Foundation calculations
- Tower Improvement Design Drawings [Construction]

Project History

VSi Project #: 121237, Revision 0
SBA Site Id: CT46133-A
SBA Site Name: Shelton-north

CT46133-A	6/5/2000	506284_CT2009 Shelton-North Geotechnical Report - 06-05-2000.pdf	Geotechnical Engineering	Diversified Technology Consultants	Geotechnical Investigation
CT46133-A	6/5/2000	506284_CT2009 Shelton-North Geotechnical Report 06-05-00.pdf	GeoEnviornmental Resources Inc	Diversified Technology Consultants	Geotechnical Investigation
CT46133-A	7/10/2000	723709_CT2009 Shelton-North Tower and Foundation Design Drawings and Calculations - 07-10-2000.pdf	Paul J. Ford	Summit Manufacturing, LLC	Tower and Foundation Design Calculations
CT46133-A	8/1/2000	506288_CT2009 Shelton-North CD-s 8-1-00.pdf	Diversified Technology Consultants	Nextel	Construction Drawings
CT46133-A	11/15/2000	723706_CT2009 Shelton-North Tower and Foundation Design Calculations - 11-15-2000.pdf	Paul J. Ford	Summit Manufacturing, LLC	Tower and Foundation Design Calculations
CT46133-A	3/5/2002	242461_CT2009 Shelton-North PJF Structural Analysis AT&T Colo 03-05-2002.pdf	Paul J. Ford	Natcomm, LLC	Structural Analysis Report
CT46133-A	5/3/2002	197435_CT2009 Shelton-North CT0921T AT&T Site Agreement.pdf	Nextel	AT&T	Site Lease Agreement
CT46133-A	5/31/2002	242447_CT2009 Shelton-North CT0921 Site Agreement.pdf	Nextel	AT&T	Site Lease Agreement
CT46133-A	10/7/2002	242457_CT2009 Shelton-North CT0921T Draft of Verizon License Supplement.pdf	Nextel	Verizon	License Supplement
CT46133-A	11/19/2002	242460_CT2009 Shelton-North PJF Structural Analysis Verizon Colo 11-19-2002.pdf	Paul J. Ford	Structure Consulting Group	Structural Analysis Report
CT46133-A	1/13/2003	242462_CT2009 Shelton-North CT0921T Executed Verizon License Supplement.pdf	Cellco	Nextel	Site Lease Agreement
CT46133-A	1/13/2003	516756_CT2009 Shelton-north Verizon SLA.pdf	Cellco	Nextel	Site Lease Agreement
CT46133-A	8/14/2006	242426_CT2009 Shelton-North CT0921T Sprint SLA.pdf	Nextel	Sprint Spectrum	Site Lease Agreement
CT46133-A	8/7/2007	242429_CT2009 Shelton-North Cingular Feasibility Structural Evaluation 8-7-07.pdf	Malouf Engineering Intl	Hudson Design Group	Structural Analysis Report
CT46133-A	2/12/2008	242433_CT2009 Shelton-North Cingular Unexecuted First Amend to New Cingular SLA.pdf	Nextel	New Cingular	Site Lease Agreement
CT46133-A	2/19/2008	197434_CT2009 Shelton-North 02 First Amendment New Cingular SLA.pdf	Nextel	New Cingular	Amendment SLA
CT46133-A	2/19/2008	242427_CT2009 Shelton-North CT0921 First Amend to New Cingular SLA.pdf	Nextel	New Cingular	Amendment SLA
CT46133-A	2/19/2008	242436_CT2009 Shelton-North Cingular First Amendment to SLA.pdf	Nextel	New Cingular	Amendment SLA
CT46133-A	9/23/2008	711884_CT2009 Shelton-north SLA.pdf	TowerCo	Nextel	Site Lease Agreement
CT46133-A	11/2/2008	714948_CT2009 Shelton-north Tower Profile.pdf	SiteMaster	TowerCo	Tower Profile Drawing
CT46133-A	11/2/2008	719729_CT2009 Shelton-north SiteMaster Inspection Report.pdf	SiteMaster	TowerCo	Tower Inspection Report
CT46133-A	3/4/2011	826220_CT2009 Shelton-north_Verical_Structural Analysis_T-	Verical Solutions	TowerCo	Structural Analysis Report

CT46133-A	3/21/2011	Mobile_Colocation_20110304.pdf	TowerCo			Site Plan
CT46133-A	5/16/2011	708806_CT2009 Shelton-north Site Plan.pdf 840071_CT2009 Shelton-north_Verical_Structural Analysis_AT&T_Reconfiguration_20110516.pdf	Vertical Solutions	TowerCo		Structural Analysis Report
CT46133-A	7/5/2011	843371_CT2009 Shelton-north 2nd Amendment - New Cingular Wireless.pdf	TowerCo	New Cingular		Amendment SLA
CT46133-A	8/10/2011	846653_CT2009 Shelton-north AT&T 2nd Amendment Rent Comm Notice.pdf	TowerCo	New Cingular		Amendment SLA
CT46133-A	12/15/2011	TowerCo Shelton North.doc	Verizon	TowerCo		Reconfiguration Tenant Application
CT46133-A	1/6/2012	859678_CT2009 Shelton-north_Verical_Structural Analysis_Verizon_Reconfiguration_20120106.pdf	Vertical Solutions	TowerCo		Structural Analysis Report
CT46133-A	1/26/2012	860825_CT2009 Shelton-north Verizon 1st Amendment to SLA Fully Executed.pdf	TowerCo	Cellco		Amendment SLA
CT46133-A	1/27/2012	860878_CT2009 Shelton-north Verizon 1st Amendment Rent Commencement Notice.pdf	TowerCo	Verizon		Commencement Notice
CT46133-A	1/30/2012	CT2009 SA Loading.xls	TowerCo	Vertical Solutions		SA Loading
CT46133-A	1/30/2012	TowerCo Shelton North. [1]dcc.doc	Verizon	TowerCo		Reconfiguration Tenant Application
CT46133-A	2/16/2012	859678_CT2009 Shelton-north_Verical_Structural Analysis_Verizon_Reconfiguration_20120216.pdf	Vertical Solutions	TowerCo		Structural Analysis Report
CT46133-A	6/11/2012	CT2009 Sprint Network Vision SA Loading.xls	TowerCo	Vertical Solutions		SA Loading
CT46133-A	6/11/2012	INV_CT73XC004_6-7-12Collo+App+-CT2009+Sprint+Reconfiguration+Application+(3).doc	Sprint	TowerCo		Reconfiguration Tenant Application
CT46133-A	07/12/2012	20120712_SAR_CT2009.pdf	Vertical Solutions	TowerCo		Structural Analysis Report

Table Note:

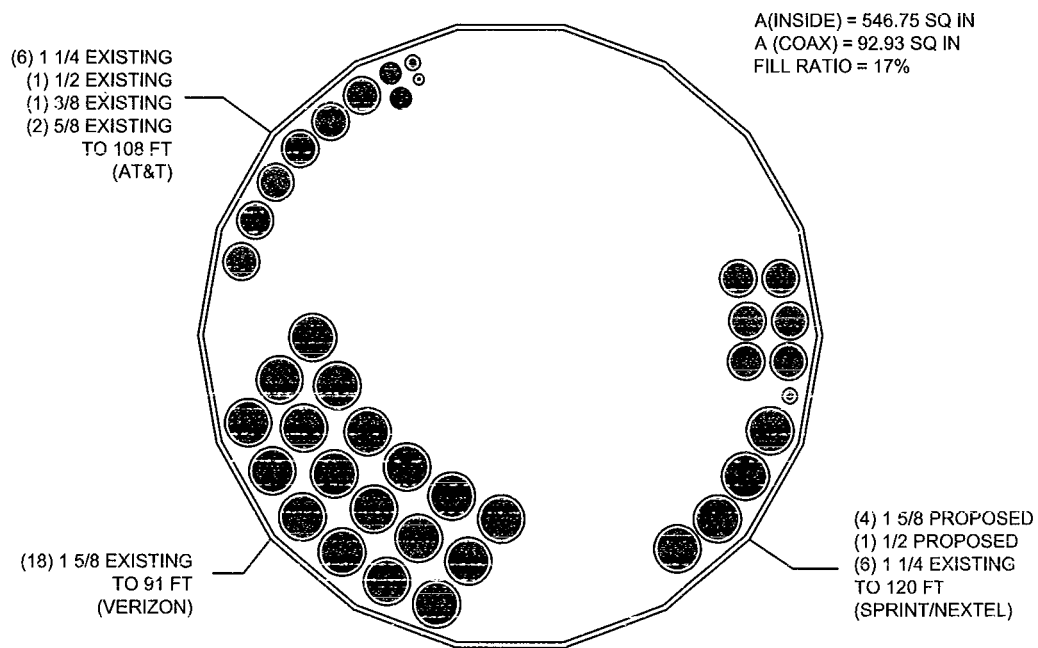
Files name format YYYYMMDD-XXX-ZZZZZZ.pdf

Where:

YYYYMMDD = Year, Month, Day published/issued

XXX=file describer

ZZZZZ=SBA Site ID



COAX CONFIGURATION PLAN - 91 FT

SCALE: 1-1/2" = 1'-0"

PROJECT INFORMATION:

SHELTON-NORTH SITE #: CT46133-A

162 BIRDSEYE ROAD
SHELTON, CT 06484
(FAIRFIELD COUNTY)

0	03-14-13	SBA
REV	DATE:	Issued For:

DRAWN BY: KCI CHECKED BY: JHW

SHEET NUMBER:

QP-P

REVISION:

0

VSI #: 130074

PLANS PREPARED FOR:



5900 Broken Sound Pkwy NW
Boca Raton, FL 33487
Office (919) 557-0555

PLANS PREPARED BY:



2002 Production Drive
Apex, NC 27539
Office: (888) 321-6167
Fax: (919) 321-1768

Section	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48	49	50	51	52	53	54	55	56	57	58	59	60	61	62	63	64	65	66	67	68	69	70	71	72	73	74	75	76	77	78	79	80	81	82	83	84	85	86	87	88	89	90	91	92	93	94	95	96	97	98	99	100	101	102	103	104	105	106	107	108	109	110	111	112	113	114	115	116	117	118	119	120	121	122	123	124	125	126	127	128	129	130	131	132	133	134	135	136	137	138	139	140	141	142	143	144	145	146	147	148	149	150	151	152	153	154	155	156	157	158	159	160	161	162	163	164	165	166	167	168	169	170	171	172	173	174	175	176	177	178	179	180	181	182	183	184	185	186	187	188	189	190	191	192	193	194	195	196	197	198	199	200	201	202	203	204	205	206	207	208	209	210	211	212	213	214	215	216	217	218	219	220	221	222	223	224	225	226	227	228	229	230	231	232	233	234	235	236	237	238	239	240	241	242	243	244	245	246	247	248	249	250	251	252	253	254	255	256	257	258	259	260	261	262	263	264	265	266	267	268	269	270	271	272	273	274	275	276	277	278	279	280	281	282	283	284	285	286	287	288	289	290	291	292	293	294	295	296	297	298	299	300	301	302	303	304	305	306	307	308	309	310	311	312	313	314	315	316	317	318	319	320	321	322	323	324	325	326	327	328	329	330	331	332	333	334	335	336	337	338	339	340	341	342	343	344	345	346	347	348	349	350	351	352	353	354	355	356	357	358	359	360	361	362	363	364	365	366	367	368	369	370	371	372	373	374	375	376	377	378	379	380	381	382	383	384	385	386	387	388	389	390	391	392	393	394	395	396	397	398	399	400	401	402	403	404	405	406	407	408	409	410	411	412	413	414	415	416	417	418	419	420	421	422	423	424	425	426	427	428	429	430	431	432	433	434	435	436	437	438	439	440	441	442	443	444	445	446	447	448	449	450	451	452	453	454	455	456	457	458	459	460	461	462	463	464	465	466	467	468	469	470	471	472	473	474	475	476	477	478	479	480	481	482	483	484	485	486	487	488	489	490	491	492	493	494	495	496	497	498	499	500	501	502	503	504	505	506	507	508	509	510	511	512	513	514	515	516	517	518	519	520	521	522	523	524	525	526	527	528	529	530	531	532	533	534	535	536	537	538	539	540	541	542	543	544	545	546	547	548	549	550	551	552	553	554	555	556	557	558	559	560	561	562	563	564	565	566	567	568	569	570	571	572	573	574	575	576	577	578	579	580	581	582	583	584	585	586	587	588	589	590	591	592	593	594	595	596	597	598	599	600	601	602	603	604	605	606	607	608	609	610	611	612	613	614	615	616	617	618	619	620	621	622	623	624	625	626	627	628	629	630	631	632	633	634	635	636	637	638	639	640	641	642	643	644	645	646	647	648	649	650	651	652	653	654	655	656	657	658	659	660	661	662	663	664	665	666	667	668	669	670	671	672	673	674	675	676	677	678	679	680	681	682	683	684	685	686	687	688	689	690	691	692	693	694	695	696	697	698	699	700	701	702	703	704	705	706	707	708	709	710	711	712	713	714	715	716	717	718	719	720	721	722	723	724	725	726	727	728	729	730	731	732	733	734	735	736	737	738	739	740	741	742	743	744	745	746	747	748	749	750	751	752	753	754	755	756	757	758	759	760	761	762	763	764	765	766	767	768	769	770	771	772	773	774	775	776	777	778	779	780	781	782	783	784	785	786	787	788	789	790	791	792	793	794	795	796	797	798	799	800	801	802	803	804	805	806	807	808	809	810	811	812	813	814	815	816	817	818	819	820	821	822	823	824	825	826	827	828	829	830	831	832	833	834	835	836	837	838	839	840	841	842	843	844	845	846	847	848	849	850	851	852	853	854	855	856	857	858	859	860	861	862	863	864	865	866	867	868	869	870	871	872	873	874	875	876	877	878	879	880	881	882	883	884	885	886	887	888	889	890	891	892	893	894	895	896	897	898	899	900	901	902	903	904	905	906	907	908	909	910	911	912	913	914	915	916	917	918	919	920	921	922	923	924	925	926	927	928	929	930	931	932	933	934	935	936	937	938	939	940	941	942	943	944	945	946	947	948	949	950	951	952	953	954	955	956	957	958	959	960	961	962	963	964	965	966	967	968	969	970	971	972	973	974	975	976	977	978	979	980	981	982	983	984	985	986	987	988	989	990	991	992	993	994	995	996	997	998	999	1000	1001	1002	1003	1004	1005	1006	1007	1008	1009	1010	1011	1012	1013	1014	1015	1016	1017	1018	1019	1020	1021	1022	1023	1024	1025	1026	1027	1028	1029	1030	1031	1032	1033	1034	1035	1036	1037	1038	1039	1040	1041	1042	1043	1044	1045	1046	1047	1048	1049	1050	1051	1052	1053	1054	1055	1056	1057	1058	1059	1060	1061	1062	1063	1064	1065	1066	1067	1068	1069	1070	1071	1072	1073	1074	1075	1076	1077	1078	1079	1080	1081	1082	1083	1084	1085	1086	1087	1088	1089	1090	1091	1092	1093	1094	1095	1096	1097	1098	1099	1100	1101	1102	1103	1104	1105	1106	1107	1108	1109	1110	1111	1112	1113	1114	1115	1116	1117	1118	1119	1120	1121	1122	1123	1124	1125	1126	1127	1128	1129	1130	1131	1132	1133	1134	1135	1136	1137	1138	1139	1140	1141	1142	1143	1144	1145	1146	1147	1148	1149	1150	1151	1152	1153	1154	1155	1156	1157	1158	1159	1160	1161	1162	1163	1164	1165	1166	1167	1168	1169	1170	1171	1172	1173	1174	1175	1176	1177	1178	1179	1180	1181	1182	1183	1184	1185	1186	1187	1188	1189	1190	1191	1192	1193	1194	1195	1196	1197	1198	1199	1200	1201	1202	1203	1204	1205	1206	1207	1208	1209	1210	1211	1212	1213	1214	1215	1216	1217	1218	1219	1220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	Client	SBA	Designed by	Kingsley

Tower Input Data

There is a pole section.

This tower is designed using the TIA/EIA-222-F standard.

The following design criteria apply:

Tower is located in Fairfield County, Connecticut.

Basic wind speed of 85 mph.

Nominal ice thickness of 0.5000 in.

Ice density of 56 pcf.

A wind speed of 74 mph is used in combination with ice.

Temperature drop of 50 °F.

Deflections calculated using a wind speed of 50 mph.

A non-linear (P-delta) analysis was used.

Pressures are calculated at each section.

Stress ratio used in pole design is 1.333.

Local bending stresses due to climbing loads, feedline supports, and appurtenance mounts are not considered.

Options

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

Tapered Pole Section Geometry

Section	Elevation	Section Length	Splice Length	Number of Sides	Top Diameter	Bottom Diameter	Wall Thickness	Bend Radius	Pole Grade
	ft	ft	ft		in	in	in	in	
L1	118.00-77.00	41.00	3.75	12	22.0000	28.7650	0.1875	0.7500	A572-65 (65 ksi)
L2	77.00-40.75	40.00	4.25	12	27.7713	34.3710	0.3125	1.2500	A572-65 (65 ksi)
L3	40.75-9.25	35.75	0.00	12	33.0448	38.8500	0.3750	1.5000	A572-65 (65 ksi)
L4	9.25-8.75	0.50	0.00	12	38.8500	41.8950	0.5000	2.0000	A572-50 (50 ksi)
L5	8.75-0.00	8.75		12	41.8950	43.4700	0.4450	1.7800	A572-50 (50 ksi)

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	Client	SBA	Designed by	Kingsley

Tapered Pole Properties

Section	Tip Dia. in	Area in ²	I in ⁴	r in	C in	I/C in ³	J in ⁴	It/Q in ²	w in	w/t
L1	22.7761	13.1693	799.7595	7.8089	11.3960	70.1790	1620.5296	6.4815	5.3935	28.765
	29.7797	17.2537	1798.5222	10.2307	14.9003	120.7040	3644.2935	8.4917	7.2065	38.435
L2	29.3915	27.6304	2659.0967	9.8302	14.3855	184.8455	5388.0509	13.5988	6.6052	21.137
	35.5835	34.2714	5074.2095	12.1929	17.8042	285.0011	10281.7241	16.8673	8.3739	26.797
L3	34.9249	39.4488	5374.1723	11.6958	17.1172	313.9634	10889.5300	19.4155	7.8510	20.936
	40.2205	46.4586	8778.2708	13.7741	20.1243	436.2025	17787.1566	22.8655	9.4068	25.085
L4	40.2205	61.7435	11590.6537	13.7293	20.1243	575.9531	23485.8068	30.3883	9.0718	18.144
	43.3729	66.6459	14576.5748	14.8194	21.7016	671.6817	29536.0925	32.8011	9.8879	19.776
L5	43.3729	59.3937	13024.9312	14.8391	21.7016	600.1827	26392.0418	29.2318	10.0353	22.551
	45.0035	61.6505	14566.8105	15.4029	22.5175	646.9118	29516.3073	30.3425	10.4574	23.5

Tower Elevation	Gusset Area (per face)	Gusset Thickness	Gusset Grade	Adjust. Factor A _f	Adjust. Factor A _r	Weight Mult.	Double Angle Stitch Bolt Spacing Diagonals	Double Angle Stitch Bolt Spacing Horizontals
ft	ft ²	in					in	in
L1				1	1	1		
118.00-77.00								
L2 77.00-40.75				1	1	1		
L3 40.75-9.25				1	1	1		
L4 9.25-8.75				1	1	1		
L5 8.75-0.00				1	1	1		

Feed Line/Linear Appurtenances - Entered As Area

Description	Face or Leg	Allow Shield	Component Type	Placement ft	Total Number		C _A A _A ft ² /ft	Weight plf
LDF6-50A (1-1/4 FOAM) (Sprint)	C	No	Inside Pole	118.00 - 0.00	6	No Ice 1/2" Ice	0.00 0.00	0.66 0.66
LDF7-50A (1-5/8 FOAM) (Sprint)	C	No	Inside Pole	118.00 - 0.00	4	No Ice 1/2" Ice	0.00 0.00	0.82 0.82
LDF4RN-50A (1/2 FOAM) (Sprint)	C	No	Inside Pole	118.00 - 0.00	1	No Ice 1/2" Ice	0.00 0.00	0.15 0.15

LDF6-50A (1-1/4 FOAM) (AT&T)	C	No	Inside Pole	108.00 - 0.00	6	No Ice 1/2" Ice	0.00 0.00	0.66 0.66
LDF4P-50A (1/2 FOAM) (AT&T)	C	No	Inside Pole	108.00 - 0.00	1	No Ice 1/2" Ice	0.00 0.00	0.15 0.15
LDF2-50A (3/8 FOAM) (AT&T)	C	No	Inside Pole	108.00 - 0.00	1	No Ice 1/2" Ice	0.00 0.00	0.08 0.08
LDF4.5-50 (5/8 FOAM) (AT&T)	C	No	Inside Pole	108.00 - 0.00	2	No Ice 1/2" Ice	0.00 0.00	0.15 0.15

LDF7-50A (1-5/8 FOAM) (Verizon)	C	No	Inside Pole	91.00 - 0.00	18	No Ice 1/2" Ice	0.00 0.00	0.82 0.82

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Feed Line/Linear Appurtenances Section Areas

Tower Section	Tower Elevation ft	Face	A_R ft ²	A_F ft ²	$C_d A_A$ In Face ft ²	$C_d A_A$ Out Face ft ²	Weight K
L1	118.00-77.00	A	0.000	0.000	0.000	0.000	0.00
		B	0.000	0.000	0.000	0.000	0.00
		C	0.000	0.000	0.000	0.000	0.65
L2	77.00-40.75	A	0.000	0.000	0.000	0.000	0.00
		B	0.000	0.000	0.000	0.000	0.00
		C	0.000	0.000	0.000	0.000	0.97
L3	40.75-9.25	A	0.000	0.000	0.000	0.000	0.00
		B	0.000	0.000	0.000	0.000	0.00
		C	0.000	0.000	0.000	0.000	0.84
L4	9.25-8.75	A	0.000	0.000	0.000	0.000	0.00
		B	0.000	0.000	0.000	0.000	0.00
		C	0.000	0.000	0.000	0.000	0.01
L5	8.75-0.00	A	0.000	0.000	0.000	0.000	0.00
		B	0.000	0.000	0.000	0.000	0.00
		C	0.000	0.000	0.000	0.000	0.23

Feed Line/Linear Appurtenances Section Areas - With Ice

Tower Section	Tower Elevation ft	Face or Leg	Ice Thickness in	A_R ft ²	A_F ft ²	$C_d A_A$ In Face ft ²	$C_d A_A$ Out Face ft ²	Weight K
L1	118.00-77.00	A	0.500	0.000	0.000	0.000	0.000	0.00
		B		0.000	0.000	0.000	0.000	0.00
		C		0.000	0.000	0.000	0.000	0.65
L2	77.00-40.75	A	0.500	0.000	0.000	0.000	0.000	0.00
		B		0.000	0.000	0.000	0.000	0.00
		C		0.000	0.000	0.000	0.000	0.97
L3	40.75-9.25	A	0.500	0.000	0.000	0.000	0.000	0.00
		B		0.000	0.000	0.000	0.000	0.00
		C		0.000	0.000	0.000	0.000	0.84
L4	9.25-8.75	A	0.500	0.000	0.000	0.000	0.000	0.00
		B		0.000	0.000	0.000	0.000	0.00
		C		0.000	0.000	0.000	0.000	0.01
L5	8.75-0.00	A	0.500	0.000	0.000	0.000	0.000	0.00
		B		0.000	0.000	0.000	0.000	0.00
		C		0.000	0.000	0.000	0.000	0.23

Feed Line Center of Pressure

Section	Elevation ft	CP_X in	CP_Z in	CP_X Ice in	CP_Z Ice in
L1	118.00-77.00	0.0000	0.0000	0.0000	0.0000
L2	77.00-40.75	0.0000	0.0000	0.0000	0.0000
L3	40.75-9.25	0.0000	0.0000	0.0000	0.0000
L4	9.25-8.75	0.0000	0.0000	0.0000	0.0000
L5	8.75-0.00	0.0000	0.0000	0.0000	0.0000

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Discrete Tower Loads

Description	Face or Leg	Offset Type	Offsets: Horz Lateral Vert ft ft ft	Azimuth Adjustment °	Placement ft	C _A A ₁ Front ft ²	C _A A ₁ Side ft ²	Weight K
Kathrein 800 10121 (AT&T)	A	From Leg	3.00 0.00 0.00	0.0000	108.00	No Ice 1/2" Ice 5.46 5.88	3.29 3.64	0.05 0.08
Kathrein 800 10121 (AT&T)	B	From Leg	3.00 0.00 0.00	0.0000	108.00	No Ice 1/2" Ice 5.46 5.88	3.29 3.64	0.05 0.08
Kathrein 800 10121 (AT&T)	C	From Leg	3.00 0.00 0.00	0.0000	108.00	No Ice 1/2" Ice 5.46 5.88	3.29 3.64	0.05 0.08
Powerwave P65-16-XLH-RR w/ MP (AT&T)	A	From Leg	3.00 0.00 0.00	0.0000	108.00	No Ice 1/2" Ice 8.64 9.29	6.36 7.54	0.09 0.15
Powerwave P65-16-XLH-RR w/ MP (AT&T)	B	From Leg	3.00 0.00 0.00	0.0000	108.00	No Ice 1/2" Ice 8.64 9.29	6.36 7.54	0.09 0.15
Powerwave P65-16-XLH-RR w/ MP (AT&T)	C	From Leg	3.00 0.00 0.00	0.0000	108.00	No Ice 1/2" Ice 8.64 9.29	6.36 7.54	0.09 0.15
(2) Powerwave LGP21401 (AT&T)	A	From Leg	3.00 0.00 0.00	0.0000	108.00	No Ice 1/2" Ice 1.43 1.59	0.37 0.48	0.02 0.03
(2) Powerwave LGP21401 (AT&T)	B	From Leg	3.00 0.00 0.00	0.0000	108.00	No Ice 1/2" Ice 1.43 1.59	0.37 0.48	0.02 0.03
(2) Powerwave LGP21401 (AT&T)	C	From Leg	3.00 0.00 0.00	0.0000	108.00	No Ice 1/2" Ice 1.43 1.59	0.37 0.48	0.02 0.03
REC/RETs (AT&T)	A	From Leg	3.00 0.00 0.00	0.0000	108.00	No Ice 1/2" Ice 0.00 0.00	0.68 0.81	0.01 0.02
REC/RETs (AT&T)	B	From Leg	3.00 0.00 0.00	0.0000	108.00	No Ice 1/2" Ice 0.00 0.00	0.68 0.81	0.01 0.02
REC/RETs (AT&T)	C	From Leg	3.00 0.00 0.00	0.0000	108.00	No Ice 1/2" Ice 0.00 0.00	0.68 0.81	0.01 0.02
(2) Ericsson RRUS-11 (AT&T)	A	From Leg	3.00 0.00 0.00	0.0000	108.00	No Ice 1/2" Ice 2.94 3.17	1.59 1.77	0.05 0.08
(2) Ericsson RRUS-11 (AT&T)	B	From Leg	3.00 0.00 0.00	0.0000	108.00	No Ice 1/2" Ice 2.94 3.17	1.59 1.77	0.05 0.08
(2) Ericsson RRUS-11 (AT&T)	C	From Leg	3.00 0.00 0.00	0.0000	108.00	No Ice 1/2" Ice 2.94 3.17	1.59 1.77	0.05 0.08
Raycap DC6-48-60-18-8CF (AT&T)	C	From Leg	3.00 0.00 0.00	0.0000	108.00	No Ice 1/2" Ice 2.57 2.80	2.57 2.80	0.03 0.06
PiROD 13' Low Profile Platform (AT&T)	A	None		0.0000	108.00	No Ice 1/2" Ice 15.70 20.10	15.70 20.10	1.30 1.76

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Description	Face or Leg	Offset Type	Offsets: Horz Lateral Vert ft ft ft	Azimuth Adjustment °	Placement ft		C _A A ₁ Front ft ²	C ₁ A ₁ Side ft ²	Weight K

Antel BXA-70063/4CFw/ Mount Pipe (Verizon)	A	From Leg	3.00 0.00 0.00	0.0000	91.00	No Ice 1/2" Ice	5.41 5.86	3.70 4.32	0.03 0.07
Antel BXA-70063/4CFw/ Mount Pipe (Verizon)	B	From Leg	3.00 0.00 0.00	0.0000	91.00	No Ice 1/2" Ice	5.41 5.86	3.70 4.32	0.03 0.07
Antel BXA-70063/4CFw/ Mount Pipe (Verizon)	C	From Leg	3.00 0.00 0.00	0.0000	91.00	No Ice 1/2" Ice	5.41 5.86	3.70 4.32	0.03 0.07
(2) Antel LPA-80063/4CF w MP (Verizon)	A	From Leg	3.00 0.00 0.00	0.0000	91.00	No Ice 1/2" Ice	7.26 7.73	7.27 7.98	0.04 0.10
(2) Antel LPA-80063/4CF w MP (Verizon)	B	From Leg	3.00 0.00 0.00	0.0000	91.00	No Ice 1/2" Ice	7.26 7.73	7.27 7.98	0.04 0.10
(2) Antel LPA-80063/4CF w MP (Verizon)	C	From Leg	3.00 0.00 0.00	0.0000	91.00	No Ice 1/2" Ice	7.26 7.73	7.27 7.98	0.04 0.10
Antel BXA-171063/12 BF w/MP (Verizon)	A	From Leg	3.00 0.00 0.00	0.0000	91.00	No Ice 1/2" Ice	4.97 5.52	5.23 6.39	0.04 0.08
Antel BXA-171063/12 BF w/MP (Verizon)	B	From Leg	3.00 0.00 0.00	0.0000	91.00	No Ice 1/2" Ice	4.97 5.52	5.23 6.39	0.04 0.08
Antel BXA-171063/12 BF w/MP (Verizon)	C	From Leg	3.00 0.00 0.00	0.0000	91.00	No Ice 1/2" Ice	4.97 5.52	5.23 6.39	0.04 0.08
(2) RFS FD9R6004/2C-3L (Verizon)	A	From Leg	3.00 0.00 0.00	0.0000	91.00	No Ice 1/2" Ice	0.37 0.45	0.08 0.14	0.00 0.00
(2) RFS FD9R6004/2C-3L (Verizon)	B	From Leg	3.00 0.00 0.00	0.0000	91.00	No Ice 1/2" Ice	0.37 0.45	0.08 0.14	0.00 0.00
(2) RFS FD9R6004/2C-3L (Verizon)	C	From Leg	3.00 0.00 0.00	0.0000	91.00	No Ice 1/2" Ice	0.37 0.45	0.08 0.14	0.00 0.00
PiROD 13' Low Profile Platform (Verizon)	C	None		0.0000	91.00	No Ice 1/2" Ice	15.70 20.10	15.70 20.10	1.30 1.76

PiROD 13' Platform w/handrail (Sprint)	C	None		0.0000	118.00	No Ice 1/2" Ice	31.30 40.20	31.30 40.20	1.82 2.45
(2) DB844H90E-XY w/Mount Pipe (Sprint)	A	From Leg	3.00 0.00 0.00	0.0000	120.00	No Ice 1/2" Ice	3.58 4.20	5.40 6.49	0.04 0.08
(2) DB844H90E-XY w/Mount Pipe (Sprint)	B	From Leg	3.00 0.00 0.00	0.0000	120.00	No Ice 1/2" Ice	3.58 4.20	5.40 6.49	0.04 0.08
(2) DB844H90E-XY w/Mount Pipe (Sprint)	C	From Leg	3.00 0.00 0.00	0.0000	120.00	No Ice 1/2" Ice	3.58 4.20	5.40 6.49	0.04 0.08
Partially Exposed NV Loading									
(2) 76" x 14" x 7" Panel w/ Mount Pipe (Partially	A	From Leg	3.00 0.00	0.0000	120.00	No Ice 1/2" Ice	9.83 10.56	5.65 6.36	0.06 0.08

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Description	Face or Leg	Offset Type	Offsets: Horz Lateral Vert ft ft ft	Azimuth Adjustment °	Placement ft		C _A A ₁ Front ft ²	C _A A ₁ Side ft ²	Weight K
Shielded) (Sprint)			0.00						
(2) 76" x 14" x 7" Panel w/ Mount Pipe (Partially Shielded) (Sprint)	B	From Leg	3.00 0.00 0.00	0.0000	120.00	No Ice 1/2" Ice	9.83 10.56	5.65 6.36	0.06 0.08
(2) 76" x 14" x 7" Panel w/ Mount Pipe (Partially Shielded) (Sprint)	C	From Leg	3.00 0.00 0.00	0.0000	120.00	No Ice 1/2" Ice	9.83 10.56	5.65 6.36	0.06 0.08
(2) RRU's 24" x 13" x 7" (60 LBs) (Fully Exposed) (Sprint)	A	From Leg	3.00 0.00 0.00	0.0000	120.00	No Ice 1/2" Ice	2.60 2.92	1.45 1.71	0.06 0.07
(2) RRU's 24" x 13" x 7" (60 LBs) (Fully Exposed) (Sprint)	B	From Leg	3.00 0.00 0.00	0.0000	120.00	No Ice 1/2" Ice	2.60 2.92	1.45 1.71	0.06 0.07
(2) RRU's 24" x 13" x 7" (60 LBs) (Fully Exposed) (Sprint)	C	From Leg	3.00 0.00 0.00	0.0000	120.00	No Ice 1/2" Ice	2.60 2.92	1.45 1.71	0.06 0.07
(2) RRU's 24" x 13" x 7" (60 LBs) (Partially Shielded) (Sprint)	A	From Leg	3.00 0.00 0.00	0.0000	120.00	No Ice 1/2" Ice	0.00 0.00	1.45 1.71	0.06 0.07
(2) RRU's 24" x 13" x 7" (60 LBs) (Partially Shielded) (Sprint)	B	From Leg	3.00 0.00 0.00	0.0000	120.00	No Ice 1/2" Ice	0.00 0.00	1.45 1.71	0.06 0.07
(2) RRU's 24" x 13" x 7" (60 LBs) (Partially Shielded) (Sprint)	C	From Leg	3.00 0.00 0.00	0.0000	120.00	No Ice 1/2" Ice	0.00 0.00	1.45 1.71	0.06 0.07
RRU Filters 24" x 13" x 7" (53 LBs) (Partially Shielded) (Sprint)	A	From Leg	3.00 0.00 0.00	0.0000	120.00	No Ice 1/2" Ice	2.60 2.92	0.00 0.00	0.05 0.06
RRU Filters 24" x 13" x 7" (53 LBs) (Partially Shielded) (Sprint)	B	From Leg	3.00 0.00 0.00	0.0000	120.00	No Ice 1/2" Ice	2.60 2.92	0.00 0.00	0.05 0.06
RRU Filters 24" x 13" x 7" (53 LBs) (Partially Shielded) (Sprint)	C	From Leg	3.00 0.00 0.00	0.0000	120.00	No Ice 1/2" Ice	2.60 2.92	0.00 0.00	0.05 0.06
(2) Combiners 12" x 6" x 2" (10LBs) (Shielded) (Sprint)	A	From Leg	3.00 0.00 0.00	0.0000	120.00	No Ice 1/2" Ice	0.00 0.00	0.00 0.00	0.01 0.01
(2) Combiners 12" x 6" x 2" (10LBs) (Shielded) (Sprint)	B	From Leg	3.00 0.00 0.00	0.0000	120.00	No Ice 1/2" Ice	0.00 0.00	0.00 0.00	0.01 0.01
(2) Combiners 12" x 6" x 2" (10LBs) (Shielded) (Sprint)	C	From Leg	3.00 0.00 0.00	0.0000	120.00	No Ice 1/2" Ice	0.00 0.00	0.00 0.00	0.01 0.01
(2) Combiners 12" x 6" x 2" (10LBs) (Partially Shielded) (Sprint)	A	From Leg	3.00 0.00 0.00	0.0000	120.00	No Ice 1/2" Ice	0.00 0.00	0.23 0.35	0.01 0.01
(2) Combiners 12" x 6" x 2" (10LBs) (Partially Shielded) (Sprint)	B	From Leg	3.00 0.00 0.00	0.0000	120.00	No Ice 1/2" Ice	0.00 0.00	0.23 0.35	0.01 0.01
(2) Combiners 12" x 6" x 2" (10LBs) (Partially Shielded) (Sprint)	C	From Leg	3.00 0.00 0.00	0.0000	120.00	No Ice 1/2" Ice	0.00 0.00	0.23 0.35	0.01 0.01
GPS (Sprint)	C	From Leg	3.00 0.00	0.0000	120.00	No Ice 1/2" Ice	0.20 0.29	0.20 0.29	0.01 0.01

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Description	Face or Leg	Offset Type	Offsets: Hor- Lateral Vert	Azimuth Adjustment	Placement	C _A A _A Front	C _A A _A Side	Weight
			ft	°	ft	ft ²	ft ²	K
			ft					
			ft					
			0.00					

Load Combinations

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

Maximum Tower Deflections - Service Wind

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Section No.	Elevation ft	Horz. Deflection in	Gov. Load Comb.	Tilt °	Twist °
L1	118 - 77	27.382	35	2.0254	0.0023
L2	80.75 - 40.75	12.943	35	1.5257	0.0009
L3	45 - 9.25	3.888	35	0.8329	0.0003
L4	9.25 - 8.75	0.127	35	0.1306	0.0000
L5	8.75 - 0	0.114	35	0.1243	0.0000

Critical Deflections and Radius of Curvature - Service Wind

Elevation ft	Appurtenance	Gov. Load Comb.	Deflection in	Tilt °	Twist °	Radius of Curvature ft
120.00	(2) DB844H90E-XY w/Mount Pipe	35	27.382	2.0254	0.0023	19653
118.00	PiROD 13' Platform w/handrail	35	27.382	2.0254	0.0023	19653
108.00	Kathrein 800 10121	35	23.243	1.9037	0.0019	9826
91.00	Antel BXA-70063/4CFw/ Mount Pipe	35	16.553	1.6804	0.0012	3638

Maximum Tower Deflections - Design Wind

Section No.	Elevation ft	Horz. Deflection in	Gov. Load Comb.	Tilt °	Twist °
L1	118 - 77	78.856	11	5.8344	0.0065
L2	80.75 - 40.75	37.304	11	4.3977	0.0027
L3	45 - 9.25	11.214	11	2.4023	0.0010
L4	9.25 - 8.75	0.367	10	0.3770	0.0001
L5	8.75 - 0	0.328	10	0.3587	0.0001

Critical Deflections and Radius of Curvature - Design Wind

Elevation ft	Appurtenance	Gov. Load Comb.	Deflection in	Tilt °	Twist °	Radius of Curvature ft
120.00	(2) DB844H90E-XY w/Mount Pipe	11	78.856	5.8344	0.0065	6941
118.00	PiROD 13' Platform w/handrail	11	78.856	5.8344	0.0065	6941
108.00	Kathrein 800 10121	11	66.948	5.4848	0.0054	3470
91.00	Antel BXA-70063/4CFw/ Mount Pipe	11	47.698	4.8429	0.0035	1282

