CONNECTICUT SITING COUNCIL

PETITION OF NEW CINGULAR WIRELESS PCS, LLC ("AT&T") TO THE CONNECTICUT SITING COUNCIL FOR A DECLARATORY RULING THAT NO CERTIFICATE OF ENVIRONMENTAL COMPATIBILITY AND PUBLIC NEED IS REQUIRED TO INSTALL STEALTH ROOFTOP WIRELESS TELECOMMUNICATIONS TOWERS ON THE EXISTING BUILDING LOCATED AT 208 HARBOR DRIVE, STAMFORD, CONNECTICUT	)	PETITION NO. _____

PETITION FOR DECLARATORY RULING TO INSTALL A STEALTH ROOFTOP WIRELESS TELECOMMUNICATIONS FACILITY ON AN EXISTING BUILDING 208 HARBOR DRIVE, STAMFORD, CONNECTICUT

I. Introduction

New Cingular Wireless PCS, LLC ("AT&T"), the "Petitioner", hereby petitions the Connecticut Siting Council ("Council") pursuant to Sections 16-50j-38 and 16-50j-39 of the Regulations of Connecticut State Agencies ("R.C.S.A.") for a declaratory ruling that no Certificate of Environmental Compatibility and Public Need ("Certificate") is required pursuant to Section 16-50k of the Connecticut General Statutes ("C.G.S.") to install stealth wireless facility on the rooftop of the existing building located at 208 Harbor Drive in Stamford, Connecticut (the "Site").

II. Existing Building

The Site is improved with an existing office building and associated parking areas. The surrounding area is characterized by Stamford Harbor (Long Island Sound) to the south and west, some residential properties to the east and municipal and residential properties to the north. An aerial photo is provided in Attachment 1.

III. AT&T's Proposed Installation

AT&T is licensed by the Federal Communications Commission ("FCC") to provide wireless services in this area of the State of Connecticut. AT&T's proposed Facility would consist of installing up to twelve (12) panel antennas behind two proposed RF transparent screen enclosures on steel support structures on top of the existing rooftop, at a centerline height of approximately 78' 9" above grade level. AT&T's proposed RF transparent screen enclosures on the rooftop will reach an overall height of 82' 9" and completely conceal AT&T's proposed antennas from view. The proposed screening extensions will be colored to blend with the existing building. AT&T's 11' 5" x 16' equipment shelter and generator is proposed to be located on a steel frame on the building's rooftop.

AT&T's proposed facility is detailed in the drawings included as Attachment 2 prepared by Hudson Design Group dated October 28, 2014 and last revised September 2, 2016. Also, annexed hereto as Attachment 3 is a portion of a passing structural analysis prepared by Hudson Design Group dated December 2, 2014, concluding that the existing building can support AT&T's proposed modifications including the new towers. For file size reasons four (4) full sized copies of the structural analysis with attendant calculations are being bulk filed with this submission.

Please note that originally it was believed the proposed Facility was under jurisdiction of the City of Stamford and local review of the proposal occurred in 2013. Subsequently it became clear that the proposed design includes two "Tower" structures as defined under Conn. Regs. § 16-50j. Specifically, a "Tower" "means a structure, whether free standing or attached to a building or another structure...that is used to support antennas for sending or receiving radio frequency signals...which is or is to be... (A) used principally to support one or more antennas for receiving or sending radio frequency signals, or for sending or receiving signals to or from satellites, or any of these."

The Facility design incorporates two different steel support structures attached to the existing building that rise up and support platforms floating above existing rooftop penthouses on which the stealth enclosures will be built. The antennas are mounted within stealth enclosures on these platform structures. The sole purpose of these structures is to support the antennas for the transmission and receipt of radio frequency signals for AT&T's network and are accordingly "towers" and under the Siting Council's jurisdiction.

IV. The Proposal Will Not Have a Substantial Adverse Environmental Effect

A comparison of the existing and proposed conditions reveals no substantial or significant environmental impacts associated with AT&T's proposed facility. The enclosures will be colored to blend with the existing building. Notably the southern portion of the building complex already hosts three (3) large satellite dishes the uppermost parts of which are higher than the proposed enclosures. A photosimulation package is being prepared and will be filed under separate cover once completed.

A. Minimal Physical Impact on Building Site

AT&T's proposed modifications will not result in any additional disturbance to the site as it will be located on the rooftop of the existing building. Existing access to the site will continue to be utilized and no tree removal or ground disturbance is necessary for these modifications. The facility is unmanned and requires no water or wastewater connections and generates no waste.

B. Compliance with MPE Limits

The operation of AT&T's antennas will not increase the total radio frequency electromagnetic power density at the site to a level at or above applicable standards. A power density report is included in Attachment 4. The total radio frequency power density will be 30.84% of the allowable FCC established general public limit at ground level and well within standards adopted by the Connecticut Department of Environmental Protection as set forth in Section 22a-162 of the Connecticut General Statutes.

V. Notice of Petition Filing

Pursuant to R.C.S.A. Section 16-50j-40(a), notice of AT&T's intent to file this Petition was sent to each person appearing of record as an owner of property that abuts the site, as well as the appropriate municipal officials and government agencies as listed in Section 16-50e of the C.G.S. Certification of such notice, a copy of the notice and the list of property owners is included in Attachment 5 along with a map provided by the City if Stamford Assessor's office used to identify abutting property owners. Attachment 6 includes a certification of service to municipal officials and government agencies to whom notice was sent.

VII. Conclusion

As set forth herein, AT&T's proposed stealth rooftop tower facility and associated equipment are wholly consistent with legislative findings outlined in Section 16-50g and 16-50aa of the General Statutes of Connecticut that seek to avoid the unnecessary proliferation of towers in the State. It is respectfully submitted that AT&T's facility does not present any significant adverse environmental effects as listed in Section 16-50p of the General Statutes. Therefore and for all the foregoing reasons, AT&T petitions the Connecticut Siting Council for a determination that the proposed wireless telecommunications facility does not require a Certificate of Environmental Compatibility and Public Need and that the Council issue an order approving same.

Respectfully Submitted,

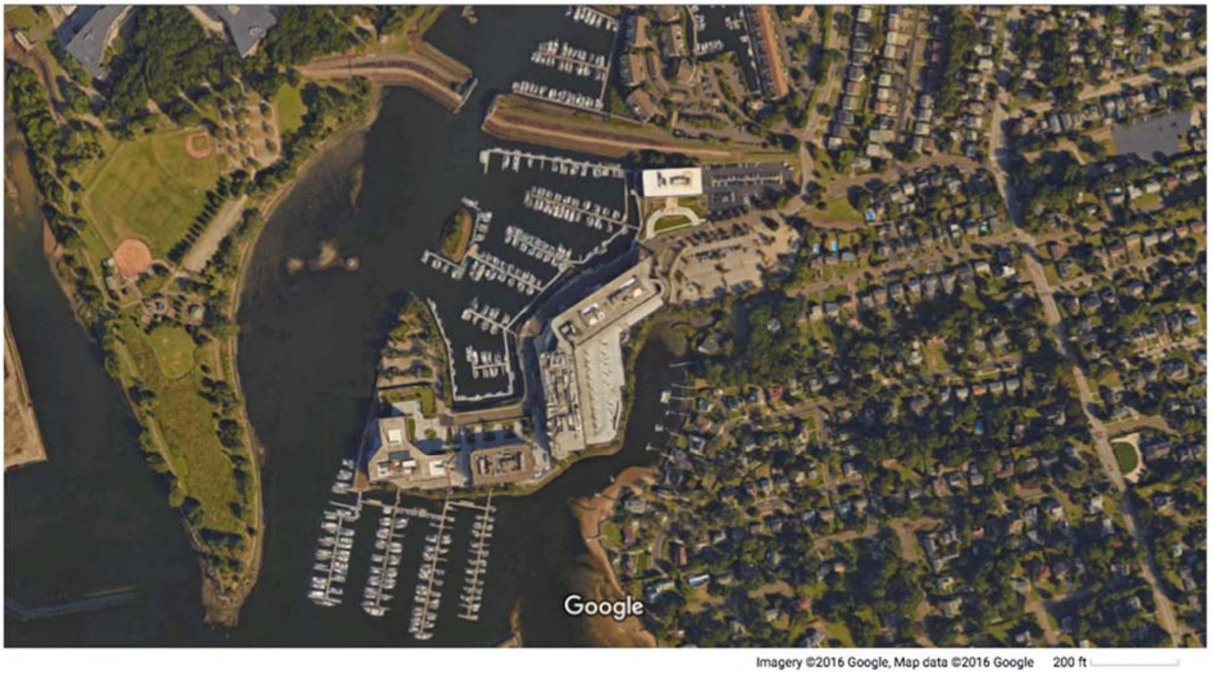
Daniel M. Laub, Esq.
On behalf of the Petitioner, AT&T
Cuddy & Feder, LLP
445 Hamilton Avenue, 14th Floor
White Plains, New York 10601
(914) 761-1300

ATTACHMENT 1

C&F: 1287916.1

Satellite image of 208 Harbor Drive and Surrounding Area

Google Maps



ATTACHMENT 2

C&F: 1287916.1

PROJECT INFORMATION

SCOPE OF WORK:

- NEW AT&T ANTENNAS: (4) ANTENNAS PER SECTOR WITH (3) SECTORS, FOR A TOTAL OF (12) ANTENNAS
- NEW AT&T (9) RRUS PER SECTOR WITH (3) SECTORS, FOR A TOTAL OF (27) RRUS
- (4) NEW AT&T RAYCAP SURGE SUPPRESSOR

ITEMS LISTED ABOVE TO BE MOUNTED ON PROPOSED PLATFORM ABOVE EXISTING PENTHOUSE.

- NEW AT&T 11'–5" x 16'–0" EQUIPMENT SHELTER ON STEEL PLATFORM
- (1) NEW AT&T GPS ANTENNA TO BE MOUNTED ON THE PROPOSED EQUIPMENT SHELTER.

ITEMS LISTED BELOW TO BE INSTALLED WITHIN PROPOSED SHELTER:

- (4) NEW AT&T EQUIPMENT RACK
- (1) NEW DC POWER PLANT
- (1) NEW BATTERY RACK

SITE ADDRESS:	208 HARBOR DRIVE STAMFORD, CT 06902	
LATITUDE:	41° 02' 05.60" N	42.034889 N
LONGITUDE:	73° 31' 57.20" W	73.532556 W
BUILDING OWNER:	HPHV DIRECT, LLC 40 EAST 52ND STREET NEW YORK, NY 10022	
TYPE OF SITE:	ROOFTOP	
BUILDING HEIGHT:	97'–0"± (AGL)	
TOP OF PROPOSED ANTENNA:	82'–9"± (AGL)	
ZONING:	M–L LIGHT INDUSTRIAL	

at&t

FA NUMBER:
10577826
SITE NUMBER:
S2900-A
SITE NAME:
STAMFORD HARBOR

PROJECT TEAM

CLIENT REPRESENTATIVE

COMPANY:	SMARTLINK, LLC
ADDRESS:	33 BOSTON POST ROAD WEST, SUITE 210
CITY, STATE, ZIP:	MARLBOROUGH, MA 01752
CONTACT:	ADAM BRAILLARD
PHONE:	(774) 369–3613 X1202
E–MAIL:	adam.braillard@smartlinkllc.com

SITE ACQUISITION

COMPANY:	SMARTLINK, LLC
ADDRESS:	33 BOSTON POST ROAD WEST, SUITE 210
CITY, STATE, ZIP:	MARLBOROUGH, MA 01752
CONTACT:	ADAM BRAILLARD
PHONE:	(774) 369–3613 X 1202
E–MAIL:	adam.braillard@smartlinkllc.com

ZONING

COMPANY:	SMARTLINK, LLC
ADDRESS:	33 BOSTON POST ROAD WEST, SUITE 210
CITY, STATE, ZIP:	MARLBOROUGH, MA 01752
CONTACT:	ADAM BRAILLARD
PHONE:	(774) 369–3613 X1202
E–MAIL:	adam.braillard@smartlinkllc.com

ENGINEERING

COMPANY:	HUDSON DESIGN GROUP, LLC.
ADDRESS:	1600 OSGOOD STREET BUILDING 20 NORTH, SUITE 3090
CITY, STATE, ZIP:	NORTH ANDOVER, MA 01845
CONTACT:	DANIEL P. HAMM, PE
PHONE:	(978) 557–5553
E–MAIL:	Info@hudsondesigngroupllc.com

RF ENGINEER

COMPANY:	AT&T MOBILITY –NEW ENGLAND
ADDRESS:	550 COCHITUATE ROAD SUITE 550 13 AND 14
CITY, STATE, ZIP:	FRAMINGHAM, MA 01701

CONSTRUCTION MANAGER

COMPANY:	SMARTLINK, LLC.
ADDRESS:	33 BOSTON POST ROAD WEST SUITE 210
CITY, STATE, ZIP:	MARLBOROUGH, MA 01752
CONTACT:	ADAM BRAILLARD
PHONE:	(774) 369–3613 X 1202
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ANNAPOLIS, MD 21401

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N. ANDOVER, MA 01845

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FAX: (978) 336-5586

DEREK J. CREASER
No. 28551

Derek J. Creaser

REVISIONS		
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1	11/24/14	ISSUED FOR CONSTRUCTION
0	10/28/14	ISSUED FOR REVIEW
REV. #	DATE	DESCRIPTION

PROJECT NO. S2900–A	DESIGNED BY: DR DRAWN BY: NS CHECKED BY: RP	SCALE: AS SHOWN

SITE NAME:

S2900-A
STAMFORD HARBOR

SITE ADDRESS:

208 HARBOR DRIVE
STAMFORD, CT 06902

SHEET TITLE:

TITLE SHEET

SHEET NO:

T-1

DRAWING INDEX

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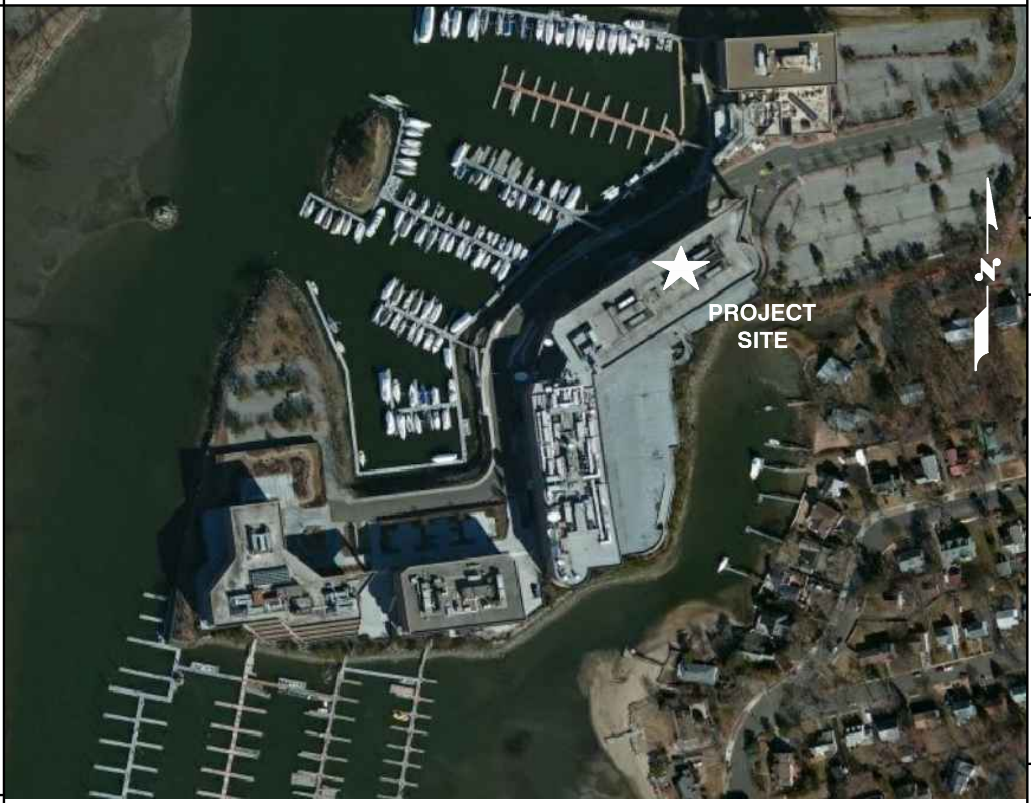
VICINITY MAP



DIRECTIONS TO SITE:

FROM ROCKY HILL, CT, TAKE I–91 SOUTH. AT EXIT 17, TAKE RAMP RIGHT FOR CT–15 SOUTH TOWARD E. MAIN ST / W. CROSS PKWY. AT EXIT 52, TAKE RAMP RIGHT FOR CT–8 SOUTH TOWARD BRIDGEPORT. TAKE RAMP RIGHT FOR I–95 SOUTH TOWARD N. Y. CITY. AT EXIT 8, TAKE RAMP RIGHT AND FOLLOW SIGNS FOR ELM ST. TURN LEFT ONTO ELM ST. TURN RIGHT ONTO JEFFERSON ST. TURN LEFT ONTO MAGEE AVEGMC/BUICK ON THE CORNER. TURN RIGHT ONTO HARBOR DR. ARRIVE AT 208 HARBOR DR, STAMFORD, CT 06902

GENERAL NOTES

1. THIS DOCUMENT IS THE CREATION, DESIGN, PROPERTY AND COPYRIGHTED WORK OF AT&T. ANY DUPLICATION OR USE WITHOUT EXPRESS WRITTEN CONSENT IS STRICTLY PROHIBITED. DUPLICATION AND USE BY GOVERNMENT AGENCIES FOR THE PURPOSES OF CONDUCTING THEIR LAWFULLY AUTHORIZED REGULATORY AND ADMINISTRATIVE FUNCTIONS IS SPECIFICALLY ALLOWED.
2. THE FACILITY IS AN UNMANNED PRIVATE AND SECURED EQUIPMENT INSTALLATION. IT IS ONLY ACCESSED BY TRAINED TECHNICIANS FOR PERIODIC ROUTINE MAINTENANCE AND THEREFORE DOES NOT REQUIRE ANY WATER OR SANITARY SEWER SERVICE. THE FACILITY IS NOT GOVERNED BY REGULATIONS REQUIRING PUBLIC ACCESS PER ADA REQUIREMENTS.
3. CONTRACTOR SHALL VERIFY ALL PLANS AND EXISTING DIMENSIONS AND CONDITIONS ON THE JOB SITE AND SHALL IMMEDIATELY NOTIFY THE AT&T REPRESENTATIVE IN WRITING OF DISCREPANCIES BEFORE PROCEEDING WITH THE WORK OR BE RESPONSIBLE FOR SAME.

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WWW.CBYD.COM

1–800–922–4455 OR DIAL 811

APPROVALS

THE FOLLOWING PARTIES HEREBY APPROVE AND ACCEPT THESE DOCUMENTS & AUTHORIZE THE SUBCONTRACTOR TO PROCEED WITH CONSTRUCTION DESCRIBED HEREIN. ALL DOCUMENTS ARE SUBJECT TO REVIEW BY THE LOCAL BUILDING DEPARTMENT & MAY IMPOSE CHANGES OR MODIFICATIONS.

DISCIPLINE:	SIGNATURE:	DATE:
SMARTLINK SITE ACQUISITION:		
SMARTLINK CONSTRUCTION MANAGER:		
AT&T PROJECT MANAGER:		

GROUNDING NOTES

1. THE SUBCONTRACTOR SHALL REVIEW AND INSPECT THE EXISTING FACILITY GROUNDING SYSTEM AND LIGHTNING PROTECTION SYSTEM (AS DESIGNED AND INSTALLED) FOR STRICT COMPLIANCE WITH THE NEC (AS ADOPTED BY THE AHJ), THE SITE–SPECIFIC (UL, LPI, OR NFPA) LIGHTING PROTECTION CODE, AND GENERAL COMPLIANCE WITH TELCORDIA AND TIA GROUNDING STANDARDS. THE SUBCONTRACTOR SHALL REPORT ANY VIOLATIONS OR ADVERSE FINDINGS TO THE CONTRACTOR FOR RESOLUTION.

2. ALL GROUND ELECTRODE SYSTEMS (INCLUDING TELECOMMUNICATION, RADIO, LIGHTNING PROTECTION, AND AC POWER GES'S) SHALL BE BONDED TOGETHER, AT OR BELOW GRADE, BY TWO OR MORE COPPER BONDING CONDUCTORS IN ACCORDANCE WITH THE NEC.

3. THE SUBCONTRACTOR SHALL PERFORM IEEE FALL–OF–POTENTIAL RESISTANCE TO EARTH TESTING (PER IEEE 1100 AND 81) FOR NEW GROUND ELECTRODE SYSTEMS. THE SUBCONTRACTOR SHALL FURNISH AND INSTALL SUPPLEMENTAL GROUND ELECTRODES AS NEEDED TO ACHIEVE A TEST RESULT OF 5 OHMS OR LESS.

4. METAL RACEWAY SHALL NOT BE USED AS THE NEC REQUIRED EQUIPMENT GROUND CONDUCTOR. STRANDED COPPER CONDUCTORS WITH GREEN INSULATION, SIZED IN ACCORDANCE WITH THE NEC, SHALL BE FURNISHED AND INSTALLED WITH THE POWER CIRCUITS TO BTS EQUIPMENT.

5. EACH BTS CABINET FRAME SHALL BE DIRECTLY CONNECTED TO THE MASTER GROUND BAR WITH GREEN INSULATED SUPPLEMENTAL EQUIPMENT GROUND WIRES, 6 AWG STRANDED COPPER OR LARGER FOR INDOOR BTS 2 AWG STRANDED COPPER FOR OUTDOOR BTS.

6. EXOTHERMIC WELDS SHALL BE USED FOR ALL GROUNDING CONNECTIONS BELOW GRADE.

7. APPROVED ANTIOXIDANT COATINGS (I.E., CONDUCTIVE GEL OR PASTE) SHALL BE USED ON ALL COMPRESSION AND BOLTED GROUND CONNECTIONS.

8. ICE BRIDGE BONDING CONDUCTORS SHALL BE EXOTHERMICALLY BONDED OR BOLTED TO THE BRIDGE AND THE TOWER GROUND BAR.

9. ALUMINUM CONDUCTOR OR COPPER CLAD STEEL CONDUCTOR SHALL NOT BE USED FOR GROUNDING CONNECTIONS.

10. MISCELLANEOUS ELECTRICAL AND NON–ELECTRICAL METAL BOXES, FRAMES AND SUPPORTS SHALL BE BONDED TO THE GROUND RING, IN ACCORDANCE WITH THE NEC.

11. METAL CONDUIT SHALL BE MADE ELECTRICALLY CONTINUOUS WITH LISTED BONDING FITTINGS OR BY BONDING ACROSS THE DISCONTINUITY WITH 6 AWS COPPER WIRE UL APPROVED GROUNDING TYPE CONDUIT CLAMPS.

12. ALL NEW STRUCTURES WITH A FOUNDATION AND/OR FOOTIING HAVING 20 FT. OR MORE 1/2" OR GREATER ELECTRICALLY CONDUCTIVE REINFORCING STEEL MUST HAVE IT BONDED TO THE GROUND RING USING AN EXOTHERMIC WELD CONNECTION USING #2 AWG SOLID TINNED COPPER GROUND WIRE, PER NEC 250.50

GENERAL NOTES

1. FOR THE PURPOSE OF CONSTRUCTION DRAWING, THE FOLLOWING DEFINITIONS SHALL APPLY:
CONTRACTOR – SMARTLINK
SUBCONTRACTOR – GENERAL CONTRACTOR
OWNER – AT&T MOBILITY

2. PRIOR TO THE SUBMISSION OF BIDS, THE BIDDING SUBCONTRACTOR SHALL VISIT THE CELL SITE TO FAMILIARIZE WITH THE EXISTING CONDITIONS AND TO CONFIRM THAT THE WORK CAN BE ACCOMPLISHED AS SHOWN ON THE CONSTRUCTION DRAWINGS. ANY DISCREPANCY FOUND SHALL BE BROUGHT TO THE ATTENTION OF CONTRACTOR.

3. ALL MATERIALS FURNISHED AND INSTALLED SHALL BE IN STRICT ACCORDANCE WITH ALL APPLICABLE CODES, REGULATIONS, AND ORDINANCES. SUBCONTRACTOR SHALL ISSUE ALL APPROPRIATE NOTICES AND COMPLY WITH ALL LAWS, ORDINANCES, RULES, REGULATIONS, AND LAWFUL ORDERS OF ANY PUBLIC AUTHORITY REGARDING THE PERFORMANCE OF THE WORK. ALL WORK CARRIED OUT SHALL COMPLY WITH ALL APPLICABLE MUNICIPAL AND UTILITY COMPANY SPECIFICATIONS AND LOCAL JURISDICTIONAL CODES, ORDINANCES AND APPLICABLE REGULATIONS.

4. DRAWINGS PROVIDED HERE ARE NOT TO BE SCALED AND ARE INTENDED TO SHOW OUTLINE ONLY.

5. UNLESS NOTED OTHERWISE, THE WORK SHALL INCLUDE FURNISHING MATERIALS, EQUIPMENT, APPURTENANCES, AND LABOR NECESSARY TO COMPLETE ALL INSTALLATIONS AS INDICATED ON THE DRAWINGS.

6. "KITTING LIST" SUPPLIED WITH THE BID PACKAGE IDENTIFIES ITEMS THAT WILL BE SUPPLIED BY CONTRACTOR. ITEMS NOT INCLUDED IN THE BILL OF MATERIALS AND KITTING LIST SHALL BE SUPPLIED BY THE SUBCONTRACTOR.

7. THE SUBCONTRACTOR SHALL INSTALL ALL EQUIPMENT AND MATERIALS IN ACCORDANCE WITH MANUFACTURER'S RECOMMENDATIONS UNLESS SPECIFICALLY STATED OTHERWISE.

8. IF THE SPECIFIED EQUIPMENT CANNOT BE INSTALLED AS SHOWN ON THESE DRAWINGS, THE SUBCONTRACTOR SHALL PROPOSE AN ALTERNATIVE INSTALLATION SPACE FOR APPROVAL BY THE CONTRACTOR.

9. SUBCONTRACTOR SHALL DETERMINE ACTUAL ROUTING OF CONDUIT, POWER AND T1 CABLES, GROUNDING CABLES AS SHOWN ON THE POWER, GROUNDING AND TELCO PLAN DRAWING. SUBCONTRACTOR SHALL UTILIZE EXISTING TRAYS AND/OR SHALL ADD NEW TRAYS AS NECESSARY. SUBCONTRACTOR SHALL CONFIRM THE ACTUAL ROUTING WITH THE CONTRACTOR.

10. THE SUBCONTRACTOR SHALL PROTECT EXISTING IMPROVEMENTS, PAVEMENTS, CURBS, LANDSCAPING AND STRUCTURES. ANY DAMAGED PART SHALL BE REPAIRED AT SUBCONTRACTOR'S EXPENSE TO THE SATISFACTION OF OWNER.

11. SUBCONTRACTOR SHALL LEGALLY AND PROPERLY DISPOSE OF ALL SCRAP MATERIALS SUCH AS COAXIAL CABLES AND OTHER ITEMS REMOVED FROM THE EXISTING FACILITY. ANTENNAS REMOVED SHALL BE RETURNED TO THE OWNER'S DESIGNATED LOCATION.

12. SUBCONTRACTOR SHALL LEAVE PREMISES IN CLEAN CONDITION.

13. ALL CONCRETE REPAIR WORK SHALL BE DONE IN ACCORDANCE WITH AMERICAN CONCRETE INSTITUTE (ACI) 301.

14. ANY NEW CONCRETE NEEDED FOR THE CONSTRUCTION SHALL BE AIR–ENTRAINED AND SHALL HAVE 4000 PSI STRENGTH AT 28 DAYS. ALL CONCRETE WORK SHALL BE DONE IN ACCORDANCE WITH ACI 318 CODE REQUIREMENTS.