Compression Checks

Pole Design Data

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Section No.	Elevation ft	Size	L ft	L _u ft	Kl/r	F _a ksi	A in ²	Actual P K	Allow. P _a K	Ratio $\frac{P}{P_a}$
L1	118 - 116.039	TP28.765x22x0.1875	41.00	0.00	0.0	39.000	13.3646	-2.91	521.22	0.006
	116.039 - 114.079					39.000	13.5599	-3.01	528.84	0.006
	114.079 - 112.118					38.816	13.7552	-3.12	533.92	0.006
	112.118 - 110.158					38.544	13.9505	-3.23	537.71	0.006
	110.158 - 108.197					38.272	14.1458	-3.34	541.39	0.006
	108.197 - 106.237					38.000	14.3411	-5.32	544.97	0.010
	106.237 - 104.276					37.728	14.5364	-5.44	548.44	0.010
	104.276 - 102.316					37.456	14.7317	-5.56	551.80	0.010
	102.316 - 100.355					37.185	14.9270	-5.69	555.06	0.010
	100.355 - 98.3947					36.913	15.1223	-5.81	558.21	0.010
	98.3947 - 96.4342					36.641	15.3177	-5.94	561.25	0.011
	96.4342 - 94.4737					36.369	15.5130	-6.08	564.19	0.011
	94.4737 - 92.5132					36.097	15.7083	-6.22	567.02	0.011
	92.5132 - 90.5526					35.825	15.9036	-7.78	569.74	0.014
	90.5526 - 88.5921					35.553	16.0989	-7.93	572.36	0.014
	88.5921 - 86.6316					35.281	16.2942	-8.08	574.88	0.014
	86.6316 - 84.6711					35.009	16.4895	-8.24	577.28	0.014
	84.6711 - 82.7105					34.737	16.6848	-8.40	579.58	0.014
	82.7105 - 80.75					34.465	16.8801	-8.57	581.78	0.015
	80.75 - 77					33.945	17.2537	-3.50	585.68	0.006
L2	80.75 - 77	TP34.371x27.7713x0.3125	40.00	0.00	0.0	39.000	28.2530	-5.71	1101.87	0.005
	77 - 75.2222					39.000	28.5481	-9.45	1113.38	0.008
	75.2222 - 73.4444					39.000	28.8433	-9.68	1124.89	0.009
	73.4444 - 71.6667					39.000	29.1384	-9.92	1136.40	0.009
	71.6667 - 69.8889					39.000	29.4336	-10.16	1147.91	0.009
	69.8889 - 68.1111					39.000	29.7287	-10.41	1159.42	0.009
	68.1111 - 66.3333					39.000	30.0239	-10.65	1170.93	0.009
	66.3333 - 64.5556					39.000	30.3190	-10.90	1182.44	0.009
	64.5556 - 62.7778					39.000	30.6142	-11.16	1193.95	0.009
	62.7778 - 61					39.000	30.9094	-11.41	1205.47	0.009
	61 - 59.2222					39.000	31.2045	-11.67	1216.98	0.010
	59.2222 - 57.4444					39.000	31.4997	-11.94	1228.49	0.010
	57.4444 - 55.6667					39.000	31.7948	-12.20	1240.00	0.010
	55.6667									

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Section No.	Elevation ft	Size	L ft	L _u ft	Kl/r	F _a ksi	A in ²	Actual P K	Allow. P _a K	Ratio P P _a
L3	55.6667 - 53.8889	TP38.85x33.0448x0.375	35.75	0.00	0.0	39.000	32.0900	-12.47	1251.51	0.010
	53.8889 - 52.1111					39.000	32.3851	-12.74	1263.02	0.010
	52.1111 - 50.3333					39.000	32.6803	-13.01	1274.53	0.010
	50.3333 - 48.5556					39.000	32.9754	-13.29	1286.04	0.010
	48.5556 - 46.7778					39.000	33.2706	-13.57	1297.55	0.010
	46.7778 - 45					39.000	33.5658	-13.85	1309.06	0.011
	45 - 40.75					39.000	34.2714	-6.95	1336.58	0.005
	45 - 40.75					39.000	40.2821	-8.11	1571.00	0.005
	40.75 - 39.0921					39.000	40.6072	-15.36	1583.68	0.010
	39.0921 - 37.4342					39.000	40.9322	-15.67	1596.36	0.010
	37.4342 - 35.7763					39.000	41.2573	-15.97	1609.04	0.010
	35.7763 - 34.1184					39.000	41.5824	-16.28	1621.71	0.010
	34.1184 - 32.4605					39.000	41.9075	-16.59	1634.39	0.010
	32.4605 - 30.8026					39.000	42.2326	-16.91	1647.07	0.010
	30.8026 - 29.1447					39.000	42.5576	-17.22	1659.75	0.010
	29.1447 - 27.4868					39.000	42.8827	-17.54	1672.43	0.010
	27.4868 - 25.8289					39.000	43.2078	-17.86	1685.10	0.011
	25.8289 - 24.1711					39.000	43.5329	-18.18	1697.78	0.011
	24.1711 - 22.5132					39.000	43.8579	-18.51	1710.46	0.011
	22.5132 - 20.8553					39.000	44.1830	-18.84	1723.14	0.011
	20.8553 - 19.1974					39.000	44.5081	-19.17	1735.82	0.011
	19.1974 - 17.5395					39.000	44.8332	-19.50	1748.49	0.011
	17.5395 - 15.8816					39.000	45.1583	-19.84	1761.17	0.011
	15.8816 - 14.2237					39.000	45.4833	-20.17	1773.85	0.011
	14.2237 - 12.5658					39.000	45.8084	-20.51	1786.53	0.011
	12.5658 - 10.9079					39.000	46.1335	-20.86	1799.21	0.012
	10.9079 - 9.25					39.000	46.4586	-21.20	1811.88	0.012
L4	9.25 - 8.75 (4)	TP41.895x38.85x0.5	0.50	0.00	0.0	30.000	61.7435	-21.22	1852.31	0.011
L5	8.75 - 7.65625	TP43.47x41.895x0.445	8.75	0.00	0.0	30.000	59.6758	-21.61	1790.27	0.012
	7.65625 - 6.5625					30.000	59.9579	-21.88	1798.74	0.012
	6.5625 - 5.46875					30.000	60.2400	-22.15	1807.20	0.012
	5.46875 - 4.375					30.000	60.5221	-22.42	1815.66	0.012
	4.375 - 3.28125					30.000	60.8042	-22.69	1824.13	0.012
	3.28125 - 2.1875					30.000	61.0863	-22.97	1832.59	0.013
	2.1875 -					30.000	61.3684	-23.24	1841.05	0.013

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Section No.	Elevation	Size	L	L _n	Kl/r	F _a	A	Actual P	Allow. P _a	Ratio P
	ft		ft	ft		ksi	in ²	K	K	$\frac{P}{P_a}$
	1.09375									
	1.09375 - 0					30.000	61.6505	-23.52	1849.52	0.013

Pole Bending Design Data

Section No.	Elevation	Size	Actual M _s	Actual f _{bx}	Allow. F _{bx}	Ratio $\frac{f_{bx}}{F_{bx}}$	Actual M _y	Actual f _{by}	Allow. F _{by}	Ratio $\frac{f_{by}}{F_{by}}$
	ft		kip-ft	ksi	ksi		kip-ft	ksi	ksi	
L1	118 - 116.039	TP28.765x22x0.1875	20.55	-3.411	39.000	0.087	0.00	0.000	39.000	0.000
	116.039 - 114.079		32.84	-5.295	39.000	0.136	0.00	0.000	39.000	0.000
	114.079 - 112.118		45.48	-7.125	38.816	0.184	0.00	0.000	38.816	0.000
	112.118 - 110.158		58.47	-8.905	38.544	0.231	0.00	0.000	38.544	0.000
	110.158 - 108.197		71.82	-10.637	38.272	0.278	0.00	0.000	38.272	0.000
	108.197 - 106.237		91.71	-13.214	38.000	0.348	0.00	0.000	38.000	0.000
	106.237 - 104.276		112.52	-15.779	37.728	0.418	0.00	0.000	37.728	0.000
	104.276 - 102.316		133.69	-18.252	37.456	0.487	0.00	0.000	37.456	0.000
	102.316 - 100.355		155.22	-20.638	37.185	0.555	0.00	0.000	37.185	0.000
	100.355 - 98.3947		177.11	-22.941	36.913	0.621	0.00	0.000	36.913	0.000
	98.3947 - 96.4342		199.35	-25.166	36.641	0.687	0.00	0.000	36.641	0.000
	96.4342 - 94.4737		221.96	-27.317	36.369	0.751	0.00	0.000	36.369	0.000
	94.4737 - 92.5132		244.93	-29.396	36.097	0.814	0.00	0.000	36.097	0.000
	92.5132 - 90.5526		270.01	-31.612	35.825	0.882	0.00	0.000	35.825	0.000
	90.5526 - 88.5921		301.32	-34.424	35.553	0.968	0.00	0.000	35.553	0.000
	88.5921 - 86.6316		332.99	-37.132	35.281	1.052	0.00	0.000	35.281	0.000
	86.6316 - 84.6711		365.01	-39.742	35.009	1.135	0.00	0.000	35.009	0.000
	84.6711 - 82.7105		397.40	-42.258	34.737	1.217	0.00	0.000	34.737	0.000
	82.7105 - 80.75		430.15	-44.684	34.465	1.296	0.00	0.000	34.465	0.000
L2	80.75 - 77	TP34.371x27.7713x0.3125	191.52	-19.040	33.945	0.561	0.00	0.000	33.945	0.000
	77 - 75.2222		302.37	-18.770	39.000	0.481	0.00	0.000	39.000	0.000
	75.2222 - 73.4444		524.62	-31.892	39.000	0.818	0.00	0.000	39.000	0.000
	73.4444 - 71.6667		555.66	-33.087	39.000	0.848	0.00	0.000	39.000	0.000
	71.6667 - 69.8889		587.00	-34.245	39.000	0.878	0.00	0.000	39.000	0.000
	69.8889 - 68.1111		618.64	-35.367	39.000	0.907	0.00	0.000	39.000	0.000
			650.59	-36.455	39.000	0.935	0.00	0.000	39.000	0.000

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Section No.	Elevation ft	Size	Actual M_x kip-ft	Actual f_{bx} ksi	Allow. F_{bx} ksi	Ratio $\frac{f_{bx}}{F_{bx}}$	Actual M_y kip-ft	Actual f_{by} ksi	Allow. F_{by} ksi	Ratio $\frac{f_{by}}{F_{by}}$
L3	68.1111 - 66.3333	TP38.85x33.0448x0.375	682.84	-37.509	39.000	0.962	0.00	0.000	39.000	0.000
	66.3333 - 64.5556		715.38	-38.532	39.000	0.988	0.00	0.000	39.000	0.000
	64.5556 - 62.7778		748.23	-39.524	39.000	1.013	0.00	0.000	39.000	0.000
	62.7778 - 61		781.38	-40.486	39.000	1.038	0.00	0.000	39.000	0.000
	61 - 59.2222		814.82	-41.420	39.000	1.062	0.00	0.000	39.000	0.000
	59.2222 - 57.4444		848.57	-42.327	39.000	1.085	0.00	0.000	39.000	0.000
	57.4444 - 55.6667		882.60	-43.207	39.000	1.108	0.00	0.000	39.000	0.000
	55.6667 - 53.8889		916.93	-44.062	39.000	1.130	0.00	0.000	39.000	0.000
	53.8889 - 52.1111		951.56	-44.892	39.000	1.151	0.00	0.000	39.000	0.000
	52.1111 - 50.3333		986.48	-45.699	39.000	1.172	0.00	0.000	39.000	0.000
	50.3333 - 48.5556		1021.68	-46.483	39.000	1.192	0.00	0.000	39.000	0.000
	48.5556 - 46.7778		1057.18	-47.244	39.000	1.211	0.00	0.000	39.000	0.000
	46.7778 - 45		1092.97	-47.984	39.000	1.230	0.00	0.000	39.000	0.000
	45 - 40.75		554.64	-23.353	39.000	0.599	0.00	0.000	39.000	0.000
	45 - 40.75		625.18	-22.911	39.000	0.587	0.00	0.000	39.000	0.000
	40.75 - 39.0921		1214.18	-43.783	39.000	1.123	0.00	0.000	39.000	0.000
	39.0921 - 37.4342		1248.77	-44.314	39.000	1.136	0.00	0.000	39.000	0.000
	37.4342 - 35.7763		1283.58	-44.830	39.000	1.150	0.00	0.000	39.000	0.000
	35.7763 - 34.1184		1318.61	-45.333	39.000	1.162	0.00	0.000	39.000	0.000
	34.1184 - 32.4605		1353.87	-45.822	39.000	1.175	0.00	0.000	39.000	0.000
	32.4605 - 30.8026		1389.35	-46.298	39.000	1.187	0.00	0.000	39.000	0.000
	30.8026 - 29.1447		1425.06	-46.761	39.000	1.199	0.00	0.000	39.000	0.000
	29.1447 - 27.4868		1460.99	-47.213	39.000	1.211	0.00	0.000	39.000	0.000
	27.4868 - 25.8289		1497.15	-47.652	39.000	1.222	0.00	0.000	39.000	0.000
	25.8289 - 24.1711		1533.54	-48.080	39.000	1.233	0.00	0.000	39.000	0.000
	24.1711 - 22.5132		1570.16	-48.498	39.000	1.244	0.00	0.000	39.000	0.000
	22.5132 - 20.8553		1607.00	-48.904	39.000	1.254	0.00	0.000	39.000	0.000
	20.8553 - 19.1974		1644.07	-49.300	39.000	1.264	0.00	0.000	39.000	0.000
	19.1974 - 17.5395		1681.36	-49.687	39.000	1.274	0.00	0.000	39.000	0.000
	17.5395 - 15.8816		1718.88	-50.063	39.000	1.284	0.00	0.000	39.000	0.000
	15.8816 - 14.2237		1756.63	-50.430	39.000	1.293	0.00	0.000	39.000	0.000
	14.2237 - 12.5658		1794.61	-50.788	39.000	1.302	0.00	0.000	39.000	0.000
	12.5658 -		1832.82	-51.138	39.000	1.311	0.00	0.000	39.000	0.000

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Section No.	Elevation ft	Size	Actual M_x kip-ft	Actual f_{bx} ksi	Allow. F_{bx} ksi	Ratio $\frac{f_{bx}}{F_{bx}}$	Actual M_y kip-ft	Actual f_{by} ksi	Allow. F_{by} ksi	Ratio $\frac{f_{by}}{F_{by}}$
	10.9079									
L4	10.9079 - 9.25	TP41.895x38.85x0.5	1871.25	-51.478	39.000	1.320	0.00	0.000	39.000	0.000
L5	9.25 - 8.75 (4)		1871.25	-38.987	30.000	1.300	0.00	0.000	30.000	0.000
	8.75 - 7.65625	TP43.47x41.895x0.445	1908.43	-37.795	30.000	1.260	0.00	0.000	30.000	0.000
	7.65625 - 6.5625		1934.09	-37.942	30.000	1.265	0.00	0.000	30.000	0.000
	6.5625 - 5.46875		1959.87	-38.086	30.000	1.270	0.00	0.000	30.000	0.000
	5.46875 - 4.375		1985.77	-38.229	30.000	1.274	0.00	0.000	30.000	0.000
	4.375 - 3.28125		2011.78	-38.369	30.000	1.279	0.00	0.000	30.000	0.000
	3.28125 - 2.1875		2037.92	-38.508	30.000	1.284	0.00	0.000	30.000	0.000
	2.1875 - 1.09375		2064.17	-38.644	30.000	1.288	0.00	0.000	30.000	0.000
	1.09375 - 0		2090.54	-38.779	30.000	1.293	0.00	0.000	30.000	0.000

Pole Interaction Design Data

Section No.	Elevation ft	Size	Ratio $\frac{P}{P_e}$	Ratio $\frac{f_{bx}}{F_{bx}}$	Ratio $\frac{f_{by}}{F_{by}}$	Comb. Stress Ratio	Allow. Stress Ratio	Criteria
L1	118 - 116.039	TP28.765x22x0.1875	0.006	0.087	0.000	0.093	1.333	H1-3 ✓
	116.039 - 114.079		0.006	0.136	0.000	0.141	1.333	H1-3 ✓
	114.079 - 112.118		0.006	0.184	0.000	0.189	1.333	H1-3 ✓
	112.118 - 110.158		0.006	0.231	0.000	0.237	1.333	H1-3 ✓
	110.158 - 108.197		0.006	0.278	0.000	0.284	1.333	H1-3 ✓
	108.197 - 106.237		0.010	0.348	0.000	0.358	1.333	H1-3 ✓
	106.237 - 104.276		0.010	0.418	0.000	0.428	1.333	H1-3 ✓
	104.276 - 102.316		0.010	0.487	0.000	0.497	1.333	H1-3 ✓
	102.316 - 100.355		0.010	0.555	0.000	0.565	1.333	H1-3 ✓
	100.355 - 98.3947		0.010	0.621	0.000	0.632	1.333	H1-3 ✓
	98.3947 - 96.4342		0.011	0.687	0.000	0.697	1.333	H1-3 ✓
	96.4342 - 94.4737		0.011	0.751	0.000	0.762	1.333	H1-3 ✓
	94.4737 - 92.5132		0.011	0.814	0.000	0.825	1.333	H1-3 ✓
	92.5132 - 90.5526		0.014	0.882	0.000	0.896	1.333	H1-3 ✓
	90.5526 -		0.014	0.968	0.000	0.982	1.333	H1-3 ✓

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Section No.	Elevation ft	Size	Ratio P P_a	Ratio f_{bx} F_{bx}	Ratio f_{by} F_{by}	Comb. Stress Ratio	Allow. Stress Ratio	Criteria
	88.5921					✓		
	88.5921 - 86.6316		0.014	1.052	0.000	1.067	1.333	H1-3 ✓
	86.6316 - 84.6711		0.014	1.135	0.000	1.149	1.333	H1-3 ✓
	84.6711 - 82.7105		0.014	1.217	0.000	1.231	1.333	H1-3 ✓
	82.7105 - 80.75		0.015	1.296	0.000	1.311	1.333	H1-3 ✓
	80.75 - 77		0.006	0.561	0.000	0.567	1.333	H1-3 ✓
L2	80.75 - 77	TP34 371x27 7713x0.3125	0.005	0.481	0.000	0.486	1.333	H1-3 ✓
	77 - 75.2222		0.008	0.818	0.000	0.826	1.333	H1-3 ✓
	75.2222 - 73.4444		0.009	0.848	0.000	0.857	1.333	H1-3 ✓
	73.4444 - 71.6667		0.009	0.878	0.000	0.887	1.333	H1-3 ✓
	71.6667 - 69.8889		0.009	0.907	0.000	0.916	1.333	H1-3 ✓
	69.8889 - 68.1111		0.009	0.935	0.000	0.944	1.333	H1-3 ✓
	68.1111 - 66.3333		0.009	0.962	0.000	0.971	1.333	H1-3 ✓
	66.3333 - 64.5556		0.009	0.988	0.000	0.997	1.333	H1-3 ✓
	64.5556 - 62.7778		0.009	1.013	0.000	1.023	1.333	H1-3 ✓
	62.7778 - 61		0.009	1.038	0.000	1.048	1.333	H1-3 ✓
	61 - 59.2222		0.010	1.062	0.000	1.072	1.333	H1-3 ✓
	59.2222 - 57.4444		0.010	1.085	0.000	1.095	1.333	H1-3 ✓
	57.4444 - 55.6667		0.010	1.108	0.000	1.118	1.333	H1-3 ✓
	55.6667 - 53.8889		0.010	1.130	0.000	1.140	1.333	H1-3 ✓
	53.8889 - 52.1111		0.010	1.151	0.000	1.161	1.333	H1-3 ✓
	52.1111 - 50.3333		0.010	1.172	0.000	1.182	1.333	H1-3 ✓
	50.3333 - 48.5556		0.010	1.192	0.000	1.202	1.333	H1-3 ✓
	48.5556 - 46.7778		0.010	1.211	0.000	1.222	1.333	H1-3 ✓
	46.7778 - 45		0.011	1.230	0.000	1.241	1.333	H1-3 ✓
	45 - 40.75		0.005	0.599	0.000	0.604	1.333	H1-3 ✓
L3	45 - 40.75	TP38.85x33.0448x0.375	0.005	0.587	0.000	0.593	1.333	H1-3 ✓

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	SBA	Kingsley

Section No.	Elevation ft	Size	Ratio $\frac{P}{P_a}$	Ratio $\frac{f_{bx}}{F_{bx}}$	Ratio $\frac{f_{by}}{F_{by}}$	Comb. Stress Ratio	Allow. Stress Ratio	Criteria
	40.75 - 39.0921		0.010	1.123	0.000	1.132	1.333	H1-3 ✓
	39.0921 - 37.4342		0.010	1.136	0.000	1.146	1.333	H1-3 ✓
	37.4342 - 35.7763		0.010	1.150	0.000	1.159	1.333	H1-3 ✓
	35.7763 - 34.1184		0.010	1.162	0.000	1.172	1.333	H1-3 ✓
	34.1184 - 32.4605		0.010	1.175	0.000	1.185	1.333	H1-3 ✓
	32.4605 - 30.8026		0.010	1.187	0.000	1.197	1.333	H1-3 ✓
	30.8026 - 29.1447		0.010	1.199	0.000	1.209	1.333	H1-3 ✓
	29.1447 - 27.4868		0.010	1.211	0.000	1.221	1.333	H1-3 ✓
	27.4868 - 25.8289		0.011	1.222	0.000	1.232	1.333	H1-3 ✓
	25.8289 - 24.1711		0.011	1.233	0.000	1.244	1.333	H1-3 ✓
	24.1711 - 22.5132		0.011	1.244	0.000	1.254	1.333	H1-3 ✓
	22.5132 - 20.8553		0.011	1.254	0.000	1.265	1.333	H1-3 ✓
	20.8553 - 19.1974		0.011	1.264	0.000	1.275	1.333	H1-3 ✓
	19.1974 - 17.5395		0.011	1.274	0.000	1.285	1.333	H1-3 ✓
	17.5395 - 15.8816		0.011	1.284	0.000	1.295	1.333	H1-3 ✓
	15.8816 - 14.2237		0.011	1.293	0.000	1.304	1.333	H1-3 ✓
	14.2237 - 12.5658		0.011	1.302	0.000	1.314	1.333	H1-3 ✓
	12.5658 - 10.9079		0.012	1.311	0.000	1.323	1.333	H1-3 ✓
	10.9079 - 9.25		0.012	1.320	0.000	1.332	1.333	H1-3 ✓
L4	9.25 - 8.75 (4)	TP41.895x38.85x0.5	0.011	1.300	0.000	1.311	1.333	H1-3 ✓
L5	8.75 - 7.65625	TP43.47x41.895x0.445	0.012	1.260	0.000	1.272	1.333	H1-3 ✓
	7.65625 - 6.5625		0.012	1.265	0.000	1.277	1.333	H1-3 ✓
	6.5625 - 5.46875		0.012	1.270	0.000	1.282	1.333	H1-3 ✓
	5.46875 - 4.375		0.012	1.274	0.000	1.287	1.333	H1-3 ✓
	4.375 - 3.28125		0.012	1.279	0.000	1.291	1.333	H1-3 ✓
	3.28125 - 2.1875		0.013	1.284	0.000	1.296	1.333	H1-3 ✓

tnxTower Vertical Solutions Inc 2002 Production Drive Apex, NC 27539 Phone: (888) 321-6167 FAX: (919) 321-1768	Job	CT46133-A	Page	16 of 16
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Section No.	Elevation ft	Size	Ratio $\frac{P}{P_a}$	Ratio $\frac{f_{bx}}{F_{bx}}$	Ratio $\frac{f_{by}}{F_{by}}$	Comb. Stress Ratio	Allow. Stress Ratio	Criteria
	2.1875 - 1.09375		0.013	1.288	0.000	1.301 ✓	1.333	H1-3 ✓
	1.09375 - 0		0.013	1.293	0.000	1.305 ✓	1.333	H1-3 ✓

Section Capacity Table

Section No.	Elevation ft	Component Type	Size	Critical Element	P K	SF*P _{allow} K	% Capacity	Pass Fail
L1	118 - 77	Pole	TP28 765x22x0.1875	1	-8.57	775.51	98.4	Pass
L2	77 - 40.75	Pole	TP34.371x27.7713x0.3125	2	-13.85	1744.98	93.1	Pass
L3	40.75 - 9.25	Pole	TP38.85x33.0448x0.375	3	-21.20	2415.24	99.9	Pass
L4	9.25 - 8.75	Pole	TP41.895x38.85x0.5	4	-21.22	2469.13	98.4	Pass
L5	8.75 - 0	Pole	TP43.47x41.895x0.445	5	-23.52	2465.41	97.9	Pass
							Summary	
							Pole (L3) 99.9	Pass
							RATING = 99.9	Pass

SELF-SUPPORTING POLE STRUCTURE REINFORCEMENT DESIGN, TIA-222-F



Design	1
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	Initials	Date
Produced By:	KCI	2/18/2013
Checked By:	JHW	2/18/2013

SELF-SUPPORTING POLE STRUCTURE REINFORCEMENT DESIGN, TIA-222-F

VSi Job #	130074
Client Site Name:	Shelton-North, CT
Client Site Number:	CT46133-A
Analysis Company:	Vertical Solutions, Inc.
Analysis Date:	July 12, 2012
Hole Size Allowance:	0.0625 inches
Allowable Stress Increase	133%
Design Percentage	100%
	133%

SELF-SUPPORTING POLE STRUCTURE REINFORCEMENT DESIGN, TIA-222-F



Pole Geometry										CT46133-A	130074
Section #	Sides # (12,16,18,0)	Elevation (ft)		Dia Across Flats (in)		Splice (ft)	Thickness (in)	Material Specification	Taper (in/ft)	Length (ft)	
		TOP	BOTTOM	TOP	BOTTOM						
1	12	118.0	77.0	22.00	28.77	3.75	0.1875	A572-65	0.165	41.00	
2	12	80.8	40.8	27.77	34.37	4.25	0.3125	A572-65	0.165	40.00	
3	12	45.0	0.0	33.04	40.47	0.00	0.3750	A572-65	0.165	45.00	

Transition Stiffeners

Input -

$P_{max} := 195 \cdot 1.05 \cdot \text{kip}$ ultimate tension in anchor rod

$x := 3.5032 \cdot \text{in}$ = distance from centerline of stiffener plate to edge of anchor rod

$y := 3.3857 \cdot \text{in}$ = distance from shaft wall to edge of anchor rod

$t := 3.25 \cdot \text{in}$ = thickness of base plate

$F_y := 50 \cdot \text{ksi}$ = minimum specified yield strength

$k := 2.9954 \cdot \text{in}$ = distance from center of anchor rod to edge of base plate

ASI := 133. %

$$I_x := \frac{2 \cdot x \cdot t^3}{12} \quad k_x := \frac{3 \cdot I_x}{y^3} \quad S_x := \frac{I_x}{\left(\frac{t}{2}\right)}$$

$$I_y := \frac{(y + k) \cdot t^3}{12} \quad k_y := \frac{192 \cdot I_y}{(2x)^3} \quad S_y := \frac{I_y}{\left(\frac{t}{2}\right)}$$

$$M_{xMax} := \frac{k_x}{k_x + 2k_y} \cdot P_{max} \cdot y \quad M'_{xAll} := F_y \cdot S_x \cdot ASI \quad r_x := \frac{M_{xMax}}{M'_{xAll}} \quad r_x = 6. \%$$

$$M_{yMax} := \frac{k_y}{k_x + 2k_y} \cdot P_{max} \cdot x \quad M'_{yAll} := F_y \cdot S_y \cdot ASI \quad r_y := \frac{M_{yMax}}{M'_{yAll}} \quad r_y = 45. \%$$

$$r := \sqrt{r_x^2 + r_y^2} \quad r = 45. \%$$

$$P_{Shaft} := \frac{k_x}{k_x + 2k_y} \cdot P_{max} \quad P_{Shaft} = 14.5 \cdot \text{kip}$$

$$P_{Stiff} := \frac{k_y}{k_x + 2k_y} \cdot P_{max} \quad P_{Stiff} = 95.1 \cdot \text{kip}$$

Input - TSP & Bar

$b := 6.75\text{in}$ = width of TS
 $F_y := 50\text{-ksi}$ = yield strength of TS
 $b_{\text{bar}} := 6.0\text{in}$ = width of bar reinforcement
 $t_{\text{bar}} := 1.5\text{in}$ = width of bar reinforcement
 $F_{y\text{Bar}} := 50\text{-ksi}$ = yield strength of bar
 $n := 11$ = number of termination bolts at base

Output - TSP thickness

$A_{\text{bar}} := b_{\text{bar}} \cdot t_{\text{bar}}$ $A_{\text{bar}} = 9.00 \cdot \text{in}^2$
 $A_{\text{TSreq}} := \left(\frac{F_{y\text{Bar}}}{F_y} \right) \cdot \left(\frac{A_{\text{bar}}}{2} \right)$ $A_{\text{TSreq}} = 4.50 \cdot \text{in}^2$
 $t_{\text{req}} := \frac{A_{\text{TSreq}}}{b}$ $t_{\text{req}} = 0.667 \cdot \text{in}$ **USE:** $t_{\text{TSP}} = 1.0\text{in}$
 $L_{\text{req}} := (n + 1) \cdot 3 \cdot \text{in} + 6 \cdot \text{in}$ $L_{\text{req}} = 42 \cdot \text{in}$

Input - TSP welds

$P_{\text{max1}} := \frac{335.91 \cdot \text{kip} + P_{\text{Stiff}}}{2}$ = Factored force in stiffener plate (max allowable tension in bar)
 $t_{\text{VW}} := 0.25 \cdot \text{in}$ = thickness of vertical weld
 $L_{\text{VW}} := L_{\text{req}} - \frac{3}{4} \cdot \text{in}$ = length of vertical weld (length of stiffener plate)
 $L_{\text{HW}} := b - \frac{3}{4} \cdot \text{in}$ = length of horizontal weld (bottom width of stiffener plate)
 $F_y = 50\text{-ksi}$ = yield stress of stiffener plate material
 $F_u := 70\text{-ksi}$ = ultimate stress of weld electrode

Output - TSP welds

$V_y := P_{\text{max1}}$
 $T_x := P_{\text{max1}}$
 $V'_{y\text{All}} := 2 \cdot \frac{4}{3} \cdot 0.30 F_u \cdot 0.707 \cdot t_{\text{VW}} \cdot L_{\text{VW}}$ $V'_{y\text{All}} = 408.3 \cdot \text{kip}$
 $r_v := \frac{V_y}{V'_{y\text{All}}}$ $r_v = 53\%$
 $T'_{x\text{All}} := \frac{4}{3} \cdot 0.60 \cdot F_y \cdot t_{\text{TSP}} \cdot L_{\text{HW}}$ $T'_{x\text{All}} = 240.0 \cdot \text{kip}$
 $r_t := \frac{T_x}{T'_{x\text{All}}}$ $r_t = 90\%$



BASE PLATE w/ SP's
TIA-222-G-2-2009

Case #1

VSi Job No.: 130074
Date: 03/14/2013
Calculated by: KCI

Input

- Reactions & Forces:

$M_u := 2091 \cdot \text{kip} \cdot \text{ft}$ = factored moment reaction at top of base plate
 $V_{ut} := 24 \cdot \text{kip}$ = factored shear reaction at top of base plate
 $P_{uADD1} := 0 \cdot \text{kip}$ = additional axial force to SP on opposite side of SP (left side)
 $P_{uADD2} := 0 \cdot \text{kip}$ = additional axial force to SP on opposite side of SP (right side)

- Shaft:

Shape := "12" = shaft shape, (18,16,12,Round)
 $D_{oShaft} := 40.470 \cdot \text{in}$ = outside diameter of shaft
 $t_{shaft} := 0.375 \cdot \text{in}$ = thickness of shaft
 $F_{yShaft} := 65 \cdot \text{ksi}$ = specified minimum yield stress of shaft
 $a_{flat1} := 8.2223 \cdot \text{in}$ = smaller distance from edge of flat to CL of SP (left side)
 $a_{flat2} := 2.7223 \cdot \text{in}$ = smaller distance from edge of flat to CL of SP (right side)

- Base Plate:

$t_{bpl} := 3.25 \cdot \text{in}$ = thickness of base plate
 $F_y := 50 \cdot \text{ksi}$ = specified minimum yield stress of shaft
 $a := 3.5032 \cdot \text{in}$ = distance from centerline of stiffener plate on left side to center of anchor rod
 $b := 3.5032 \cdot \text{in}$ = distance from centerline of stiffener plate on right side to center of anchor rod
 $y := 3.3857 \cdot \text{in}$ = distance from shaft wall to center of anchor rod

- Stiffener Plates:

$n_{SP} := 8$ = total number of SP
 $Z_s := 8.266 \cdot \text{in}^3$ = plastic section modulus of SPs

- SP on Left Side of AR:

$b_{SP1} := 6.75 \cdot \text{in}$ = width of stiffener plate
 $t_{SP1} := 1.0 \cdot \text{in}$ = thickness of stiffener plate
 $L_{SP1} := 42.5 \cdot \text{in}$ = length of stiffener plate
 $clip_1 := 0.75 \cdot \text{in}$ = length of clip
 $t_{VW1} := 0.25 \cdot \text{in}$ = thickness of vertical weld
 $F_{ySP1} := 50 \cdot \text{ksi}$ = specified minimum yield stress of SP material
 $F_{EXX1} := 70 \cdot \text{ksi}$ = specified minimum ultimate stress of weld electrode
 $k_1 := b_{SP1} - y$ = distance from center of anchor rod to edge of base plate / edge of stiffener plate
 $k_1 = 3.364 \cdot \text{in}$

CONSTANTS:

$E \equiv 29000 \cdot \text{ksi}$
 $\phi_{AR} := 0.8$
 $\phi_f := 0.9$
 $\phi_t := 0.9$
 $K \equiv 0.80$
 $\phi_c \equiv 0.90$
 $\phi_v \equiv 1.00$
 $\phi_w := 0.75$

- SP on Right Side of AR:

$$b_{SP2} := 6.75 \cdot \text{in} \quad = \text{width of stiffener plate}$$

$$t_{SP2} := 1.0 \cdot \text{in} \quad = \text{thickness of stiffener plate}$$

$$L_{SP2} := 42.5 \cdot \text{in} \quad = \text{length of stiffener plate}$$

$$\text{clip}_2 := 0.75 \cdot \text{in} \quad = \text{length of clip}$$

$$t_{VW2} := 0.25 \cdot \text{in} \quad = \text{thickness of vertical weld}$$

$$F_{ySP2} := 50 \cdot \text{ksi} \quad = \text{specified minimum yield stress of SP material}$$

$$F_{EXX2} := 70 \cdot \text{ksi} \quad = \text{specified minimum ultimate stress of weld electrode}$$

$$k_2 := b_{SP2} - y \quad = \text{distance from center of anchor rod to edge of base plate / edge of stiffener plate}$$

$$k_2 = 3.364 \cdot \text{in}$$

- Anchor Rods:

$$\eta := 0.5 \quad = \text{coefficient per Figure 4.4}$$

$$F_{ub} := 100 \cdot \text{ksi} \quad = \text{specified minimum tensile strength of bolt}$$

$$Q := \begin{pmatrix} 2 \\ 4 \\ 4 \\ 2 \\ 0 \\ 0 \\ 0 \end{pmatrix} \quad d := \begin{pmatrix} 2 \cdot 12 + 0 \\ 1 \cdot 12 + 11 + \frac{1}{4} \\ 6 \\ 0 \\ 0 \\ 0 \\ 0 \end{pmatrix} \cdot \text{in} \quad \bar{A}_w := \begin{pmatrix} 3.25 \\ 3.25 \\ 3.25 \\ 3.25 \\ 0 \\ 0 \\ 0 \end{pmatrix} \text{in}^2$$

$$V_{utn} := \frac{V_{ut}}{\eta} \quad V_{un} := \frac{V_{utn}}{\sum(Q)} \quad V_u := \begin{pmatrix} V_{un} \\ V_{un} \\ V_{un} \\ V_{un} \\ V_{un} \\ 0 \\ 0 \\ 0 \end{pmatrix}$$

Output - Anchor Rod, Deformation Method:

$$\phi R_{nt} := \phi_{AR} \cdot F_{ub} \cdot (A) \quad \text{sumQAd} := \sum (Q \cdot d^2 \cdot A)$$

$$\phi R_{nt} = \begin{pmatrix} 260 \\ 260 \\ 260 \\ 260 \\ 0 \\ 0 \\ 0 \end{pmatrix} \cdot \text{kip} \quad \text{sumQAd} = 11239 \cdot \text{in}^4$$

$$P_u := \frac{M_u \cdot (d \cdot A)}{\text{sumQAd}} \quad r_{AR} := \left(\frac{P_u + V_u}{\phi R_{nt}} \right) \text{ [section 4.9.9]}$$

$$P_u = \begin{pmatrix} 174.1 \\ 168.7 \\ 43.5 \\ 0.0 \\ 0.0 \\ 0.0 \\ 0.0 \end{pmatrix} \cdot \text{kip} \quad V_u = \begin{pmatrix} 4 \\ 4 \\ 4 \\ 4 \\ 0 \\ 0 \\ 0 \end{pmatrix} \cdot \text{kip} \quad r_{AR} = \begin{pmatrix} 69 \\ 66 \\ 18 \\ 2 \\ 0 \\ 0 \\ 0 \end{pmatrix} \cdot \%$$

ϕR_{nt} = nominal tension strength
 d = distance from center
 A = area of fastener
 Q = quantity of fasteners