15. ALL STRUCTURAL STEEL WORK SHALL BE DETAILED, FABRICATED AND ERECTED IN ACCORDANCE WITH AISC SPECIFICATIONS. ALL STRUCTURAL STEEL SHALL BE ASTM A36 (F_y = 36 ksi) UNLESS OTHERWISE NOTED. PIPES SHALL BE ASTM A53 TYPE E (F_y = 36 ksi). ALL STEEL EXPOSED TO WEATHER SHALL BE HOT DIPPED GALVANIZED. TOUCHUP ALL SCRATCHES AND OTHER MARKS IN THE FIELD AFTER STEEL IS ERECTED USING A COMPATIBLE ZINC RICH PAINT.

16. CONSTRUCTION SHALL COMPLY WITH "GENERAL CONSTRUCTION SERVICES FOR CONSTRUCTION OF AT&T MOBILITY SITES."

17. SUBCONTRACTOR SHALL VERIFY ALL EXISTING DIMENSIONS AND CONDITIONS PRIOR TO COMMENCING ANY WORK. ALL DIMENSIONS OF EXISTING CONSTRUCTION SHOWN ON THE DRAWINGS MUST BE VERIFIED. SUBCONTRACTOR SHALL NOTIFY THE CONTRACTOR OF ANY DISCREPANCIES PRIOR TO ORDERING MATERIAL OR PROCEEDING WITH CONSTRUCTION.

18. APPLICABLE BUILDING CODES:
SUBCONTRACTOR'S WORK SHALL COMPLY WITH ALL APPLICABLE NATIONAL, STATE, AND LOCAL CODES AS ADOPTED BY THE LOCAL AUTHORITY HAVING JURISDICTION (AHJ) FOR THE LOCATION. THE EDITION OF THE AHJ ADOPTED CODES AND STANDARDS IN EFFECT ON THE DATE OF CONTRACT AWARD SHALL GOVERN THE DESIGN.
BUILDING CODE: 2005 CT BUILDING CODE
2013 AMENDMENT
ELECTRICAL CODE: NATIONAL ELECTRICAL CODE (NFPA 70)
FIRE CODE: 2005 CT STATE FIRE SAFETY CODE
2009 AMENDMENTS

SUBCONTRACTOR'S WORK SHALL COMPLY WITH THE LATEST EDITION OF THE FOLLOWING STANDARDS:

AMERICAN CONCRETE INSTITUTE (ACI) 318; BUILDING CODE
REQUIREMENTS FOR STRUCTURAL CONCRETE;

AMERICAN INSTITUTE OF STEEL CONSTRUCTION (AISC)

MANUAL OF STEEL CONSTRUCTION, ASD, NINTH EDITION;

TELECOMMUNICATIONS INDUSTRY ASSOCIATION (TIA) 222–F,
STRUCTURAL STANDARDS FOR STEEL

ANTENNA TOWER AND ANTENNA SUPPORTING STRUCTURES; REFER
TO ELECTRICAL DRAWINGS FOR SPECIFIC ELECTRICAL STANDARDS.

FOR ANY CONFLICTS BETWEEN SECTIONS OF LISTED CODES AND STANDARDS REGARDING MATERIAL, METHODS OF CONSTRUCTION, OR OTHER REQUIREMENTS, THE MOST RESTRICTIVE REQUIREMENT SHALL GOVERN. WHERE THERE IS CONFLICT BETWEEN A GENERAL REQUIREMENT AND A SPECIFIC REQUIREMENT, THE SPECIFIC REQUIREMENT SHALL GOVERN.

DESIGN CRITERIA

1. INTERNATIONAL BUILDING CODE 2003 WITH 2005 CONNECTICUT SUPPLEMENT WITH 2009 AMENDMENTS; ASCE 7–05 MINIMUM DESIGN LOADS FOR BUILDINGS AND OTHER STRUCTURES.

WIND ANALYSIS:

REFERENCE WIND SPEED:	100 MPH	(INCLUDES 3–SECOND GUST)
CATEGORY:	D	

ROOF:

LIVE LOADS:

ROOF SNOW LOAD:	30 PSF	(CONNECTICUT SUPPLEMENT)
SERVICE LOAD:	60 PSF	(EQUIPMENT PLATFORM ONLY)
PENTHOUSE FLOOR LOAD:	150 PSF	(ASSUMED)

DEAD LOADS:

ROOF (TYPE 0):	5 PSF	(SEE PG. 170 FOR BREAKDOWN)
ROOF (TYPE 1):	46 PSF	(SEE PG. 170 FOR BREAKDOWN)
ROOF (TYPE 2):	85 PSF	(SEE PG. 170 FOR BREAKDOWN)
ROOF (TYPE 3):	95 PSF	(SEE PG. 170 FOR BREAKDOWN)
PENTHOUSE WALL:	50 PSF	
PENTHOUSE ROOF:	10 PSF	
FRP ENCLOSURE:	30 PLF	

2. EIA/TIA –222– F STRUCTURAL STANDARDS FOR STEEL ANTENNA TOWERS AND ANTENNA SUPPORTING STRUCTURES

CITY/TOWN:	STAMFORD	
COUNTY:	FAIRFIELD	
WIND LOAD:	85 MPH	(FASTEST MILE)
NOMINAL ICE THICKNESS:	3/4 INCH	

3. APPROXIMATE HEIGHT ABOVE GRADE TO THE TOP OF THE FRP ENCLOSURES:

105'–9"+/–

ABBREVIATIONS

AGL	ABOVE GRADE LEVEL	G.C.	GENERAL CONTRACTOR	RF	RADIO FREQUENCY
AWG	AMERICAN WIRE GAUGE	MGB	MASTER GROUND BUS		
BCW	BARE COPPER WIRE	MIN	MINIMUM	TBD	TO BE DETERMINED
BTS	BASE TRANSCEIVER STATION	PROPOSED	NEW	TBR	TO BE REMOVED
EXISTING	EXISTING	N.T.S.	NOT TO SCALE	TBRR	TO BE REMOVED AND REPLACED
EG	EQUIPMENT GROUND	REF	REFERENCE	TYP	TYPICAL
EGR	EQUIPMENT GROUND RING	REQ	REQUIRED		

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DEREK J. CREASER
No.28551

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PROJECT NO.: S2900–A
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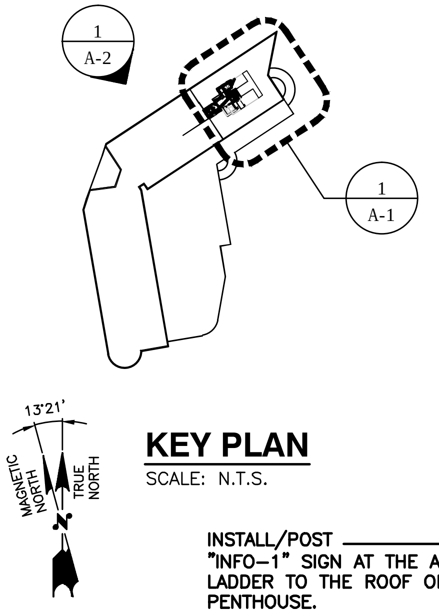
DRAWN BY: NS
CHECKED BY: RP
SCALE: AS SHOWN

SITE NAME:
S2900-A
STAMFORD HARBOR

SITE ADDRESS:
208 HARBOR DRIVE
STAMFORD, CT 06902

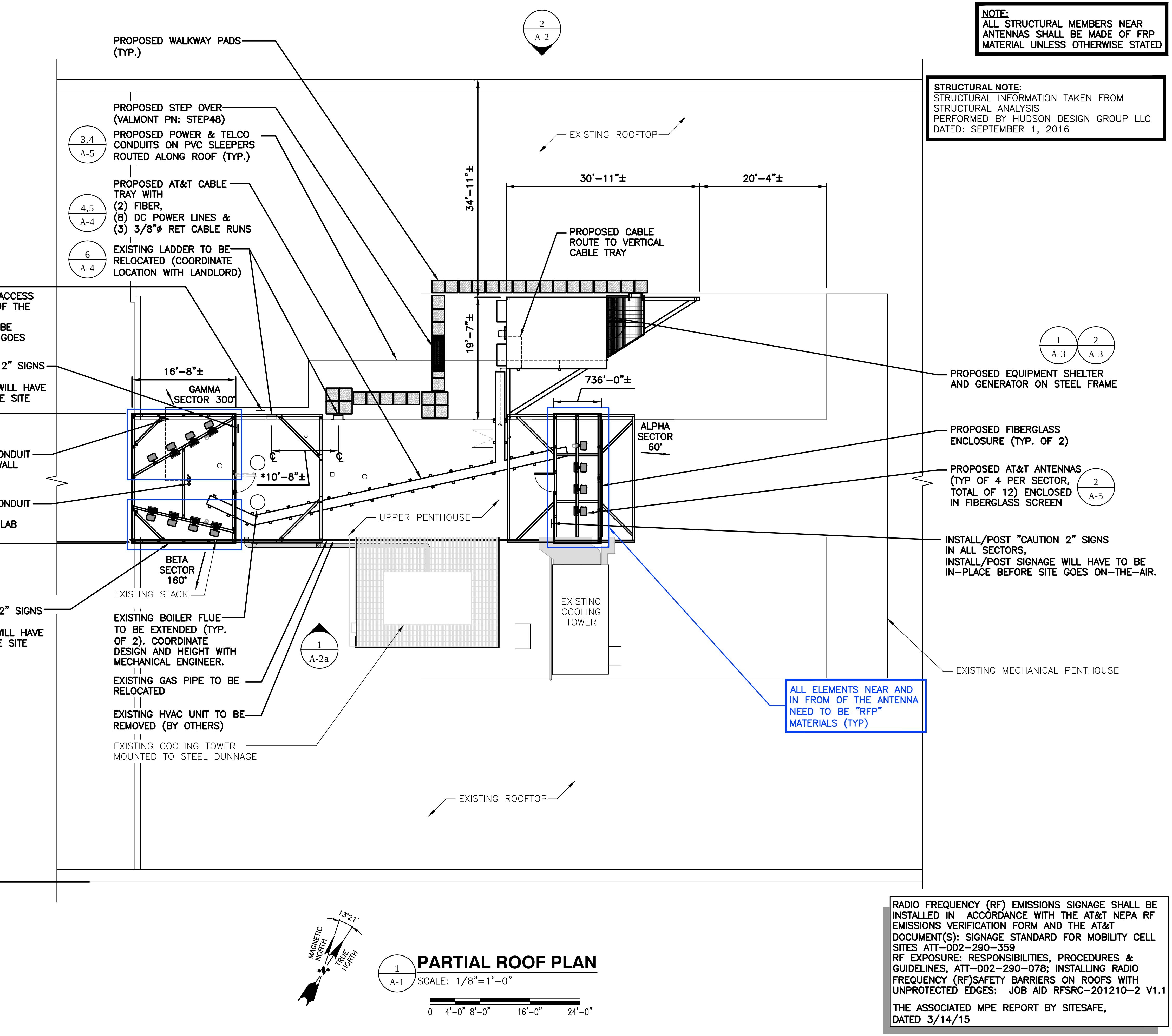
SHEET TITLE:
GENERAL NOTES

SHEET NO:
GN-1



KEY PLAN

SCALE: N.T.S.


2
A-2
PROPOSED WALKWAY PADS (TYP.)
PROPOSED STEP OVER (VALMONT PN: STEP48)
3,4
A-5
PROPOSED POWER & TELCO CONDUITS ON PVC SLEEPERS ROUTED ALONG ROOF (TYP.)
4,5
A-4
PROPOSED AT&T CABLE TRAY WITH (2) FIBER, (8) DC POWER LINES & (3) 3/8"ø RET CABLE RUNS
6
A-4
EXISTING LADDER TO BE RELOCATED (COORDINATE LOCATION WITH LANDLORD)
INSTALL/POST "INFO-1" SIGN AT THE ACCESS LADDER TO THE ROOF OF THE PENTHOUSE. SIGNAGE WILL HAVE TO BE IN-PLACE BEFORE SITE GOES ON-THE-AIR.
INSTALL/POST "CAUTION 2" SIGNS IN ALL SECTORS, INSTALL/POST SIGNAGE WILL HAVE TO BE IN-PLACE BEFORE SITE GOES ON-THE-AIR.
1
A-5
PROPOSED UTILITY CONDUIT PENETRATION THRU WALL
1
A-5
PROPOSED UTILITY CONDUIT PENETRATION THRU PENTHOUSE FLOOR SLAB
20'-10"±
54'-4"±
INSTALL/POST "CAUTION 2" SIGNS IN ALL SECTORS, INSTALL/POST SIGNAGE WILL HAVE TO BE IN-PLACE BEFORE SITE GOES ON-THE-AIR.
EXISTING ROOFTOP
34'-11"±
30'-11"±
20'-4"±
19'-7"±
PROPOSED CABLE ROUTE TO VERTICAL CABLE TRAY
16'-8"±
GAMMA SECTOR 300°
736'-0"±
ALPHA SECTOR 60°
*10'-8"±
UPPER PENTHOUSE
BETA SECTOR 160°
EXISTING STACK
EXISTING BOILER FLUE TO BE EXTENDED (TYP. OF 2). COORDINATE DESIGN AND HEIGHT WITH MECHANICAL ENGINEER.
1
A-2a
EXISTING GAS PIPE TO BE RELOCATED
EXISTING HVAC UNIT TO BE REMOVED (BY OTHERS)
EXISTING COOLING TOWER MOUNTED TO STEEL DUNNAGE
EXISTING COOLING TOWER
1
A-3
2
A-3
PROPOSED EQUIPMENT SHELTER AND GENERATOR ON STEEL FRAME
PROPOSED FIBERGLASS ENCLOSURE (TYP. OF 2)
PROPOSED AT&T ANTENNAS (TYP OF 4 PER SECTOR, TOTAL OF 12) ENCLOSED IN FIBERGLASS SCREEN
2
A-5
INSTALL/POST "CAUTION 2" SIGNS IN ALL SECTORS, INSTALL/POST SIGNAGE WILL HAVE TO BE IN-PLACE BEFORE SITE GOES ON-THE-AIR.
EXISTING MECHANICAL PENTHOUSE
ALL ELEMENTS NEAR AND IN FROM OF THE ANTENNA NEED TO BE "RFP" MATERIALS (TYP)
EXISTING ROOFTOP
13°21'
MAGNETIC NORTH
TRUE NORTH
0
4'-0"
8'-0"
16'-0"
24'-0"

1
A-1

PARTIAL ROOF PLAN

SCALE: 1/8"=1'-0"

NOTE:
ALL STRUCTURAL MEMBERS NEAR ANTENNAS SHALL BE MADE OF FRP MATERIAL UNLESS OTHERWISE STATED

STRUCTURAL NOTE:
STRUCTURAL INFORMATION TAKEN FROM STRUCTURAL ANALYSIS
PERFORMED BY HUDSON DESIGN GROUP LLC
DATED: SEPTEMBER 1, 2016

RADIO FREQUENCY (RF) EMISSIONS SIGNAGE SHALL BE INSTALLED IN ACCORDANCE WITH THE AT&T NEPA RF EMISSIONS VERIFICATION FORM AND THE AT&T DOCUMENT(S): SIGNAGE STANDARD FOR MOBILITY CELL SITES ATT-002-290-359
RF EXPOSURE: RESPONSIBILITIES, PROCEDURES & GUIDELINES, ATT-002-290-078; INSTALLING RADIO FREQUENCY (RF)SAFETY BARRIERS ON ROOFS WITH UNPROTECTED EDGES: JOB AID RFSRC-201210-2 V1.1

THE ASSOCIATED MPE REPORT BY SITESAFE, DATED 3/14/15

at&t

550 COCHITUATE RD.
FRAMINGHAM, MA, 01701

smartlink

1997 ANNAPOLIS EXCHANGE PKWY
SUITE 200
ANNAPOLIS, MD 21401

Hudson Design Group

1600 OSGOOD STREET
BUILDING 20 NORTH, SUITE 3090
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DEREK J. CREASER

REVISIONS

REV. #	DATE	DESCRIPTION
5	09/02/16	REVISED PER COMMENTS
4	08/07/15	REVISED PER COMMENTS
3	03/31/15	REVISED PER COMMENTS
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0	10/28/14	ISSUED FOR REVIEW

PROJECT NO.	DESIGNED BY: DR DRAWN BY: NS CHECKED BY: RP	SCALE:
S2900-A		AS SHOWN

SITE NAME:

S2900-A
STAMFORD HARBOR

SITE ADDRESS:

208 HARBOR DRIVE
STAMFORD, CT 06902

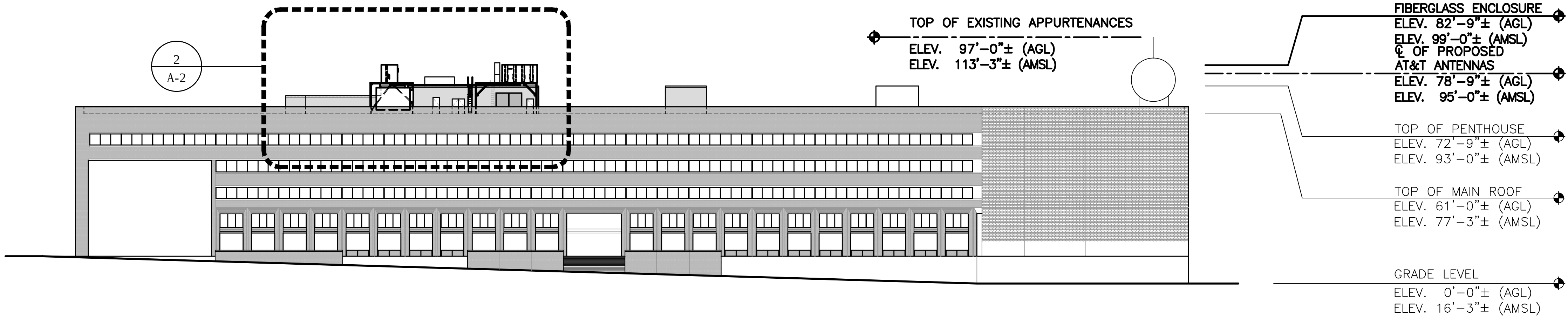
SHEET TITLE:

ROOF PLAN

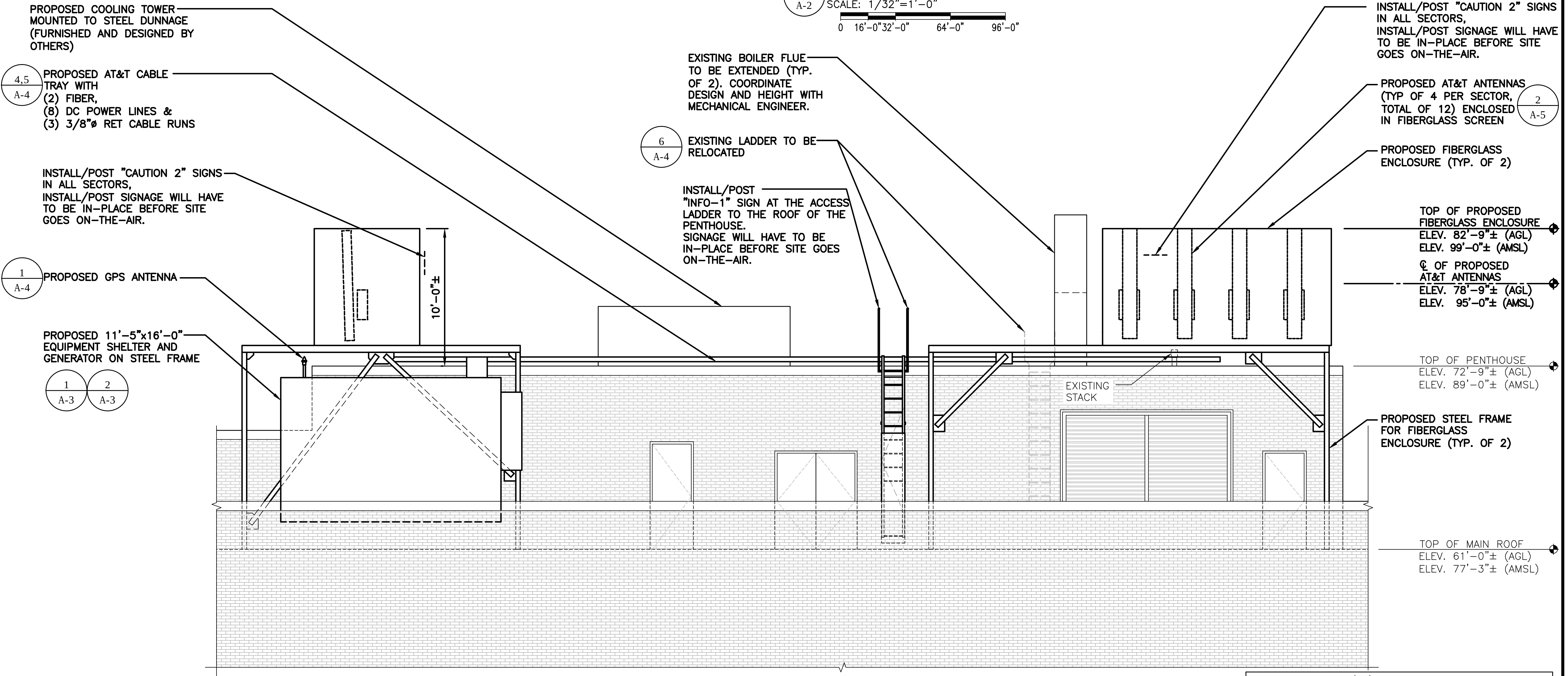
SHEET NO:

A-1

NOTE:
ALL STRUCTURAL MEMBERS NEAR
ANTENNAS SHALL BE MADE OF FRP
MATERIAL UNLESS OTHERWISE STATED



1
A-2
NORTH ELEVATION
SCALE: 1/32"=1'-0"
0 16'-0" 32'-0" 64'-0" 96'-0"



2
A-2
PARTIAL NORTH ELEVATION
SCALE: 1/4"=1'-0"
0 2'-0" 4'-0" 8'-0" 12'-0"

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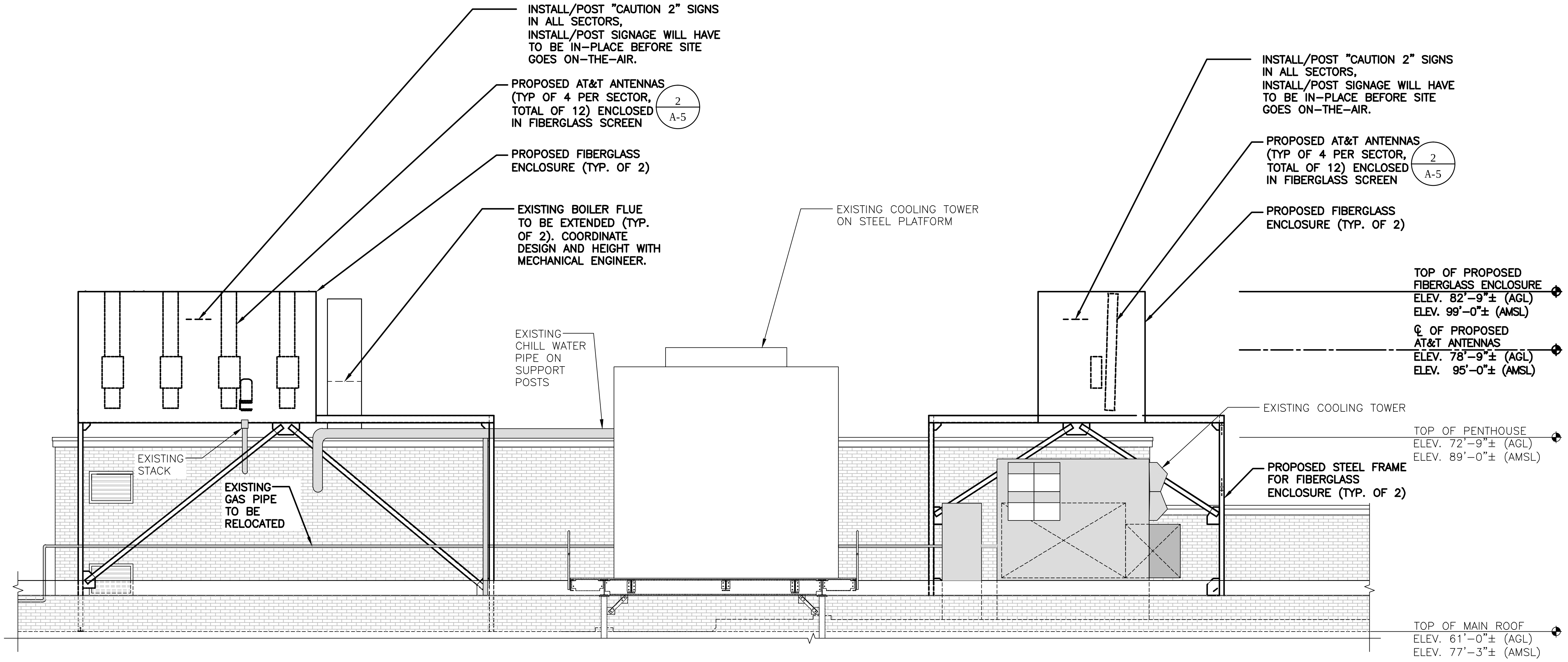
S2900-A
STAMFORD HARBOR

SITE ADDRESS:
208 HARBOR DRIVE
STAMFORD, CT 06902

SHEET TITLE:
ELEVATION

SHEET NO:
A-2

NOTE:
ALL STRUCTURAL MEMBERS NEAR ANTENNAS SHALL BE MADE OF FRP MATERIAL UNLESS OTHERWISE STATED


INSTALL/POST "CAUTION 2" SIGNS IN ALL SECTORS, INSTALL/POST SIGNAGE WILL HAVE TO BE IN-PLACE BEFORE SITE GOES ON-THE-AIR.
PROPOSED AT&T ANTENNAS (TYP OF 4 PER SECTOR, TOTAL OF 12) ENCLOSED IN FIBERGLASS SCREEN
2 A-5
PROPOSED FIBERGLASS ENCLOSURE (TYP. OF 2)
EXISTING BOILER FLUE TO BE EXTENDED (TYP. OF 2). COORDINATE DESIGN AND HEIGHT WITH MECHANICAL ENGINEER.
EXISTING COOLING TOWER ON STEEL PLATFORM
EXISTING CHILL WATER PIPE ON SUPPORT POSTS
EXISTING STACK
EXISTING GAS PIPE TO BE RELOCATED
INSTALL/POST "CAUTION 2" SIGNS IN ALL SECTORS, INSTALL/POST SIGNAGE WILL HAVE TO BE IN-PLACE BEFORE SITE GOES ON-THE-AIR.
PROPOSED AT&T ANTENNAS (TYP OF 4 PER SECTOR, TOTAL OF 12) ENCLOSED IN FIBERGLASS SCREEN
2 A-5
PROPOSED FIBERGLASS ENCLOSURE (TYP. OF 2)
TOP OF PROPOSED FIBERGLASS ENCLOSURE ELEV. 82'-9"± (AGL) ELEV. 99'-0"± (AMSL)
℄ OF PROPOSED AT&T ANTENNAS ELEV. 78'-9"± (AGL) ELEV. 95'-0"± (AMSL)
EXISTING COOLING TOWER
TOP OF PENTHOUSE ELEV. 72'-9"± (AGL) ELEV. 89'-0"± (AMSL)
PROPOSED STEEL FRAME FOR FIBERGLASS ENCLOSURE (TYP. OF 2)
TOP OF MAIN ROOF ELEV. 61'-0"± (AGL) ELEV. 77'-3"± (AMSL)

1 A-2a PENTHOUSE ELEVATION (SOUTH VIEW)

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

0 2'-0" 4'-0" 8'-0" 12'-0"