Output - Check Base Plate Flexure:

$$P_{uAR} := \max(1.054999 \cdot \phi R_{nt})$$

$$P_{uAR} = 274 \cdot \text{kip}$$

$$t := t_{bpl}$$

$$t = 3.25 \cdot \text{in}$$

$$k := \min(k_1, k_2)$$

$$k = 3.36 \cdot \text{in}$$

$$I_x := \frac{(a + b) \cdot t^3}{12}$$

$$I_x = 20.04 \cdot \text{in}^4$$

$$k_x := \frac{3 \cdot I_x}{y^3}$$

$$k_x = 1.55 \cdot \text{in}$$

$$S_x := \frac{I_x}{\left(\frac{t}{2}\right)}$$

$$S_x = 12.33 \cdot \text{in}^3$$

$$Z_x := 1.5 \cdot S_x$$

$$Z_x = 18.50 \cdot \text{in}^3$$

$$I_y := \frac{(y + k) \cdot t^3}{12}$$

$$I_y = 19.31 \cdot \text{in}^4$$

$$k_y := \begin{cases} \frac{3 \cdot I_y \cdot (3 \cdot a + b)^2}{2 \cdot a^3 \cdot b^2} & \text{if } a \geq b \\ \frac{3 \cdot I_y \cdot (3 \cdot b + a)^2}{2 \cdot b^3 \cdot a^2} & \text{if } a < b \end{cases}$$

$$k_y = 10.78 \cdot \text{in}$$

$$S_y := \frac{I_y}{\left(\frac{t}{2}\right)}$$

$$S_y = 11.88 \cdot \text{in}^3$$

$$Z_y := 1.5 \cdot S_y$$

$$Z_y = 17.82 \cdot \text{in}^3$$

$$M_{ux} := \left(\frac{k_x}{k_x + k_y} \right) \cdot P_{uAR} \cdot y$$

$$M_{ux} = 9.7 \cdot \text{kip} \cdot \text{ft}$$

$$\phi M_{nx} := \phi_f \cdot F_y \cdot Z_x$$

$$\phi M_{nx} = 69.4 \cdot \text{kip} \cdot \text{ft}$$

$$r_x := \frac{M_{ux}}{\phi M_{nx}}$$

$$r_x = 14. \%$$

$$M_{uy} := \begin{cases} \frac{k_y}{k_x + k_y} \cdot \left[\frac{P_{uAR} \cdot a \cdot b^2}{(a + b)^2} \right] & \text{if } a \leq b \\ \frac{k_y}{k_x + k_y} \cdot \left[\frac{P_{uAR} \cdot a^2 \cdot b}{(a + b)^2} \right] & \text{if } a > b \end{cases}$$

$$M_{uy} = 17.5 \cdot \text{kip} \cdot \text{ft}$$

$$\phi M_{ny} := \phi_f \cdot F_y \cdot Z_y$$

$$\phi M_{ny} = 66.8 \cdot \text{kip} \cdot \text{ft}$$

$$r_y := \frac{M_{uy}}{\phi M_{ny}}$$

$$r_y = 26.0\%$$

$$r_{BPL} := \sqrt{r_x^2 + r_y^2}$$

$$r_{BPL} = 30.0\%$$

$$P_{uShaft} := \left(\frac{k_x}{k_x + k_y} \right) \cdot P_{uAR}$$

$$P_{uShaft} = 34.5 \cdot \text{kip}$$

$$P_{utSP} := \left(\frac{k_y}{k_x + k_y} \right) \cdot P_{uAR}$$

$$P_{utSP} = 239.8 \cdot \text{kip}$$

Output - Calculate Forces in SP's:

$$l_{xx} := a + b$$

$$l = 7.0 \cdot \text{in}$$

$$P_{uSP1} := \frac{P_{utSP} \cdot b^2}{l^3} \cdot (b + 3 \cdot a)$$

$$P_{uSP2} := \frac{P_{utSP} \cdot a^2}{l^3} \cdot (a + 3 \cdot b)$$

$$P_{utSP1} := P_{uSP1} + P_{uADD1}$$

$$P_{utSP1} = 119.9 \cdot \text{kip}$$

$$P_{utSP2} := P_{uSP2} + P_{uADD2}$$

$$P_{utSP2} = 119.9 \cdot \text{kip}$$

Output - Calculate SP Section Properties (LEFT Side):

$$L_{VW1} := L_{SP1} - \text{clip}_1$$

$$L_{VW1} = 41.75 \cdot \text{in}$$

$$L_{HW1} := b_{SP1} - \text{clip}_1$$

$$L_{HW1} = 6.00 \cdot \text{in}$$

$$\theta_1 := \text{atan}\left(\frac{b_{SP1}}{L_{SP1}}\right)$$

$$\theta_1 = 9.02 \cdot \text{deg}$$

$$B_1 := L_{SP1} \cdot \sin(\theta_1)$$

$$B_1 = 6.67 \cdot \text{in}$$

$$N_{B1} := \frac{\text{clip}_1}{(\sin(\theta_1) + \cos(\theta_1))}$$

$$N_{B1} = 0.655 \cdot \text{in}$$

$$N_1 := \frac{N_{B1}}{B_1}$$

$$N_1 = 0.098$$

$$L_1 := \sqrt{L_{SP1}^2 + b_{SP1}^2}$$

$$L_1 = 43.03 \cdot \text{in}$$

$$r_1 := \frac{t_{SP1}}{\sqrt{12}}$$

$$r_1 = 0.289 \cdot \text{in}$$

$$x_1 := \frac{b_{SP1}}{2}$$

$$x_1 = 3.38 \cdot \text{in}$$

Output - Calculate Compressive Strength of SP:

$$\lambda_{c1} := \frac{K \cdot L_1}{r_1 \cdot \pi} \cdot \sqrt{\frac{F_{ySP1}}{E}} \quad \lambda_{c1} = 1.576$$

$$F_{crB1} := \begin{cases} \left(0.658^{\lambda_{c1}^2}\right) \cdot F_{ySP1} & \text{if } \lambda_{c1} \leq 1.5 \\ \left[\left(\frac{0.877}{\lambda_{c1}}\right)^2\right] \cdot F_{ySP1} & \text{if } \lambda_{c1} > 1.5 \end{cases} \quad F_{crB1} = 17.6 \cdot \text{ksi}$$

$$\Delta F_{cr1} := F_{ySP1} - F_{crB1} \quad \Delta F_{cr1} = 32.4 \cdot \text{ksi}$$

$$P_{nSP1} := \frac{t_{SP1} \cdot B_1^2}{6 \cdot x_1} \cdot \left[3 \cdot F_{ySP1} \cdot (1 - N_1^2) - 2 \cdot (\Delta F_{cr1}) \cdot (1 - N_1^3) \right] \quad P_{nSP1} = 184.2 \cdot \text{kip}$$

$$\phi P_{nSP1} := \phi_c \cdot P_{nSP1} \quad \phi P_{nSP1} = 165.7 \cdot \text{kip}$$

$$r_{cSP1} := \frac{P_{utSP1}}{\phi P_{nSP1}} \quad r_{cSP1} = 72\%$$

Output - Calculate Shear and Tensile Strength of CAN-SP:

- Calculate Forces in SP:

$$h_{V1} := \text{clip}_1 + \frac{L_{VW1}}{2} \quad h_{V1} = 21.63 \cdot \text{in}$$

$$V_{uV1} := P_{utSP1} \quad = \text{shear on Vertical leg} \quad V_{uV1} = 119.9 \cdot \text{kip}$$

$$T_{uV1} := \frac{P_{utSP1} \cdot x_1}{h_{V1}} \quad = \text{max tension on Vertical leg} \quad T_{uV1} = 18.7 \cdot \text{kip}$$

$$V_{uH1} := \frac{P_{uSP1} \cdot x_1}{h_{V1}} \quad = \text{shear on Horizontal leg} \quad V_{uH1} = 18.7 \cdot \text{kip}$$

$$T_{uH1} := P_{utSP1} \quad = \text{tension on Horizontal leg} \quad T_{uH1} = 119.9 \cdot \text{kip}$$

- Shear Strength of Vertical Leg of SP:

$$\phi V_{nV1} := \phi_v \cdot (0.6 \cdot F_{ySP1}) \cdot (L_{VW1} \cdot t_{SP1}) \quad \phi V_{nV1} = 1252.5 \cdot \text{kip}$$

$$r_{vV1} := \frac{V_{uV1}}{\phi V_{nV1}} \quad r_{vV1} = 10\%$$

- Tensile Strength of Vertical Leg of SP:

$$\phi T_{nV1} := \phi_t \cdot F_{ySP1} \cdot (L_{VW1} \cdot t_{SP1}) \quad \phi T_{nV1} = 1878.8 \cdot \text{kip}$$

$$r_{tV1} := \frac{T_{uV1}}{\phi T_{nV1}} \quad r_{tV1} = 1\%$$

- Combined Tension & Shear Strength of Vertical Leg of SP:

$$r_{V1} := \left(\frac{T_{uV1}}{\phi T_{nV1}} \right) + \left(\frac{V_{uV1}}{\phi V_{nV1}} \right)^2 \quad r_{V1} = 2.0\%$$

- Shear Strength of Horizontal Leg of SP:

$$\phi V_{nH1} := \phi_v \cdot (0.6 \cdot F_{ySP1}) \cdot (L_{HW1} \cdot t_{SP1}) \quad \phi V_{nH1} = 180.0 \cdot \text{kip}$$

$$r_{vH1} := \frac{V_{uH1}}{\phi V_{nH1}} \quad r_{vH1} = 10.0\%$$

- Tensile Strength of Horizontal Leg of SP:

$$\phi T_{nH1} := \phi_t \cdot F_{ySP1} \cdot (L_{HW1} \cdot t_{SP1}) \quad \phi T_{nH1} = 270.0 \cdot \text{kip}$$

$$r_{tH1} := \frac{T_{uH1}}{\phi T_{nH1}} \quad r_{tH1} = 44.0\%$$

- Combined Tension & Shear Strength of Horizontal Leg of SP:

$$r_{H1} := \left(\frac{T_{uH1}}{\phi T_{nH1}} \right) + \left(\frac{V_{uH1}}{\phi V_{nH1}} \right)^2 \quad r_{H1} = 45.0\%$$

Output - Check Shear and Tensile Strength of Vertical SP Weld:

$$\theta_v \equiv 0 \cdot \text{deg}$$

$$F_{w_v1} := 0.60 \cdot F_{EXX1} \cdot \left(1.0 + 0.50 \cdot \sin(\theta_v)^{1.5} \right) \quad F_{w_v1} = 42.0 \cdot \text{ksi}$$

$$\theta_t \equiv 90 \cdot \text{deg}$$

$$F_{w_t1} := 0.60 \cdot F_{EXX1} \cdot \left(1.0 + 0.50 \cdot \sin(\theta_t)^{1.5} \right) \quad F_{w_t1} = 63.0 \cdot \text{ksi}$$

- Shear Strength of Vertical Weld:

$$A_{wV1} := (0.707 \cdot t_{wV1}) \cdot L_{wV1} \quad A_{wV1} = 7.38 \cdot \text{in}^2$$

$$\phi V_{nVw1} := 2 \cdot (\phi_w \cdot F_{w_v1} \cdot A_{wV1}) \quad \phi V_{nVw1} = 465 \cdot \text{kip}$$

$$r_{vVw1} := \frac{V_{uV1}}{\phi V_{nVw1}} \quad r_{vVw1} = 26.0\%$$

- Tensile Strength of Vertical Weld:

$$\phi T_{nVw1} := 2 \cdot (\phi_w \cdot F_{w_t1} \cdot A_{wV1}) \quad \phi T_{nVw1} = 697 \cdot \text{kip}$$

$$r_{tVw1} := \frac{T_{uV1}}{\phi T_{nVw1}} \quad r_{tVw1} = 3.0\%$$

- Combined Tension & Shear Strength of Vertical Weld:

$$r_{Vw1} := \left(\frac{T_{uV1}}{\phi T_{nVw1}} \right) + \left(\frac{V_{uV1}}{\phi V_{nVw1}} \right)^2 \quad r_{Vw1} = 9.0\%$$

Output - Check Design Strength for Horizontal Reaction:

$$n_{\text{sides}} := \begin{cases} 18 & \text{if Shape} = "18" \\ 16 & \text{if Shape} = "16" \\ 12 & \text{if Shape} = "12" \\ 0 & \text{if Shape} = "Round" \end{cases}$$

$$n_{\text{sides}} = 12$$

$$\theta_{\text{flat}} := \begin{cases} "N/A" & \text{if Shape} = "Round" \\ \frac{360 \cdot \text{deg}}{n_{\text{sides}}} & \text{otherwise} \end{cases}$$

$$\theta_{\text{flat}} = 30.0 \cdot \text{deg}$$

$$FW := \begin{cases} "N/A" & \text{if Shape} = "Round" \\ D_{\text{oShaft}} \cdot \tan\left(\frac{\theta_{\text{flat}}}{2}\right) & \text{otherwise} \end{cases}$$

$$FW = 10.84 \cdot \text{in}$$

$$D_{\text{s1}} := \begin{cases} (D_{\text{oShaft}} + b_{\text{SP1}}) & \text{if Shape} = "Round" \\ "N/A" & \text{otherwise} \end{cases}$$

$$D_{\text{s1}} = "N/A" \cdot \text{in}$$

$$A_{\text{s1}} := \begin{cases} (b_{\text{SP1}} \cdot t_{\text{SP1}}) & \text{if Shape} = "Round" \\ "N/A" & \text{otherwise} \end{cases}$$

$$A_{\text{s1}} = "N/A" \cdot \text{in}^2$$

$$D_{\text{shaft}} := D_{\text{oShaft}} - 2 \cdot t_{\text{shaft}}$$

$$D_{\text{shaft}} = 39.72 \cdot \text{in}$$

$$Z_{\text{shaft}} := \frac{D_{\text{oShaft}}^3}{6} - \frac{D_{\text{shaft}}^3}{6}$$

$$Z_{\text{shaft}} = 602.9 \cdot \text{in}^3$$

$$Z_1 := \begin{cases} (Z_{\text{shaft}} + Z_s) & \text{if Shape} = "Round" \\ \left(\frac{L_{\text{VW1}} \cdot t_{\text{shaft}}^2}{4} \right) & \text{otherwise} \end{cases}$$

$$Z_1 = 1.47 \cdot \text{in}^3$$

$$U_1 := \begin{cases} \left(\frac{Z_{\text{shaft}}}{Z_1} \right) & \text{if Shape} = "Round" \\ "N/A" & \text{otherwise} \end{cases}$$

$$U_1 = "N/A"$$

$$Q_{\text{fl}} := \begin{cases} [1 - 0.3 \cdot U_1 \cdot (1 + U_1)] & \text{if Shape} = "Round" \\ "N/A" & \text{otherwise} \end{cases}$$

$$Q_{\text{fl}} = "N/A"$$

$$\phi R_{\text{nHshaft1}} := \begin{cases} \phi_f \left[F_{\text{yShaft}} \cdot (5.5) \cdot (t_{\text{shaft}}^2) \cdot \left(1 + \frac{L_{\text{VW1}}}{4 \cdot D_{\text{oShaft}}} \right) \cdot Q_{\text{fl}} \right] & \text{if Shape} = "Round" \\ \phi_f \left[\frac{F_{\text{yShaft}} \cdot Z_1 \cdot FW^2}{a_{\text{flat1}} \cdot (FW - a_{\text{flat1}})^2} \right] & \text{if Shape} = "12" \end{cases}$$

$$\phi R_{\text{nHshaft1}} = 178.7 \cdot \text{kip}$$

$$r_{\text{Hshaft1}} := \frac{T_{\text{uV1}}}{\phi R_{\text{nHshaft1}}}$$

$$r_{\text{Hshaft1}} = 10.0\%$$

Output - Check Design Shaft Punching Shear:

$$V_{uPS1} := T_{uV1}$$

$$V_{uPS1} = 18.7 \cdot \text{kip}$$

$$\phi V_{n1} := \left[\phi_v \cdot (0.6 \cdot F_{y\text{Shaft}}) \cdot (t_{\text{shaft}} \cdot L_{VW1}) \right] \cdot 2$$

$$\phi V_{n1} = 1221.2 \cdot \text{kip}$$

$$r_{vPS1} := \frac{V_{uPS1}}{\phi V_{n1}}$$

$$r_{vPS1} = 2\%$$

Output - Calculate SP Section Properties (RIGHT Side):

$$L_{VW2} := L_{SP2} - \text{clip}_2$$

$$L_{VW2} = 41.75 \cdot \text{in}$$

$$L_{HW2} := b_{SP2} - \text{clip}_2$$

$$L_{HW2} = 6.00 \cdot \text{in}$$

$$\theta_2 := \text{atan}\left(\frac{b_{SP2}}{L_{SP2}}\right)$$

$$\theta_2 = 9.02 \cdot \text{deg}$$

$$B_2 := L_{SP2} \cdot \sin(\theta_2)$$

$$B_2 = 6.67 \cdot \text{in}$$

$$N_{B2} := \frac{\text{clip}_2}{(\sin(\theta_2) + \cos(\theta_2))}$$

$$N_{B2} = 0.655 \cdot \text{in}$$

$$N_2 := \frac{N_{B2}}{B_2}$$

$$N_2 = 0.098$$

$$L_2 := \sqrt{L_{SP2}^2 + b_{SP2}^2}$$

$$L_2 = 43.03 \cdot \text{in}$$

$$r_2 := \frac{t_{SP2}}{\sqrt{12}}$$

$$r_2 = 0.289 \cdot \text{in}$$

$$x_2 := \frac{b_{SP2}}{2}$$

$$x_2 = 3.38 \cdot \text{in}$$

Output - Calculate Compressive Strength of SP:

$$\lambda_{c2} := \frac{K \cdot L_2}{r_2 \cdot \pi} \cdot \sqrt{\frac{F_{ySP2}}{E}}$$

$$\lambda_{c2} = 1.576$$

$$F_{crB2} := \begin{cases} \left(0.658^{\lambda_{c2}^2}\right) \cdot F_{ySP2} & \text{if } \lambda_{c2} \leq 1.5 \\ \left[\left(\frac{0.877}{\lambda_{c2}^2}\right) \cdot F_{ySP2}\right] & \text{if } \lambda_{c2} > 1.5 \end{cases}$$

$$F_{crB2} = 17.6 \cdot \text{ksi}$$

$$\Delta F_{cr2} := F_{ySP2} - F_{crB2}$$

$$\Delta F_{cr2} = 32.4 \cdot \text{ksi}$$

$$P_{nSP2} := \frac{t_{SP2} \cdot B_2^2}{6 \cdot x_2} \cdot \left[3 \cdot F_{ySP2} \cdot (1 - N_2^2) - 2 \cdot (\Delta F_{cr2}) \cdot (1 - N_2^3) \right]$$

$$P_{nSP2} = 184.2 \cdot \text{kip}$$

$$\phi P_{nSP2} := \phi_c \cdot P_{nSP2}$$

$$\phi P_{nSP2} = 165.7 \cdot \text{kip}$$

$$r_{cSP2} := \frac{P_{utSP2}}{\phi P_{nSP2}}$$

$$r_{cSP2} = 72\%$$

Output - Calculate Shear and Tensile Strength of SP:

- Calculate Forces in SP:

$$h_{V2} := clip_2 + \frac{L_{VW2}}{2}$$

$$h_{V2} = 21.63 \cdot \text{in}$$

$$V_{uV2} := P_{utSP2} \quad = \text{shear on Vertical leg}$$

$$V_{uV2} = 119.9 \cdot \text{kip}$$

$$T_{uV2} := \frac{P_{utSP2} \cdot x_2}{h_{V2}} \quad = \text{max tension on Vertical leg}$$

$$T_{uV2} = 18.7 \cdot \text{kip}$$

$$V_{uH2} := \frac{P_{uSP2} \cdot x_2}{h_{V2}} \quad = \text{shear on Horizontal leg}$$

$$V_{uH2} = 18.7 \cdot \text{kip}$$

$$T_{uH2} := P_{utSP2} \quad = \text{tension on Horizontal leg}$$

$$T_{uH2} = 119.9 \cdot \text{kip}$$

- Shear Strength of Vertical Leg of SP:

$$\phi V_{nV2} := \phi_V \cdot (0.6 \cdot F_{ySP2}) \cdot (L_{VW2} \cdot t_{SP2})$$

$$\phi V_{nV2} = 1252.5 \cdot \text{kip}$$

$$r_{vV2} := \frac{V_{uV2}}{\phi V_{nV2}}$$

$$r_{vV2} = 10\%$$

- Tensile Strength of Vertical Leg of SP:

$$\phi T_{nV2} := \phi_t \cdot F_{ySP2} \cdot (L_{VW2} \cdot t_{SP2})$$

$$\phi T_{nV2} = 1878.8 \cdot \text{kip}$$

$$r_{tV2} := \frac{T_{uV2}}{\phi T_{nV2}}$$

$$r_{tV2} = 1\%$$

- Combined Tension & Shear Strength of Vertical Leg of SP:

$$r_{V2} := \left(\frac{T_{uV2}}{\phi T_{nV2}} \right) + \left(\frac{V_{uV2}}{\phi V_{nV2}} \right)^2$$

$$r_{V2} = 2\%$$

- Shear Strength of Horizontal Leg of SP:

$$\phi V_{nH2} := \phi_V \cdot (0.6 \cdot F_{ySP2}) \cdot (L_{HW2} \cdot t_{SP2})$$

$$\phi V_{nH2} = 180.0 \cdot \text{kip}$$

$$r_{vH2} := \frac{V_{uH2}}{\phi V_{nH2}}$$

$$r_{vH2} = 10\%$$

- Tensile Strength of Horizontal Leg of SP:

$$\phi T_{nH2} := \phi_t \cdot F_{ySP2} \cdot (L_{HW2} \cdot t_{SP2})$$

$$\phi T_{nH2} = 270.0 \cdot \text{kip}$$

$$r_{tH2} := \frac{T_{uH2}}{\phi T_{nH2}}$$

$$r_{tH2} = 44\%$$

- Combined Tension & Shear Strength of Horizontal Leg of SP:

$$r_{H2} := \left(\frac{T_{uH2}}{\phi T_{nH2}} \right) + \left(\frac{V_{uH2}}{\phi V_{nH2}} \right)^2$$

$$r_{H2} = 45\%$$

Output - Check Shear and Tensile Strength of Vertical SP Weld:

$$F_{w_v2} := 0.60 \cdot F_{EXX2} \cdot \left(1.0 + 0.50 \cdot \sin(\theta_v)\right)^{1.5}$$

$$F_{w_v2} = 42.0 \cdot \text{ksi}$$

$$F_{w_t2} := 0.60 \cdot F_{EXX2} \cdot \left(1.0 + 0.50 \cdot \sin(\theta_t)\right)^{1.5}$$

$$F_{w_t2} = 63.0 \cdot \text{ksi}$$

- Shear Strength of Vertical Weld:

$$A_{wV2} := (0.707 \cdot t_{VW2}) \cdot L_{VW2}$$

$$A_{wV2} = 7.38 \cdot \text{in}^2$$

$$\phi V_{nVW2} := 2 \cdot (\phi_w \cdot F_{w_v2} \cdot A_{wV2})$$

$$\phi V_{nVW2} = 465 \cdot \text{kip}$$

$$r_{vVW2} := \frac{V_{uV2}}{\phi V_{nVW2}}$$

$$r_{vVW2} = 26\%$$

- Tensile Strength of Vertical Weld:

$$\phi T_{nVW2} := 2 \cdot (\phi_w \cdot F_{w_t2} \cdot A_{wV2})$$

$$\phi T_{nVW2} = 697 \cdot \text{kip}$$

$$r_{tVW2} := \frac{T_{uV2}}{\phi T_{nVW2}}$$

$$r_{tVW2} = 3\%$$

- Combined Tension & Shear Strength of Vertical Weld:

$$r_{VW2} := \left(\frac{T_{uV2}}{\phi T_{nVW2}} \right) + \left(\frac{V_{uV2}}{\phi V_{nVW2}} \right)^2$$

$$r_{VW2} = 9\%$$

Output - Check Design Strength for Horizontal Reaction:

$$Z_2 := \begin{cases} (Z_{\text{shaft}} + Z_s) & \text{if Shape} = \text{"Round"} \\ \left(\frac{L_{VW2} \cdot t_{\text{shaft}}^2}{4} \right) & \text{otherwise} \end{cases}$$

$$Z_2 = 1.47 \cdot \text{in}^3$$

$$U_2 := \begin{cases} \left(\frac{Z_{\text{shaft}}}{Z_2} \right) & \text{if Shape} = \text{"Round"} \\ \text{"N/A"} & \text{otherwise} \end{cases}$$

$$U_2 = \text{"N/A"}$$

$$Q_{f2} := \begin{cases} [1 - 0.3 \cdot U_2 \cdot (1 + U_2)] & \text{if Shape} = \text{"Round"} \\ \text{"N/A"} & \text{otherwise} \end{cases}$$

$$Q_{f2} = \text{"N/A"}$$

$$\phi R_{nHshaft2} := \begin{cases} \phi_f \cdot \left[F_{y\text{Shaft}} \cdot (5.5) \cdot (t_{\text{shaft}}^2) \cdot \left(1 + \frac{L_{VW2}}{4 \cdot D_{o\text{Shaft}}} \right) \cdot Q_{f1} \right] & \text{if Shape} = \text{"Round"} \\ \phi_f \cdot \left[\frac{F_{y\text{Shaft}} \cdot Z_2 \cdot FW^2}{a_{\text{flat1}} \cdot (FW - a_{\text{flat1}})^2} \right] & \text{if Shape} = \text{"12"} \end{cases}$$

$$\phi R_{nHshaft2} = 178.7 \cdot \text{kip}$$

$$r_{Hshaft2} := \frac{T_{uV2}}{\phi R_{nHshaft2}}$$

$$r_{Hshaft2} = 10\%$$

Output - Check Design Shaft Punching Shear:

$$V_{uPS2} := T_u V_2$$

$$V_{uPS2} = 18.7 \cdot \text{kip}$$

$$\phi V_{n2} := \left[\phi_v \cdot (0.6 \cdot F_{y\text{Shaft}}) \cdot (t_{\text{shaft}} \cdot L_{VW2}) \right] \cdot 2$$

$$\phi V_{n2} = 1221.2 \cdot \text{kip}$$

$$r_{vPS2} := \frac{V_{uPS2}}{\phi V_{n2}}$$

$$r_{vPS2} = 2. \%$$

Output - Results Summary:

- Anchor Rods & Base Plate:

$$\text{result}_{AR} := \max(r_{AR})$$

$$\text{result}_{AR} = 69. \%$$

$$\text{result}_{BPL} := \begin{pmatrix} r_x \\ r_y \\ r_{BPL} \end{pmatrix}$$

$$\text{result}_{BPL} = \begin{pmatrix} 14 \\ 26 \\ 30 \end{pmatrix} \cdot \%$$

$$\text{MaxUtilization}_{AR_BPL} := \max(\text{result}_{AR}, \text{result}_{BPL})$$

$$\text{MaxUtilization}_{AR_BPL} = 69. \%$$

- SP on Left Side:

$$\text{result}_{SP1} := \begin{pmatrix} r_{cSP1} \\ r_{vV1} \\ r_{tV1} \\ r_{vV1} \\ r_{vH1} \\ r_{tH1} \\ r_{H1} \end{pmatrix}$$

$$\text{result}_{SP1} = \begin{pmatrix} 72 \\ 10 \\ 1 \\ 2 \\ 10 \\ 44 \\ 45 \end{pmatrix} \cdot \%$$

$$\text{result}_{SPweld1} := \begin{pmatrix} r_{vVw1} \\ r_{tVw1} \\ r_{Vw1} \end{pmatrix}$$

$$\text{result}_{SPweld1} = \begin{pmatrix} 26 \\ 3 \\ 9 \end{pmatrix} \cdot \%$$

$$\text{result}_{shaft1} := \begin{pmatrix} r_{Hshaft1} \\ r_{vPS1} \end{pmatrix}$$

$$\text{result}_{shaft1} = \begin{pmatrix} 10 \\ 2 \end{pmatrix} \cdot \%$$

$$\text{MaxUtilization}_{SP1} := \max(\text{result}_{SP1}, \text{result}_{SPweld1}, \text{result}_{shaft1})$$

$$\text{MaxUtilization}_{SP1} = 72. \%$$

- SP on Right Side:

$$\text{result}_{\text{SP2}} := \begin{pmatrix} r_{\text{cSP2}} \\ r_{\text{vV2}} \\ r_{\text{tV2}} \\ r_{\text{V2}} \\ r_{\text{vH2}} \\ r_{\text{tH2}} \\ r_{\text{H2}} \end{pmatrix} \quad \text{result}_{\text{SP2}} = \begin{pmatrix} 72 \\ 10 \\ 1 \\ 2 \\ 10 \\ 44 \\ 45 \end{pmatrix} \%$$

$$\text{result}_{\text{SPweld2}} := \begin{pmatrix} r_{\text{vVw2}} \\ r_{\text{tVw2}} \\ r_{\text{Vw2}} \end{pmatrix} \quad \text{result}_{\text{SPweld2}} = \begin{pmatrix} 26 \\ 3 \\ 9 \end{pmatrix} \%$$

$$\text{result}_{\text{shaft2}} := \begin{pmatrix} r_{\text{Hshaft2}} \\ r_{\text{vPS2}} \end{pmatrix} \quad \text{result}_{\text{shaft2}} = \begin{pmatrix} 10 \\ 2 \end{pmatrix} \%$$

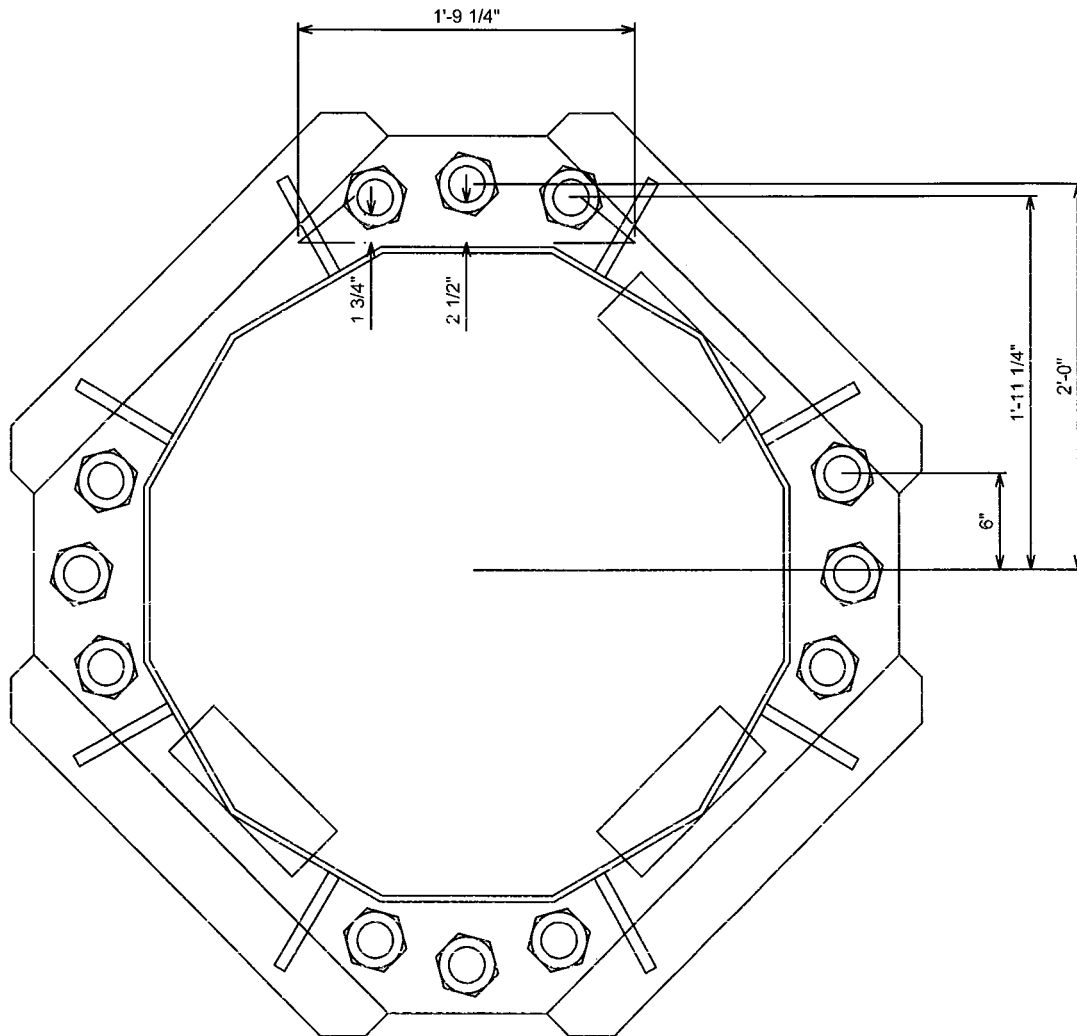
$$\text{MaxUtilization_SP2} := \max(\text{result}_{\text{SP2}}, \text{result}_{\text{SPweld2}}, \text{result}_{\text{shaft2}})$$

$$\text{MaxUtilization_SP2} = 72 \%$$

$$\text{MaxUtilization} := \max(\text{MaxUtilization_AR_BPL}, \text{MaxUtilization_SP1}, \text{MaxUtilization_SP2})$$

$$\text{MaxUtilization} = 72 \%$$

$t_{\text{SP1}} = 1.000 \cdot \text{in}$	$t_{\text{SP2}} = 1.000 \cdot \text{in}$
$b_{\text{SP1}} = 6.750 \cdot \text{in}$	$b_{\text{SP2}} = 6.750 \cdot \text{in}$
$L_{\text{SP1}} = 42.50 \cdot \text{in}$	$L_{\text{SP2}} = 42.50 \cdot \text{in}$



BASE PLATE LAYOUT

SCALE: 1" = 1'-0"

PROJECT INFORMATION:

SHELTON-NORTH SITE #: CT46133-A

162 BIRDSEYE ROAD
SHELTON, CT 06484
(FAIRFIELD COUNTY)

0	03-14-13	SBA
REV	DATE:	Issued For:

DRAWN BY: KCI CHECKED BY: JHW

SHEET NUMBER:

BP

REVISION:

0

VSI #: I30074

PLANS PREPARED FOR:



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PLANS PREPARED BY:



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BASE PLATE DESIGN, DEFORMATION METHOD (DIFFERENT AREAS)

Input - $M := 2091 \cdot \text{kip} \cdot \text{ft}$ = moment at top of flange plate
 $P := 23 \cdot \text{kip}$ = axial load (use zero if base plate is grouted)
 $F_y := 50 \cdot \text{ksi}$ = yield stress of base plate
 $b_{\text{eff}} := 21.25 \cdot \text{in}$ = effective width of base plate in flexure
 $t := 3.25 \cdot \text{in}$ = thickness of flange plate
 $\text{ASI} := 133 \cdot \%$ = allowable stress increase

$$Q := \begin{pmatrix} 2 \\ 4 \\ 4 \\ 2 \\ 0 \end{pmatrix} \quad d := \begin{pmatrix} 24 \\ 1 \cdot 12 + 11 + \frac{1}{4} \\ 6 \\ 0 \\ 0 \end{pmatrix} \cdot \text{in} \quad A_{\text{stiff}} := \begin{pmatrix} 3.98 \\ 3.98 \\ 3.98 \\ 3.98 \\ 0 \end{pmatrix} \text{in}^2 \quad A_{\text{stress}} := \begin{pmatrix} 3.25 \\ 3.25 \\ 3.25 \\ 3.25 \\ 0 \end{pmatrix} \text{in}^2 \quad F_t := \begin{pmatrix} 0.60 \cdot 75 \\ 0.60 \cdot 75 \\ 0.60 \cdot 75 \\ 0.60 \cdot 75 \\ 0 \end{pmatrix} \cdot \text{ksi}$$

$$\sum \overrightarrow{(Q)} = 12 \quad \text{sumQAd} := \sum \overrightarrow{(Q \cdot d^2 \cdot A_{\text{stiff}})} \quad \text{sumQAd} = 13764 \cdot \text{in}^4$$

$$R_w := \frac{M \cdot \overrightarrow{(d \cdot A_{\text{stiff}})}}{\text{sumQAd}} + \frac{P \cdot A_{\text{stiff}}}{\sum \overrightarrow{(A_{\text{stiff}} \cdot Q)}}$$

**Anchor
Rods =**

$$f_t := \left(\frac{R}{A_{\text{stress}}} \right) \quad r := \left(\frac{f_t}{\text{ASI} \cdot F_t} \right)$$

$$R = \begin{pmatrix} 176.1 \\ 170.6 \\ 45.5 \\ 1.9 \\ 0.0 \end{pmatrix} \cdot \text{kip} \quad f_t = \begin{pmatrix} 54.2 \\ 52.5 \\ 14.0 \\ 0.6 \\ 0.0 \end{pmatrix} \cdot \text{ksi} \quad r = \begin{pmatrix} 91 \\ 88 \\ 23 \\ 1 \\ 0 \end{pmatrix} \cdot \%$$

Q = quantity of fasteners

d = distance from center

A = area of fastener

Ft = allowable tension stress

$$\underline{\underline{m}} := \begin{pmatrix} 2.5 \\ 1.75 \\ 0 \\ 0 \\ 0 \end{pmatrix} \cdot \text{in}$$

$$M_{PL} := \overrightarrow{\left[\left(\frac{Q}{2} \right) \cdot R \cdot m \right]}$$

$$M_{PL} = \begin{pmatrix} 36.7 \\ 49.8 \\ 0.0 \\ 0.0 \\ 0.0 \end{pmatrix} \cdot \text{kip} \cdot \text{ft}$$

$$\sum M_{PL} = 1037.3 \cdot \text{kip} \cdot \text{in}$$

$$f_b := \frac{\sum M_{PL}}{\left(\frac{b_{\text{eff}} \cdot t^2}{6} \right)}$$

$$f_b = 27.7 \cdot \text{ksi}$$

$$F'_b := \text{ASI} \cdot 0.75 \cdot F_y$$

$$r_b := \frac{f_b}{F'_b}$$

Base Plate =

$$r_b = 56. \%$$

PAD FOUNDATION DESIGN FOR SELF-SUPPORTING POLE STRUCTURE: ANSI TIA-222-F

Inputs: Reactions

$M := 2091 \cdot \text{k} \cdot \text{ft}$ = Overturning moment at top of pier, unfactored
 $P := 23 \cdot \text{k}$ = Axial load at top of pier unfactored
 $V_w := 24 \cdot \text{k}$ = Shear load at top of pier unfactored

Inputs: Concrete

$B_{\text{pad}} := 22 \cdot \text{ft}$ = Pad width (and length)
 $B_{\text{pier}} := 0 \cdot \text{ft}$ = Pier diameter
 $H_w := 6 \cdot \text{in}$ = Distance from top of pier to top of grade
 $z_{\text{pad}} := 3.5 \cdot \text{ft}$ = Pad depth
 $t_{\text{pad}} := 4 \cdot \text{ft}$ = Pad thickness
 $f_c := 3000 \cdot \text{psi}$ = specified 28-day compressive strength
 $\gamma_c := 150 \cdot \text{pcf}$ = Density of concrete

CONSTANTS:

$\text{kip} \equiv 1000 \cdot \text{lbf}$ $\text{pcf} \equiv \frac{\text{lb}}{\text{ft}^3}$
 $\text{ksi} \equiv \frac{\text{kip}}{\text{in}^2}$ $\text{psf} \equiv \frac{\text{lb}}{\text{ft}^2}$
 $G \equiv 11200 \cdot \text{ksi}$
 $E \equiv 29000 \cdot \text{ksi}$ $k \equiv 1000 \cdot \text{lb}$
 $\Phi_s \equiv 0.75$

Inputs: Rebar and Anchorage

$d_{\text{tie}} := 0 \cdot \text{in}$ = diameter of tie in pier
 $d_{\text{vert}} := 0 \cdot \text{in}$ = diameter of verticals in pier
 $n_{\text{vert}} := 0$ = number of verticals in pier
 $d_{\text{hTop}} := 1.128 \cdot \text{in}$ = diameter of horizontal bars in top of pad
 $n_{\text{hTop}} := 23$ = number of horizontal bars in top of pad
 $d_{\text{hBot}} := 1.128 \cdot \text{in}$ = diameter of horizontal bars in bottom of pad
 $n_{\text{hBot}} := 23$ = number of horizontal bars in bottom of pad
 $\text{cover} := 3 \cdot \text{in}$ = distanced from outside of concrete to edge of rebar
 $\text{BC} := 48 \cdot \text{in}$ = bolt-circle diameter for anchor rods
 $d_{\text{template}} := 6 \cdot \text{in}$ = anchor rod template width
 $\text{embed} := 72 \cdot \text{in}$ = anchor rod embedment
 $f_y := 60 \cdot \text{ksi}$ = specified minimum yield strength of rebar

Inputs: Strength

$\Phi M_{n\text{Bot}} := 4376 \cdot \text{k} \cdot \text{ft}$ = nominal flexural resistance, positive moment [BM-FLEX_MnPadBot.xmcd (A-03)]
 $\Phi M_{n\text{Top}} := 4376 \cdot \text{k} \cdot \text{ft}$ = nominal flexural resistance, negative moment [BM-FLEX_MnPadTop.xmcd (A-03)]

Inputs: Soil

$q'_{\text{all}} := 6000 \cdot \text{psf}$ = Net allowable bearing pressure
 $\psi := 0.3$ = coefficient of friction

Output: Factored Reactions

$$M_u := 1.3 \cdot M \quad = \text{Overturning moment at top of pier, factored}$$

$$M_u = 2718 \cdot \text{k} \cdot \text{ft}$$

$$P_u := 1.3P \quad = \text{Axial load at top of pier, factored}$$

$$P_u = 30 \cdot \text{k}$$

$$V_u := 1.3V \quad = \text{Shear load at top of pier, factored}$$

$$V_u = 31 \cdot \text{k}$$

Output: Dead Loads

$$V_{\text{pad}} := B_{\text{pad}}^2 \cdot t_{\text{pad}}$$

$$D_{\text{pad}} := V_{\text{pad}} \cdot \gamma_c$$

$$D_{\text{pad}} = 290.4 \cdot \text{k}$$

Output: Eccentricity:

$$P_{\text{total}} := D_{\text{pad}} + P$$

$$P_{\text{total}} = 313.4 \cdot \text{k}$$

$$M_{\text{total}} := M + V \cdot (H + z_{\text{pad}})$$

$$M_{\text{total}} = 2187 \cdot \text{k} \cdot \text{ft}$$

$$\text{ecc} := \frac{M_{\text{total}}}{P_{\text{total}}}$$

$$\text{ecc} = 6.98 \text{ ft}$$

$$\text{limit} := \frac{B_{\text{pad}}}{6}$$

$$\text{limit} = 3.67 \text{ ft}$$

$$X := 3 \cdot \left(\frac{B_{\text{pad}}}{2} - \text{ecc} \right)$$

$$X = 12.07 \text{ ft}$$

Output: Bearing pressures, unfactored (bottom)

$$q_{\text{max1}} := \frac{P_{\text{total}}}{B_{\text{pad}}^2} + \frac{M_{\text{total}}}{\frac{B_{\text{pad}}^3}{6}}$$

$$q_{\text{max1}} = 1880 \cdot \text{psf}$$

$$q_{\text{max2}} := \frac{2 \cdot P_{\text{total}}}{3 \cdot B_{\text{pad}}^2 \cdot \left(0.5 - \frac{\text{ecc}}{B_{\text{pad}}} \right)}$$

$$q_{\text{max2}} = 2361 \cdot \text{psf}$$

$$q_{\text{max}} := \text{if} \left(\text{ecc} > \frac{B_{\text{pad}}}{6}, q_{\text{max2}}, q_{\text{max1}} \right)$$

$$q_{\text{max}} = 2361 \cdot \text{psf}$$

$$q_{\text{min1}} := \frac{P_{\text{total}}}{B_{\text{pad}}^2} - \frac{M_{\text{total}}}{\frac{B_{\text{pad}}^3}{6}}$$

$$q_{\text{min1}} = 1880 \cdot \text{psf}$$

$$B_{\text{cant}} := \frac{B_{\text{pad}} - B_{\text{pier}}}{2}$$

$$B_{\text{cant}} = 11.00 \text{ ft}$$

$$q_{\text{pier1}} := q_{\text{min1}} + (q_{\text{max1}} - q_{\text{min1}}) \cdot \frac{B_{\text{pad}} - B_{\text{cant}}}{B_{\text{pad}}}$$

$$q_{\text{pier2}} := q_{\text{max}} \cdot \left(\frac{X - B_{\text{cant}}}{X} \right)$$

$$q_{\text{pier}} := \text{if}(\text{ecc} < \text{limit}, q_{\text{pier1}}, \text{if}(q_{\text{pier2}} > 0, q_{\text{pier2}}, 0))$$

$$q_{\text{pier}} = 208 \cdot \text{psf}$$

$$q'_{\text{max}} := q_{\text{max}}$$

$$q'_{\text{max}} = 2361 \cdot \text{psf}$$

Calculate qu, Bottom

$$q_{u\text{Max}} := 1.3 \cdot (q_{\text{max}} - \gamma_c \cdot t_{\text{pad}})$$

$$q_{u\text{Max}} = 2290 \cdot \text{psf}$$

$$q_{u\text{Pier}} := 1.3 \cdot (q_{\text{pier}} - \gamma_c \cdot t_{\text{pad}})$$

$$q_{u\text{Pier}} = -509 \cdot \text{psf}$$

Calculate qu, Top

$$q_{u\text{Top}} := 1.3 \cdot (\gamma_c \cdot t_{\text{pad}})$$

$$q_{u\text{Top}} = 780 \cdot \text{psf}$$

Calculate shear nominal resistances

$$A_{\text{pier}} := \frac{\pi \cdot B_{\text{pier}}^2}{4}$$

$$A_{\text{pier}} = 0 \cdot \text{in}^2$$

$$\Phi V_{c\text{Pier}} := 0.85 \cdot 2 \cdot \sqrt{\frac{f'_c}{\text{psi}}} \cdot \frac{A_{\text{pier}}}{\text{in}^2} \cdot 1 \text{ k}$$

$$\Phi V_{c\text{Pier}} = 0 \cdot \text{k}$$

$$d_{\text{Bot}} := t_{\text{pad}} - \text{cover} - 1.5 \cdot d_{h\text{Bot}}$$

$$d_{\text{Bot}} = 43.31 \cdot \text{in}$$

$$\Phi V_{c\text{Pad}} := 0.85 \cdot 2 \cdot \sqrt{\frac{f'_c}{\text{psi}}} \cdot \left(\frac{B_{\text{pad}}}{1 \cdot \text{in}} \cdot \frac{d_{\text{Bot}}}{1 \cdot \text{in}} \right) \cdot 1 \text{ k}$$

$$\Phi V_{c\text{Pad}} = 1065 \cdot \text{k}$$

Calculate Factored Forces in Pad, Postive:

$$R_r := \text{if}(q_{u\text{Pier}} > 0 \cdot \text{psf}, q_{u\text{Pier}} \cdot B_{\text{pad}} \cdot B_{\text{cant}}, 0)$$

$$R_r = 0 \cdot \text{k}$$

$$R_t := \text{if}\left[X < B_{\text{cant}}, \frac{1}{2} \cdot q_{u\text{Max}} \cdot X \cdot B_{\text{pad}}, \frac{1}{2} \cdot (q_{u\text{Max}} - q_{u\text{Pier}}) \cdot B_{\text{cant}} \cdot B_{\text{pad}}\right]$$

$$R_t = 338.66 \cdot \text{k}$$

$$M_{uR} := R_r \cdot \frac{B_{\text{cant}}}{2}$$

$$M_{uT} := \text{if}\left[X > B_{\text{cant}}, R_t \cdot \frac{2}{3} \cdot B_{\text{cant}}, R_t \cdot \left(B_{\text{cant}} - \frac{X}{3}\right)\right]$$

$$M_{u\text{Bot}} := M_{uR} + M_{uT}$$

$$M_{u\text{Bot}} = 2484 \cdot \text{k} \cdot \text{ft}$$

$$V_{u\text{Bot}} := R_r + R_t$$

$$V_{u\text{Bot}} = 339 \cdot \text{k}$$

Calculate Factored Forces in Pad, Negative:

$$M_{u\text{Top}} := q_{u\text{Top}} \cdot B_{\text{cant}} \cdot B_{\text{pad}} \cdot \frac{B_{\text{cant}}}{2}$$

$$M_{u\text{Top}} = 1038 \cdot \text{k} \cdot \text{ft}$$

$$V_{u\text{Top}} := q_{u\text{Top}} \cdot B_{\text{cant}} \cdot B_{\text{pad}}$$

$$V_{u\text{Top}} = 189 \cdot \text{k}$$

Calculate Overturning Stability:

$$OTM_{total} := M + V \cdot (H + z_{pad})$$

$$OTM_{total} = 2187 \cdot k \cdot ft$$

$$OTM_r := P_{total} \cdot \frac{B_{pad}}{2}$$

$$OTM_r = 3447 \cdot k \cdot ft$$

Calculate Sliding Stability:

$$H_{total} := V$$

$$H_{total} = 24 \cdot k$$

$$H_r := (D_{pad} + P) \cdot \psi$$

$$H_r = 94 \cdot k$$

Design Checks, Soil:

$$r_{q'} := \frac{q'_{max}}{q'_{all}}$$

Net Bearing Pressure

$$r_{q'} = 39\%$$

$$r_{OTM} := \frac{OTM_{total}}{\frac{OTM_r}{1.5}}$$

Overturning Stability

$$r_{OTM} = 95\%$$

$$r_H := \frac{H_{total}}{\frac{H_r}{2.0}}$$

Sliding Stability

$$r_H = 51\%$$

Design Checks, Pad Structure:

$$r_{mBot} := \frac{M_{uBot}}{\Phi M_{nBot}}$$

$$r_{mBot} = 57\%$$

$$r_{vBot} := \frac{V_{uBot}}{\Phi V_{cPad}}$$

$$r_{vBot} = 32\%$$

$$r_{mTop} := \frac{M_{uTop}}{\Phi M_{nTop}}$$

$$r_{mTop} = 24\%$$

$$r_{vTop} := \frac{V_{uTop}}{\Phi V_{cPad}}$$

$$r_{vTop} = 18\%$$

Design Checks, Pad Serviceability:

$$r_{sPad} := \frac{0.0018 \cdot B_{pad} \cdot t_{pad}}{n_{hTop} \cdot \frac{\pi \cdot d_{hTop}^2}{4} + n_{hBot} \cdot \frac{\pi \cdot d_{hBot}^2}{4}}$$

$$r_{sPad} = 50\%$$

62 Birdseye Road

Shelton

Alcatel-Lucent 

RECEIVED
JUL 10 2014

1 Robbins Road
Westford, MA 01886

July 9, 2014

State of Connecticut
Connecticut Siting Council
10 Franklin Square
New Britain, CT 06051

CONNECTICUT
SITING COUNCIL

RE: Notification of Construction Completion on telecommunication facilities

To whom it may concern:

Alcatel Lucent hereby acknowledges that the list of attached sites have completed construction per the approval granted on the specified date. Please advise if further information is needed..

Very truly yours,

Martha Powers

Martha Powers
Lead Development Manager
Alcatel-Lucent
Sprint Vision Project
1 Robbins Road
Westford, MA 01886

Cc: FST, Siterra

EM/TS #	Address	Town	Sprint ID	Decision Date
EM-SPRINT-062-130912	1065 Wintergreen Avenue	Hamden	CT03XC003	10/15/2013
EM-SPRINT-NEXTEL-060-130118	10 Tanner Marsh Road	Guilford	CT03XC022	2/14/2013
EM-SPRINT-004-130822	181 Montevideo Road	Avon	CT03XC053	9/6/2013
EM-SPRINT-NEXTEL-155-130214	1358 New Britain Ave.	West Hartford	CT03XC057	3/1/2013
EM-SPRINT-NEXTEL-164-130201	440 Hayden Station Road	Windsor	CT03XC065	3/8/2013
EM-SPRINT-NEXTEL-132-130201	59 McGuire Road	South Windsor	CT03XC066	3/1/2013
EM-SPRINT-NEXTEL-054-130201	299 Paxton Way	Glastonbury	CT03XC081	3/1/2013
EM-SPRINT-NEXTEL-094-130214	36 Prospect Street	Newington	CT03XC084	3/1/2013
EM-SPRINT-110-130725	10 Sparks Street	Plainville	CT03XC086	8/8/2013
EM-SPRINT-007-130314	260 Beckley Road	Kensington	CT03XC088	4/5/2013
EM-SPRINT-NEXTEL-155-130201	570 New Park Avenue	West Hartford	CT03XC091	3/1/2013
EM-SPRINT-NEXTEL-106-130201	430 Middlesex Turnpike	Old Saybrook	CT03XC102	3/1/2013
EM-SPRINT-NEXTEL-105-130201	30 Short Hills Road	Old Lyme	CT03XC104	3/1/2013
EM-SPRINT-NEXTEL-152-130201	41 Manitock Hill Road	Waterford	CT03XC105	3/1/2013
EM-SPRINT-NEXTEL-045-130201	93 Roxbury Road	East Lyme	CT03XC110	3/1/2013
EM-SPRINT-152-130114	45R Fargo Road	Waterford	CT03XC112	2/14/2013
EM-SPRINT-NEXTEL-027-130201	48 Cow Hill Road	Clinton	CT03XC156	3/1/2013
EM-SPRINT-NEXTEL-082-130201	238 Meridan Road	Middlefield	CT03XC160	3/8/2013
EM-SPRINT-047-130109	160 Plantation Road	East Windsor	CT03XC202	2/7/2013
EM-SPRINT-NEXTEL-077-130214	53 Slater Street	Manchester	CT03XC211	3/1/2013
EM-SPRINT-142-130109	497 Old Post Road	Tolland	CT03XC212	2/7/2013
EM-SPRINT-NEXTEL-042-130222	94 East High Street	East Hampton	CT03XC335	3/8/2013
EM-SPRINT-057-121226	Butternut Hollow Road	Greenwich	CT03XC343	1/11/2013
EM-SPRINT-158-130213	515 Boston Post Road	Westport	CT03XC355	3/1/2013
EM-SPRINT-046-130402	206 Everett Road	Easton	CT03XC362	4/19/2013
EM-SPRINT-085-130322	474 MAIN STREET	MONROE	CT03XC365	4/5/2013
EM-SPRINT-086-131011	57 Cook Drive	Montville	CT03XC365	10/25/2013
EM-SPRINT-118-130322	76 EAST RIDGE	RIDGEFIELD	CT03XC370	4/5/2013
EM-SPRINT-097-131230	20 Barnabas Road	Newtown	CT03XC383	1/21/2014
EM-SPRINT-051-130207	3965 Congress Street	Fairfield	CT03XC385	3/1/2013
EM-SPRINT-NEXTEL-094-130214	123 Costello Road	Newington	CT23XC555	3/1/2013
EM-SPRINT-119-131008	699 Old Main Street	Rocky Hill	CT23XC556	10/25/2013
EM-SPRINT-077-131008	60 Adams Street	Manchester	CT23XC557	10/25/2013
EM-SPRINT-NEXTEL-080-130123	462 West Main Street	Meriden	CT25XC840	2/14/2013
EM-SPRINT-096-130920	18 Hilltop View Lane	New Milford	CT33XC095	10/4/2013
EM-SPRINT-157-130213	237 Godfrey Road	Weston	CT33XC522	3/1/2013
EM-SPRINT-018-131008	20 Vale Road	Brookfield	CT33XC525	10/25/2013
EM-SPRINT-077-130528	595 Keeney Street	Manchester	CT33XC538	6/14/2013
EM-SPRINT-NEXTEL-129-130214	400 Main Street	Somers	CT33XC554	3/1/2013
EM-SPRINT-047-130322	15 CHAMBERLAIN	BROADBROOK	CT33XC565	4/5/2013
EM-SPRINT-004-130502	277 Huckleberry Road	Avon	CT33XC589	5/17/2013

EM-SPRINT-143-130604	218 Wheeler Road	Torrington	CT33XC592	6/28/2013
EM-SPRINT-140-130724	583 Chapel Street	Thomaston	CT33XC603	8/8/2013
EM-SPRINT-103-130920	Charles Marshall Drive	Norwalk	CT33XC802	10/4/2013
EM-SPRINT-NEXTEL-064-130214	439-455 Homestead Ave.	Hartford	CT43XC805	3/1/2013
EM-SPRINT-064-130311	99 Meadow Street	Hartford	CT43XC806	4/5/2013
EM-SPRINT-083-131127	290 Preston Ave.	Middletown	CT43XC816	12/16/2013
EM-SPRINT-128-130920	530 Bushy Hill Road	Simsbury	CT43XC825	10/4/2013
EM-SPRINT-164-130405A	340 Bloomfield Avenue	Windsor	CT43XC826	4/19/2013
EM-SPRINT-077-130109	239 Middle Turnpike	Manchester	CT43XC827	2/13/2013
EM-SPRINT-165-130118	2-4 Volunteer Drive	Windsor Locks	CT43XC828	2/14/2013
EM-SPRINT-NEXTEL-139-130214	44 Fyler Place	Suffield	CT43XC829	3/8/2013
EM-SPRINT-111-130712	171 Town Hill Road	Plymouth	CT54XC712	7/26/2013
EM-SPRINT-009-130322	38 Spring Hill Road	Bethel	CT54XC749	4/5/2013
EM-SPRINT-154-131011	315 Spencer Plains Road	Westbrook	CT54XC758	10/25/2013
EM-SPRINT-023-130405	14 Canton Springs Road	Canton	CT54XC760	4/19/2013
EM-SPRINT-104-130606	153 Old Salem Road	Norwich	CT54XC775	6/28/2013
EM-SPRINT-164-130405B	99 Day Hill Road	Windsor	CT54XC787	4/19/2013
EM-SPRINT-132-130920	300 Governor's Highway	South Windsor	CT60XC014	10/4/2013
EM-SPRINT-094-130108	605 Willard Avenue	Newington	CT60XC018	1/25/2013
EM-SPRINT-146-130506	197 South Street	Vernon	CT60XC935	5/24/2013
EM-SPRINT-146-130311	777 Talcottville Road	Vernon	CT70XC147	4/5/2013
EM-SPRINT-126-130531	62 Birdseye Road	Shelton	CT73XC004	6/21/2013

Site ID		CT73XC004 - Shelton North															
Site Addresss		162 Birdseye Road, Shelton, CT 06484															
Site Type		Monopole															
Sector 1																	
Antenna Number	Antenna Make	Antenna Model	Radio Type	Frequency Band	Technology	Power Out Per Channel (Watts)	Number of Channels	Composite Power	Antenna Gain in direction of sample point (dBd)	Antenna Height (ft)	analysis height	Cable Size	Cable Loss (dB)	Additional Loss	ERP	Power Density Value	Power Density Percentage
1a	RFS	APXVSPP18-C-A20	RRH	1900 MHz	CDMA / LTE	20	2	40	15.9	118.3	112.3	1/2 "	0.5	0	1386.9474	39.53725	3.95372%
1a	RFS	APXVSPP18-C-A20	RRH	850 MHz	CDMA / LTE	20	1	20	13.4	118.3	112.3	1/2 "	0.5	0	389.96892	11.11671	1.96062%
Sector total Power Density Value:																5.914%	
Sector 2																	
Antenna Number	Antenna Make	Antenna Model	Radio Type	Frequency Band	Technology	Power Out Per Channel (Watts)	Number of Channels	Composite Power	Antenna Gain in direction of sample point (dBd)	Antenna Height (ft)	analysis height	Cable Size	Cable Loss (dB)	Additional Loss	ERP	Power Density Value	Power Density Percentage
2a	RFS	APXVSPP18-C-A20	RRH	1900 MHz	CDMA / LTE	20	2	40	15.9	118.3	112.3	1/2 "	0.5	0	1386.9474	39.53725	3.95372%
2a	RFS	APXVSPP18-C-A20	RRH	850 MHz	CDMA / LTE	20	1	20	13.4	118.3	112.3	1/2 "	0.5	0	389.96892	11.11671	1.96062%
Sector total Power Density Value:																5.914%	
Sector 3																	
Antenna Number	Antenna Make	Antenna Model	Radio Type	Frequency Band	Technology	Power Out Per Channel (Watts)	Number of Channels	Composite Power	Antenna Gain in direction of sample point (dBd)	Antenna Height (ft)	analysis height	Cable Size	Cable Loss (dB)	Additional Loss	ERP	Power Density Value	Power Density Percentage
3a	RFS	APXVSPP18-C-A20	RRH	1900 MHz	CDMA / LTE	20	2	40	15.9	118.3	112.3	1/2 "	0.5	0	1386.9474	39.53725	3.95372%
3a	RFS	APXVSPP18-C-A20	RRH	850 MHz	CDMA / LTE	20	1	20	13.4	118.3	112.3	1/2 "	0.5	0	389.96892	11.11671	1.96062%
Sector total Power Density Value:																5.914%	

Site Composite MPE %	
Carrier	MPE %
Sprint	17.743%
AT&T	24.520%
Nextel	3.920%
Verizon Wireless	48.530%
Total Site MPE %	94.713%

OWNERSHIP OF DOCUMENTS: THIS DOCUMENT AND THE IDEAS AND DESIGNS INCORPORATED HEREIN, AS AN INSTRUMENT OF PROFESSIONAL SERVICE, ARE THE PROPERTY OF KMB DESIGN GROUP, LLC AND ARE NOT TO BE USED, IN WHOLE OR IN PART, FOR OTHER PROJECTS WITHOUT THE WRITTEN AUTHORIZATION OF KMB DESIGN GROUP, LLC. IT IS UNLAWFUL FOR ANY PERSON TO AMEND ANY ASPECT OF THESE DRAWINGS UNLESS THEY HAVE THE APPROVAL OF THE LICENSED PROFESSIONAL IN WRITING.

GENERAL CONSTRUCTION NOTES:

1. This set of plans has been prepared for the purposes of municipal and agency review and approval. This set of plans shall not be utilized as construction documents until all drawings have been revised to indicate "ISSUED FOR CONSTRUCTION." Contractor shall e-mail plans@kmbdg.com to ensure that they have the latest set of construction drawings prior to commencing any work whatsoever.
2. ADA compliance: The facility is a normally unoccupied mobile radio facility.
3. These plans are intended to be used to direct the proposed layout. Drawings should not be scaled unless otherwise noted. Plans, elevations and details are intended to show the end result of design. Minor modifications may be required to suit job dimensions or conditions.
4. The contractor shall verify all dimensions and conditions and notify the Project Manager of any discrepancies before starting any work.
5. These plans are designed to reflect observed field conditions. Certain conditions are assumed to comply with general standard construction design methods and principles, and the Contractor shall note that not all areas of structural attachment have been opened or specifically verified. The Contractor is therefore requested to notify the Engineer immediately should encountered field conditions vary from those depicted on the drawings. KMB Design Group, LLC will issue field change direction if required. The Project Manager is referenced on the cover sheet.
6. All equipment and materials shall be installed in accordance with the manufacturer's recommendations unless otherwise noted by the Engineer of Record.
7. The Contractor shall be responsible for all work performed and materials installed to be in strict conformance, as a minimum standard, with all applicable codes, regulations and ordinances having jurisdiction. Electrical systems shall be installed in conformance with the National Electrical Code, and all other local and state jurisdictional codes, ordinances, and with local utility company specifications, whichever is more stringent.
8. The Contractor shall keep contract area clean, hazard free and dispose of all dirt, stumps, stones, rubbish or debris in accordance with all local and environmental laws. No materials or equipment shall be placed anywhere on or in the structure without making adequate provisions to protect existing property. Upon completion, repair any damage that may have occurred during construction. Repair all existing wall surfaces damaged during construction such that they match and blend with adjacent surfaces.
9. The Contractor shall be solely responsible and have control over construction means, methods, techniques, sequences, and procedures.

SPRINT SPECIFICATIONS:

1. Contractor shall ensure that they obtain the latest copy of the following documents from ALU:
 - A. Cell Site Installation & De-Installation Services - Attachment G-1
 - B. Sprint Integrated Construction Standards for Wireless Sites
 - C. Standard Construction Specifications for Wireless Sites
2. Contractor shall notify the Engineer immediately if any of the Sprint standards contradict the standards provided by KMB Design Group, LLC so that the Engineer can provide direction.
3. State, Federal and Local codes prevail.

DIVISION 1 - GENERAL REQUIREMENTS SECTION 01010 SUMMARY OF WORK:

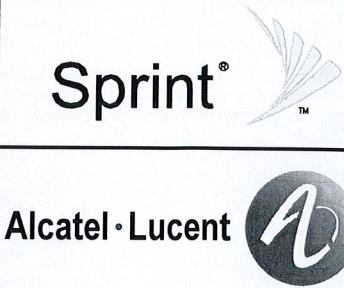
1. The Contractor shall review and become familiar with specifications contained in the bid package prepared by KMB Design Group, LLC and the client. The Contractor shall e-mail plans@kmbdg.com to ensure that they have the latest set of construction drawings prior to commencing any work whatsoever.
2. In the event of a conflict between the bid package specifications and these notes, the provisions of the clients specifications shall take precedence.
3. The Contractor shall visit the site of the proposed work and fully acquaint themselves with the conditions as they exist in order that any restrictions pertaining to the work are understood. All areas and dimensions are indicated on the drawings as accurately as possible, but all conditions shall be verified by each contractor and/or subcontractor at the site. The failure of the contractor to examine or receive any form, instrument or document, or to visit the site shall not relieve the Contractor from any obligation with respect to their quoted price. The submission of a quotation shall acknowledge that the Contractor and their Subcontractors have fully examined the site and know the existing conditions and have made provisions for operating under the conditions as they exist at the site and have included all necessary items.
4. The General Contractor's responsibilities shall include, but not be limited to, construction of the equipment foundation, including electrical service, telephone conduits, grounding system and coordination with local utility companies.
5. The antenna installers responsibilities shall include, but not be limited to, cable tray installation, routing of cables from radio equipment to antennas, associated hardware for securing antenna cables, antenna mounts, determining supplier of antennas, grounding of antennas to grounding system, installing antennas and verifying with Radio Frequency Engineers, the alignment, location, and proper orientation of antennas.
6. The Contractors shall coordinate construction activities with the building Landlord in order to avoid conflicts with current use of the site.
7. The Owner may have work performed under separate contracts, concurrently, with the work of this contract.
8. The General Contractor shall permit access to the project to these contractors to perform their work.
9. The Contractor shall conform to all applicable local, county, state, and federal codes, laws and requirements, including OSHA.
10. The Contractor shall apply and pay for the construction permit, certificate of occupancy and all other required permits or licenses. The Contractor is responsible for obtaining all inspections.
11. Care shall be exercised in protecting the building occupants during the demolition and construction periods of this project. Every effort shall be made to maintain a clean operation. Debris shall not accumulate. All debris will be deposited in a suitable container on a daily basis and shall be emptied on a regular schedule. The location of the container shall be coordinated with the Building Manager.
12. Safety procedures: Attention is directed to federal, state, and local laws, rules and regulations concerning construction safety and health standards. The construction company awarded this project shall ensure all working surroundings and conditions are sanitary, and are not hazardous or dangerous to the health or safety of the work crews or building occupants. Precaution shall be exercised at all times for the protection of persons and property. It is mandatory that the safety provisions of applicable local laws, OSHA regulations and building and construction codes, be observed for all contractors and antenna riggers.
13. The General Contractor must coordinate all roof related work with the Landlord's pre-approved roofer. The General Contractor must confirm the compatibility of all materials and ensure that all existing roof warranties, if any, remain in effect.

SECTION 01613 - DELIVERY, STORAGE AND HANDLING:

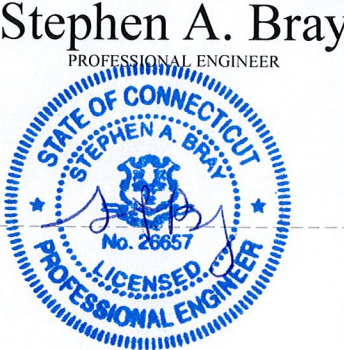
1. The Contractor shall be responsible for all procedures and scheduling associated with hoisting, staging, and erecting of materials and equipment to and/or upon the site.
2. All elements of the existing site, i.e. structures, site plantings, etc. shall be protected as necessary from said actions. This work must be done in a safe, secure nondestructive manner for protecting personnel and property.

SECTION 01740 WARRANTIES AND BONDS:

1. The Contractor shall guarantee all labor and materials used in this project for a minimum period of one (1) year commencing from the date of final acceptance by the client. The Contractor is not required to guarantee material supplied by the Owner.
2. Final date of acceptance is deemed as the date that all required state and federal approval have been obtained including, but not limited to:
 - A. Final inspection
 - B. Certificate of Occupancy
3. Any deficiencies that come evident during this one (1) year period shall be corrected by the Contractor at the Contractor's expense.



△				
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△	05-21-13	REVISED PER CLIENT COMMENTS	JRF	KCD
△	03-27-13	ISSUED FOR CONSTRUCTION	DTP	KCD
REV.	DATE	REVISION DESCRIPTION	DRAWN BY	CHKD. BY



CT LICENSE: 26657 5/21/13

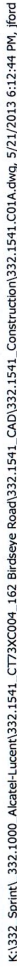
PROJECT NUMBER: 332.1541		
SITE INFORMATION: 162 BIRDSEYE ROAD SHELTON, CT 06484 FAIRFIELD COUNTY CT73XC004		
DESIGN TYPE: RAW LAND		
DRAWN BY: CCR	CHECKED BY:	DATE: 04-09-12
SHEET TITLE: GENERAL NOTES 1 OF 2		
SHEET NUMBER: C01		REV.: 1

11. All back fill shall be compacted to 95% modified proctor density as determined by ASTM standard test procedures.

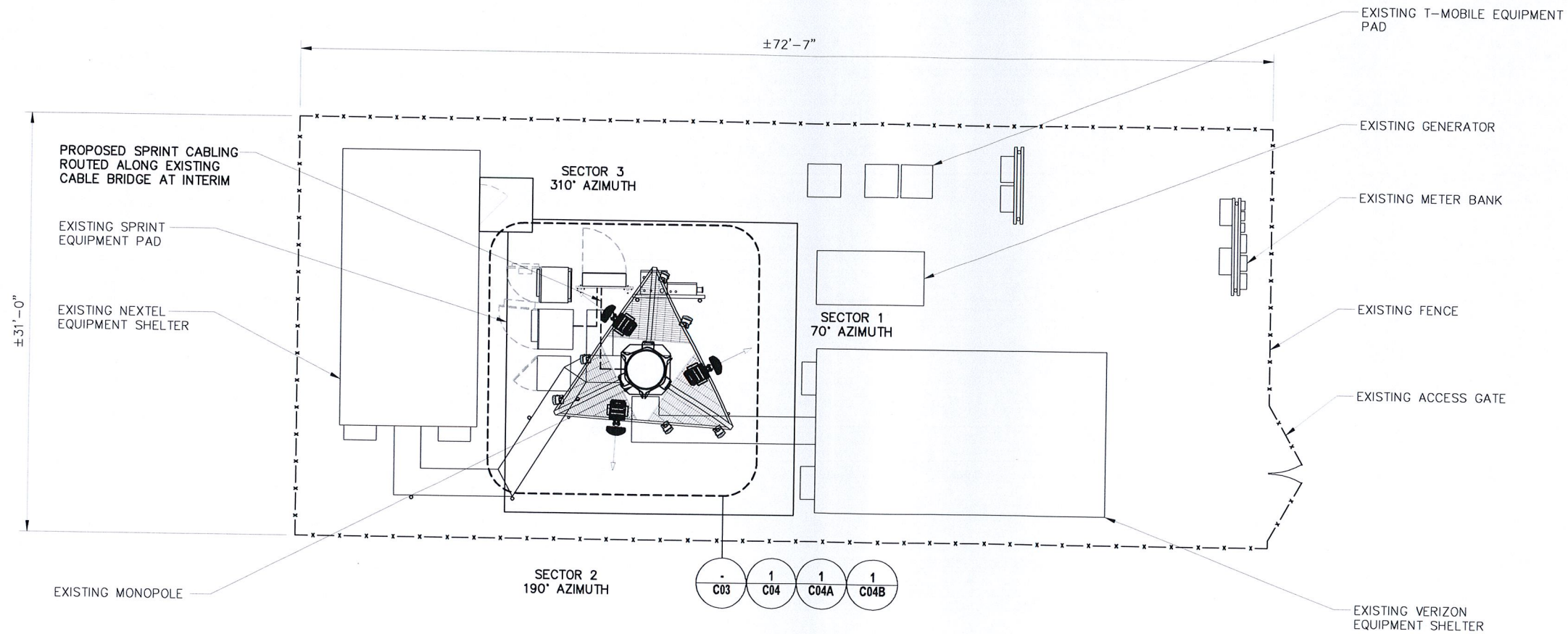
20. For cold -weather and hot-weather concrete placement, conform to applicable ACI codes and recommendations. In either case, materials containing chloride, calcium, salts, etc. shall not be used. Protect fresh concrete from weather for 7 days minimum.

4. Inspections:

- A. All structural steel antenna frames, and connections shall be inspected prior to installation of antennas.
- B. All antenna cable trays, supports, channels and clamps shall be inspected prior to installation of antenna cables.
- C. Coordinate all inspections with the client's Construction Manager.
- D. Contractor to make notifications 72 hours prior to any required inspections.



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- CABLING NOTES:**
1. PROPOSED CABLING TO FOLLOW EXISTING ROUTE AND METHOD OF ATTACHMENT AT INTERIM.
 2. EXISTING COAXIAL CABLES TO BE REMOVED AT FINAL.
 3. CONTRACTOR TO REPAIR/REPLACE ANY MISSING/DAMAGED CABLE TRAY AND ADD HURRICANE STRAPS AS REQUIRED IF APPLICABLE.
- GENERAL NOTES:**
1. FINAL ANTENNA & EQUIPMENT CONFIGURATION SHOWN ON THIS PLAN. SEE EQUIPMENT & ANTENNA PLAN SHEETS FOR EXISTING AND INTERIM CONFIGURATION.
 2. CONTRACTOR TO REPLACE ALL MISSING GROUND BARS AND GROUNDING CONNECTIONS AS REQUIRED IN ACCORDANCE WITH SPRINT GROUNDING AND ANTI-THEFT GUIDELINES. CONTRACTOR SHALL PROVIDE BEFORE & AFTER PHOTOS.
 3. CONTRACTOR TO RESTORE ANY RUST AREA TO ORIGINAL CONDITION AND PROTECTIVE COATING TO BE APPLIED.
 4. STRUCTURAL ANALYSIS PROVIDED UNDER SEPARATE COVER.

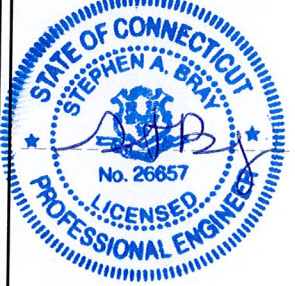
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1	05-21-13	REVISED PER CLIENT COMMENTS	JRF	KCD
0	03-27-13	ISSUED FOR CONSTRUCTION	DTP	KCD
REV.	DATE	REVISION DESCRIPTION	DRAWN BY	CHKD. BY

KMB
DESIGN GROUP
kmbdg.com
1800 ROUTE 34, SUITE 209
WALL, NJ 07719
(732) 280-5623

Stephen A. Bray
PROFESSIONAL ENGINEER



CT LICENSE: 26657 5/21/13

PROJECT NUMBER: **332.1541**

SITE INFORMATION:
162 BIRDSEYE ROAD
SHELTON, CT 06484
FAIRFIELD COUNTY
CT73XC004

DESIGN TYPE: **RAW LAND**

DRAWN BY: **CCR** CHECKED BY: DATE: **04-09-12**

SHEET TITLE: **COMPOUND PLAN**

SHEET NUMBER: **C02** REV.: **1**



1 **COMPOUND PLAN**

11x17 SCALE: 1" = 10' 24x36 SCALE: 1" = 5'

K:\332_Sprint\332.1000_Alcatel-Lucent\332.1541_CT73XC004_162 Birdseye Road\332.1541_CAD\332.1541_Construction\332.1541_C02.dwg, 5/21/2013 6:12:51 PM, jford

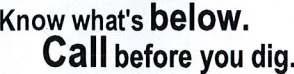


11x17 SCALE: 1" = 20' 24x36 SCALE: 1" = 10'

NOTES:

1. CONTRACTOR TO VERIFY ALL TOWER MODIFICATIONS HAVE BEEN COMPLETED AS PER VERTICAL SOLUTIONS STRUCTURAL ANALYSIS REPORT PRIOR TO CONSTRUCTION.
2. CONTRACTOR TO REPLACE ALL MISSING GROUND BARS AND GROUNDING CONNECTIONS AS REQUIRED IN ACCORDANCE WITH SPRINT GROUNDING AND ANTI-THEFT GUIDELINES. CONTRACTOR SHALL PROVIDE BEFORE & AFTER PHOTOS.
3. ALL STRUCTURAL MODIFICATIONS CONTAINED WITHIN THE MODIFICATION DESIGN BY VERTICAL SOLUTIONS ARE TO BE COMPLETED PRIOR TO ANY WORK BEING COMPLETED.





APPROVALS		APPROVED	APPROVED AS NOTED	DISAPPROVED REVISE
ALU CONSTRUCTION	DATE	☐	☐	☐
ALU RF	DATE	☐	☐	☐
ALU LEASING	DATE	☐	☐	☐
SITE OWNER/LANDLORD	DATE	☐	☐	☐

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SITE ID: CT73XC004
SITE NAME: SHELTON-NORTH

THE STRUCTURAL ENGINEERING CONCERNING THE STRUCTURAL STABILITY OF THE TOWER/POLE, FOUNDATION, ANTENNAS, MOUNTS AND ALL ASSOCIATED ANCILLARY RADIO EQUIPMENT IS BEING COMPLETED BY OTHERS. KMB DESIGN GROUP, LLC HAS NOT BEEN REQUESTED TO PERFORM ANY STRUCTURAL ANALYSIS SERVICES TO VERIFY THAT THE TOWER/POLE AND/OR FOUNDATION IS CAPABLE OF SUPPORTING THE PROPOSED EQUIPMENT DEPICTED WITHIN THESE SIGNED AND SEALED DRAWINGS. FURTHERMORE KMB DESIGN GROUP, LLC HAS NOT BEEN REQUESTED TO PHYSICALLY CONFIRM THE EXISTING MOUNT CONFIGURATION AND PERFORM A STRUCTURAL ANALYSIS TO VERIFY THAT THE EXISTING, INTERIM AND PROPOSED ANTENNAS, MOUNTS AND ALL ASSOCIATED ANCILLARY RADIO EQUIPMENT CAN BE SAFELY SUPPORTED. SIGNED AND SEALED DRAWINGS REVISED TO STATE "ISSUED FOR CONSTRUCTION" SHALL BE PROVIDED TO THE PROFESSIONAL ENGINEERS RESPONSIBLE FOR THE STRUCTURAL ANALYSIS OF THE TOWER/POLE, ANTENNAS, MOUNTS AND ALL ASSOCIATED ANCILLARY RADIO EQUIPMENT. KMB DESIGN GROUP, LLC SHALL BE NOTIFIED SHOULD THE STRUCTURAL ANALYSIS RESULT IN SOME ELEMENTS NOT BEING STRUCTURALLY CAPABLE OF SUPPORTING THE PROPOSED DESIGN DEPICTED. THE CONTRACTOR SHALL NOT COMMENCE CONSTRUCTION WITHOUT OBTAINING (A) A SIGNED AND SEALED COPY OF THE PLANS "ISSUED FOR CONSTRUCTION"; (B) STRUCTURAL ANALYSIS REPORT STATING THAT THE TOWER/POLE/FOUNDATION IS CAPABLE OF SUPPORTING THE PROPOSED LOADING REFERENCING THE SIGNED AND SEALED PLANS BY KMB DESIGN GROUP, LLC; (C) SPRINT PLATFORM ANALYSIS STATING THAT THE SPRINT PLATFORM IS CAPABLE OF SUPPORTING THE PROPOSED DESIGN AS REFERENCED WITHIN THE SIGNED AND SEALED PLANS BY KMB DESIGN GROUP, LLC.

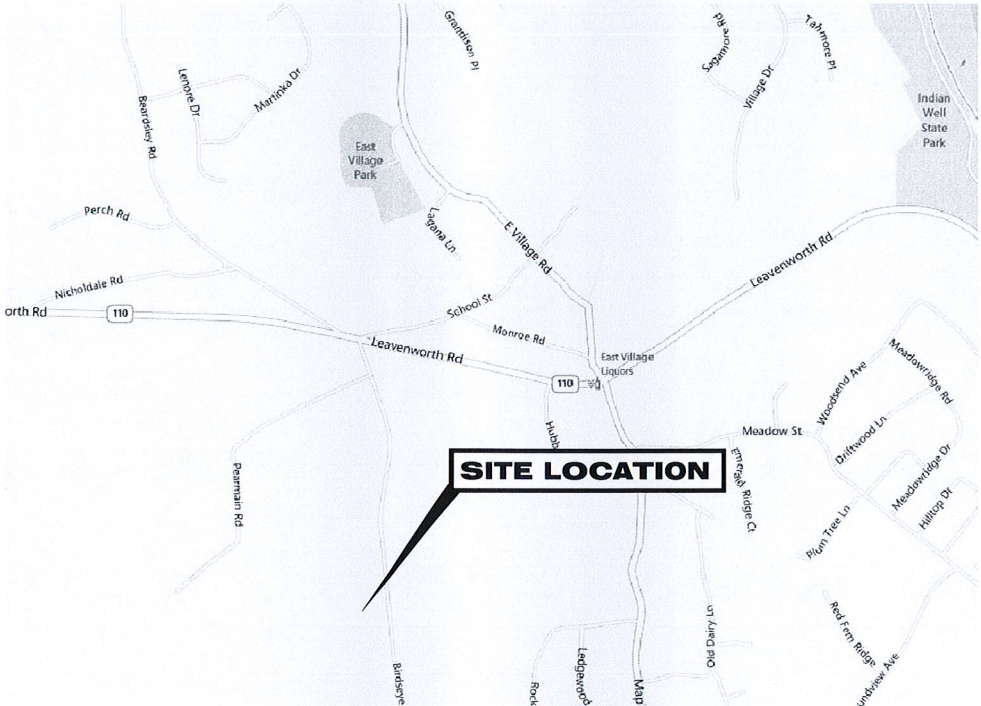


NETWORK VISION CONSTRUCTION DRAWINGS



AERIAL VIEW

SCALE: NTS



LOCATION MAP

SCALE: NTS

SITE INFORMATION

PARCEL ID	134 3
ZONING CLASSIFICATION	R-1
ZONING JURISDICTION	FAIRFIELD COUNTY

PROJECT INFORMATION:

SITE ADDRESS:
162 BIRDSEYE ROAD
SHELTON, CT 06484
FAIRFIELD COUNTY

COORDINATES:
LATITUDE: N 41° 19' 32.82"
LONGITUDE: W 73° 8' 55.35"] DATUM : NAD 83

STRUCTURE HEIGHT:
±118'-0" (TOP OF MONOPOLE)

PROJECT DIRECTORY:

PROPERTY OWNER:
TOWERCO ASSETS, LLC

STRUCTURE OWNER:
SBA COMMUNICATIONS
5900 BROKEN SOUND PARKWAY NW
BOCA RATON, FL 33487-2797
(919) 557-0555

APPLICANT:
SPRINT-NEXTEL
6200 SPRINT PARKWAY
OVERLAND PARK, KS 66251

ENGINEER:
KMB DESIGN GROUP, LLC
1800 ROUTE 34, SUITE 209
WALL, NJ 07719
KEITH DRENNAN - PROJECT MANAGER
(732) 280-5623

POWER COMPANY:
CONNECTICUT LIGHT & POWER
P.O. BOX 270
HARTFORD, CT 06141-0270
(800) 286-2000

CONSTRUCTION MANAGER:
TODD AMANN
(914) 715-9363

NOTE:
CONTRACTOR TO VERIFY ALL TOWER
MODIFICATIONS HAVE BEEN COMPLETED
AS PER VERTICAL SOLUTIONS
STRUCTURAL ANALYSIS REPORT PRIOR
TO CONSTRUCTION.