RADIO FREQUENCY (RF) EMISSIONS SIGNAGE SHALL BE INSTALLED IN ACCORDANCE WITH THE AT&T NEPA RF EMISSIONS VERIFICATION FORM AND THE AT&T DOCUMENT(S): SIGNAGE STANDARD FOR MOBILITY CELL SITES ATT-002-290-359 RF EXPOSURE: RESPONSIBILITIES, PROCEDURES & GUIDELINES, ATT-002-290-078; INSTALLING RADIO FREQUENCY (RF)SAFETY BARRIERS ON ROOFS WITH UNPROTECTED EDGES: JOB AID RFSRC-201210-2 V1.1

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DEREK J. CREASER

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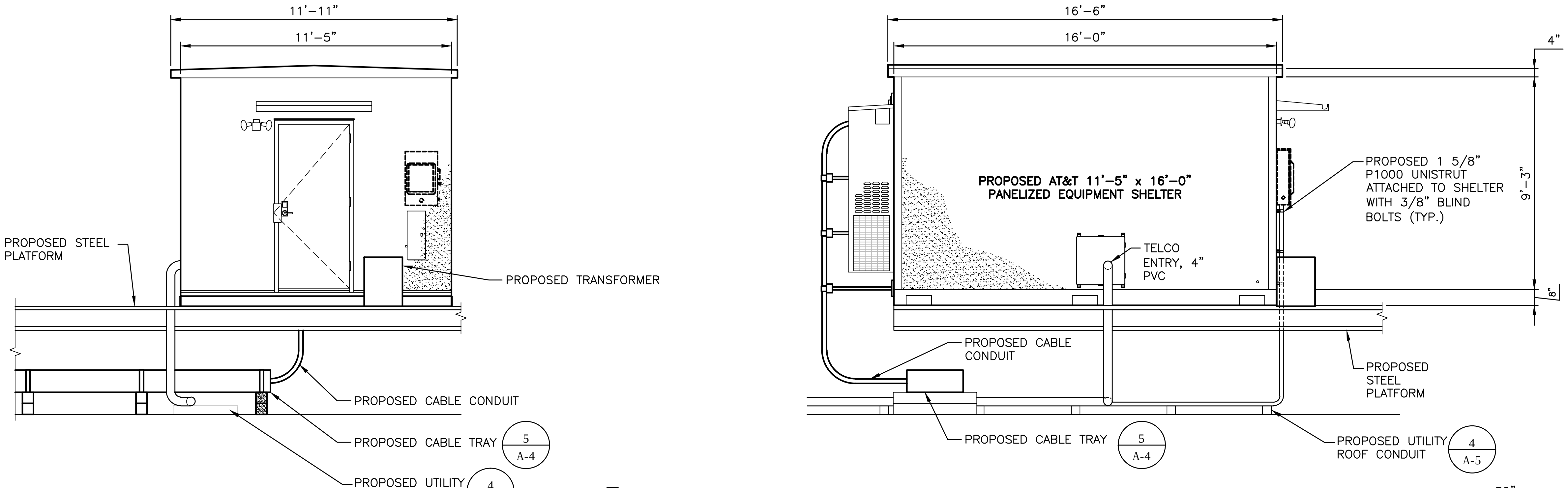
DESIGNED BY: DR
DRAWN BY: NS
CHECKED BY: RP
SCALE: AS SHOWN

SITE NAME:
S2900-A
STAMFORD HARBOR

SITE ADDRESS:
208 HARBOR DRIVE
STAMFORD, CT 06902

SHEET TITLE:
PENTHOUSE ELEVATION

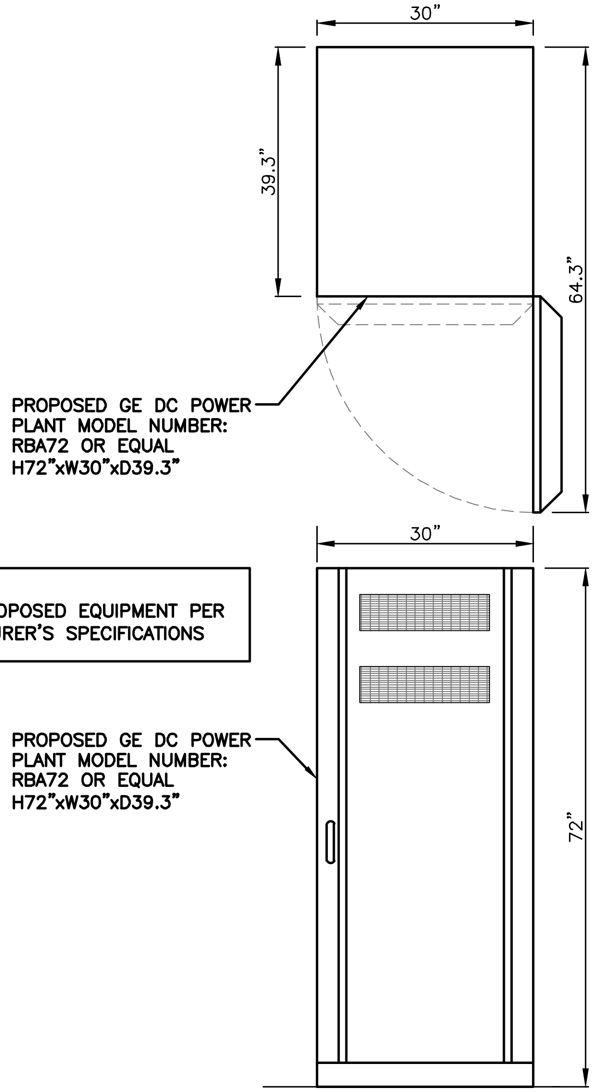
SHEET NO:
A-2a


11'–11"
11'–5"
PROPOSED STEEL PLATFORM
PROPOSED TRANSFORMER
PROPOSED CABLE CONDUIT
PROPOSED CABLE TRAY 5 A-4
PROPOSED UTILITY ROOF CONDUIT 4 A-5
16'–6"
16'–0"
4"
PROPOSED AT&T 11'–5" x 16'–0" PANELIZED EQUIPMENT SHELTER
PROPOSED 1 5/8" P1000 UNISTRUT ATTACHED TO SHELTER WITH 3/8" BLIND BOLTS (TYP.)
9'–3"
8"
TELCO ENTRY, 4" PVC
PROPOSED CABLE CONDUIT
PROPOSED STEEL PLATFORM
PROPOSED CABLE TRAY 5 A-4
PROPOSED UTILITY ROOF CONDUIT 4 A-5

1 A-3

SHELTER DETAIL

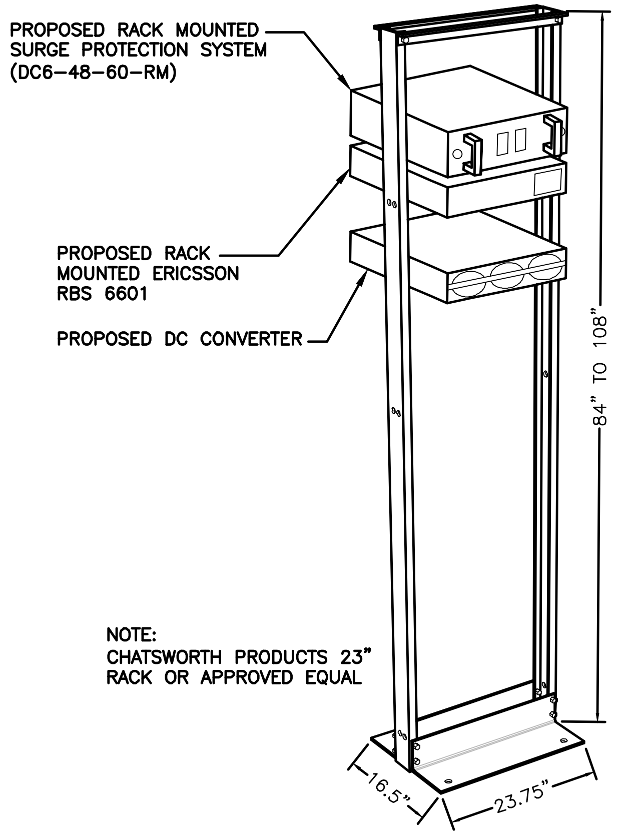
SCALE: N.T.S.


30"
39.3"
64.3"
PROPOSED GE DC POWER PLANT MODEL NUMBER: RBA72 OR EQUAL H72"xW30"xD39.3"
30"
72"
PROPOSED GE DC POWER PLANT MODEL NUMBER: RBA72 OR EQUAL H72"xW30"xD39.3"

NOTE:
MOUNT PROPOSED EQUIPMENT PER MANUFACTURER'S SPECIFICATIONS

5 A-3

PROPOSED DC POWER PLANT DETAIL

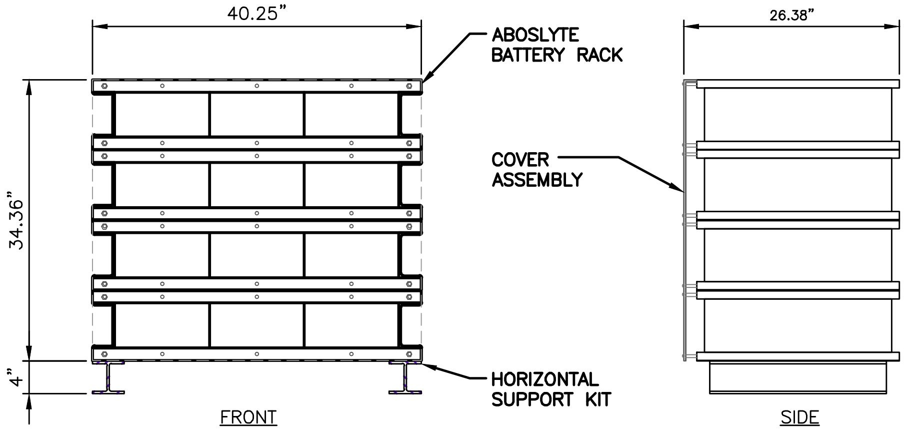

PROPOSED RACK MOUNTED SURGE PROTECTION SYSTEM (DC6–48–60–RM)
PROPOSED RACK MOUNTED ERICSSON RBS 6601
PROPOSED DC CONVERTER
84" TO 108"
16.5"
23.75"

NOTE:
CHATSWORTH PRODUCTS 23" RACK OR APPROVED EQUAL

4 A-3

EQUIPMENT RACK DETAIL

SCALE: N.T.S.



NOTE:
MOUNT PER MANUFACTURER'S SPECIFICATIONS.

3 A-3

ABSOLYTE BATTERY RACK

SCALE: N.T.S.

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STATE OF CONNECTICUT
DEREK J. CREASER
LICENSED PROFESSIONAL ENGINEER

REVISIONS

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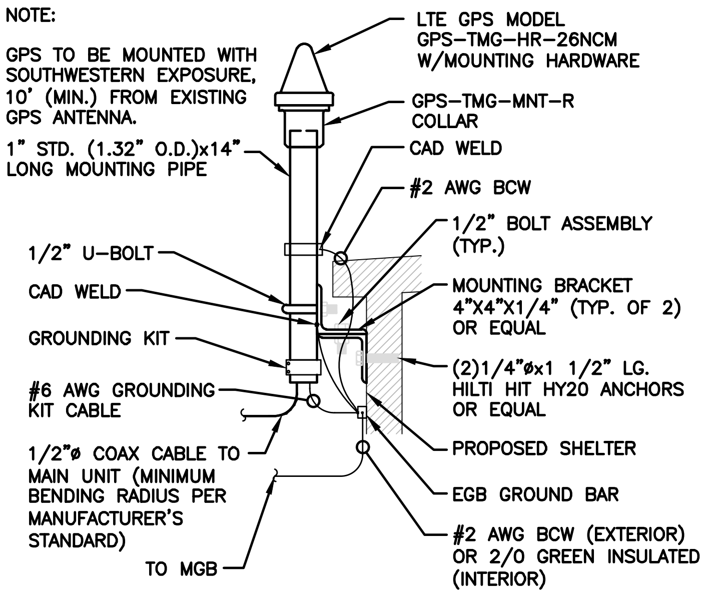
STAMFORD HARBOR

SITE ADDRESS:
208 HARBOR DRIVE
STAMFORD, CT 06902

SHEET TITLE:
SHELTER AND
EQUIPMENT DETAILS

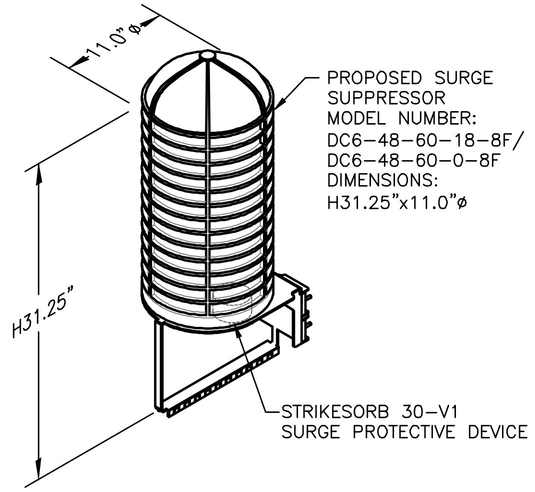
SHEET NO:
A-3


NOTE:
GPS TO BE MOUNTED WITH SOUTHWESTERN EXPOSURE, 10' (MIN.) FROM EXISTING GPS ANTENNA.
LTE GPS MODEL GPS–TMG–HR–26NCM W/MOUNTING HARDWARE
GPS–TMG–MNT–R COLLAR
1" STD. (1.32" O.D.)x14" LONG MOUNTING PIPE
CAD WELD
#2 AWG BCW
1/2" BOLT ASSEMBLY (TYP.)
1/2" U–BOLT
CAD WELD
MOUNTING BRACKET 4"X4"X1/4" (TYP. OF 2) OR EQUAL
GROUNDING KIT
(2)1/4"øx1 1/2" LG. HILTI HIT HY20 ANCHORS OR EQUAL
#6 AWG GROUNDING KIT CABLE
PROPOSED SHELTER
1/2"ø COAX CABLE TO MAIN UNIT (MINIMUM BENDING RADIUS PER MANUFACTURER'S STANDARD)
EGB GROUND BAR
TO MGB
#2 AWG BCW (EXTERIOR) OR 2/0 GREEN INSULATED (INTERIOR)

1
A-4

GPS MOUNTING DETAIL

SCALE: N.T.S.