DRAWING INDEX

DWG #	DRAWING TITLES
A01	COVER SHEET
C01	GENERAL NOTES 1 OF 2
C01A	GENERAL NOTES 2 OF 2
C02	COMPOUND PLAN
C02A	ELEVATION
C03	EQUIPMENT PLANS
C03A	EQUIPMENT & ANTENNA SPECIFICATIONS
C04	EXISTING ANTENNA PLAN (ALL SECTORS)
C04A	INTERIM ANTENNA PLAN (ALL SECTORS)
C04B	FINAL ANTENNA PLAN (ALL SECTORS)
C04C	RRH MOUNT DETAILS
C05	SITE DETAILS
C06	RF SCHEDULE
C06A	RF DATA SHEET
C06B	TOWER TOP BLOCK DIAGRAM
C07	AAV DRAWINGS - SITE PHOTOS
C07A	AAV DRAWINGS - KEY & EQUIPMENT PLAN
C07B	AAV DRAWINGS - DETAILS
E01	ELECTRICAL NOTES
E02	ELECTRICAL & GROUNDING DETAILS

CODES & STANDARDS

These documents are in compliance & all construction to be in accordance with the following codes & standards as applicable:

State Building Code: 2005 Connecticut Supplement which includes the 2009 Amendment (effective August 1, 2009) to the 2005 State Building Code

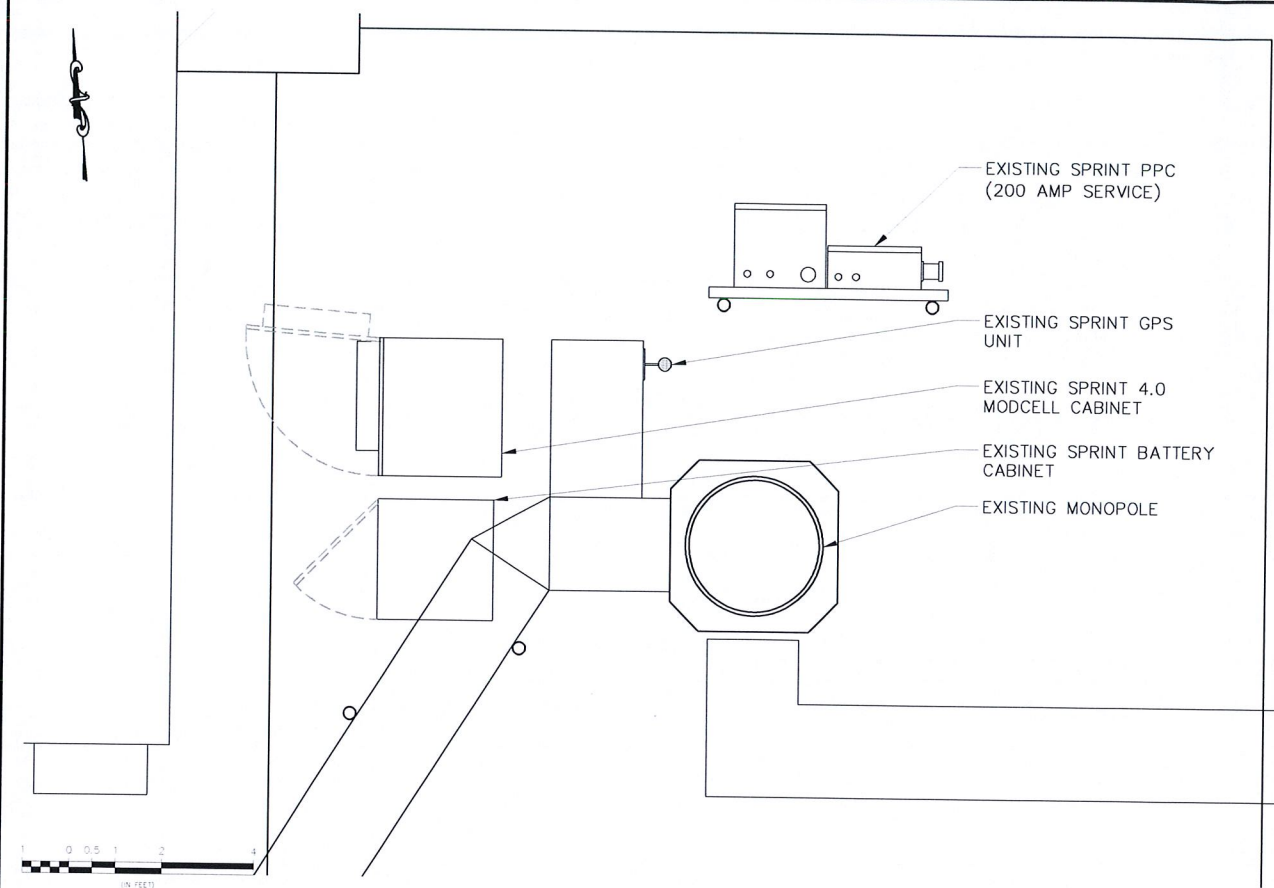
2003 International Building Code
2003 International Residential Code
2003 International Existing Building Code
2003 International Mechanical Code
2003 International Plumbing Code
2006 International Energy Conservation Code (new edition adopted with changes-effective August 1, 2009)
2009 International Energy Conservation Code with Connecticut Amendments (effective October 7, 2011)
ICC/ANSI A117.1-2003 Accessible and Usable Building and Facilities

2005 National Electrical Code (NFPA-70)

DRIVING DIRECTIONS

- | | |
|---|---|
| 1. DEPART 1 INTERNATIONAL BLVD, MAHWAH, NJ 07495 | onto Westchester Ave (CR-62 E) |
| 2. Take 3rd exit from roundabout International Blvd onto Leisure Ln | 8. Take exit #9N/Hutchinson Pkwy North/Merritt Pkwy onto |
| 3. Take ramp onto State Highway 17 (RT-17 N) | Hutchinson River Pky N |
| 4. Continue on I-287 N | 9. Continue on Merritt Pkwy (CT-15 N) |
| 5. Take the I-87 S/I-287/New York State Thruway South/Tappan | 10. Take exit #48B/CT-111/Main St toward Trumbull/Long Hill/Monroe |
| Zee Br/New York City exit onto New York State Thruway South | 11. Turn left onto Main St (CT-111) |
| (I-287 E, I-87 S) (partial toll road) | 12. Continue on Monroe Tpke (CT-111) |
| 6. Bear left onto Cross Westchester Expy (I-287 E) at exit #8 | 13. Bear right onto Shelton Rd (CT-110) |
| toward White Plains/Rye | 14. Turn right onto Birdseye Rd. Your destination on Birdseye Rd is |
| 7. Take exit #9S-N/Hutchinson Pkwy/Whitestone Br/Merritt Pkwy | on the right |

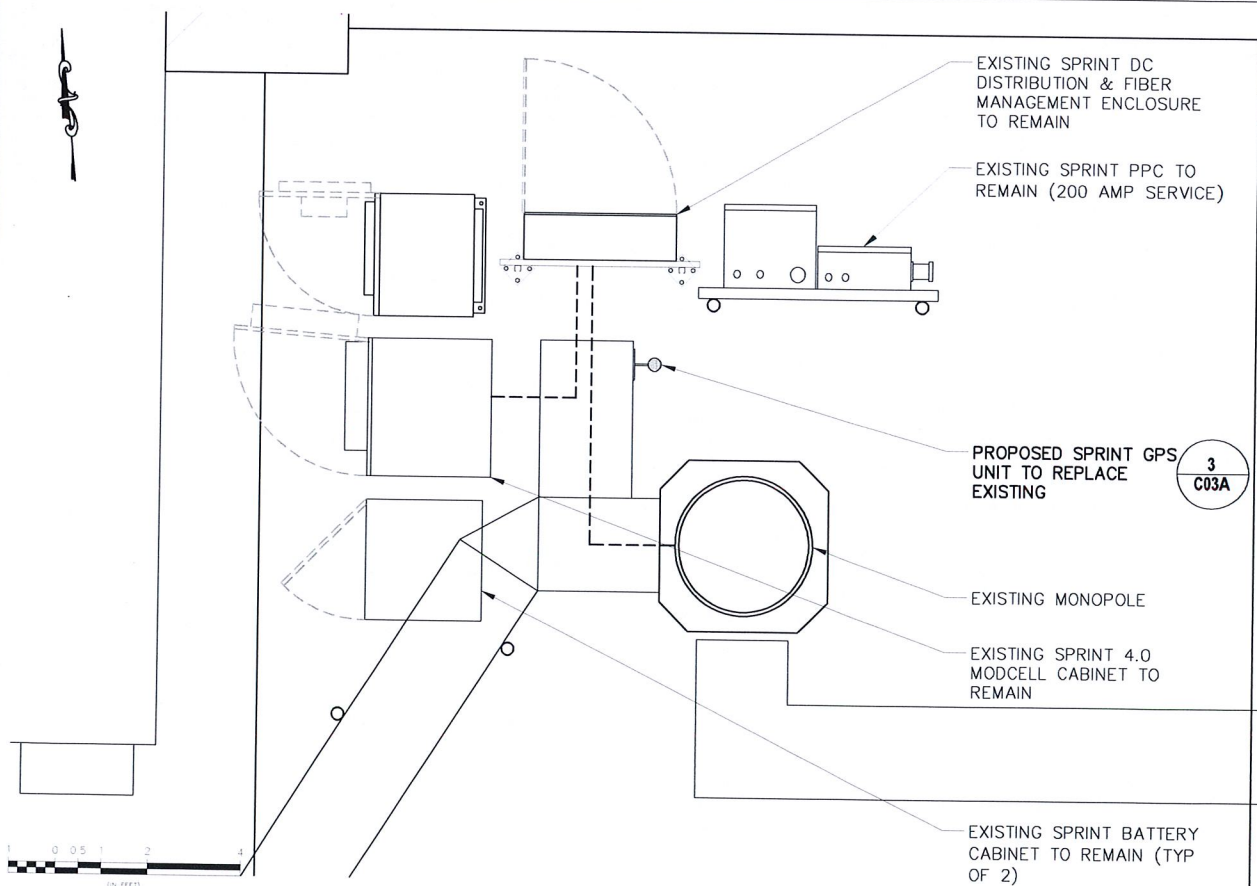
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1 EXISTING EQUIPMENT PLAN

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

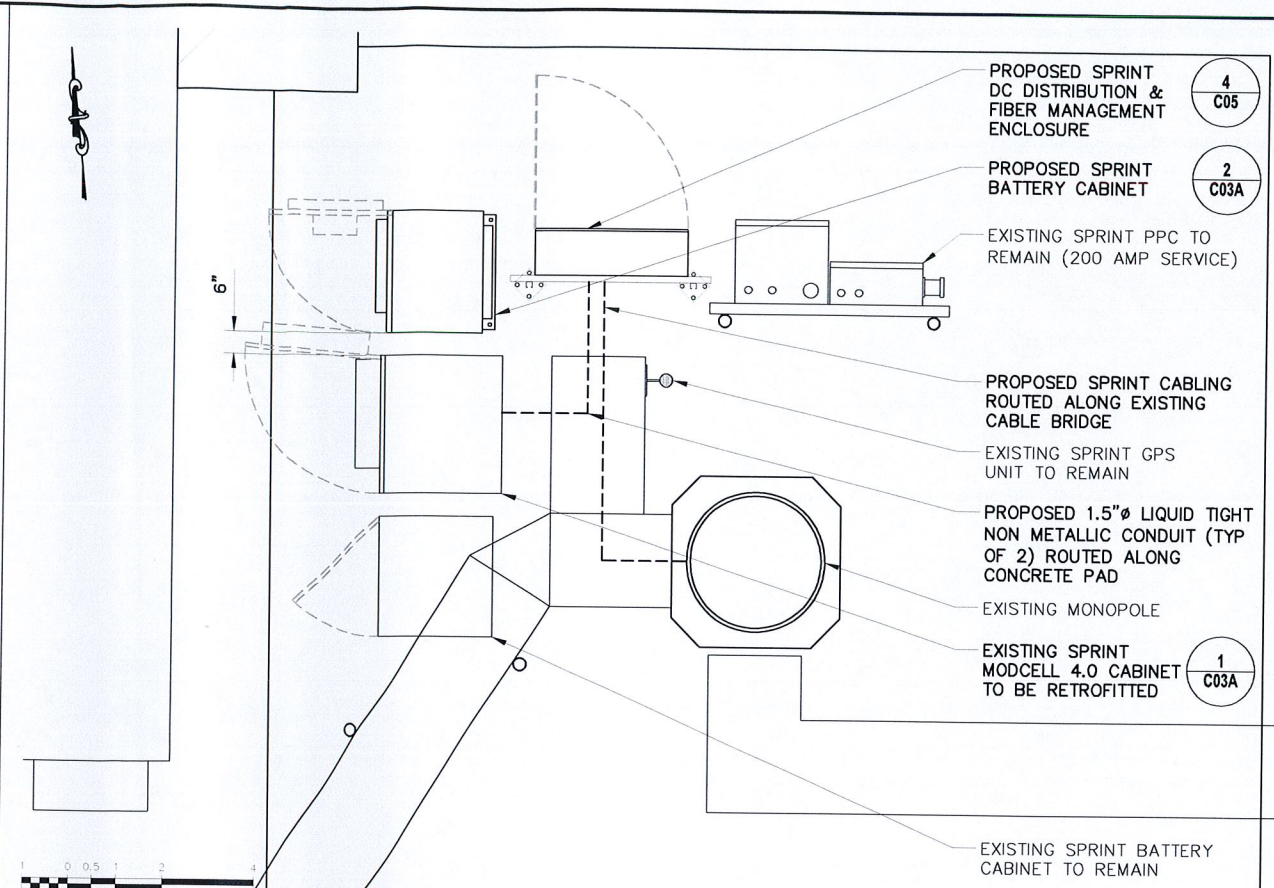
24x36 SCALE: 1/2" = 1'-0"



3 FINAL EQUIPMENT PLAN

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

24x36 SCALE: 1/2" = 1'-0"



2 INTERIM EQUIPMENT PLAN

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

24x36 SCALE: 1/2" = 1'-0"

NOTE:
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1	05-21-13	REVISED PER CLIENT COMMENTS	JRF	KCD	
2	03-27-13	ISSUED FOR CONSTRUCTION	DTP	KCD	
REV.	DATE	REVISION DESCRIPTION	DRAWN BY	CHKD. BY	

KMB DESIGN GROUP
kmbdg.com
1800 ROUTE 34, SUITE 209
WALL, NJ 07719
(732) 280-5623

Stephen A. Bray



CT LICENSE: 26657 5/21/13

PROJECT NUMBER
332.1541

SITE INFORMATION:
162 BIRDSEYE ROAD
SHELTON, CT 06484
FAIRFIELD COUNTY
CT73XC004

DESIGN TYPE:
RAW LAND

DRAWN BY: CCR CHECKED BY: DATE: 04-09-12

SHEET TITLE:
EQUIPMENT PLANS

SHEET NUMBER: C03 REV: 1

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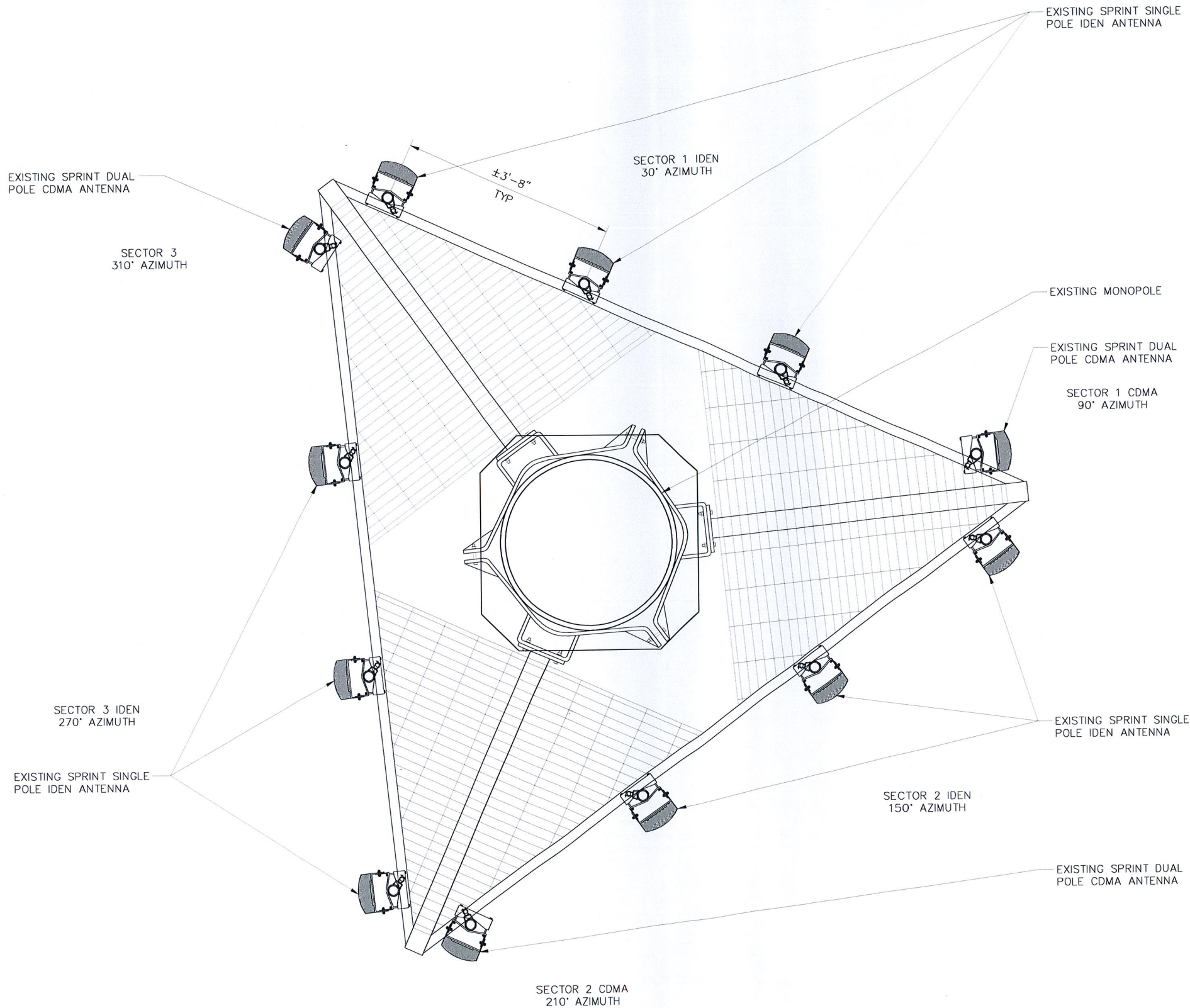


1

EXISTING ANTENNA PLAN @ ±120'-0" AGL (ALL SECTORS)

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

24x36 SCALE: 1" = 1'-0"



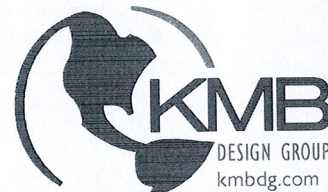
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WALL, NJ 07719
(732) 280-5623

Stephen A. Bray
PROFESSIONAL ENGINEER



CT LICENSE: 26657

5/21/13

PROJECT NUMBER:

332.1541

SITE INFORMATION:

162 BIRDSEYE ROAD
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FAIRFIELD COUNTY

CT73XC004

DESIGN TYPE:

RAW LAND

DRAWN BY:

CCR

CHECKED BY:

DATE:

04-09-12

SHEET TITLE:

EXISTING ANTENNA PLAN
(ALL SECTORS)

SHEET NUMBER:

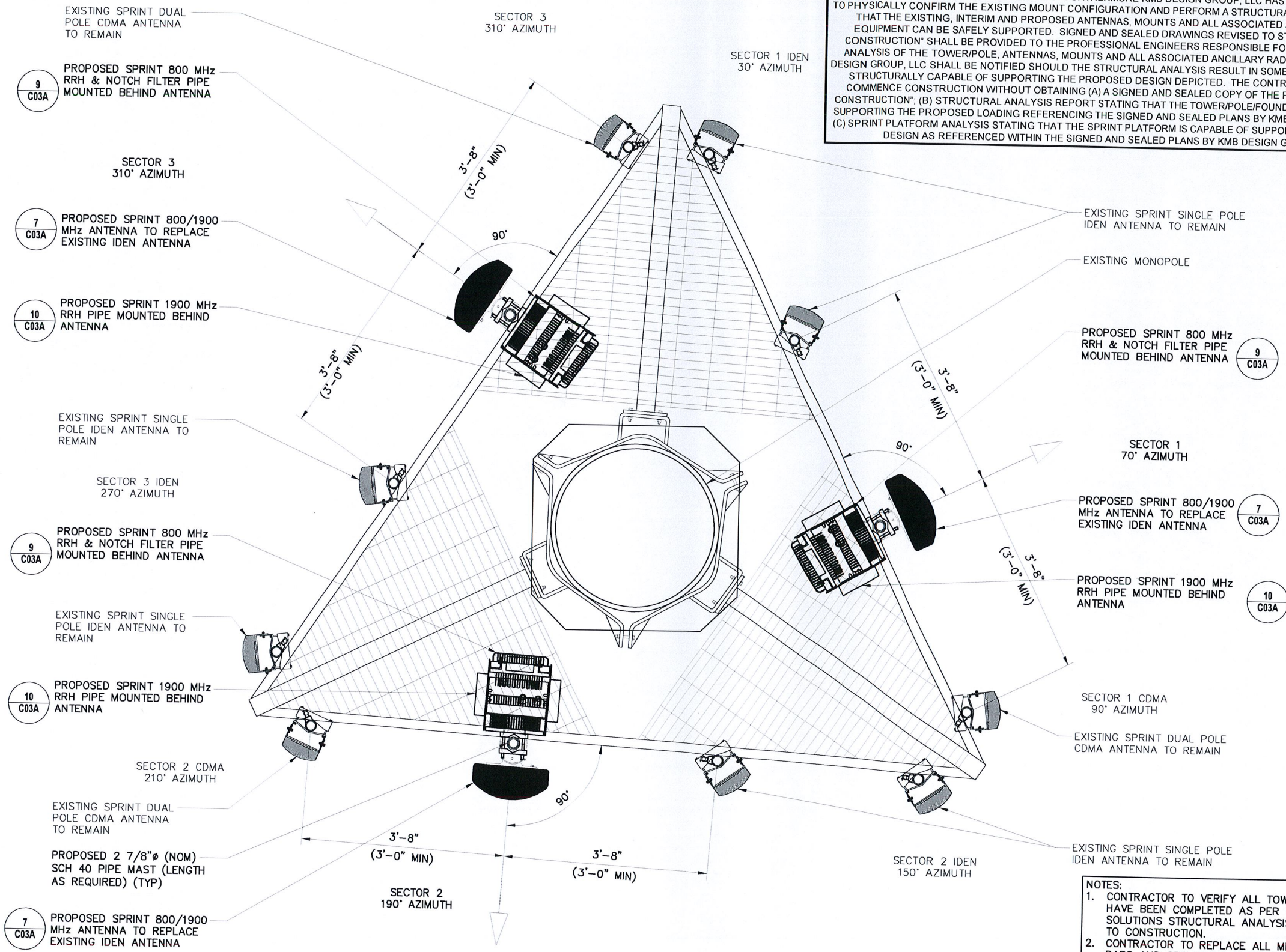
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FAIRFIELD COUNTY

CT73XC004

DESIGN TYPE: **RAW LAND**

DRAWN BY: **CCR** CHECKED BY: DATE: **04-09-12**

SHEET TITLE:
**INTERIM ANTENNA PLAN
(ALL SECTORS)**

SHEET NUMBER: REV:

C04A **1**



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1

FINAL ANTENNA PLAN @ ±120'-0" AGL (ALL SECTORS)

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

24x36 SCALE: 1" = 1'-0"

EXISTING SPRINT ANTENNA
TO BE REMOVED. EXISTING
EMPTY PIPE MAST TO
REMAIN

EXISTING SPRINT 800 MHz
RRH & NOTCH FILTER PIPE
MOUNTED BEHIND ANTENNA
TO REMAIN

SECTOR 3
310° AZIMUTH

EXISTING SPRINT 800/1900
MHz ANTENNA TO REMAIN

EXISTING SPRINT 1900 MHz
RRH PIPE MOUNTED BEHIND
ANTENNA TO REMAIN

EXISTING SPRINT SINGLE
POLE IDEN ANTENNA TO
REMAIN

SECTOR 3 IDEN
270° AZIMUTH

EXISTING SPRINT 800 MHz
RRH & NOTCH FILTER PIPE
MOUNTED BEHIND ANTENNA
TO REMAIN

EXISTING SPRINT SINGLE
POLE IDEN ANTENNA TO
REMAIN

EXISTING SPRINT 1900 MHz
RRH PIPE MOUNTED BEHIND
ANTENNA TO REMAIN

EXISTING SPRINT ANTENNA
TO BE REMOVED. EXISTING
EMPTY PIPE MAST TO
REMAIN

EXISTING SPRINT 800/1900
MHz ANTENNA TO REMAIN

SECTOR 1 IDEN
30° AZIMUTH

EXISTING SPRINT SINGLE POLE
IDEN ANTENNA TO REMAIN

EXISTING MONOPOLE

EXISTING SPRINT 800 MHz
RRH & NOTCH FILTER PIPE
MOUNTED BEHIND ANTENNA
TO REMAIN

SECTOR 1
70° AZIMUTH

EXISTING SPRINT 800/1900
MHz ANTENNA TO REMAIN

EXISTING SPRINT 1900 MHz
RRH PIPE MOUNTED BEHIND
ANTENNA TO REMAIN

EXISTING SPRINT ANTENNA
TO BE REMOVED. EXISTING
EMPTY PIPE MAST TO REMAIN

EXISTING SPRINT SINGLE POLE
IDEN ANTENNA TO REMAIN

SECTOR 2 IDEN
150° AZIMUTH

NOTES:

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Stephen A. Bray
PROFESSIONAL ENGINEER



CT LICENSE: 26657 5/21/13

PROJECT NUMBER: 332.1541

SITE INFORMATION:
162 BIRDSEYE ROAD
SHELTON, CT 06484
FAIRFIELD COUNTY

CT73XC004

DESIGN TYPE: RAW LAND

DRAWN BY: CCR CHECKED BY: DATE: 04-09-12

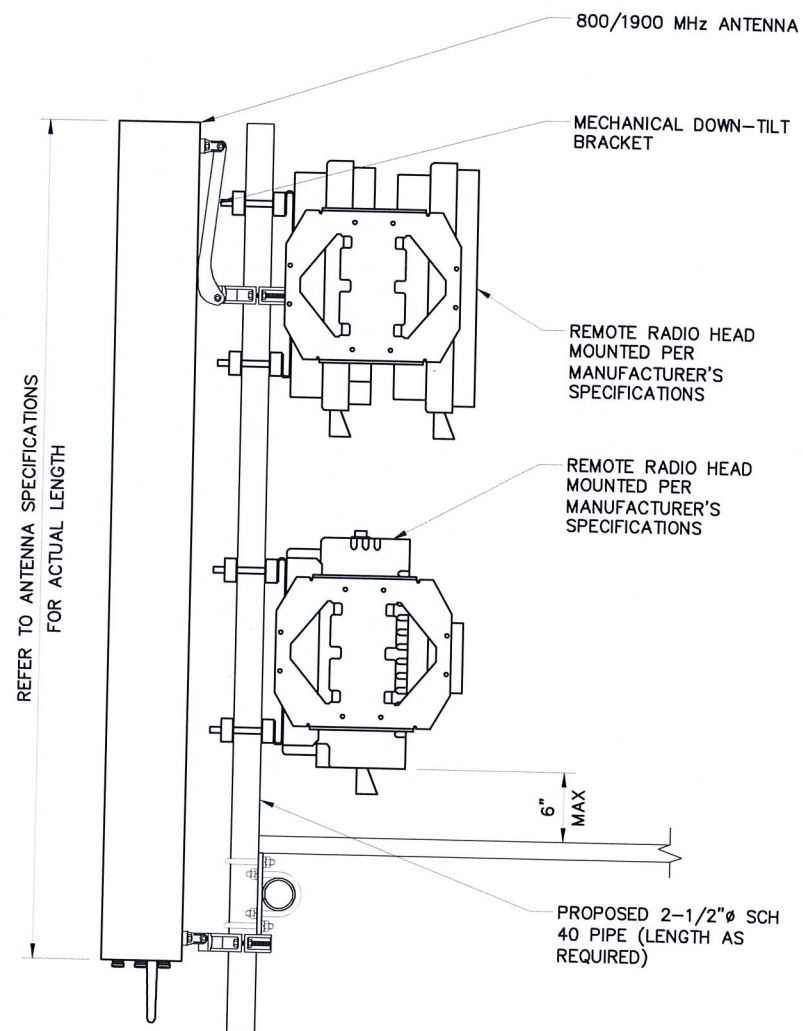
SHEET TITLE:
FINAL ANTENNA PLAN
(ALL SECTORS)

SHEET NUMBER: REV.:

C04B

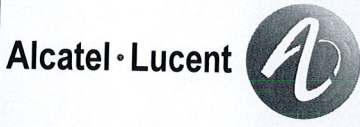
1

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THE STRUCTURAL ENGINEERING CONCERNING THE STRUCTURAL STABILITY OF THE TOWER/POLE, FOUNDATION, ANTENNAS, MOUNTS AND ALL ASSOCIATED ANCILLARY RADIO EQUIPMENT IS BEING COMPLETED BY OTHERS. KMB DESIGN GROUP, LLC HAS NOT BEEN REQUESTED TO PERFORM ANY STRUCTURAL ANALYSIS SERVICES TO VERIFY THAT THE TOWER/POLE AND/OR FOUNDATION IS CAPABLE OF SUPPORTING THE PROPOSED EQUIPMENT DEPICTED WITHIN THESE SIGNED AND SEALED DRAWINGS. FURTHERMORE KMB DESIGN GROUP, LLC HAS NOT BEEN REQUESTED TO PHYSICALLY CONFIRM THE EXISTING MOUNT CONFIGURATION AND PERFORM A STRUCTURAL ANALYSIS TO VERIFY THAT THE EXISTING, INTERIM AND PROPOSED ANTENNAS, MOUNTS AND ALL ASSOCIATED ANCILLARY RADIO EQUIPMENT CAN BE SAFELY SUPPORTED. SIGNED AND SEALED DRAWINGS REVISED TO STATE "ISSUED FOR CONSTRUCTION" SHALL BE PROVIDED TO THE PROFESSIONAL ENGINEERS RESPONSIBLE FOR THE STRUCTURAL ANALYSIS OF THE TOWER/POLE, ANTENNAS, MOUNTS AND ALL ASSOCIATED ANCILLARY RADIO EQUIPMENT. KMB DESIGN GROUP, LLC SHALL BE NOTIFIED SHOULD THE STRUCTURAL ANALYSIS RESULT IN SOME ELEMENTS NOT BEING STRUCTURALLY CAPABLE OF SUPPORTING THE PROPOSED DESIGN DEPICTED. THE CONTRACTOR SHALL NOT COMMENCE CONSTRUCTION WITHOUT OBTAINING (A) A SIGNED AND SEALED COPY OF THE PLANS "ISSUED FOR CONSTRUCTION", (B) STRUCTURAL ANALYSIS REPORT STATING THAT THE TOWER/POLE/FOUNDATION IS CAPABLE OF SUPPORTING THE PROPOSED LOADING REFERENCING THE SIGNED AND SEALED PLANS BY KMB DESIGN GROUP, LLC; (C) SPRINT PLATFORM ANALYSIS STATING THAT THE SPRINT PLATFORM IS CAPABLE OF SUPPORTING THE PROPOSED DESIGN AS REFERENCED WITHIN THE SIGNED AND SEALED PLANS BY KMB DESIGN GROUP, LLC.

- NOTES:
1. CONTRACTOR TO VERIFY ALL TOWER MODIFICATIONS HAVE BEEN COMPLETED AS PER VERTICAL SOLUTIONS STRUCTURAL ANALYSIS REPORT PRIOR TO CONSTRUCTION.
 2. CONTRACTOR TO REPLACE ALL MISSING GROUND BARS AND GROUNDING CONNECTIONS AS REQUIRED IN ACCORDANCE WITH SPRINT GROUNDING AND ANTI-THEFT GUIDELINES. CONTRACTOR SHALL PROVIDE BEFORE & AFTER PHOTOS.
 3. ALL STRUCTURAL MODIFICATIONS CONTAINED WITHIN THE MODIFICATION DESIGN BY VERTICAL SOLUTIONS ARE TO BE COMPLETED PRIOR TO ANY WORK BEING COMPLETED.



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1	05-21-13	REVISED PER CLIENT COMMENTS	JRF	KCD
0	03-27-13	ISSUED FOR CONSTRUCTION	DTP	KCD
REV.	DATE	REVISION DESCRIPTION	DRAWN BY	CHKD. BY



Stephen A. Bray
PROFESSIONAL ENGINEER



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SHELTON, CT 06484
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CT73XC004

DESIGN TYPE: RAW LAND

DRAWN BY: CCR CHECKED BY: DATE: 04-09-12

SHEET TITLE: RRH MOUNT DETAILS

SHEET NUMBER: REV.:

C04C 1



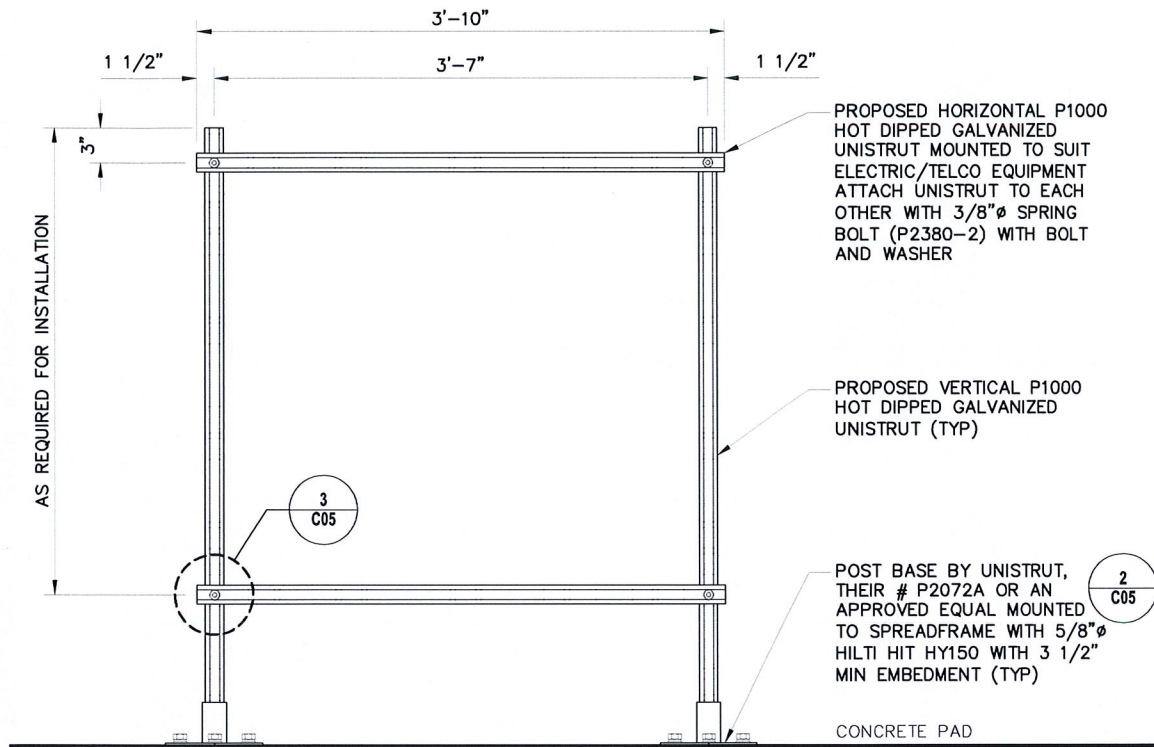
1 RRH MOUNT DETAIL

SCALE: NTS

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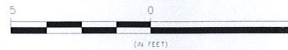
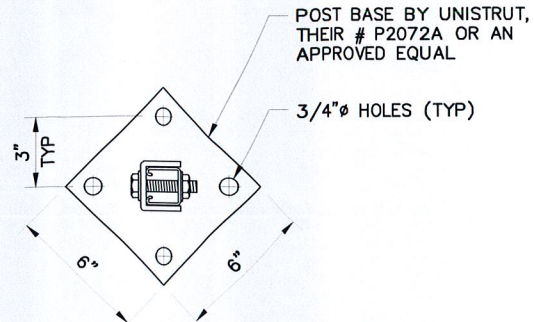
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1 UNISTRUT BACKBOARD ELEVATION

11x17 SCALE: 3/4" = 1'-0"

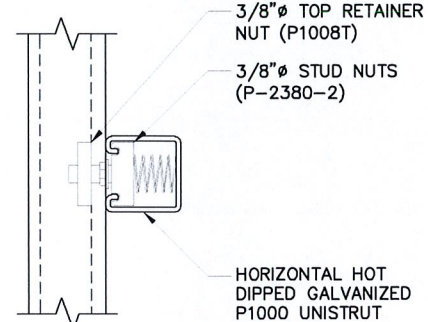
24x36 SCALE: 1 1/2" = 1'-0"



2 POST BASE DETAIL

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

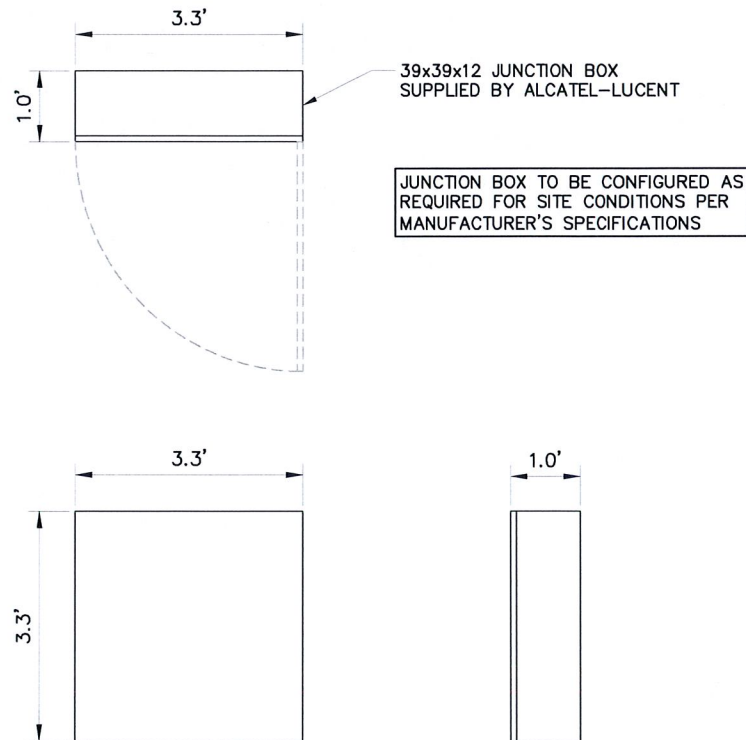
24x36 SCALE: 3" = 1'-0"



3 UNISTRUT CONNECTION DETAIL

11x17 SCALE: 3" = 1'-0"

24x36 SCALE: 6" = 1'-0"



4 DC DISTRIBUTION & FIBER MGMT ENCLOSURE DETAIL

11x17 SCALE: 3/8" = 1'-0"

24x36 SCALE: 3/4" = 1'-0"

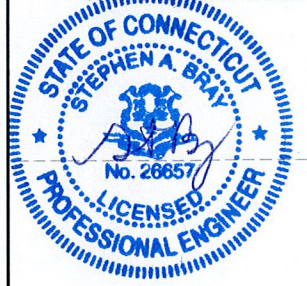


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1	05-21-13	REVISED PER CLIENT COMMENTS	JRF	KCD
0	03-27-13	ISSUED FOR CONSTRUCTION	DTP	KCD
REV.	DATE	REVISION DESCRIPTION	DRAWN BY	CHKD. BY



1800 ROUTE 34, SUITE 209
WALL, NJ 07719
(732) 280-5623

Stephen A. Bray
PROFESSIONAL ENGINEER



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162 BIRDSEYE ROAD
SHELTON, CT 06484
FAIRFIELD COUNTY

CT73XC004

DESIGN TYPE: RAW LAND

DRAWN BY: CCR CHECKED BY: DATE: 04-09-12

SHEET TITLE: SITE DETAILS

SHEET NUMBER: C05 REV.: 1

[illegible]

NOTES:

1. DUE TO FIELD MEASUREMENTS AND THE INSTALLATION OF NEW ANTENNAS THAT VARY IN SIZE FROM THE EXISTING ANTENNAS, THE ANTENNA RAD CENTER HAS CHANGED FROM WHAT IS ON RECORD. THE DATABASE MAY NEED TO BE UPDATED TO MATCH THESE PLANS.
2. SOME CABLING MAY CHANGE AT THE TIME OF CONSTRUCTION. CONTRACTOR TO CONFIRM ALL CABLE LENGTHS, TYPE, QUANTITIES, AND CONFIGURATION PRIOR TO CONSTRUCTION.
3. ALL UNUSED POWER AND FIBER MUST BE PROPERLY TERMINATED AND WEATHERPROOFED.



				
				
				
				
				
				
	05-21-13	REVISED PER CLIENT COMMENTS	JRF	KCC
	03-27-13	ISSUED FOR CONSTRUCTION	DTP	KCC
REV.	DATE	REVISION DESCRIPTION	DRAWN BY	CHK BY



Stephen A. Bray
PROFESSIONAL ENGINEER



CT LICENSE: 26657 5/21/

PROJECT NUMBER: **332.1541**

SITE INFORMATION:
162 BIRDSEYE ROAD
SHELTON, CT 06484
FAIRFIELD COUNTY

CT73XC004

DESIGN TYPE: RAW LAND

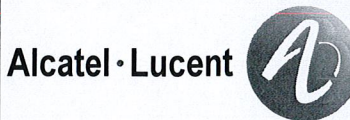
DRAWN BY: CCR	CHECKED BY:	DATE: 04-09-12
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SHEET TITLE: RF SCHEDULE

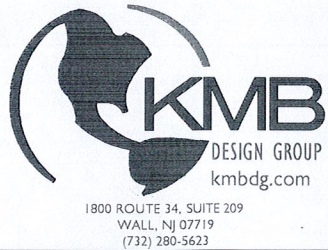
SHEET NUMBER:	REV.:
C06	1

Market		Southern Connecticut		
Cascade ID		CT73XC004		
		SECTOR 1	SECTOR 2	SECTOR 3
Split sector present		No	No	No
1900	1900MHz_Azimuth	70	190	310
	1900MHz_No_of_Antennas	1	1	1
	1900MHz_RADCenter(ft)	120	120	120
	1900MHz_Antenna Make	RFS	RFS	RFS
	1900MHz_Antenna Model	APXVSP18-C-A20	APXVSP18-C-A20	APXVSP18-C-A20
	1900MHz_Horizontal_Beamwidth	65	65	65
	1900MHz_Vertical_Beam width	5.5	5.5	5.5
	1900MHz_AntennaHeight (ft)	6	6	6
	1900MHz_AntennaGain(dBd)	15.9	15.9	15.9
	1900MHz_E_Tilt	-2	-2	-2
	1900MHz_M_Tilt	0	0	0
	1900MHz_Carrier_Forecast_Year_2013	2	2	2
	1900MHz_RRH Manufacturer	ALU	ALU	ALU
	1900MHz_RRH Model	RRH 1900 4X45 65MHz	RRH 1900 4X45 65MHz	RRH 1900 4X45 65MHz
	1900MHz_RRH Count	1	1	1
	1900MHz_RRH Location	Top of the Pole/Tower	Top of the Pole/Tower	Top of the Pole/Tower
	1900MHz_Combiner_Model	No Combiner Required	No Combiner Required	No Combiner Required
	1900MHz_Top_Jumper #1_Length (RRH or Combiner-to-Antenna for TT or Main Coax to	10	10	10
	1900MHz_Top_Jumper #1_Cable_Model (RRH or Combiner-to-Antenna for TT or Main Coax	LCF12-50J	LCF12-50J	LCF12-50J
	1900MHz_Top_Jumper #2_Length (RRH to Combiner for TT if applicable, ft)	N/A	N/A	N/A
1900MHz_Top_Jumper #2_Cable_Model (RRH to Combiner for TT if applicable)	N/A	N/A	N/A	
1900MHz_Main_Coax_Cable_Length (ft)	N/A	N/A	N/A	
1900MHz_Main_Coax_Cable_Model	N/A	N/A	N/A	
1900MHz_Bottom_Jumper #1_Length (Ground based RRH to Combiner-OR-Main Coax, ft)	N/A	N/A	N/A	
1900MHz_Bottom_Jumper #1_Cable_Model (Ground based RRH to Combiner-OR-Main Coax)	N/A	N/A	N/A	
1900MHz_Bottom_Jumper #2_Length (Ground based-Combiner to Main Coax, ft)	N/A	N/A	N/A	
1900MHz_Bottom_Jumper #2_Cable_Model (Ground based-Combiner to Main Coax)	N/A	N/A	N/A	
800	800MHz_Azimuth	70	190	310
	800MHz_No_of_Antennas	0	0	0
	800MHz_RADCenter(ft)	120	120	120
	800MHz_AntennaMake	RFS	RFS	RFS
	800MHz_AntennaModel	APXVSP18-C-A20 (Shared w/1900)	APXVSP18-C-A20 (Shared w/1900)	APXVSP18-C-A20 (Shared w/1900)
	800MHz_Horizontal_Beamwidth	65	65	65
	800MHz_Vertical_Beam width	11.5	11.5	11.5
	800MHz_AntennaHeight (ft)	6	6	6
	800MHz_AntennaGain (dBd)	13.4	13.4	13.4
	800MHz_E_Tilt	0	-8	-6
	800MHz_M_Tilt	0	0	0
	800MHz_RRH Manufacturer	ALU	ALU	ALU
	800MHz_RRH Model	800MHz 2x50W	800MHz 2x50W	800MHz 2x50W
	800MHz_RRH Count	1	1	1
	800MHz_RRH Location	Top of the Pole/Tower	Top of the Pole/Tower	Top of the Pole/Tower
	800_Top_Jumper #1_Length (RRH to Antenna for TT or Main Coax to Antenna for GM)	10	10	10
	800_Top_Jumper_Cable_Model (RRH to Antenna for TT or Main Coax to Antenna for GM)	LCF12-50J	LCF12-50J	LCF12-50J
	800MHz_Main_Coax_Cable_Length (ft)	N/A	N/A	N/A
	800MHz_Main_Coax_Cable_Model	N/A	N/A	N/A
	800_Bottom_Jumper #1_Length (Ground based RRH to Main Coax)	N/A	N/A	N/A
800_Bottom_Jumper #1_Cable_Model (Ground based RRH to Main Coax)	N/A	N/A	N/A	
Plumbing Scenario *		124	124	124
Comments	* If plumbing scenario does not match the material received, please contact your Construction Manager			
	11/9/2012			

DUE TO FIELD MEASUREMENTS AND THE INSTALLATION OF NEW ANTENNAS THAT VARY IN SIZE FROM THE EXISTING ANTENNAS, THE ANTENNA RAD CENTER HAS CHANGED FROM WHAT IS ON RECORD. THE DATABASE NEEDS TO BE UPDATED TO MATCH THESE PLANS.



				
				
				
				
				
				
	05-21-13	REVISED PER CLIENT COMMENTS	JRF	KC
	03-27-13	ISSUED FOR CONSTRUCTION	DTP	KC
REV.	DATE	REVISION DESCRIPTION	DRAWN BY	CHKD BY



Stephen A. Bray
PROFESSIONAL ENGINEER



CT LICENSE: 26657 5/21/1

PROJECT NUMBER: **332.1541**

SITE INFORMATION:
162 BIRDSEYE ROAD
SHELTON, CT 06484
FAIRFIELD COUNTY

CT73XC004

DESIGN TYPE: RAW LAND

DRAWN BY: CCR	CHECKED BY:	DATE: 04-09-12
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SHEET TITLE:

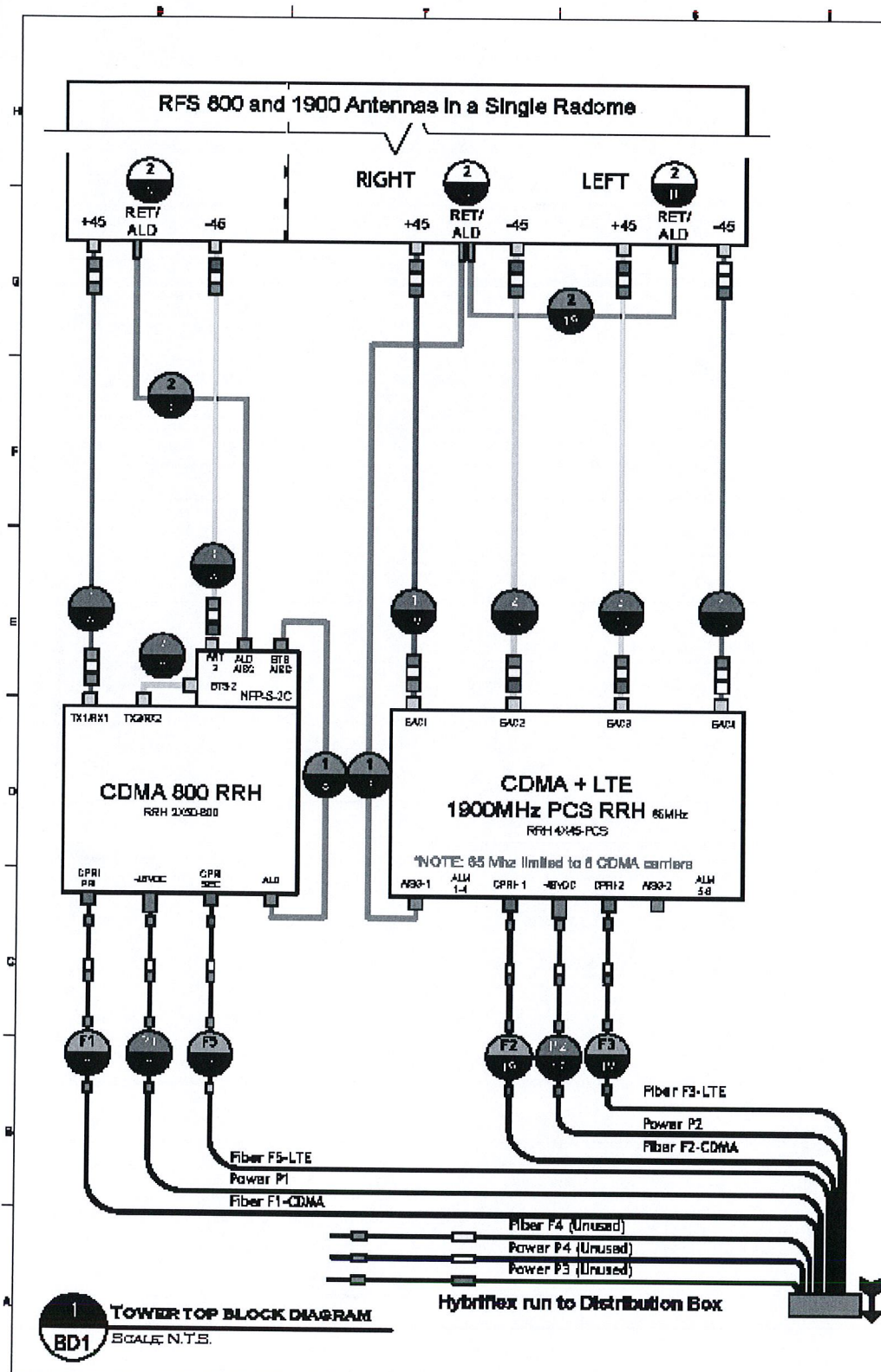
RF DATA SHEET

SHEET NUMBER:	REV.:
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C06A

1

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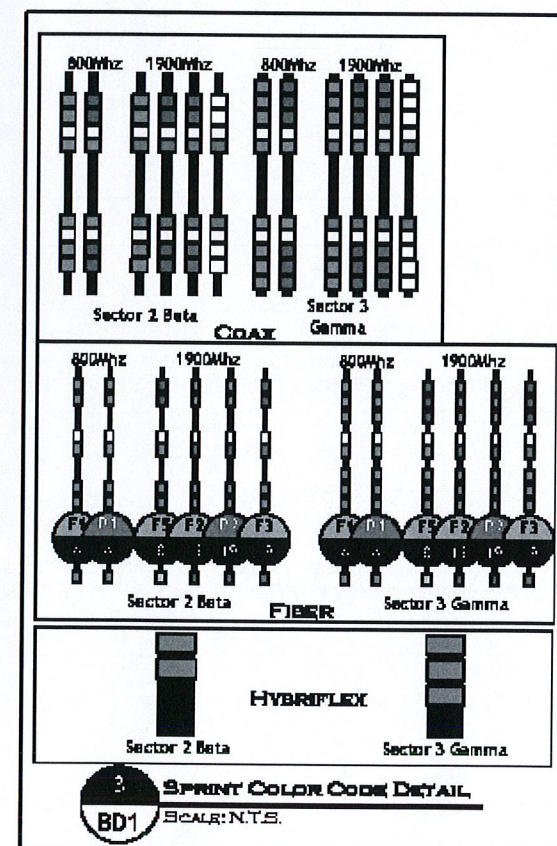
Power Feed Polarity Definition:
IF wires are BLACK AND BLACK/WHITE STRIPE:
■ Black= -48VDC Feed (Battery)
■ Black/White Stripes= Return

IF wires are RED AND BLACK:
■ Red= -48VDC Feed (Battery)
■ Black= Return

NOTE: For power feed use the same Hybriflex OEM color designator as the fiber.

■ MM Pair 1= F1= Green= P1(Green)
■ MM Pair 2= F2= Blue= P2(Blue)
■ MM Pair 3= F3= Red= P3(Red)
■ MM Pair 4= F4= Yellow= P4(Yellow)
■ MM Pair 5= F5= Orange= (No P5 power feed)

2 HYBRIFLEX OEM COLOR CODE
BD1 SCALE: N.T.S.



J. Steve Wilson
STEVE.WILSON@NCSTECH.NET
PH 9122460227

Sprint
NETWORK VISION
Alcatel-Lucent

ASG
COAX
FIBER
POWER
NOTES

FREQ

4 DIAGRAM LEGEND
BD1 SCALE: N.T.S.

BACK TO TITLE SHEET

SCENARIO 124_V2.2_V6D

SHEET DESCRIPTION
TOWER TOP BLOCK DIAGRAM

SHEET NUMBER
BD1

Sprint

Alcatel-Lucent

REV.	DATE	REVISION DESCRIPTION	DRAWN BY	CHKD. BY
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△				
△	05-21-13	REVISED PER CLIENT COMMENTS	JRF	KCD
△	03-27-13	ISSUED FOR CONSTRUCTION	DTP	KCD

KMB
DESIGN GROUP
kmbdg.com
1800 ROUTE 34, SUITE 209
WALL, NJ 07719
(732) 280-5623

Stephen A. Bray
PROFESSIONAL ENGINEER

STATE OF CONNECTICUT
STEPHEN A. BRAY
No. 26657
LICENSED PROFESSIONAL ENGINEER

CT LICENSE: 26657 5/21/13

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162 BIRDSEYE ROAD
SHELTON, CT 06484
FAIRFIELD COUNTY

CT73XC004

DESIGN TYPE:
RAW LAND

DRAWN BY: CCR CHECKED BY: DATE: 04-09-12

SHEET TITLE:
TOWER TOP BLOCK DIAGRAM

SHEET NUMBER: C06B REV: 1

K:\332_Sprint_332.1000_Alcatel-Lucent\332.1541_CT73XC004_162 Birdseye Road\332.1541_CAD\332.1541_Construction\332.1541_C06B.dwg, 5/21/2013 6:14:02 PM, jford

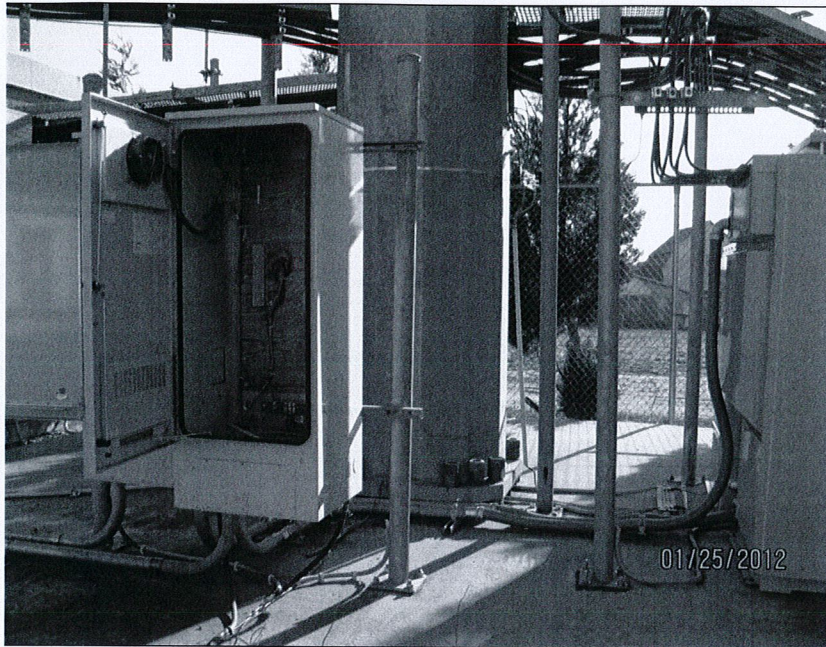
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1 EXISTING SIGNAGE



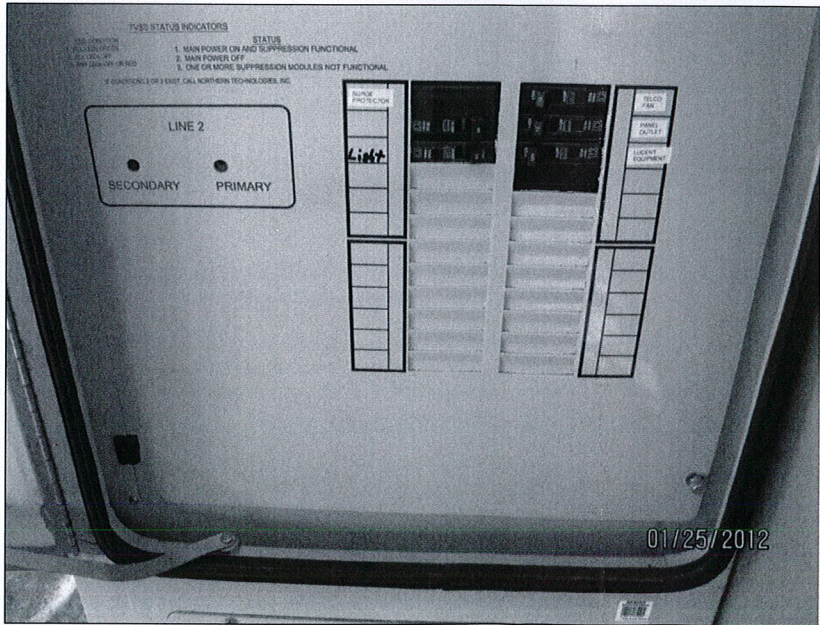
2 PROPOSED MEET POINT



3 EXISTING EQUIPMENT AREA



4 EXISTING TELCO CABINET



5 EXISTING POWER SOURCE



6 PROPOSED NID EQUIPMENT LOCATION



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1	05-21-13	REVISED PER CLIENT COMMENTS	JRF	KCD
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RAW LAND

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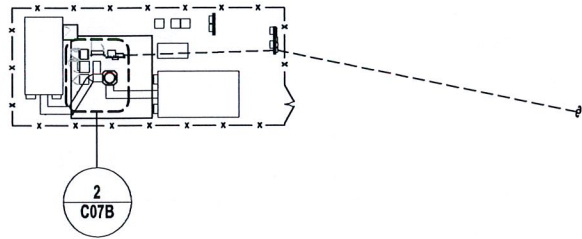
SHEET TITLE:
SITE PHOTOS

SHEET NUMBER: REV.:

C07

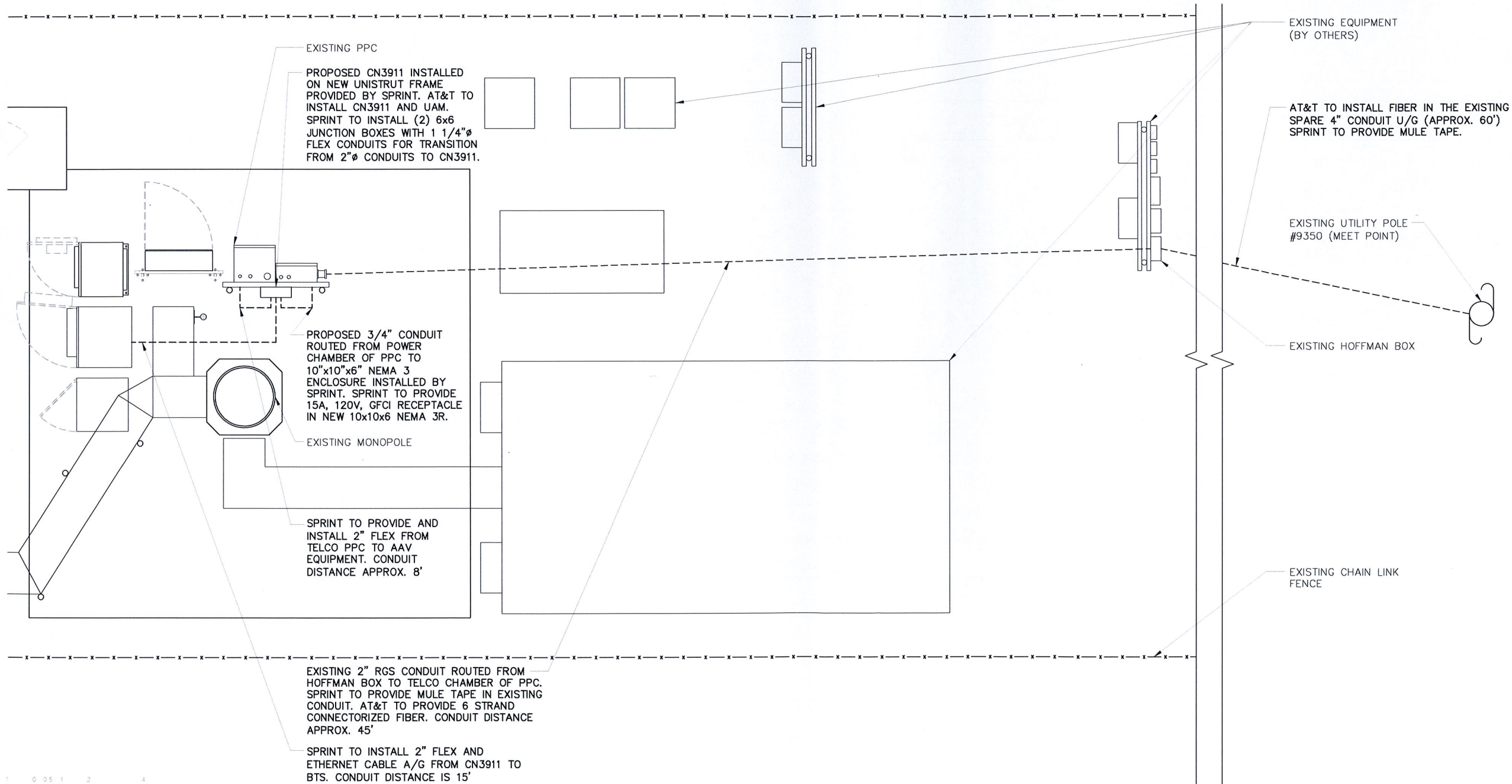
1

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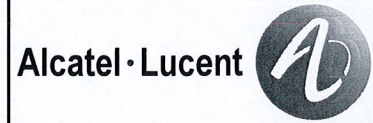
KEY PLAN
SCALE: NTS

1
C07B

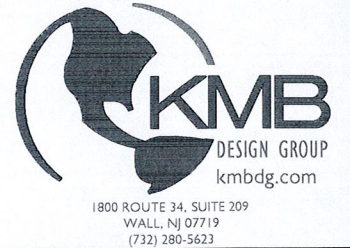


AAV SCOPE OF WORK NOTES:

1. AT&T TO INSTALL FIBER IN THE EXISTING SPARE 4" CONDUIT U/G (APPROX. 60') SPRINT TO PROVIDE MULE TAPE.
2. EXISTING 2" RGS CONDUIT ROUTED FROM HOFFMAN BOX TO TELCO CHAMBER OF PPC. SPRINT TO PROVIDE MULETAPE IN EXISTING CONDUIT. AT&T TO PROVIDE 6 STRAND CONNECTORIZED FIBER. CONDUIT DISTANCE APPROX. 45'
3. PROPOSED 3/4" CONDUIT ROUTED FROM POWER CHAMBER OF PPC TO 10"x10"x6" NEMA 3 ENCLOSURE INSTALLED BY SPRINT. SPRINT TO PROVIDE 15A, 120V, GFCI RECEPTACLE IN NEW 10x10x6 NEMA 3R.
4. PROPOSED CN3911 INSTALLED ON NEW UNISTRUT FRAME PROVIDED BY SPRINT. AT&T TO INSTALL CN3911 AND UAM. SPRINT TO INSTALL (2) 6x6 JUNCTION BOXES WITH 1 1/4" FLEX CONDUITS FOR TRANSITION FROM 2" CONDUITS TO CN3911.
5. SPRINT TO INSTALL 2" FLEX AND ETHERNET CABLE A/G FROM CN3911 TO BTS. CONDUIT DISTANCE IS 15'
6. SPRINT TO PROVIDE AND INSTALL 2" FLEX FROM TELCO PPC TO AAC EQUIPMENT. CONDUIT DISTANCE APPROX. 8'



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DESIGN TYPE:
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DRAWN BY: CCR CHECKED BY: DATE: 04-09-12

SHEET TITLE:
KEY PLAN &
EQUIPMENT PLAN

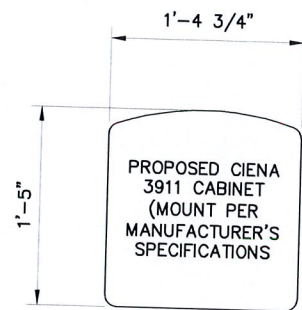
SHEET NUMBER: REV:

C07A 1

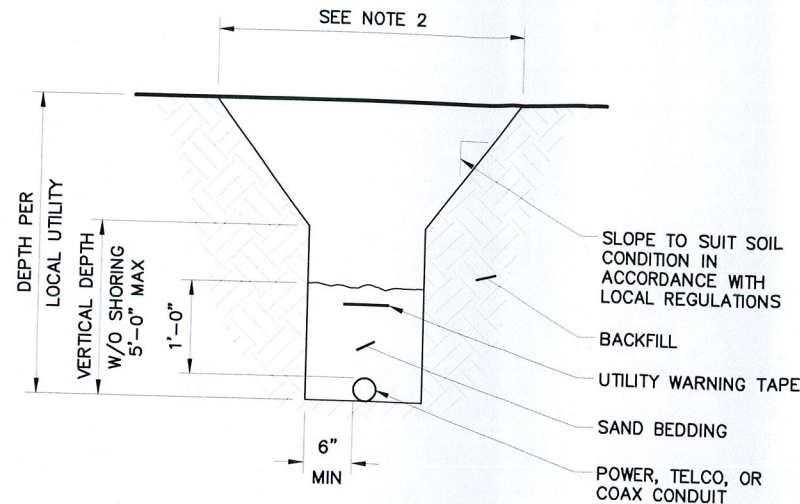
2 EQUIPMENT PLAN

11x17 SCALE: 1/4" = 1'-0" 24x36 SCALE: 1/2" = 1'-0"

K:\332_Sprint\332.1000_Alcatel-Lucent\332.1541_CAD\332.1541_Construction\332.1541_C07A.dwg, 5/21/2013 6:14:34 PM, Jrd



PROPOSED CIENA
3911 CABINET
(MOUNT PER
MANUFACTURER'S
SPECIFICATIONS)



NOTES:

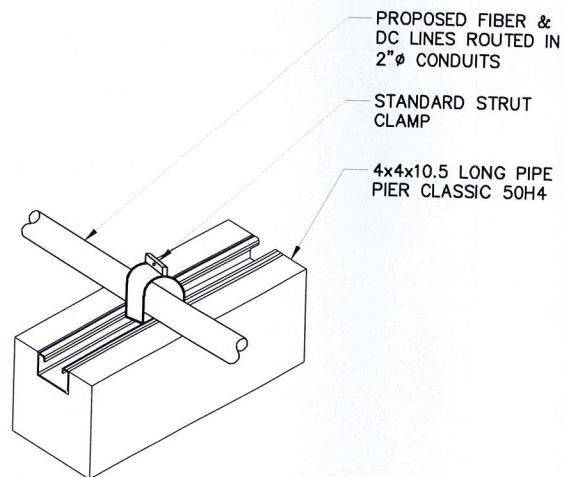
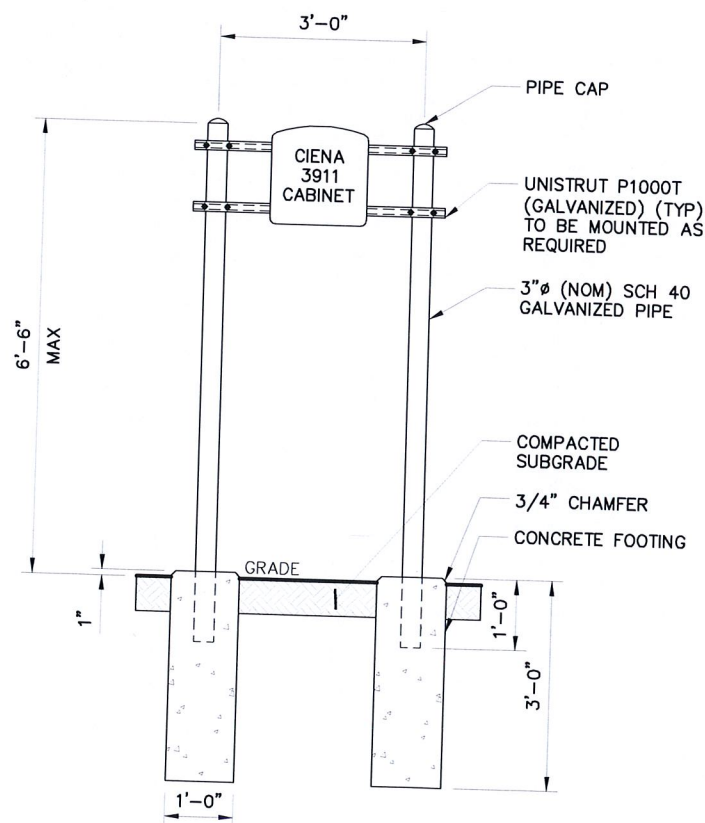
1. DETAIL SHOWN IS FOR ONE CONDUIT. MULTIPLE CONDUITS CAN BE PLACED IN THE SAME TRENCH AS LONG AS A MINIMUM SEPARATION PER THE LOCAL UTILITY COMPANIES IS MAINTAINED. IN ALL CASES THE MINIMUM CENTER TO CENTER SPACING BETWEEN CONDUITS IS 1'-0" (NOT REQUIRED FOR COAX).
2. CONTRACTOR SHALL RESTORE THE TRENCH TO ITS ORIGINAL CONDITIONS BY EITHER SEEDING OR SODDING GRASS AREAS, OR REPLACING ASPHALT OR CONCRETE AREAS TO ITS ORIGINAL CROSS SECTION.

1 TYP CIENA 3911 SPECIFICATIONS

SCALE: NTS

3 TYP TRENCH DETAIL

SCALE: NTS



4 TYP CONDUIT ALONG CONCRETE DETAIL

SCALE: NTS

2 UNISTRUT FRAME DETAIL

11x17 SCALE: 3/8" = 1'-0"

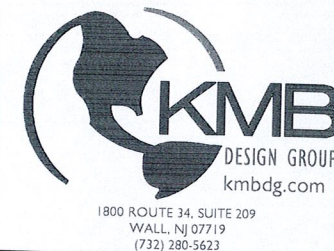
24x36 SCALE: 3/4" = 1'-0"

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1	05-21-13	REVISED PER CLIENT COMMENTS	JRF	KCD
2	03-27-13	ISSUED FOR CONSTRUCTION	DTP	KCD
REV.	DATE	REVISION DESCRIPTION	DRAWN BY	CHKD. BY



Stephen A. Bray
PROFESSIONAL ENGINEER



CT LICENSE: 26657 5/21/13

PROJECT NUMBER:
332.1541

SITE INFORMATION:
162 BIRDSEYE ROAD
SHELTON, CT 06484
FAIRFIELD COUNTY

CT73XC004

DESIGN TYPE:
RAW LAND

DRAWN BY: CCR CHECKED BY: DATE: 04-09-12

SHEET TITLE:
DETAILS

SHEET NUMBER: REV.:

C07B

1

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GENERAL SPECIFICATIONS

- Contractor shall verify that the total number of service entrance disconnects in the existing utility company pedestal must not exceed six. If the new service added exceeds this value, contractor must coordinate with the utility company and authority having jurisdiction. Run an additional exclusive and dedicated service lateral set for the new load added to the compound as per NEC Article # 230-2(B)
- All work should be done in a neat workmanlike manner, left clean and free from defects, and completely operable. The contractor shall provide all equipment as scheduled on the drawings. All materials shall be new and all work and materials shall be guaranteed by the contractor for a period of one (1) year from the date of acceptance by the owner.
- All work shall be carefully coordinated with the landlord and all trades involved, and the contractor shall provide proper connections, fittings, valves, piping, etc. for all equipment furnished by carrier or other trades involved in this contract.
- Contractor shall inform the engineer immediately of any conflict discovered before performing any work related to such conflict.
- Provide all required temporary utilities and pay all associated fees and operating costs.
- Before submitting this bid, the contractor shall visit the job site to examine and fully acquaint himself with the existing job conditions, paying particular attention to the location of existing conditions to make a complete and operable system without additional cost to the carrier or the engineer.
- Obtain all permits and approvals from authorities having jurisdiction and paying all fees required.
- Label all equipment served from Sprint panelboard with phenolic labels sized in relation to usage.
- Contractor to provide and install engraved label on the Sprint meter socket enclosure.
- Redlined As-Builts are to be delivered to a Sprint representative.
- The equipment/protections must be rated for standard of AIC rate higher than incoming equipment and/or utility company AIC rate.

GROUNDING NOTES

- The subcontractor is responsible for properly sequencing grounding and underground conduit installation as to prevent any loss of continuity in the grounding system or damage to the conduit.
- All exterior ground conductors shall be #2 AWG solid tinned copper unless otherwise indicated.
- All ground connections above grade (interior & exterior) shall be formed using high press crimps.
- All ground connections below grade shall be exothermic (Cadweld).
- Connections to equipment and enclosures shall be made utilizing two-hole ground lugs with an antioxidant compound.
- Maximum resistance of the completed ground system shall not exceed 5 Ohms. Testing shall be performed in accordance with technical specification for facility grounding, using fall potential method.
- Where grounding connections are made to painted metal surfaces shall be scraped clean to bear metal to ensure proper contact. Surfaces shall be restored to match original finishes.
- Use of 90° bends in the protection grounding conductors shall be avoided when 45° bends can be adequately supported.
- Ground depth shall be 30" minimum below finished grade, or 6" below frost line, whichever is greater.