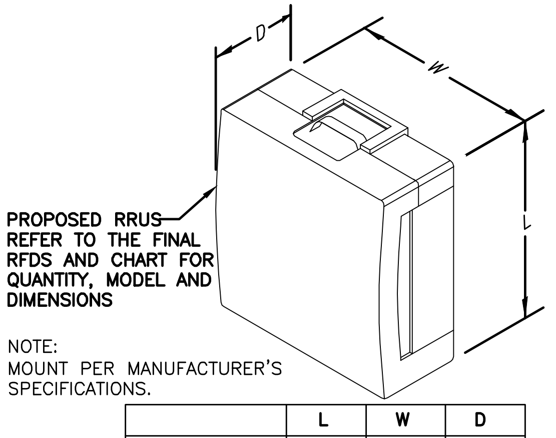

11.0"ø
H31.25"
PROPOSED SURGE SUPPRESSOR MODEL NUMBER: DC6–48–60–18–8F/ DC6–48–60–0–8F DIMENSIONS: H31.25"x11.0"ø
STRIKESORB 30–V1 SURGE PROTECTIVE DEVICE

NOTE:
MOUNT PER MANUFACTURER'S SPECIFICATIONS.

2
A-4

DC SURGE SUPPRESSOR DETAIL

SCALE: N.T.S.


D
W
L
PROPOSED RRUS REFER TO THE FINAL RFDS AND CHART FOR QUANTITY, MODEL AND DIMENSIONS
NOTE:
MOUNT PER MANUFACTURER'S SPECIFICATIONS.

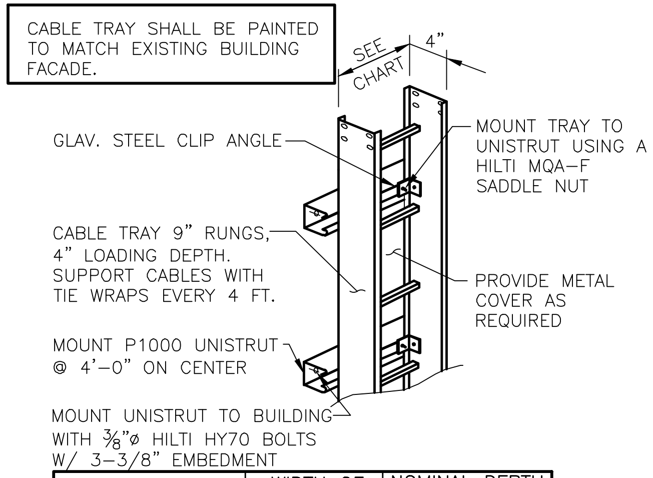
	L	W	D
RRUS – 11	19.7"	17.0"	7.2"
RRUS – 12	20.4"	18.5"	7.5"
RRUS – 32	27.2"	12.1"	7.0"
RRUS – E2	20.4"	18.5"	7.5"
LTE – A2	16.4"	15.2"	3.4"

3
A-4

RRUS DETAIL

SCALE: N.T.S.

CABLE TRAY SHALL BE PAINTED TO MATCH EXISTING BUILDING FACADE.


SEE CHART
4"
GLAV. STEEL CLIP ANGLE
MOUNT TRAY TO UNISTRUT USING A HILTI MQA–F SADDLE NUT
CABLE TRAY 9" RUNGS, 4" LOADING DEPTH. SUPPORT CABLES WITH TIE WRAPS EVERY 4 FT.
PROVIDE METAL COVER AS REQUIRED
MOUNT P1000 UNISTRUT @ 4'–0" ON CENTER
MOUNT UNISTRUT TO BUILDING WITH 3/8"ø HILTI HY70 BOLTS W/ 3–3/8" EMBEDMENT

NUMBER OF COAXIAL CABLES	WIDTH OF CABLE TRAY	NOMINAL DEPTH OF CABLE TRAY
18	36"	4"
12	24"	4"
6	12"	4"

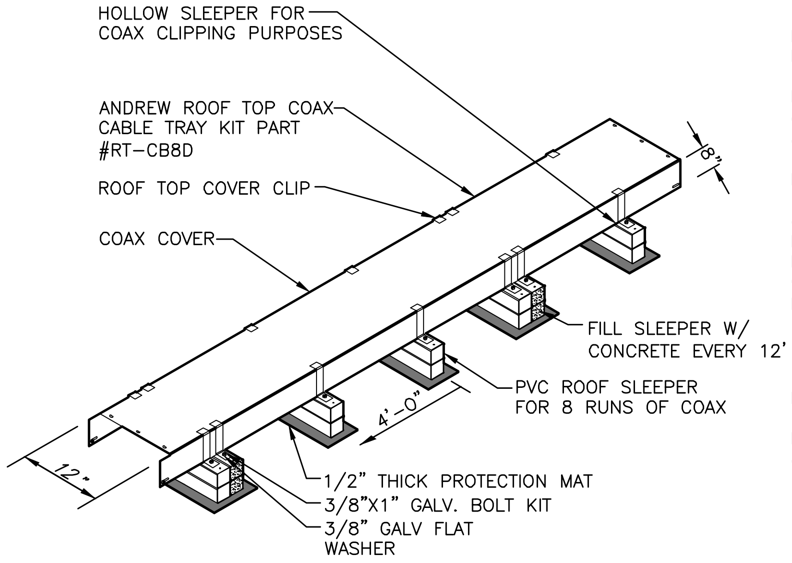
NOTES:

1. UNISTRUT SHALL BE TIGHTENED IN A MANNER SO AS NOT TO DAMAGE OR CRUSH THE EXTERIOR FINISH.
2. SEAL ALL PENETRATIONS WATERTIGHT.
3. WHEN CABLE TRAY COVERS ARE SPECIFIED, THEY SHALL BE INSTALLED IN ACCORDANCE WITH MANUFACTURERS INSTALLATION PROCEDURES AND INSTRUCTIONS FOR 'HIGH WIND CONDITIONS'. THIS INCLUDES CONNECTOR TYPE AND SPACINGS.

4
A-4

VERTICAL CABLE TRAY DETAIL

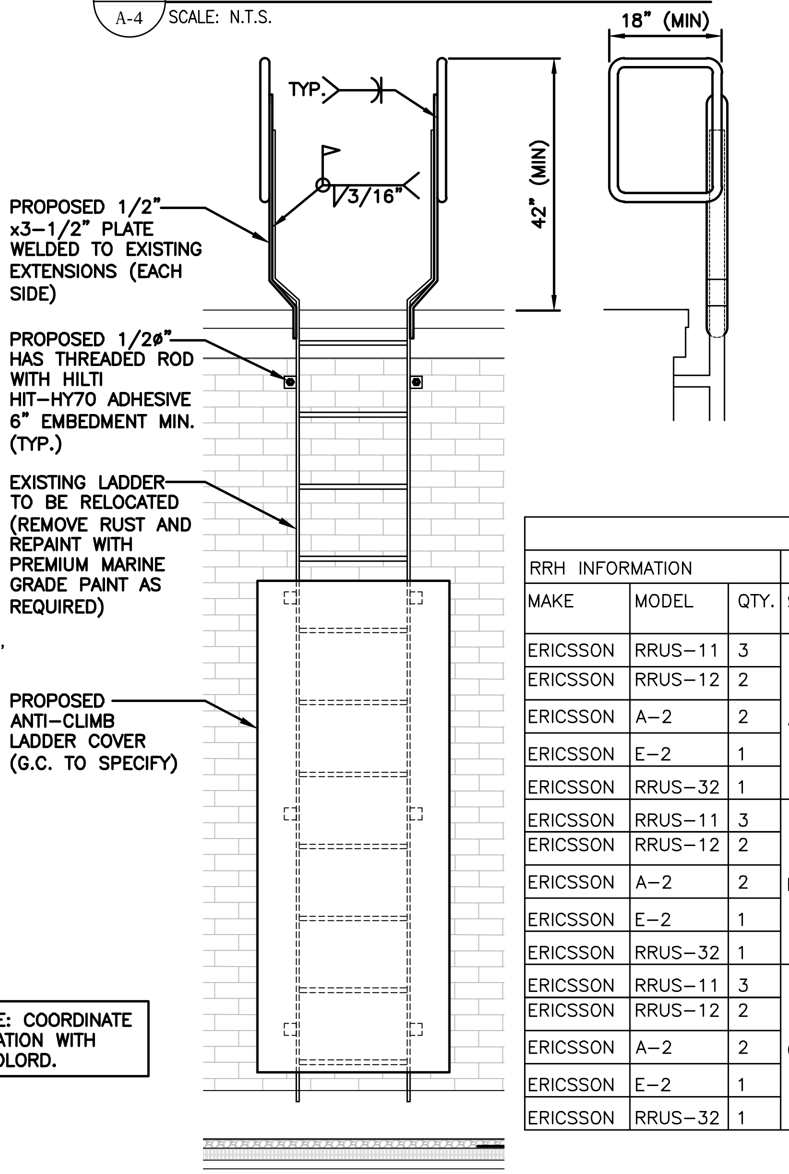
SCALE: N.T.S.


HOLLOW SLEEPER FOR COAX CLIPPING PURPOSES
ANDREW ROOF TOP COAX CABLE TRAY KIT PART #RT–CB8D
ROOF TOP COVER CLIP
COAX COVER
8"
FILL SLEEPER W/ CONCRETE EVERY 12'
PVC ROOF SLEEPER FOR 8 RUNS OF COAX
4'–0"
12"
1/2" THICK PROTECTION MAT
3/8"X1" GALV. BOLT KIT
3/8" GALV FLAT WASHER

5
A-4

CABLE TRAY DETAIL

SCALE: N.T.S.


18" (MIN)
TYP.
3/16"
42" (MIN)
PROPOSED 1/2" x3–1/2" PLATE WELDED TO EXISTING EXTENSIONS (EACH SIDE)
PROPOSED 1/2ø" HAS THREADED ROD WITH HILTI HIT–HY70 ADHESIVE 6" EMBEDMENT MIN. (TYP.)
EXISTING LADDER TO BE RELOCATED (REMOVE RUST AND REPAINT WITH PREMIUM MARINE GRADE PAINT AS REQUIRED)
PROPOSED ANTI–CLIMB LADDER COVER (G.C. TO SPECIFY)

NOTE: COORDINATE LOCATION WITH LANDLORD.

6
A-4

RELOCATED LADDER DETAIL

SCALE: N.T.S.

RF SYSTEM SCHEDULE & B.O.M.

RRH INFORMATION

MAKE	MODEL	QTY.
ERICSSON	RRUS–11	3
ERICSSON	RRUS–12	2
ERICSSON	A–2	2
ERICSSON	E–2	1
ERICSSON	RRUS–32	1
ERICSSON	RRUS–11	3
ERICSSON	RRUS–12	2
ERICSSON	A–2	2
ERICSSON	E–2	1
ERICSSON	RRUS–32	1
ERICSSON	RRUS–11	3
ERICSSON	RRUS–12	2
ERICSSON	A–2	2
ERICSSON	E–2	1
ERICSSON	RRUS–32	1

ANTENNA INFORMATION

SECTOR	POSITION	MODEL	FEED	AZIMUTH	RAD CTR (AGL)	FIBER/POWER LENGTH	FEEDERS	MECHANICAL DOWNTILT	ELECTRICAL DOWNTILT
ALPHA	IA	HPA–65R–BUU–HB	BOTTOM	60°	78'–9"±	53'±	FIBER/CD POWER	0°	0°
	IIA	HPA–65R–BUU–HB	BOTTOM	60°	78'–9"±	53'±	FIBER/CD POWER	0°	0°
	IIIA	HPA–65R–BUU–HB	BOTTOM	60°	78'–9"±	53'±	FIBER/CD POWER	0°	0°
	IVA	HPA–65R–BUU–HB	BOTTOM	60°	78'–9"±	53'±	FIBER/CD POWER	0°	0°
BETA	IB	HPA–65R–BUU–HB	BOTTOM	160°	78'–9"±	100'±	FIBER/CD POWER	0°	0°
	IIB	HPA–65R–BUU–HB	BOTTOM	160°	78'–9"±	100'±	FIBER/CD POWER	0°	0°
	IIIB	HPA–65R–BUU–HB	BOTTOM	160°	78'–9"±	100'±	FIBER/CD POWER	0°	0°
	IVB	HPA–65R–BUU–HB	BOTTOM	160°	78'–9"±	100'±	FIBER/CD POWER	0°	0°
GAMMA	IC	HPA–65R–BUU–HB	BOTTOM	300°	78'–9"±	100'±	FIBER/CD POWER	0°	0°
	IIC	HPA–65R–BUU–HB	BOTTOM	300°	78'–9"±	100'±	FIBER/CD POWER	0°	0°
	IIIC	HPA–65R–BUU–HB	BOTTOM	300°	78'–9"±	100'±	FIBER/CD POWER	0°	0°
	IVC	HPA–65R–BUU–HB	BOTTOM	300°	78'–9"±	100'±	FIBER/CD POWER	0°	0°

7
A-4

RF SYSTEM SCHEDULE & B.O.M.

SCALE: N.T.S.