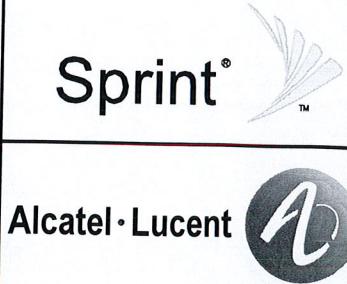
ELECTRICAL SYMBOLS		ABBREVIATIONS	
WIRING SYMBOLS		AWG	AMERICAN WIRE GAUGE
	DISCONNECT SWITCH	BCW	BARE COPPER WIRE
	METER	DWG	DRAWING
	CIRCUIT BREAKER	EMT	ELECTRICAL METALLIC TUBING
	CADWELD TYPE CONNECTION	GEN	GENERATOR
	COMPRESSION TYPE CONNECTION	MGB	MASTER GROUND BAR
	GROUND ROD WITH ACCESS	PVC	RIGID (SCH 40) PVC CONDUIT
	CHEMICAL GROUND ROD	RGS	RIGID GALVANIZED STEEL
	GROUND ROD	RWY	RACEWAY
	CONDUIT TURNING DOWN	TYP	TYPICAL
	CONDUIT TURNING UP		
	JUNCTION BOX		
	PULL BOX		
	CONDUIT RUNNING ABOVE GRADE		
	CONDUIT RUNNING UNDER GROUND		

ELECTRICAL SPECIFICATIONS

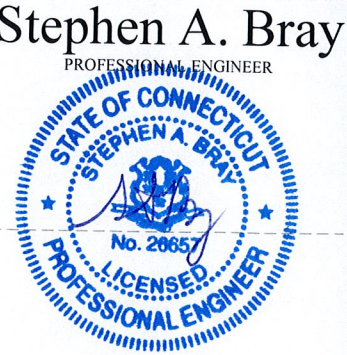
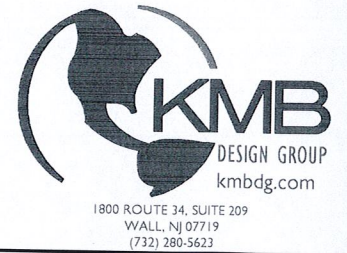
- General:
 - The electrical contractor shall furnish all labor, materials, tools, transportation equipment, services and facilities required for the complete, proper and substantial installation of all electrical work. All fixtures, devices, and equipment shown, noted or required on these drawings, and/or contained herein shall be connected from the source of electric power to the final connection, tested and made ready for satisfactory operation.
 - Service equipment shall be 120/240 VAC, 100 Amp, single phase, unless otherwise directed by the Sprint Construction Manager.
 - Unless otherwise indicated, the arrangement, position, connections, etc. shown on the drawings shall be taken on a diagram basis. The right is reserved by the engineer to make minor changes in locations and arrangements when required by job development without additional compensation to the contractor.
 - All work shall conform to the adopted edition of the National Electrical Code and local, state and applicable codes.
 - When a utility company meter is specified, the contractor shall obtain all associated cut-in cards, inspections, etc., necessary to have the meter set. It is the responsibility of the contractor to meet with utility company prior to construction to verify source of electric service, tap and meter location.
- Identification:
 - Provide typewritten directories for panels, indicating use of each branch circuit and designating spare circuits. Handwritten directories are not acceptable.
 - All panel boards, switches and other equipment enclosures shall bear engraved nameplates as manufactured by Seton Nameplate Corp., or equal lettering to be 1/2" white letters on black background unless noted otherwise.
- Raceways:
 - Minimum conduit size shall be 3/4" unless otherwise noted on the drawings.
 - Exposed raceways shall be run true, plumb, and parallel or perpendicular to building lines.
 - Conduit routings are schematic. Sub contractor shall install conduits so that access to equipment is not blocked.
- Wiring Methods:
 - All feeders shall consist of pulled conductors in conduit. All branch circuits shall consist of pulled conductors in conduit. Except 15 and 20 Ampere 1 pole lighting receptacles, miscellaneous branch circuits concealed above suspended ceilings or within dry walls shall consist of type MC metal clad cable if allowed by code. Connections to communications cabinets and vibrating equipment shall consist of pulled conductors in LFMC, maximum 6' in length.
 - Conductors shall be continuous from origin to panel or equipment without splices. Where tap splices are necessary and approved, they shall be made with suitable connectors in junction boxes.
 - Equipment ground conductors shall be provided for all feeders and branch circuits.
 - The contractor shall conceal all conduit routing passing through finished areas. Conduit routing through unfinished shall be supported as specified in drawings. Unless clearly specified, no conduits shall be routed on exterior surface of buildings.
 - All conductor terminals shall be U.L. listed for minimum of 75° C.
 - Provide fire stopping around all conduits at wall and floor penetrations.
 - Seal all exterior wall penetrations as required.
 - Underground conduits shall be a minimum of 24" below finished grade. All underground work shall be documented by photograph before any backfill is begun. Photos will be required at time punchlist is performed. Feeders shall be individual conductors in schedule 40 PVC, direct burial conduit. When buried conduits are subject to vehicular traffic, conduits shall be encased in concrete. All sweeps below grade shall be schedule 80 PVC.
 - All feeders in "damp" or "wet" locations shall consist of individual conductor in rigid galvanized steel or rigid aluminum conduit. Liquid-tight flexible metallic conduit shall be utilized when connecting to equipment cabinets and vibrating equipment. The maximum length for flexible conduit shall be 6'-0".
- Wiring Devices:
 - Switches, receptacles and other wiring devices shall be specification grade of type, size and rating indicated on the drawings.
- Disconnect Switches:
 - Switches shall be quick-make, quick-break NEMA 1 for indoor use and NEMA 3R for outdoor use as manufactured by General Electric, Square D or equal. Electrical contractor to provide all safety disconnects.
- Special Requirements:
 - The electrical contractor shall furnish and install all power and control wiring for equipment contained in contract documents.
 - All work requiring an outage or interruption of service (power, telephone) shall be scheduled only at such time permitted by owner.
- Lighting fixtures and lamps:
 - Lighting fixtures shall be furnished complete with necessary hardware and lamps.
- Transformers:
 - Transformers shall be dry type with average temperature rise not to exceed 150° C (115° C)(80° C)
- Transformers shall be as manufactured by Square D, General Electric, or Siemens.

The contractor is required to contact the utility companies prior to starting construction. This is necessary to reconfirm that the utility points have remained consistent with the contractor documents:

- * Telephone Demarcation Point
- * Electrical Service Tap Point
- * New Utility Meter Location

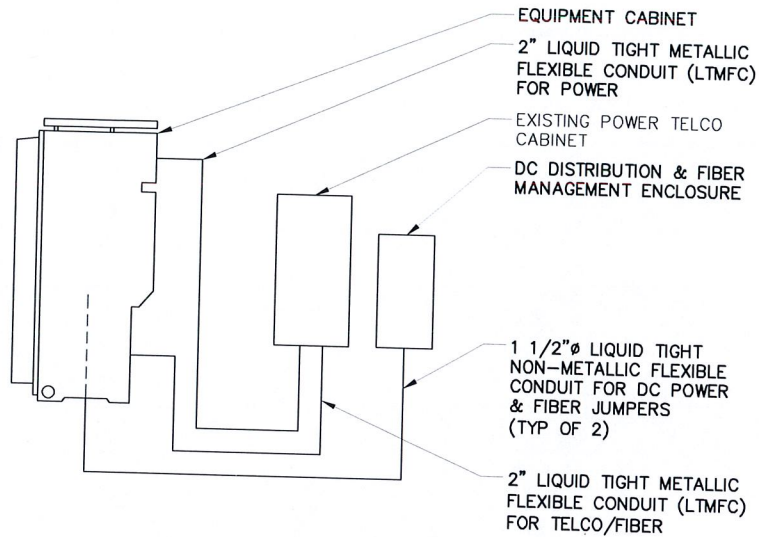


					
					
					
					
					
					
	05-21-13	REVISED PER CLIENT COMMENTS	JRF	KCD	
	03-27-13	ISSUED FOR CONSTRUCTION	DTP	KCD	
REV.	DATE	REVISION DESCRIPTION	DRAWN BY	CHKD. BY	



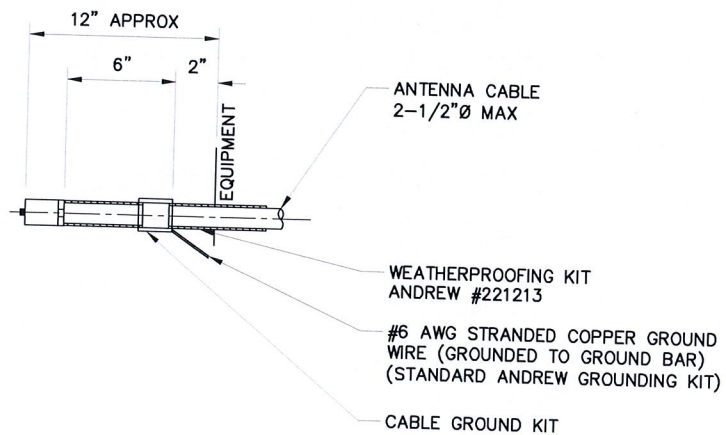
CT LICENSE: 26657		5/21/13	
PROJECT NUMBER: 332.1541			
SITE INFORMATION: 162 BIRDSEYE ROAD SHELTON, CT 06484 FAIRFIELD COUNTY CT73XC004			
DESIGN TYPE: RAW LAND			
DRAWN BY: CCR	CHECKED BY:	DATE: 04-09-12	
SHEET TITLE: ELECTRICAL NOTES			
SHEET NUMBER: E01		REV.: 1	

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1 PLUMBING SCHEMATIC (IF REQUIRED)

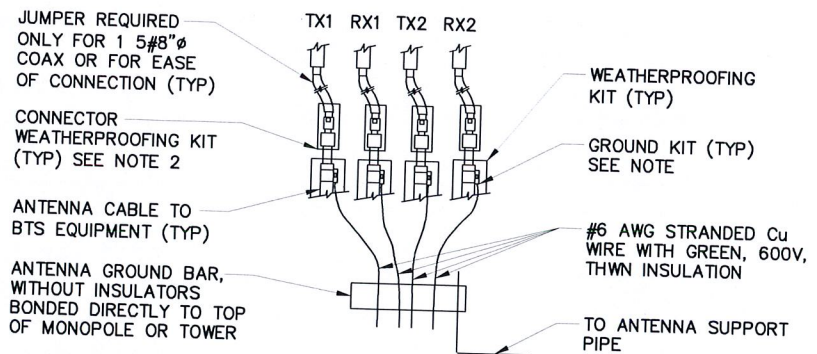
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NOTE:
DO NOT INSTALL CABLE GROUND KIT AT A BEND AND ALWAYS DIRECT GROUND WIRE DOWN TO GROUND BAR.

4 CABLE GROUND KIT CONNECTION DETAIL

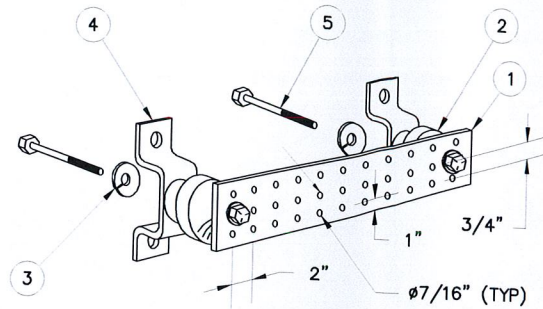
SCALE: NTS



NOTES:
1. DO NOT INSTALL CABLE GROUND KIT AT A BEND AND ALWAYS DIRECT GROUND WIRE DOWN TO ANTENNA GROUND BAR.
2. WEATHER PROOFING SHALL BE TWO-PART TAPE KIT. COLD SHRINK SHALL NOT BE USED.
3. ATTACH "DO NOT DISCONNECT" LABELS TO GROUND BARS. CAN USE BRASS TAG "DO NOT DISCONNECT" AT EACH COAX GROUND POINT OR BACK-A-LITE PLATE ON GROUND BAR.

7 GROUND BAR TO GROUND WIRE CONNECTION DETAIL

SCALE: NTS



1. GALVANIZED STEEL GROUND BAR, 1/4" x 4" x 20", HAGER PART NO TGBI-14420C OR A.L.T. PART NO. 382227. HOLE CENTERS TO MATCH NEMA DOUBLE LUG CONFIGURATION.
2. INSULATORS, NEWTON INSTRUMENT CAT. NO. 3061-4.
3. 5/8" LOCKWASHERS, NEWTON INSTRUMENT CO. CAT. NO. 3015-8.
4. WALL MOUNTING BRACKET, NEWTON INSTRUMENT CO. CAT NO. A-6056.
5. 5/8-11 x 1" H.H.C.S.BOLTS, NEWTON INSTRUMENT CO. CAT NO. 3012-1

2 GROUND BAR DETAIL

SCALE: NTS

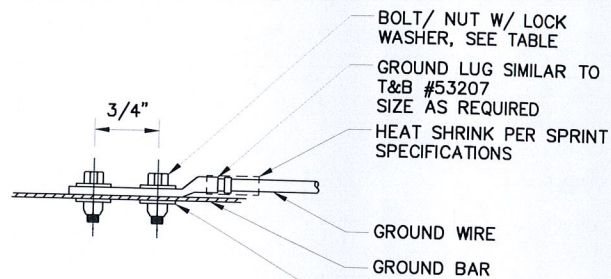
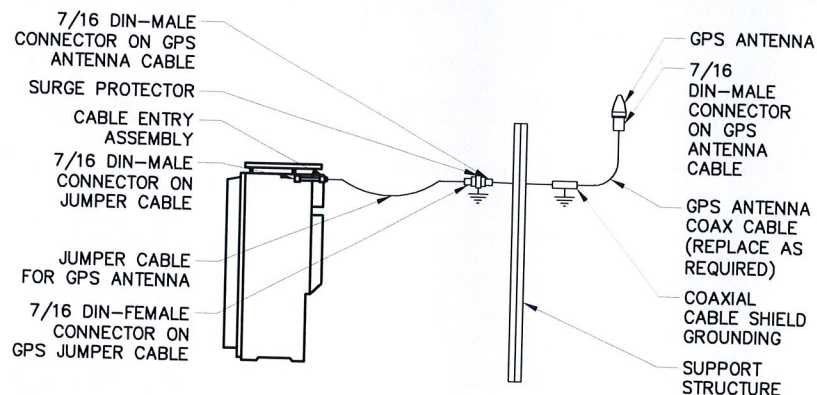


TABLE		
WIRE SIZE	LUG #	BOLT SIZE
#4/0	53212	1/2" - 20 NC x 1/2" S.S. BOLT & NUT W/ LOCK WASHERS
#2	53207	1/4" - 20 NC x 1/2" S.S. BOLT & NUT W/ LOCK WASHERS
#6	53205	

STANDARD LOCK WASHERS SHALL BE USED ON GROUND BARS, SERRATED "DRAGON TOOTH" LOCK WASHERS SHALL BE USED ON CONNECTIONS TO BUILDING STEEL AND MISCELLANEOUS METALS.

5 GROUND LUG CONNECTION DETAIL

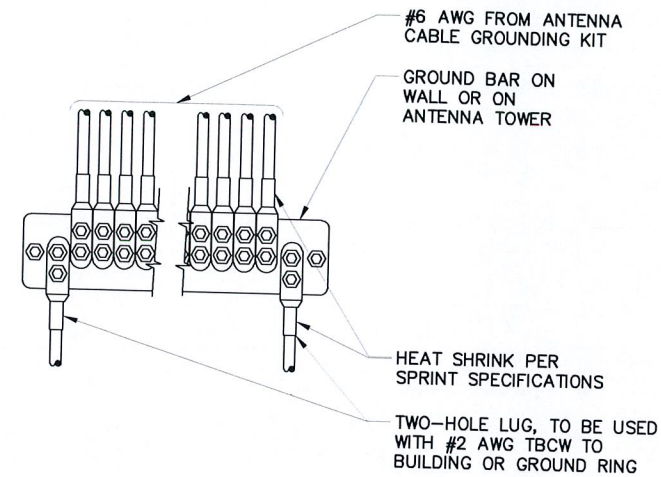
SCALE: NTS



NOTES:
1. GPS SURGE NEEDS TO BE INSTALLED AWAY FROM, AND SEPARATE FROM THE MMBTS CABINET.
2. THE JUMPERS ARE DESIGNED TO BE INSTALLED BEFORE / AFTER THE GPS SURGE.
3. THE GPS SURGE NEEDS TO BE CONNECTED TO THE GROUND SYSTEM VIA A GROUND LEAD.
4. CONTRACTOR TO SWEEP EXISTING COAX AND REPLACE AS REQUIRED.

8 GPS SURGE ARRESTOR & GROUNDING SCHEMATIC

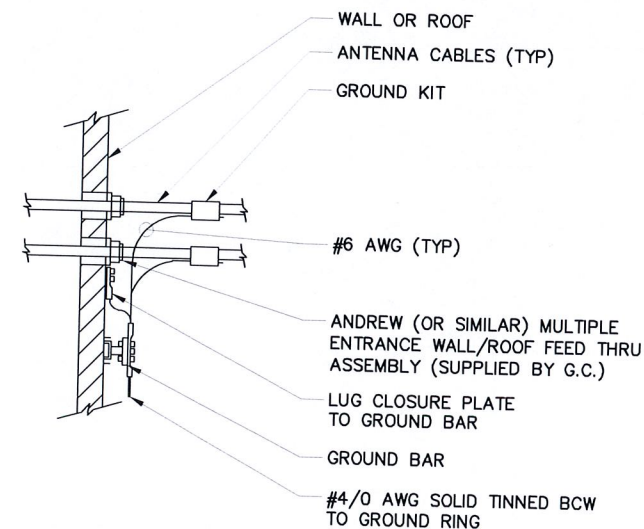
SCALE: NTS



NOTE:
CONTRACTOR TO UTILIZE KOPR-SHIELD (THOMAS & BETTS) ON ALL LUG CONNECTIONS

3 GROUND LUG TO GROUND BAR CONNECTION DETAIL

SCALE: NTS



6 CABLE GROUNDING DETAIL

SCALE: NTS

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REV.	DATE	REVISION DESCRIPTION	DRAWN BY	CHKD. BY
1	05-21-13	REVISED PER CLIENT COMMENTS	JRF	KCD
0	03-27-13	ISSUED FOR CONSTRUCTION	DTP	KCD

KMB DESIGN GROUP
kmbdg.com
1800 ROUTE 34, SUITE 209
WALL, NJ 07719
(732) 280-5623

Stephen A. Bray
PROFESSIONAL ENGINEER



CT LICENSE: 26657 5/21/13

PROJECT NUMBER:
332.1541

SITE INFORMATION:
162 BIRDSEYE ROAD
SHELTON, CT 06484
FAIRFIELD COUNTY

CT73XC004

DESIGN TYPE:
RAW LAND

DRAWN BY: CCR CHECKED BY: DATE: 04-09-12

SHEET TITLE:
ELECTRICAL & GROUNDING DETAILS

SHEET NUMBER: REV.:

E02

1

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BILL OF MATERIAL - MONOPOLE REINFORCEMENT

MARK NO.	DESCRIPTION	SIZE	QTY
RB-01	REINFORCING BAR 01	A572-50 $\bar{R}$ 1 1/2" x 6" x 8'-9"	4
TSP-01	TRANSITION STIFFENER PLATE	A572-50 $\bar{R}$ 1" x 6 3/4" x 3' 6"	8
BPE-01	BASE PLATE EXTENSION 01	A572-50 $\bar{R}$ 3 1/4"	4
SB	STITCH BOLT (AJAX)*	20-mm $\varnothing$ - STANDARD LENGTH ONESIDE W/ 30-mm $\varnothing$ SLEEVE	96
	WELD ELECTRODE	E70XX	TBD

- NOTES:
1. LABEL BARS WITH BAR #.
 2. BARS ARE TO BE ASTM A572 GRADE 50 STEEL & HOT-DIP GALVANIZED.
 3. HOLES IN BARS ARE 31mm $\varnothing$ & DIMENSIONED TO CENTERS.
 4. BOTTOM OF BARS ON LEFT AS SHOWN.
 5. SEE SLEEVE CHART FOR AJAX SLEEVE SIZE AND QUANTITY.

* = A325 1 1/8" $\varnothing$ MAY BE USED.

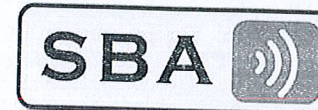
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BILL OF MATERIAL - AJAX SLEEVE

SLEEVE SIZE	QTY
30-mm $\varnothing$ x 1.75"	96

NOTE:
1. 15'-6" $\pm$ TOTAL NEEDED.

PLANS PREPARED FOR:



5900 BROKEN SOUND PARKWAY NW
BOCA RATON, FL 33487-2797
(919) 557-0555

PROJECT INFORMATION:

SHELTON-NORTH
CT46133-A

5505 DEWEY AVE
SHELTON, CT 06484
(FAIRFIELD COUNTY)

PLANS PREPARED BY:



2002 PRODUCTION DRIVE
APEX, NC 27539
OFFICE: (888) 321-6167
www.verticalsolutions-inc.com

1	03-15-13	CONSTRUCTION
0	03-14-13	CONSTRUCTION
REV	DATE	ISSUED FOR:

DRAWN BY: JWM CHECKED BY: KCI

SHEET TITLE:

BILL OF MATERIALS

SHEET NUMBER:	REVISION:
B-1	1
	VSI #: 130074

SEAL:



March 15, 2013

GENERAL NOTES:

1. ALL REFERENCES TO TOWER OWNER IN THESE DOCUMENTS SHALL BE CONSIDERED AS SBA COMMUNICATIONS CORPORATION OR ITS DESIGNATED REPRESENTATIVE.
2. ALL WORK PRESENTED ON THESE DRAWINGS MUST BE COMPLETED BY THE CONTRACTOR UNLESS NOTED OTHERWISE. THE CONTRACTOR MUST HAVE CONSIDERABLE EXPERIENCE IN PERFORMANCE OF WORK SIMILAR TO THAT DESCRIBED HEREIN. BY ACCEPTANCE OF THIS ASSIGNMENT, THE CONTRACTOR IS ATTESTING THAT HE DOES HAVE SUFFICIENT EXPERIENCE AND ABILITY, THAT HE IS KNOWLEDGEABLE OF THE WORK TO BE PERFORMED AND THAT HE IS PROPERLY LICENSED AND PROPERLY REGISTERED TO DO THIS WORK IN THE STATE OF CONNECTICUT.
3. THE STRUCTURE IS DESIGNED IN ACCORDANCE WITH TIA/EIA-222-F-1996, FOR A 85 MPH FASTEST MILE BASIC WIND SPEED. ALL WORK SHALL BE COMPLETED IN ACCORDANCE WITH THE CONNECTICUT STATE BUILDING CODE, 2005 EDITION.
4. UNLESS SHOWN OR NOTED OTHERWISE ON THE CONTRACT DRAWINGS, OR IN THE SPECIFICATIONS, THE FOLLOWING NOTES SHALL APPLY TO THE MATERIALS LISTED HEREIN, AND TO THE PROCEDURES TO BE USED ON THIS PROJECT.
5. ALL PRODUCT MANUFACTURER'S INSTRUCTIONS SHALL BE FOLLOWED EXACTLY AND SHALL SUPERCEDE ANY CONFLICTING NOTES ENCLOSED HEREIN.
6. IT IS THE CONTRACTOR'S SOLE RESPONSIBILITY TO DETERMINE MODIFICATION PROCEDURE AND SEQUENCE TO INSURE THE SAFETY OF THE STRUCTURE AND IT'S COMPONENT PARTS DURING ERECTION AND/OR FIELD MODIFICATIONS. THIS INCLUDES, BUT IS NOT LIMITED TO, THE ADDITION OF TEMPORARY BRACING, GUYS OR TIE-DOWNS THAT MAY BE NECESSARY, SUCH MATERIAL SHALL BE REMOVED AND SHALL REMAIN THE PROPERTY OF THE CONTRACTOR AFTER THE COMPLETION OF THE PROJECT.
7. ALL DIMENSIONS, ELEVATIONS, AND EXISTING CONDITIONS SHOWN ON THE DRAWINGS SHALL BE FIELD VERIFIED BY THE CONTRACTOR PRIOR TO BEGINNING ANY MATERIALS ORDERING, FABRICATION OR CONSTRUCTION WORK ON THIS PROJECT. CONTRACTOR SHALL NOT SCALE CONTRACT DRAWINGS IN LIEU OF FIELD VERIFICATION. ANY DISCREPANCIES SHALL BE IMMEDIATELY BROUGHT TO THE ATTENTION OF THE OWNER AND THE OWNER'S ENGINEER. THE DISCREPANCIES MUST BE RESOLVED BEFORE THE CONTRACTOR IS TO PROCEED WITH THE WORK. THE CONTRACT DOCUMENTS DO NOT INDICATE THE METHOD OF CONSTRUCTION. THE CONTRACTOR SHALL SUPERVISE AND DIRECT THE WORK AND SHALL BE SOLELY RESPONSIBLE FOR ALL CONSTRUCTION MEANS, METHODS, TECHNIQUES, SEQUENCES, AND PROCEDURES. OBSERVATION VISITS TO THE SITE BY THE OWNER AND/OR THE ENGINEER SHALL NOT INCLUDE INSPECTION OF THE PROTECTIVE MEASURES AND PROCEDURES.
8. ALL MATERIALS AND EQUIPMENT FURNISHED SHALL BE NEW AND OF GOOD QUALITY, FREE FROM FAULTS AND DEFECTS AND IN COMFORMANCE WITH THE CONTRACT DOCUMENTS. ANY AND ALL SUBSTITUTIONS MUST BE PROPERLY APPROVED AND AUTHORIZED IN WRITING BY THE OWNER AND ENGINEER PRIOR TO INSTALLATION. THE CONTRACTOR SHALL FURNISH SATISFACTORY EVIDENCE AS TO THE KIND AND QUALITY OF THE MATERIALS AND EQUIPMENT BEING SUBSTITUTED.
9. THE CONTRACTOR SHALL BE RESPONSIBLE FOR INITIATING, MAINTAINING AND SUPERVISING ALL SAFETY PRECAUTIONS AND PROGRAMS IN CONNECTION WITH THE WORK. THE CONTRACTOR IS RESPONSIBLE FOR INSURING THAT THIS PROJECT AND RELATED WORK COMPLIES WITH ALL APPLICABLE AND LOCAL, STATE, AND FEDERAL SAFETY CODES AND REGULATIONS GOVERNING THIS WORK.
10. ACCESS TO THE PROPOSED WORK SITE MAY BE RESTRICTED. THE CONTRACTOR SHALL COORDINATE INTENDED CONSTRUCTION ACTIVITY, INCLUDING WORK SCHEDULE AND MATERIALS ACCESS, WITH THE RESIDENT LEASING AGENT FOR APPROVAL.
11. BILL OF MATERIALS AND PART NUMBERS LISTED ON THE CONSTRUCTION DRAWINGS ARE INTENDED TO AID THE CONTRACTOR/OWNER. CONTRACTOR/OWNER SHALL VERIFY PARTS AND QUANTITIES WITH THE MANUFACTURER PRIOR TO BIDDING AND/OR ORDERING MATERIALS.
12. CONTRACTOR SHALL SECURE ALL NECESSARY PERMITS FOR THIS PROJECT FROM ALL APPLICABLE GOVERNING AGENCIES.
13. ALL PERMITS THAT MUST BE OBTAINED ARE THE RESPONSIBILITY OF THE CONTRACTOR. THE CONTRACTOR WILL BE RESPONSIBLE FOR ABIDING BY ALL CONDITIONS AND REQUIREMENTS OF THE PERMITS.
14. 24 HOURS BEFORE THE BEGINNING OF ANY CONSTRUCTION, THE CONTRACTOR MUST NOTIFY THE APPLICABLE JURISDICTIONAL (STATE, COUNTY OR CITY) ENGINEER.
15. THE CONTRACTOR SHALL REWORK (DRY, SCARIFY, ETC.) ALL MATERIAL NOT SUITABLE FOR SUBGRADE IN ITS PRESENT STATE. IF THE MATERIAL REMAINS UNSUITABLE AFTER REWORKING, THE CONTRACTOR SHALL UNDERCUT THIS MATERIAL AND REPLACE IT WITH APPROVED MATERIAL. IF PAVING IS TO BE DONE, ALL SUBGRADES SHALL BE PROOFROLLED WITH A FULLY LOADED TANDEM AXLE DUMP TRUCK PRIOR TO PAVING. ANY SOFT MATERIAL SHALL BE REWORKED OR REPLACED.
16. THE CONTRACTOR IS REQUIRED TO MAINTAIN ALL PIPES, DITCHES, AND OTHER DRAINAGE STRUCTURES FREE FROM OBSTRUCTION UNTIL WORK IS ACCEPTED BY THE OWNER. THE CONTRACTOR IS RESPONSIBLE FOR ANY DAMAGES CAUSED BY FAILURE TO MAINTAIN DRAINAGE STRUCTURE IN OPERABLE CONDITION.
17. ALL MATERIALS AND WORKMANSHIP SHALL BE WARRANTED FOR ONE YEAR FROM ACCEPTANCE DATE.
18. ALL DIMENSIONS SHALL BE VERIFIED WITH THE PLANS (LATEST REVISION) PRIOR TO COMMENCING CONSTRUCTION. THE OWNER SHALL HAVE A SET OF APPROVED PLANS AVAILABLE AT THE SITE AT ALL TIMES WHILE WORK IS BEING PERFORMED. A DESIGNATED RESPONSIBLE EMPLOYEE SHALL BE AVAILABLE FOR CONTACT BY GOVERNING AGENCY INSPECTORS.

STRUCTURAL STEEL NOTES:

1. THE FABRICATION AND ERECTION OF STRUCTURAL STEEL SHALL CONFORM TO THE AISC SPECIFICATION FOR THE MANUAL OF STEEL CONSTRUCTION, LOAD AND RESISTANCE FACTOR DESIGN, 13TH EDITION.
2. UNLESS OTHERWISE NOTED, ALL STRUCTURAL ELEMENTS SHALL CONFORM TO THE FOLLOWING REQUIREMENTS:
A. ALL SHAPES SHALL BE ASTM A572-50, PLATES A572-65, TUBES A500-C, PIPES A500-C
B. ALL BOLTS SHALL BE GALVANIZED A325 HIGH STRENGTH BOLTS.
C. ALL NUTS SHALL BE CARBON AND ALLOY STEEL NUTS.
D. ALL WASHERS SHALL BE ASTM F436 HARDENED STEEL WASHERS.
3. ALL CONNECTIONS NOT FULLY DETAILED ON THESE PLANS SHALL BE DETAILED BY THE FABRICATOR IN ACCORDANCE WITH AISC SPECIFICATION FOR MANUAL OF STEEL CONSTRUCTION, LOAD AND RESISTANCE FACTOR DESIGN, 13TH EDITION.
4. HOLES SHALL NOT BE FLAME CUT THRU STEEL UNLESS APPROVED BY THE ENGINEER.
5. HOT-DIP GALVANIZE ALL ITEMS UNLESS OTHERWISE NOTED, AFTER FABRICATION WHERE PRACTICABLE. GALVANIZING: ASTM A123, ASTM A153/153M OR ASTM A653/653M, G90, AS APPLICABLE.
6. REPAIR DAMAGED SURFACES WITH GALVANIZING REPAIR METHOD AND PAINT CONFORMING TO ASTM OR BY APPLICATION OF STICK OR THICK PASTE MATERIAL SPECIFICALLY DESIGNED FOR REPAIR OF GALVANIZING. CLEAN AREAS TO BE REPAIRED AND REMOVE SLAG FROM WELDS. HEAT SURFACES TO WHICH STICK OR PASTE MATERIAL IS APPLIED, WITH A TORCH, TO A TEMPERATURE SUFFICIENT TO MELT THE METALLICS IN STICK OR PASTE; SPREAD MOLTEN MATERIAL UNIFORMLY OVER SURFACES TO BE COATED AND WIPE OFF EXCESS MATERIAL.
7. A NUT LOCKING DEVICE SHALL BE INSTALLED ON ALL PROPOSED AND/OR REPLACED BOLTS.
8. ALL PROPOSED AND/OR REPLACED BOLTS SHALL BE OF SUFFICIENT LENGTH TO EXCLUDE THE THREADS FROM THE SHEAR PLANE.
9. ALL PROPOSED AND/OR REPLACED BOLTS SHALL BE OF SUFFICIENT LENGTH SUCH THAT THE END OF THE BOLT BE AT LEAST FLUSH WITH THE FACE OF THE NUT. IT IS NOT PERMITTED FOR THE BOLT END TO BE BELOW THE FACE OF THE NUT AFTER TIGHTENING IS COMPLETED.
10. DO NOT OVER TORQUE ASSEMBLY BOLTS. GALVANIZING ON BOLT NUTS AND STEEL PARTS MAY ACT AS A LUBRICANT, THUS OVER TIGHTENING MAY OCCUR AND MAY CAUSE BOLTS TO CRACK AND SNAP OFF.

BOLT TIGHTENING PROCEDURE:

1. TIGHTEN FLANGE BOLTS BY AISC- "TURN OF THE NUT" METHOD, USING THE CHART BELOW:

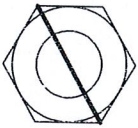
BOLT LENGTHS UP TO AND INCLUDING FOUR DIA.		
3/4"	BOLTS UP TO AND INCLUDING 4.0 LENGTH	+1/3 TURN BEYOND SNUG TIGHT
7/8"	BOLTS UP TO AND INCLUDING 3.5 LENGTH	+1/3 TURN BEYOND SNUG TIGHT
1"	BOLTS UP TO AND INCLUDING 4.0 LENGTH	+1/3 TURN BEYOND SNUG TIGHT
1-1/8"	BOLTS UP TO AND INCLUDING 4.5 LENGTH	+1/3 TURN BEYOND SNUG TIGHT
1-1/4"	BOLTS UP TO AND INCLUDING 5.0 LENGTH	+1/3 TURN BEYOND SNUG TIGHT
1-1/2"	BOLTS UP TO AND INCLUDING 6.0 LENGTH	+1/3 TURN BEYOND SNUG TIGHT

BOLT LENGTH OVER FOUR DIA. BUT NOT EXCEEDING 8 DIA.		
3/4"	BOLTS 4.25 TO 6.0 INCH LENGTH	+1/2 TURN BEYOND SNUG TIGHT
7/8"	BOLTS 3.75 TO 7.0 INCH LENGTH	+1/2 TURN BEYOND SNUG TIGHT
1"	BOLTS 4.25 TO 8.0 INCH LENGTH	+1/2 TURN BEYOND SNUG TIGHT
1-1/8"	BOLTS 4.75 TO 9.0 INCH LENGTH	+1/2 TURN BEYOND SNUG TIGHT
1-1/4"	BOLTS 5.25 TO 10.0 INCH LENGTH	+1/2 TURN BEYOND SNUG TIGHT
1-1/2"	BOLTS 6.25 TO 12.0 INCH LENGTH	+1/2 TURN BEYOND SNUG TIGHT

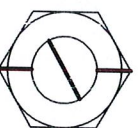
2. SPLICE BOLTS SUBJECT TO DIRECT TENSION SHALL BE INSTALLED AND TIGHTENED AS PER SECTION 8(d)(1) OF THE AISC MANUAL OF STEEL CONSTRUCTION. THE INSTALLATION PROCEDURE IS PARAPHRASED AS FOLLOWS:

"FASTENERS SHALL BE INSTALLED IN PROPERLY ALIGNED HOLES AND BE TIGHTENED BY ONE OF THE METHODS DESCRIBED IN SUBSECTION 8(d)(1) THROUGH 8(d)(4).

8(d)(1) TURN-OF-THE-NUT TIGHTENING.
BOLTS SHALL BE INSTALLED IN ALL HOLES OF THE CONNECTION AND BROUGHT TO A SNUG TIGHT CONDITION. SNUG TIGHT IS DEFINED AS THE TIGHTNESS THAT EXISTS WHEN THE PLIES OF A JOINT ARE IN FIRM CONTACT. THIS MAY BE OBTAINED BY A FEW IMPACTS OF AN IMPACT WRENCH OR THE FULL EFFORT OF A MAN USING AN ORDINARY SPUD WRENCH. SNUG TIGHTENING SHALL PROGRESS SYSTEMATICALLY...UNTIL ALL THE BOLTS ARE SIMULTANEOUSLY SNUG TIGHT AND THE CONNECTION IS FULLY COMPACTED. FOLLOWING THIS INITIAL OPERATION ALL BOLTS IN THE CONNECTION SHALL BE TIGHTENED FURTHER BY THE APPLICABLE AMOUNT OF ROTATION SPECIFIED ABOVE. DURING THE TIGHTENING OPERATION THERE SHALL BE NO ROTATION OF THE PART NOT TURNED BY THE WRENCH. TIGHTENING SHALL PROGRESS SYSTEMATICALLY.

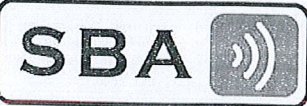


BEFORE 1/3 TURN



AFTER 1/3 TURN

PLANS PREPARED FOR:



5900 BROKEN SOUND PARKWAY NW
BOCA RATON, FL 33487-2797
(919) 557-0555

PROJECT INFORMATION:

SHELTON-NORTH

CT46133-A

5505 DEWEY AVE
SHELTON, CT 06484
(FAIRFIELD COUNTY)

PLANS PREPARED BY:



2002 PRODUCTION DRIVE
APEX, NC 27539
OFFICE: (888) 321-6167
www.verticalsolutions-inc.com

0	03-14-13	CONSTRUCTION
REV	DATE	ISSUED FOR:

DRAWN BY: JWM CHECKED BY: KCI

SHEET TITLE:

PROJECT NOTES

SHEET NUMBER:	REVISION:
N-1	0
VSI #: 130074	

SEAL:



APPLICABLE CODES AND STANDARDS

1. TIA/EIA STRUCTURAL STANDARDS FOR STEEL ANTENNA TOWERS AND ANTENNA SUPPORTING STRUCTURES, 222-F-2005 EDITION.
2. 2005 CONNECTICUT STATE BUILDING CODE.
3. ACI 318: AMERICAN CONCRETE INSTITUTE, BUILDING CODE REQUIREMENTS FOR STRUCTURAL CONCRETE, 318-99.
4. CRSI: CONCRETE REINFORCING STEEL INSTITUTE, MANUAL OF STANDARD PRACTICE, LATEST EDITION.
5. AISC: AMERICAN INSTITUTE OF STEEL CONSTRUCTION, MANUAL OF STEEL CONSTRUCTION, LATEST EDITION.
6. AWS: AMERICAN WELDING SOCIETY D1.1, STRUCTURAL WELDING CODE, LATEST EDITION.

STRUCTURAL STEEL

1. ALL DETAILING, FABRICATION AND ERECTION OF STRUCTURAL STEEL SHALL CONFORM TO THE AISC SPECIFICATIONS, LATEST EDITION.
2. ALL EXPOSED STRUCTURAL STEEL MEMBERS SHALL BE HOT-DIPPED GALVANIZED AFTER FABRICATION PER ASTM A123. EXPOSED STEEL HARDWARE AND ANCHOR BOLTS SHALL BE GALVANIZED PER ASTM A153 OR B695.
3. ALL U-BOLTS SHALL BE ASTM A307 OR EQUIVALENT, WITH LOCKING DEVICE, UNLESS NOTED OTHERWISE.

WELDING

1. ALL WELDING SHALL BE PERFORMED BY WELDERS CURRENTLY STATE OR AWS CERTIFIED TO THE AWS D1.1 STRUCTURAL WELDING CODE, LATEST EDITION.
2. ALL FIELD WELDING SHALL UTILIZE LOW HYDROGEN ELECTRODES.
3. PRIOR TO FIELD WELDING, GRIND OFF GALVANIZING TO 1/2" BEYOND ALL FIELD WELD SURFACES.
4. ALL FIELD CUT, FIELD WELDED, OR DAMAGED GALVANIZING SURFACES SHALL BE REPAIRED WITH ZINC RICH PAINT (95% ZINC CONTENT) PER ASTM A780.
5. PRIOR TO FIELD WELDING, CONTRACTOR SHALL CLEAR THE INTERIOR OF MONOPOLE OF FLAMMABLE DEBRIS. COAXIAL CABLE SHALL BE SHIFTED AWAY FROM PROXIMITY OF THE WELD AND/OR COVERED WITH A HEAT RESISTANT BLANKET.

PAINT

1. CLEAN AND PAINT PROPOSED STEEL ACCORDING TO FAA ADVISORY CIRCULAR AC 70/7460-1K.

REINFORCEMENT STEEL

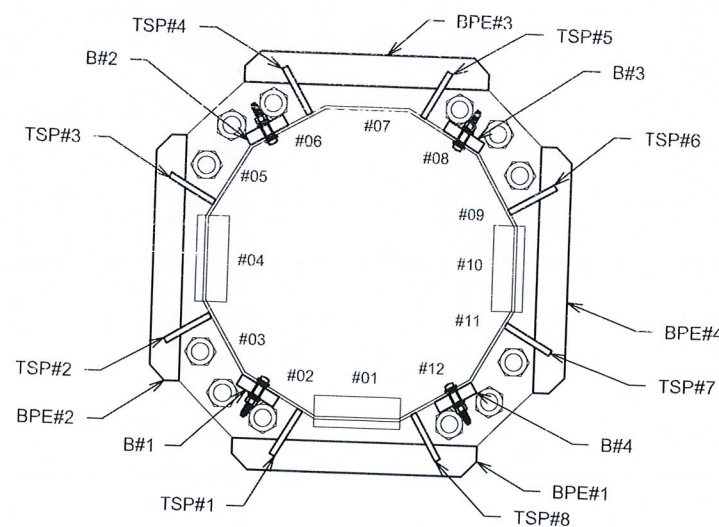
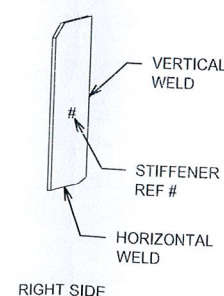
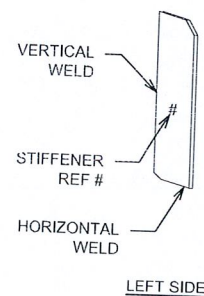
1. ALL REINFORCEMENT BARS ARE ASTM A572 GRADE 50, $F_y = 50$ ksi, $F_u = 65$ ksi.