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550 COCHITUATE RD.
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1997 ANNAPOLIS EXCHANGE PKWY
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DEREK J. CREASER

REVISIONS

REV. #	DATE	DESCRIPTION
5	09/02/16	REVISED PER COMMENTS
4	08/07/15	REVISED PER COMMENTS
3	03/31/15	REVISED PER COMMENTS
2	01/13/15	REVISED PER COMMENTS
1	11/24/14	ISSUED FOR CONSTRUCTION
0	10/28/14	ISSUED FOR REVIEW

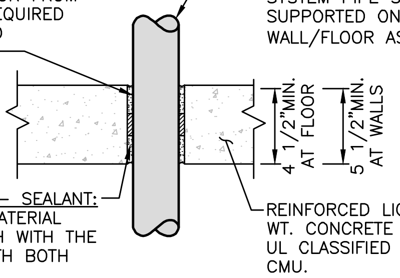
PROJECT NO. S2900–A
DESIGNED BY: DR
DRAWN BY: NS
CHECKED BY: RP
SCALE: AS SHOWN

SITE NAME:
S2900-A
STAMFORD HARBOR

SITE ADDRESS:
208 HARBOR DRIVE
STAMFORD, CT 06902

SHEET TITLE:
EQUIPMENT DETAILS

SHEET NO:
A-4



PACKING MATERIAL: MIN 1-1/2 in. THICKNESS OF MIN 6 pcf MINERAL WOOL BATT INSULATION FIRMLY PACKED INTO OPENING AS A PERMANENT FORM. PACKING MATERIAL TO BE RECESSED FROM TOP SURFACE OF FLOOR OR FROM BOTH SURFACES OF WALL AS REQUIRED TO ACCOMMODATE THE REQUIRED THICKNESS OF FILL MATERIAL.

ONE 2"ø (OR SMALLER) SCHEDULE 40 PVC PIPE TO BE CENTERED WITHIN FIRESTOP SYSTEM. A NOM. ANNULAR SPACE OF 5/16" IS REQUIRED WITHIN THE FIRESTOP SYSTEM PIPE SHALL BE RIGIDLY SUPPORTED ON BOTH SIDES OF WALL/FLOOR ASSEMBLY

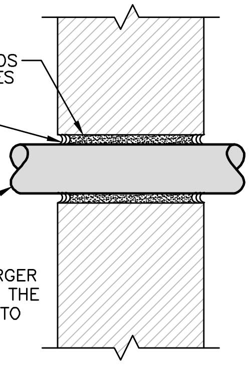
FILL, VOID OR CAVITY MATERIAL – SEALANT: MIN 2 in. THICKNESS OF FILL MATERIAL APPLIED WITHIN ANNULUS, FLUSH WITH THE TOP SURFACE OF FLOOR OR WITH BOTH SURFACES OF WALL.

REINFORCED LIGHT WT. CONCRETE OR UL CLASSIFIED CMU.

SPECIFIED TECHNOLOGIES INC:
SPECSEAL SERIES SSS SEALANT OR SPECSEAL LCI SEALANT.

UL SYSTEM NUMBER: C-AJ-2057
F RATING – 2 HR.

PVC CONDUIT PENETRATION DETAIL IN CONCRETE OR MASONRY



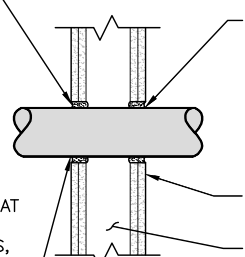
GROUT ALL VOIDS AROUND SLEEVES

SEALANT

CONDUIT

NOTE:
CORE HOLE 1 1/2" LARGER THAN THE DIAMETER OF THE CONDUIT. CORE DRILLS TO BE SEALED WITH ELASTOMERIC SEALANT

PIPE AND CONDUIT PENETRATION DETAIL IN NON-RATED PARTITION



PACKING MATERIAL: MIN. 1 in. THICKNESS OF MIN. 3.5 pcf FIBERGLASS INSULATION SHALL BE WRAPPED AROUND THE THROUGH-PENETRANT AND SECURED TOGETHER BY MEANS OF NO. 24 AWG STEEL TIE WIRE. PACKING MATERIAL SHALL BE CENTERED AT MID-DEPTH OF OPENING AND RECESSED FROM BOTH SURFACES OF WALL ASSEMBLY REQUIRED TO ACCOMMODATE THE REQUIRED THICKNESS OF FILL MATERIAL.

FILL, VOID OR CAVITY MATERIAL – CAULK OR PUTTY: IN 2 HR FIRE RATED ASSEMBLIES MIN 3/4 IN. THICKNESS FILL MATERIAL APPLIED WITHIN THE ANNULUS, FLUSH BOTH SURFACES OF WALL. ADDITIONAL FILL MATERIAL TO BE INSTALLED SUCH THAT A MIN 1/4 in. CROWN IS FORMED AROUND THE PENETRATING ITEM. IN 1 HR FIRE RATED ASSEMBLIES, MIN 5/8 in. THICKNESS OF FILL MATERIAL APPLIED WITHIN ANNULUS ON BOTH SURFACES OF WALL. ADDITIONAL FILL MATERIAL TO BE INSTALLED SUCH THAT A MIN 3/8 in. CROWN IS FORMED AROUND THE PENETRATING ITEM AND LAPPING 1 in. BEYOND THE PERIPHERY OF THE OPENING.

SPECIFIED TECHNOLOGIES INC:
SPECSEAL SERIES SSS SEALANT,
SPECSEAL LCI SEALANT OR
SPECSEAL PUTTY.

ONE 4"ø OR SMALLER METALLIC PIPE OR CONDUIT TO BE CENTERED WITHIN FIRESTOP SYSTEM. PIPE SHALL BE RIGIDLY SUPPORTED ON BOTH SIDES OF WALL/FLOOR ASSEMBLY AND HAVE AN ANNULAR SPACE OF 3/4"

LAYERS OF 5/8" THICK GYPSUM WALL BOARD

WOOD OR METAL STUDS

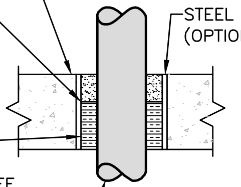
UL SYSTEM NUMBER: W-L-1029
F RATING – 1 & 2 HR.

PIPE AND CONDUIT PENETRATION DETAIL IN GYPSUM WALLBOARD

ALL CORES THROUGH ELECTRIC ROOMS TO BE FIRE-STOPPED.

USE FULL CONDUIT RUNS THROUGH PENETRATIONS

FLOOR OR WALL	MIN FLOOR OR WALL THKNS. (in.)	MAX DIAM OF STEEL PIPE OR CONDUIT (in.)	MIN ANNULAR SPACE (in.)	MAX ANNULAR SPACE (in.)	MIN FILL MTL THKNS (in.)	MIN FORMING MTL THKNS (in.)	F RATING (HOURS)	T RATING (HOURS)
FLOOR	3-3/4	1-1/2	3/8	2-1/8	1	2-3/4	2	0
FLOOR	3-3/4	6	3/8	3/4	1	2-3/4	2	0
FLOOR	3-3/4	6	3/8	1	2	1-3/4	2	0
FLOOR	4-1/2	1-1/2	3/8	2-1/8	1	3-1/2	3	3/4
FLOOR	4-1/2	6	3/8	3/4	1	3-1/2	3	0
FLOOR	4-1/2	6	3/8	1	2	2-1/2	3	0
WALL	5-1/2	1-1/2	3/8	2-1/8	1	3-1/2	3	3/4
WALL	5-1/2	6	3/8	3/4	1	3-1/2	3	0
WALL	6-1/2	1-1/2	3/8	2-1/8	2	2-1/2	3	1
WALL	6-1/2	6	3/8	1	2	2-1/2	3	0



CONCRETE FLOOR OR WALL ASSEMBLY, MINIMUM 3-3/4 in. THICKNESS FLOOR/ MINIMUM 6-1/2 in. WALL

TYPE AS OR TYPE SS:
MINIMUM THICKNESS OF SEALANT AS SPECIFIED IN THE TABLE ABOVE, APPLIED WITHIN THE OPENING, FLUSH WITH THE TOP SURFACE OF THE FLOOR OR BOTH SURFACES OF THE WALL.

STEEL SLEEVE (OPTIONAL)

FORMING MATERIAL:
MINERAL WOOL BATT INSULATION (MINIMUM 4.0 pcf) FIRMLY PACKED INTO THE OPENING AS A PERMANENT FORM; SEE TABLE FOR MINIMUM REQUIRED THICKNESS

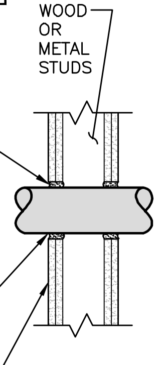
METALLIC PIPE:
STEEL PIPE: 6"ø (OR SMALLER) SCHEDULE 10 (OR HEAVIER) STEEL PIPE.
CONDUIT: 4"ø (OR SMALLER) ELECTRICAL METALLIC TUBING (EMT)
OR 6"ø RIGID STEEL CONDUIT.

UL SYSTEM NUMBER: C-AJ-1020
F RATING – 3 HR. (FOR PIPES GREATER THAN 4")
F RATING – 2 HR. (FOR PIPES LESS THAN 4")

PIPE AND CONDUIT PENETRATION DETAIL IN CONCRETE OR MASONRY

WALL HR	MAX DIAM OF THROUGH PENETRANT in.	T RATING HR
1	2	1
1	1-1/4	1
2	2	1
2	1-1/4	1 1/2

THE HOURLY F RATING OF THE FIRESTOP SYSTEM IS EQUAL TO THE HOURLY FIRE RATING OF THE WALL ASSEMBLY IN WHICH IT IS INSTALLED.



WOOD OR METAL STUDS

THROUGH PENETRANTS: ONE 2"ø NONMETALLIC PIPE, CONDUIT OR RACEWAY TO BE CENTERED WITHIN THE FIRESTOP SYSTEM. A NOM ANNULAR SPACE OF 5/16 in. IS REQUIRED WITHIN THE FIRESTOP SYSTEM. PIPE, CONDUIT OR RACEWAY TO BE RIGIDLY SUPPORTED ON BOTH SIDES OF THE FLOOR OR WALL ASSEMBLY.

FILL, VOID OR CAVITY MATERIAL – SEALANT: MIN 5/8 in. THICKNESS OF FILL MATERIAL APPLIED WITHIN ANNULUS, FLUSH WITH BOTH SURFACES OF WALL. ADDITIONAL FILL MATERIAL TO BE INSTALLED SUCH THAT A MIN 1/4 in. THICK CROWN IS FORMED AROUND THE PENETRATING ITEM AND LAPPING 1 in. BEYOND THE PERIPHERY OF THE OPENING.

LAYERS OF 5/8" GYPSUM BOARD

SPECIFIED TECHNOLOGIES INC:
SPECSEAL SERIES SSS SEALANT,
SPECSEAL LCI SEALANT.

UL SYSTEM NUMBER: W-L-2093
F RATING – 1 & 2 HR.

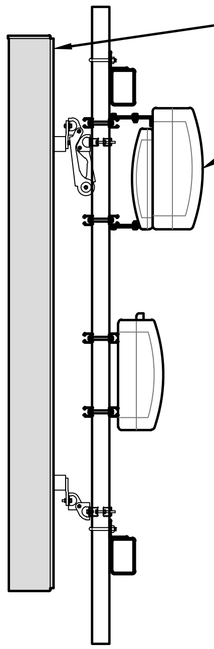
PVC CONDUIT PENETRATION DETAIL IN GYPSUM WALLBOARD

NOTE:

CABLES IN VERTICAL RUNS. CABLES INSTALLED IN VERTICAL RUNS AND PENETRATING MORE THAN ONE FLOOR, OR CABLES INSTALLED IN VERTICAL RUNS IN A SHAFT, SHALL BE TYPE CMR. FLOOR PENETRATIONS REQUIRING TYPE CMR SHALL CONTAIN ONLY CABLES SUITABLE FOR RISER OR PLENUM USE. LISTED RISER COMMUNICATIONS RACEWAYS AND LISTED PLENUM COMMUNICATIONS RACEWAYS SHALL BE PERMITTED TO BE INSTALLED IN VERTICAL RISER RUNS IN A SHAFT FROM FLOOR TO FLOOR. **ONLY TYPE CMR CABLES SHALL BE PERMITTED TO BE INSTALLED IN THESE RISERS. ONLY CMP CABLES SHALL BE PERMITTED TO BE INSTALLED IN PLENUMS.**

METAL RACEWAYS OR FIREPROOF SHAFTS. LISTED COMMUNICATIONS CABLES SHALL BE ENCASED IN A METAL RACEWAY OR LOCATED IN A FIREPROOF SHAFT HAVING FIRESTOPS AT EACH FLOOR.

1 A-5 PENETRATION DETAIL
SCALE: N.T.S.

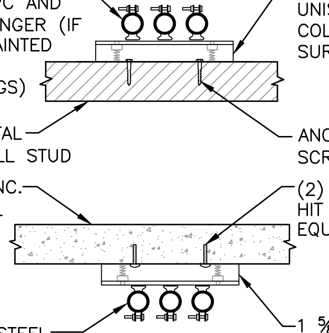


PROPOSED LTE ANTENNA MOUNTED TO PROPOSED PIPE ON NEW SECTOR FRAME (TYP. OF 4 PER SECTOR, TOTAL OF 12)

PROPOSED RRUS INSTALLED BEHIND ANTENNAS ON PROPOSED MOUNTING PIPE (TYP. OF 9 PER SECTOR, TOTAL OF 27)

NOTE:
ALL STRUCTURAL MEMBERS NEAR ANTENNAS SHALL BE MADE OF FRP MATERIAL UNLESS OTHERWISE STATED

2 A-5 ANTENNA MOUNTING DETAIL
SCALE: N.T.S.



GALVANIZED STEEL CONDUIT/ PVC AND ANDREWS HANGER (IF EXTERIOR, PAINTED COLOR OF SURROUNDINGS)

1 ⅝" GALV. P1000 UNISTRUT (PAINTED COLOR OF SURROUNDINGS)

EXISTING METAL CEILING/ WALL STUD

ANCHORED W/ SHEET METAL SCREWS (2 PER UNISTRUT)

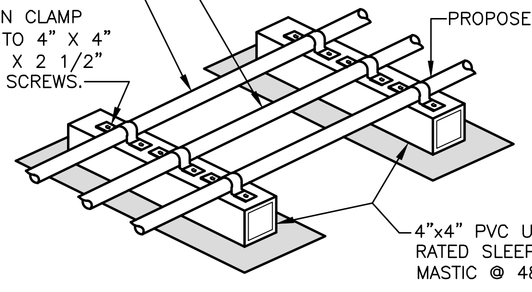
EXISTING CONC. CEILING/WALL

(2) ¼"øx1 ½" LG. HILTI HIT HY20 ANCHORS OR EQUAL

GALVANIZED STEEL CONDUIT AND ANDREWS HANGER (PAINTED COLOR OF SURROUNDINGS)

1 ⅝" GALV. P1000 UNISTRUT (PAINTED COLOR OF SURROUNDINGS)

3 A-5 CONDUIT RUN DETAIL
SCALE: N.T.S.



TELCO CONDUIT

GROUND WIRE/CONDUIT

PROPOSED CONDUIT

HOLD DOWN CLAMP FASTENED TO 4" X 4" WITH 3/8" X 2 1/2" LONG LAG SCREWS.