FIELD WELDS

1. ALL FIELD WELDS SHALL BE MADE WITH E70XX WELD RODS.

GENERAL NOTES:

1. ALL METHODS, MATERIAL AND WORKMANSHIP SHALL FOLLOW THE DICTATES OF GOOD CONSTRUCTION PRACTICES.
2. ALL WORK INDICATED ON THESE DRAWINGS SHALL BE PERFORMED BY QUALIFIED CONTRACTORS EXPERIENCED IN TOWER AND FOUNDATION CONSTRUCTION.
3. THE CONTRACTOR SHALL NOTIFY THE ENGINEER OF RECORD IMMEDIATELY OF ANY INSTALLATION INTERFERENCES. ALL NEW WORK SHALL ACCOMMODATE EXISTING CONDITIONS. DETAILS NOT SPECIFICALLY SHOWN ON THE DRAWINGS SHALL FOLLOW SIMILAR DETAILS FOR THIS JOB.
4. ANY SUBSTITUTIONS MUST CONFORM TO THE REQUIREMENTS OF THE NOTES AND SPECIFICATIONS AND SHOULD BE SIMILAR TO THOSE SHOWN. ALL SUBSTITUTIONS SHALL BE SUBMITTED TO THE ENGINEER OF RECORD FOR REVIEW AND APPROVAL PRIOR TO FABRICATION.
5. ANY MANUFACTURED DESIGN ELEMENTS MUST CONFORM TO THE REQUIREMENTS OF THESE NOTES AND SPECIFICATIONS AND SHOULD BE SIMILAR TO THOSE SHOWN. THESE DESIGN ELEMENTS MUST BE STAMPED BY AN ENGINEER PROFESSIONALLY REGISTERED IN THE STATE OF THE PROJECT, AND SUBMITTED TO THE ENGINEER OF RECORD FOR APPROVAL PRIOR TO FABRICATION.
6. ALL WORK SHALL BE DONE IN ACCORDANCE WITH LOCAL CODES AND OSHA SAFETY REGULATIONS.
7. THE CONTRACTOR IS RESPONSIBLE FOR THE DESIGN AND EXECUTION OF ALL MISCELLANEOUS SHORING, BRACING, TEMPORARY SUPPORTS, ETC. NECESSARY TO PROVIDE A COMPLETE AND STABLE STRUCTURE AS SHOWN ON THESE DRAWINGS.
8. ANY STEEL WHICH HAS BEEN FIELD CUT OR WELDED SHALL BE COLD GALVANIZED WITH 95% ZINC RICH PAINT PER ASTM A780.
9. CONTRACTOR'S PROPOSED INSTALLATION SHALL NOT INTERFERE, NOR DENY ACCESS TO, ANY EXISTING OPERATIONAL AND SAFETY EQUIPMENT.



FIGURE

SPECIAL INSPECTION

1. A QUALIFIED INDEPENDENT TESTING LABORATORY, EMPLOYED BY THE OWNER, SHALL PERFORM INSPECTION AND TESTING IN ACCORDANCE WITH CTBC 2005, SECTION 1704 AS REQUIRED BY PROJECT SPECIFICATIONS FOR THE FOLLOWING CONSTRUCTION WORK:
 - a) STRUCTURAL WELDING
 - b) HIGH STRENGTH BOLTS
2. THE INSPECTION AGENCY SHALL SUBMIT INSPECTION AND TEST REPORTS TO THE BUILDING DEPARTMENT, THE ENGINEER OF RECORD, AND THE OWNER IN ACCORDANCE WITH CTBC 2005, SECTION 1704. UNLESS THE FABRICATOR IS APPROVED BY THE BUILDING OFFICIAL TO PERFORM SUCH WORK WITHOUT THE SPECIAL INSPECTIONS.

FIELD BOLTS

1. ALL STITCH, SPLICE & TERMINATION BOLTS ARE 20 mm ONESIDE BOLTS BY AJAX.
 - a) BOLTS SHALL MEET AS 1252, PROPERTRY CLASS 8.8 (SIMILAR TO ASTM A325M)
 - b) $F_u = 120$ ksi
2. EACH BOLT SHALL INCLUDE A 29 mm O.D. BY 20 mm I.D. SLEEVE ($F_u = 120$ ksi)
3. BOLT HOLES SHALL BE 31 mm MAXIMUM.

PHOTO CHECKLIST

1. CONTRACTOR SHALL SUBMIT THE FOLLOWING PHOTOS TO VERTICAL SOLUTIONS. IF PHOTOS DON'T MEET THE SATISFACTION OF OWNER OR ENGINEER OF RECORD, CONTRACTOR SHALL RETURN TO SITE AT HIS OWN EXPENSE TO OBTAIN ADDITIONAL PHOTOS. AS AN ALTERNATE, CONTRACTOR MAY RETAIN VERTICAL SOLUTIONS TO EXECUTE AN INSPECTION FOR A FEE. SBA MAY ALSO ELECT TO RETAIN VERTICAL SOLUTIONS IF CONTRACTOR SCHEDULE DOES NOT MEET PROJECT TIMELINES. CONTACT inspections@verticalsolutions-inc.com FOR FEE AMOUNT AND / OR SCHEDULE.

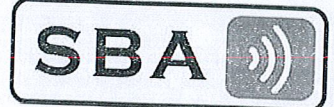
BAR REINFORCEMENT - SELF SUPPORTING POLE STRUCTURE

COMPLETE (Y/N)	PHOTOGRAPH(S) DESCRIPTION
	LABEL AND PHOTO EACH STIFFENER PLATE OF EACH SIDE AND BASE PATE EXTENSION AFTER WELDING AND PRIOR TO COLD GALVANIZING.
	LABEL AND PHOTO EACH STIFFENER PLATE OF EACH SIDE AND BASE PLATE EXTENSION AFTER COLD GALVANIZING.
	BOTTOM OF B#1 TO B#4, INCLUDING ALL TERMINATION. MAKE SURE RB'S ARE LABELED PER FIGURE BELOW.
	FULL ELEVATION OF B#1 TO B#4, INCLUDING FULL LENGTH OF BAR.
	TOP OF B#1 TO B#4, INCLUDING ALL TERMINATION BOLTS.

NOTES:

1. MAKE SURE ALL FASTENERS ARE CLEARLY MARKED AND TURNED PER "BOLT TIGHTENING PROCEDURE".

PLANS PREPARED FOR:



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BOCA RATON, FL 33487-2797
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SHELTON, CT 06484
(FAIRFIELD COUNTY)

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DRAWN BY: JWM CHECKED BY: KCI

SHEET TITLE:

PROJECT NOTES

SHEET NUMBER: REVISION:

N-2

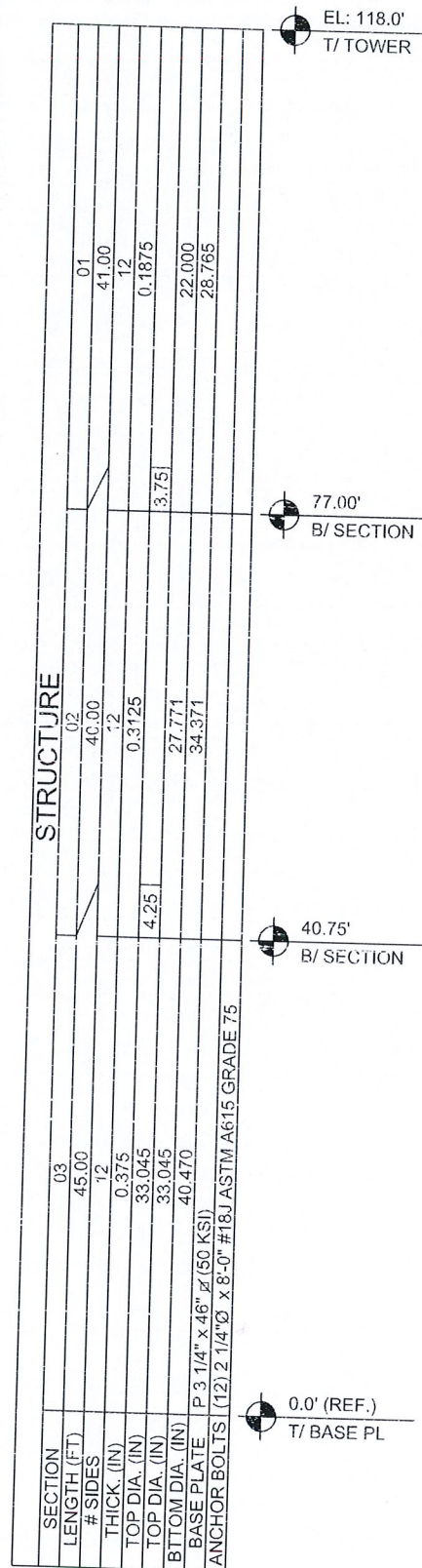
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VSI #: 130074

SEAL:



March 14, 2013



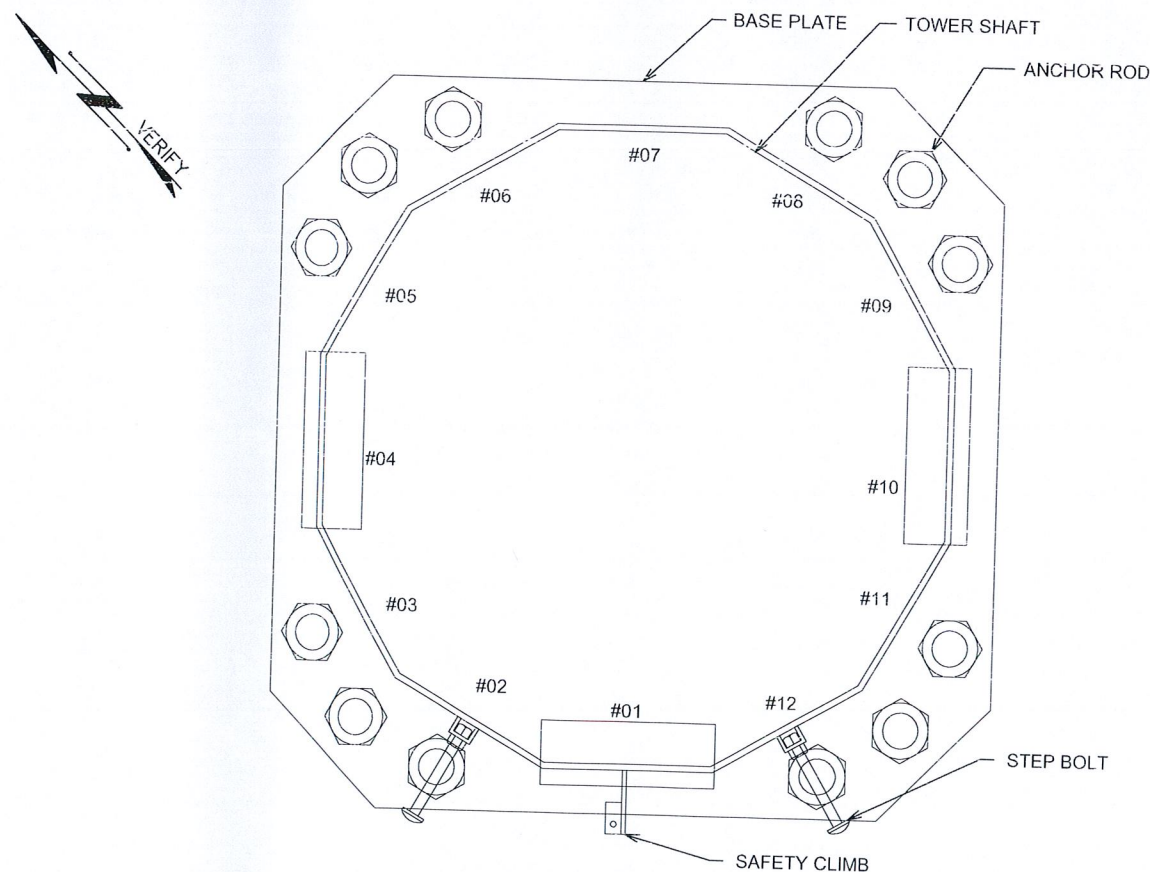
TOWER ELEVATION
SCALE: 1/16" = 1'

TOWER BY
SUMMIT MANUFACTURING, LLC
JOB NO. 12218
DATED NOVEMBER 15, 2000

FOUNDATION BY
SUMMIT MANUFACTURING, LLC
JOB NO. 12218
DATED MARCH 5, 2002

GEOTECHNICAL REPORT BY
DR. CLARENCE WELTO, P.E., P.C.
DATED JUNE 5, 2000

NOTE:
1. #XX DENOTES FLAT NUMBER



SECTION @ BASE 8.0'
SCALE: 1/2" = 1'-0"

MODIFICATION DESIGN PROVISIONS

THIS MODIFICATION DESIGN IS BASED ON VERTICAL SOLUTIONS STRUCTURAL ANALYSIS REPORT, VSI JOB # 130074, DATED MARCH 14, 2013. THIS REPORT IS BASED ON A SPECIFIC ANTENNA AND COAX CONFIGURATION, SEE THE REPORT FOR ANTENNA AND COAX LOADING. ANY OTHER ANTENNA CONFIGURATION REQUIRES REVIEW BY VERTICAL SOLUTIONS.

CONSTRUCTION INTERFERENCES

EXISTING AND PROPOSED ANTENNAS, MOUNTS, COAX, AND HAND-HOLE RIMS ARE NOT SHOWN FOR CLARITY. CONTRACTOR SHALL COORDINATE WITH THE TOWER OWNER WITH RESPECT TO INTERFERENCES TO REINFORCEMENT. CONTRACTOR SHALL FIELD VERIFY TOWER DIMENSION PRIOR TO FABRICATION.

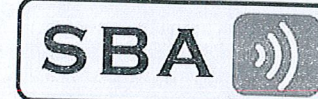
FIELD VERIFICATION

PRE MODIFICATION REPORT COMPLETED BY VERTICAL SOLUTIONS INC., JOB # 130074 DATED MARCH 7, 2013.

MODIFICATION SCHEDULE

NO.	MODIFICATION DESCRIPTION
1	INSTALL (4) BASE PLATE EXTENSIONS, SEE SHEET S-2.
2	INSTALL (8) TRANSITION STIFFENER PLATES, SEE SHEET S-2.
3	INSTALL (4) REINFORCING BARS, SEE SHEET S-3.
4	CONTRACTOR SHALL PROVIDE CONSTRUCTION PROGRESS PHOTOS, AS WELL AS PROJECT COMPLETION PHOTOS, ALONG WITH STEEL & CONCRETE CERTIFICATION FOR VERTICAL SOLUTIONS, INC. TO COMPLETE A POST MODIFICATION LETTER, SEE SHEET N-2.

PLANS PREPARED FOR:



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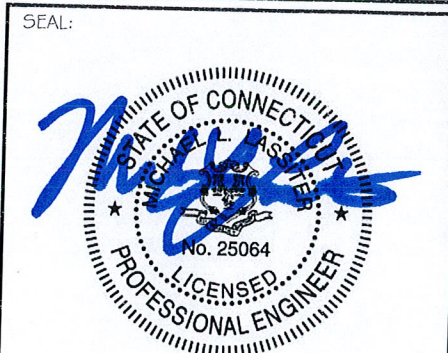
DRAWN BY: JWM CHECKED BY: KCI

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

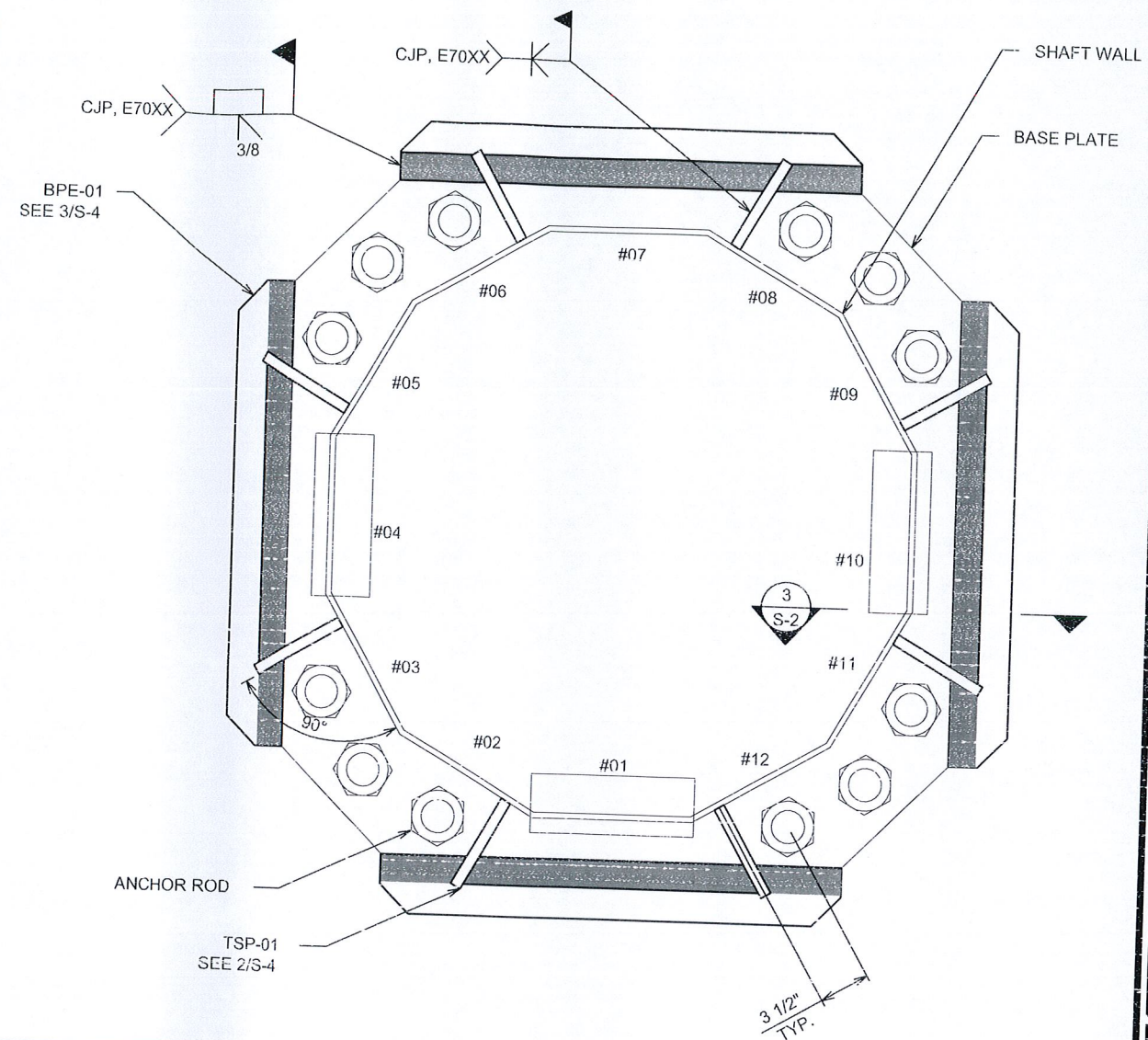
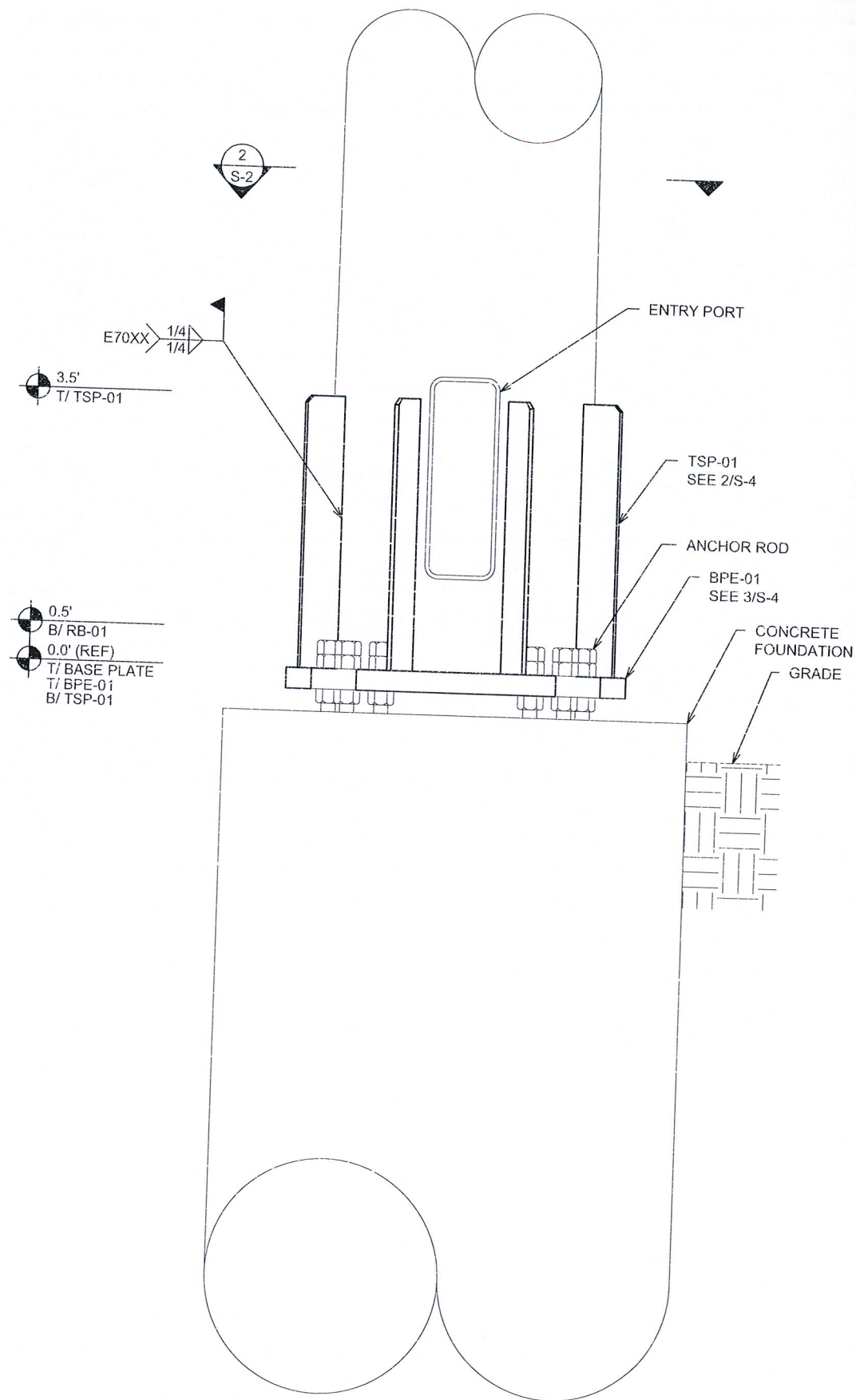
SHEET NUMBER:
S-1

REVISION:
0

VSI #: 130074



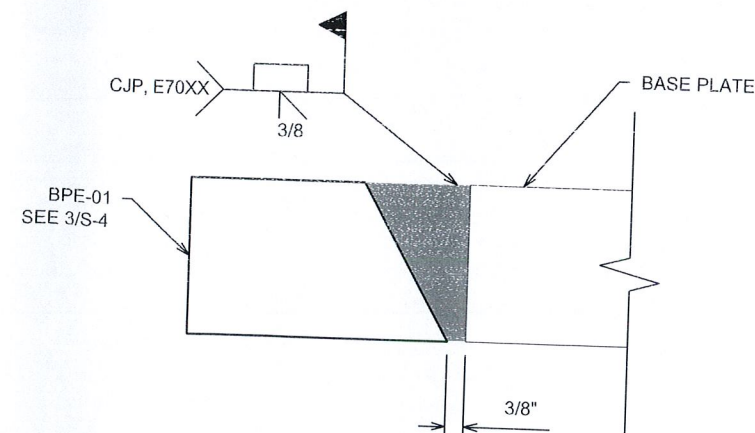
March 14, 2013



2
S-2

BASE PLAN

SCALE: 1" = 1'-0"



3
S-2

BPE-01 TO BASE PLATE CONNECTION

SCALE: 3" = 1'-0"

1
S-2

SECTION ELEVATION

SCALE: 1/2" = 1'-0"

PLANS PREPARED FOR:

SBA

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vertical solutions

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SHEET TITLE:

CONSTRUCTION DETAILS

SHEET NUMBER:

S-2

REVISION:

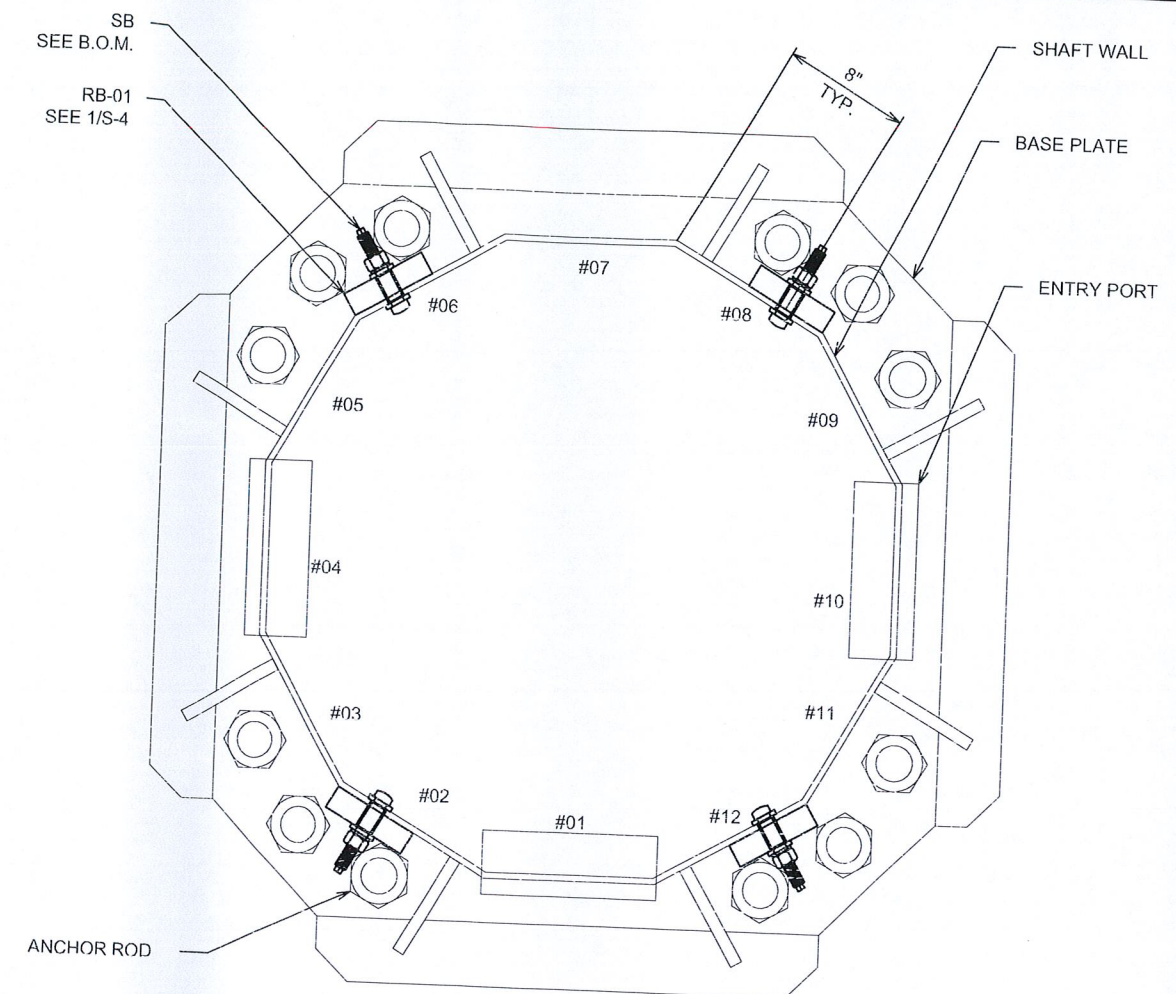
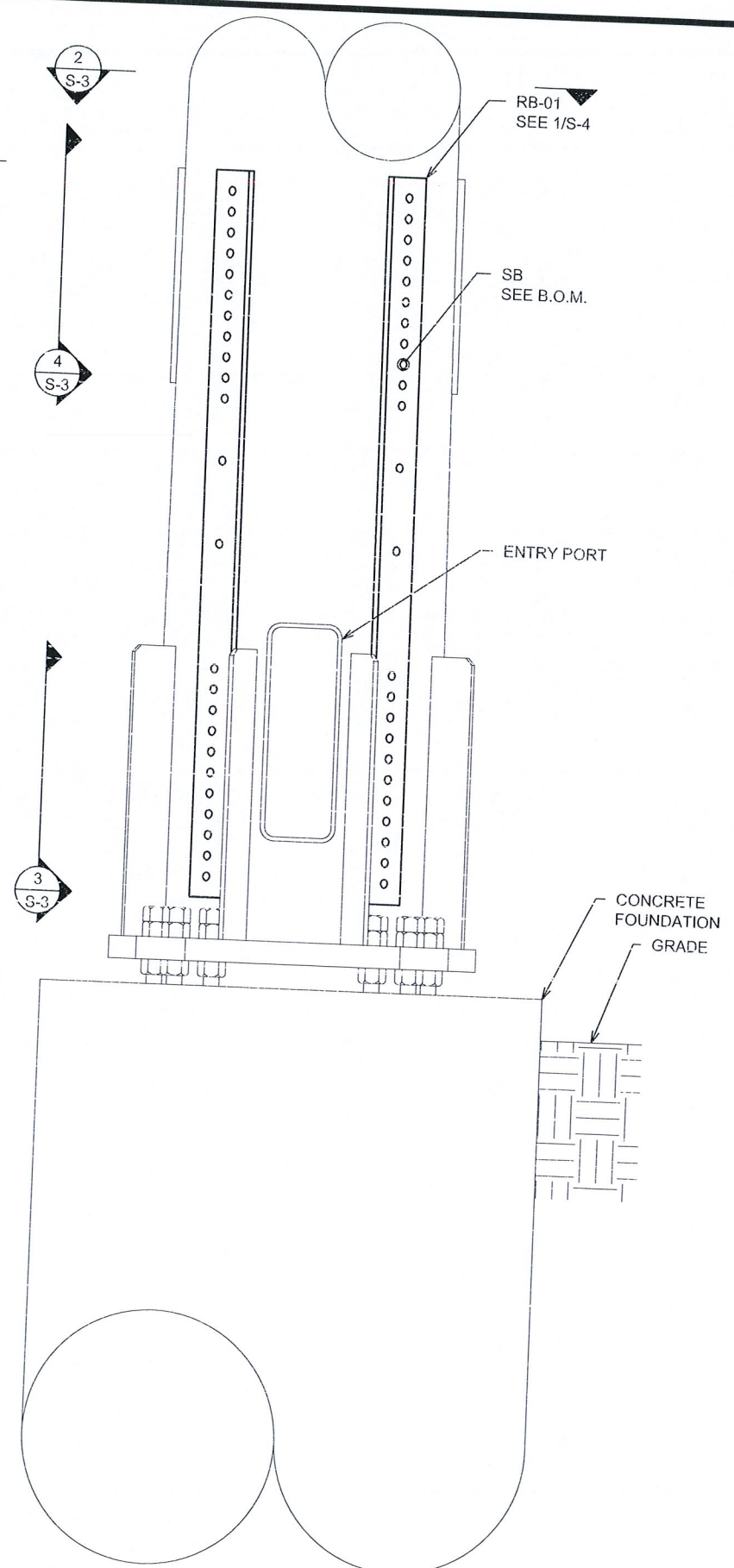
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VSI #: 130074

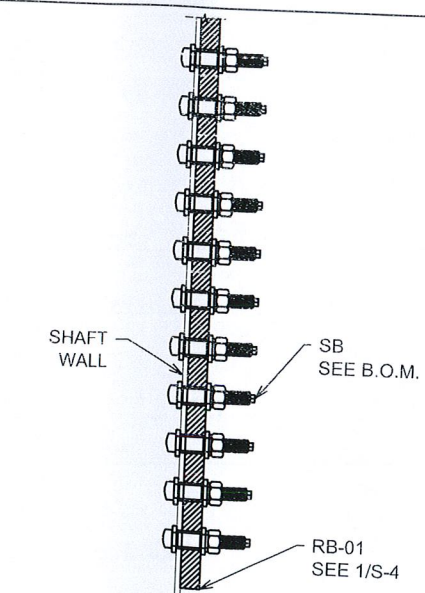
SEAL:

STATE OF CONNECTICUT
MICHAEL L. LANGRISH
No. 25064
LICENSED PROFESSIONAL ENGINEER

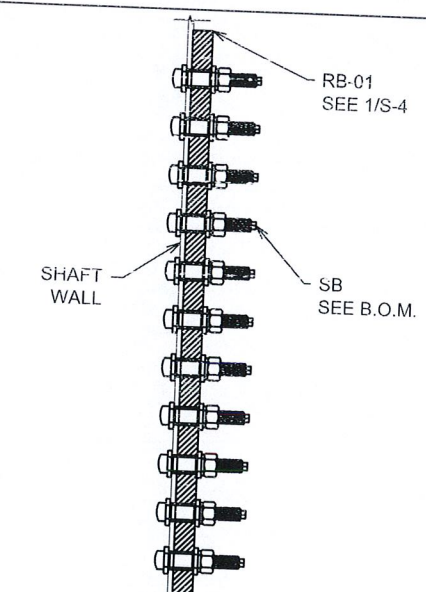
March 14, 2013



2 BASE PLAN
SCALE: 1" = 1'-0"



3 RB-01 BOTTOM TERM.
SCALE: 1" = 1'-0"



4 RB-01 TOP TERM
SCALE: 1" = 1'-0"

1 SECTION ELEVATION
SCALE: 1/2" = 1'-0"

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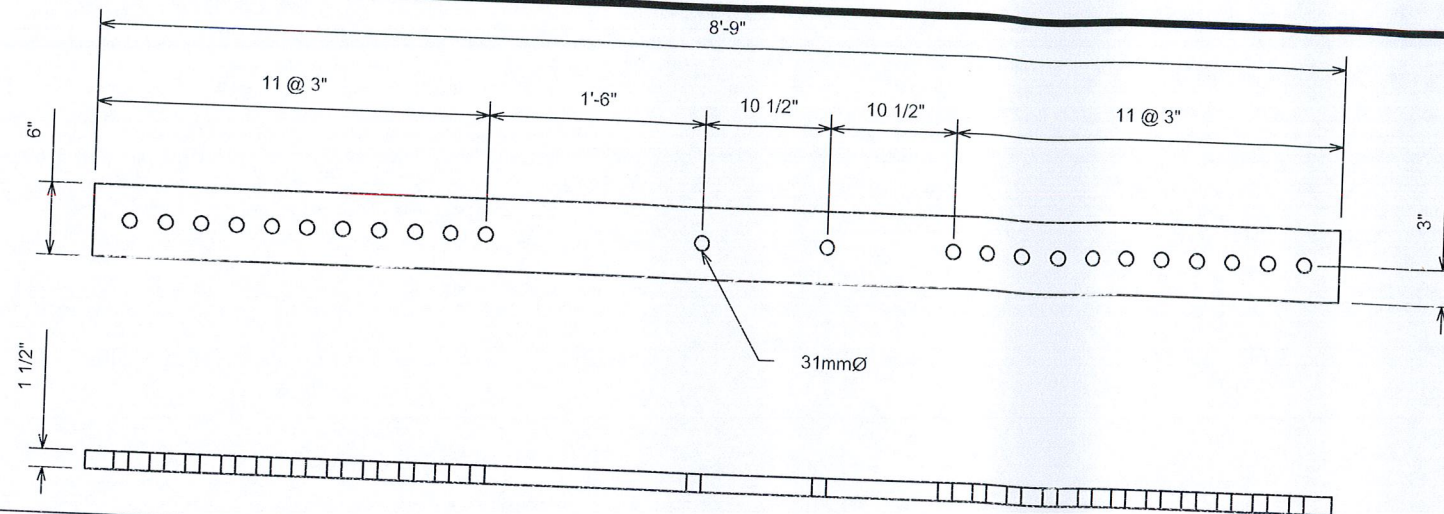
SHEET NUMBER:
S-3

REVISION:
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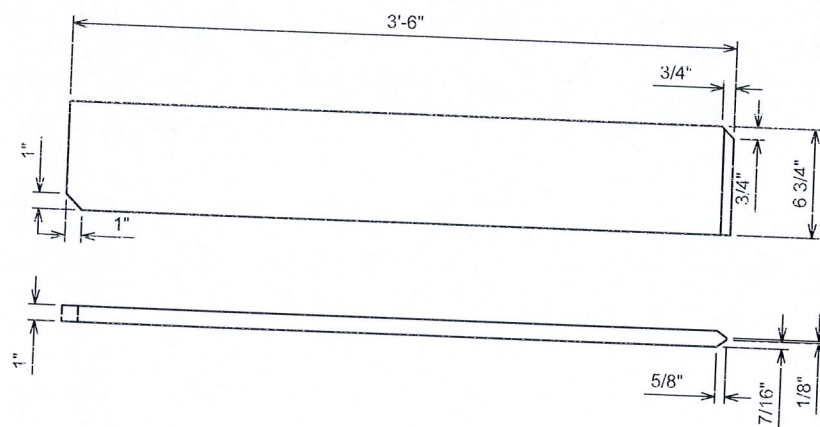
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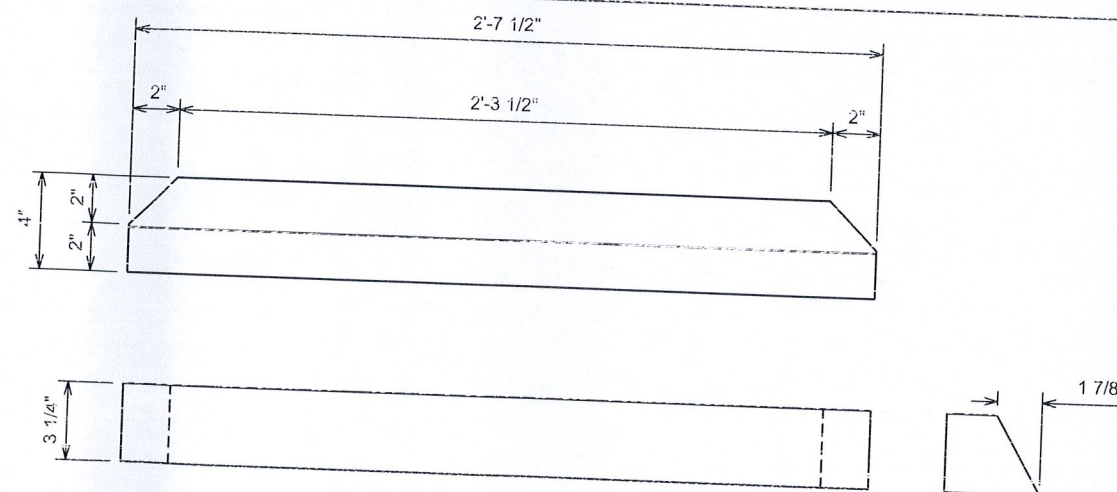
March 14, 2013



1 RB-01 DETAIL
S-4 SCALE: 3/8" = 1'-0"



2 TSP-01 DETAIL
S-4 SCALE: 1" = 1'-0"



3 BPE-01 DETAIL
S-4 SCALE: 1 1/2" = 1'-0"

PLANS PREPARED FOR:



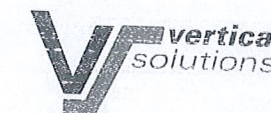
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DRAWN BY: JWM CHECKED BY: KCI

SHEET TITLE:

**FABRICATION
DETAILS**

SHEET NUMBER:

S-4

REVISION:

0

VSI #: 130074

SEAL:



March 14, 2013