4"x4" PVC U.V. RATED SLEEPER SET ON MASTIC @ 48" O.C.

4 A-5 ROOF CONDUIT DETAIL
SCALE: N.T.S.

550 COCHITUATE RD.
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STATE OF CONNECTICUT
DEREK J. CREASER
No.28551
LICENSED PROFESSIONAL ENGINEER

REVISIONS		
5	09/02/16	REVISED PER COMMENTS
4	08/07/15	REVISED PER COMMENTS
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REV. #	DATE	DESCRIPTION

PROJECT NO.		SCALE:
S2900-A	DESIGNED BY: DR DRAWN BY: NS CHECKED BY: RP	AS SHOWN

SITE NAME:
S2900-A
STAMFORD HARBOR

SITE ADDRESS:
208 HARBOR DRIVE
STAMFORD, CT 06902

SHEET TITLE:
EQUIPMENT DETAILS

SHEET NO:
A-5

STRUCTURAL NOTES:

1. DESIGN REQUIREMENTS ARE PER CT STATE BUILDING CODE AND APPLICABLE SUPPLEMENTS(2003 IBC, 2005 CT SUPP.) AND AMENDMENTS (2009, 2011 & 2013 CT AMENDEMENTS), IASCE 7-02, EIA/TIA-322-F STRUCTURAL STANDARDS FOR STEEL ANTENNA, TOWERS AND ANTENNA SUPPORTING STRUCTURES.

2. CONTRACTOR SHALL VERIFY ALL DIMENSIONS AND CONDITIONS IN THE FIELD PRIOR TO FABRICATION AND ERECTION OF ANY MATERIAL. ANY UNUSUAL CONDITIONS SHALL BE REPORTED TO THE ATTENTION OF THE CONSTRUCTION MANAGER AND ENGINEER OF RECORD.

3. DESIGN AND CONSTRUCTION OF STRUCTURAL STEEL SHALL CONFORM TO THE AMERICAN INSTITUTE OF STEEL CONSTRUCTION "SPECIFICATION FOR THE DESIGN, FABRICATION AND ERECTION OF STRUCTURAL STEEL FOR BUILDINGS".

4. STRUCTURAL STEEL SHALL CONFORM TO ASTM A992 (Fy=50 ksi), MISCELLANEOUS STEEL SHALL CONFORM TO ASTM A36 UNLESS OTHERWISE INDICATED.

5. STEEL PIPE SHALL CONFORM TO ASTM A500 "COLD-FORMED WELDED & SEAMLESS CARBON STEEL STRUCTURAL TUBING", GRADE B, OR ASTM A53 PIPE STEEL BLACK AND HOT-DIPPED ZINC-COATED WELDED AND SEAMLESS TYPE E OR S, GRADE B. PIPE SIZES INDICATED ARE NOMINAL. ACTUAL OUTSIDE DIAMETER IS LARGER.

6. STRUCTURAL CONNECTION BOLTS SHALL BE HIGH STRENGTH BOLTS (BEARING TYPE) AND CONFORM TO ASTM A325 "HIGH STRENGTH BOLTS FOR STRUCTURAL JOINTS, INCLUDING SUITABLE NUTS AND PLAIN HARDENED WASHERS". ALL BOLTS SHALL BE 3/4" DIA UON.

7. ALL STEEL MATERIALS SHALL BE GALVANIZED AFTER FABRICATION IN ACCORDANCE WITH ASTM A123 "ZINC (HOT-DIP GALVANIZED) COATINGS ON IRON AND STEEL PRODUCTS", UNLESS OTHERWISE NOTED.

8. ALL BOLTS, ANCHORS AND MISCELLANEOUS HARDWARE SHALL BE GALVANIZED IN ACCORDANCE WITH ASTM A153 "ZINC-COATING (HOT-DIP) ON IRON AND STEEL HARDWARE", UNLESS OTHERWISE NOTED.

9. FIELD WELDS, DRILL HOLES, SAW CUTS AND ALL DAMAGED GALVANIZED SURFACES SHALL BE REPAIRED WITH AN ORGANIC ZINC REPAIR PAINT COMPLYING WITH REQUIREMENTS OF ASTM A780. GALVANIZING REPAIR PAINT SHALL HAVE 65 PERCENT ZINC BY WEIGHT, ZIRP BY DUNCAN GALVANIZING, GALVA BRIGHT PREMIUM BY CROWN OR EQUAL. THICKNESS OF APPLIED GALVANIZING REPAIR PAINT SHALL BE NOT NOT LESS THAN 4 COATS (ALLOW TIME TO DRY BETWEEN COATS) WITH A RESULTING COATING THICKNESS REQUIRED BY ASTM A123 OR A153 AS APPLICABLE.

10. CONTRACTOR SHALL COMPLY WITH AWS CODE FOR PROCEDURES, APPEARANCE AND QUALITY OF WELDS, AND FOR METHODS USED IN CORRECTING WELDING. ALL WELDERS AND WELDING PROCESSES SHALL BE QUALIFIED IN ACCORDANCE WITH AWS "STANDARD QUALIFICATION PROCEDURES". ALL WELDING SHALL BE DONE USING E70XX ELECTRODES AND WELDING SHALL CONFORM TO AISC AND DI.I. WHERE FILLET WELD SIZES ARE NOT SHOWN, PROVIDE THE MINIMUM SIZE PER TABLE J2.4 IN THE AISC "MANUAL OF STEEL CONSTRUCTION". 9TH EDITION.

11. INCORRECTLY FABRICATED, DAMAGED OR OTHERWISE MISFITTING OR NON-CONFORMING MATERIALS OR CONDITIONS SHALL BE REPORTED TO THE CONSTRUCTION MANAGER PRIOR TO REMEDIAL OR CORRECTIVE ACTION. ANY SUCH ACTION SHALL REQUIRE CONSTRUCTION MANAGER APPROVAL.

12. UNISTRUTS SHALL BE FORMED STEEL CHANNEL STRUT FRAMING AS MANUFACTURED BY UNISTRUT CORP., WAYNE, MI OR EQUAL. STRUT MEMBERS SHALL BE 1 5/8"x1 5/8"x12GA, UNLESS OTHERWISE NOTED, AND SHALL BE HOT-DIP GALVANIZED AFTER FABRICATION.

13. EPOXY ANCHOR ASSEMBLY SHALL CONSIST OF STAINLESS STEEL ANCHOR ROD WITH NUTS & WASHERS. AN INTERNALLY THREADED INSERT, A SCREEN TUBE AND A EPOXY ADHESIVE. THE ANCHORING SYSTEM SHALL BE THE HILTI-HIT HY-200 SYSTEMS (AS SPECIFIED IN DWG.) OR ENGINEERS APPROVED EQUAL.

14. EXPANSION BOLTS SHALL CONFORM TO FEDERAL SPECIFICATION FF-S-325, GROUP II, TYPE 4, CLASS I, HILTI KWIK BOLT III OR APPROVED EQUAL. INSTALLATION SHALL BE IN ACCORDANCE WITH THE MANUFACTURER'S RECOMMENDATIONS.

15. LUMBER SHALL COMPLY WITH THE REQUIREMENTS OF THE AMERICAN INSTITUTE OF TIMBER CONSTRUCTION AND THE NATIONAL FOREST PRODUCTS ASSOCIATION'S NATIONAL DESIGN SPECIFICATION FOR WOOD CONSTRUCTION. ALL LUMBER SHALL BE PRESSURE TREATED AND SHALL BE STRUCTURAL GRADE NO. 2 OR BETTER.

16. WHERE ROOF PENETRATIONS ARE REQUIRED, THE CONTRACTOR SHALL CONTACT AND COORDINATE RELATED WORK WITH THE BUILDING OWNER AND THE EXISTING ROOF INSTALLER. WORK SHALL BE PERFORMED IN SUCH A MANNER AS TO NOT VOID THE EXISTING ROOF WARRANTY. ROOF SHALL BE WATERTIGHT.

17. ALL FIBERGLASS MEMBERS USED ARE AS MANUFACTURED BY STRONGWELL COMPANY OF BRISTOL, VA 24203. ALL DESIGN CRITERIA FOR THESE MEMBERS IS BASED ON INFORMATION PROVIDED IN THE DESIGN MANUAL. ALL REQUIREMENTS PUBLISHED IN SAID MANUAL MUST BE STRICTLY ADHERED TO.

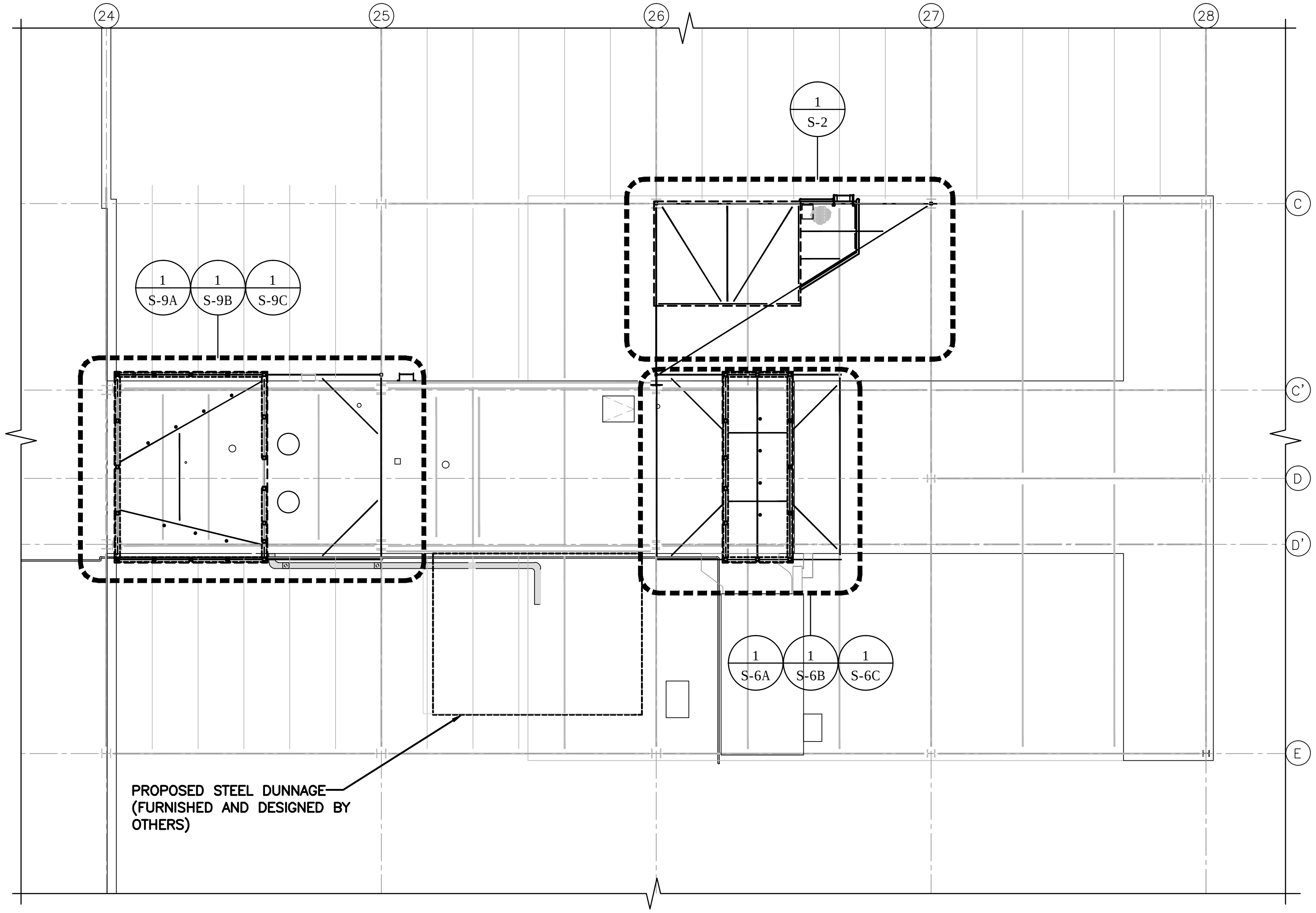
18. NO MATERIALS TO BE ORDERED AND NO WORK TO BE COMPLETED UNTIL SHOP DRAWINGS HAVE BEEN REVIEWED AND APPROVED IN WRITING.

19. SUBCONTRACTOR SHALL FIREPROOF ALL STEEL TO PRE-EXISTING CONDITIONS.

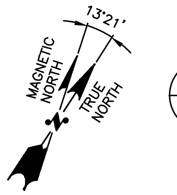
CODE INSPECTION CHECKLIST

BEFORE CONSTRUCTION		DURING CONSTRUCTION		AFTER CONSTRUCTION	
CONSTRUCTION/INSTALLATION INSPECTIONS AND TESTING REQUIRED (COMPLETED BY ENGINEER OF RECORD)	REPORT ITEM	CONSTRUCTION/INSTALLATION INSPECTIONS AND TESTING REQUIRED (COMPLETED BY ENGINEER OF RECORD)	REPORT ITEM	CONSTRUCTION/INSTALLATION INSPECTIONS AND TESTING REQUIRED (COMPLETED BY ENGINEER OF RECORD)	REPORT ITEM
REQUIRED	ENGINEER OF RECORD APPROVED SHOP DRAWINGS	**REQUIRED**	CONSTRUCTION INSPECTIONS	**REQUIRED**	MODIFICATION INSPECTOR REDLINE OR RECORD DRAWINGS
REQUIRED	MATERIAL SPECIFICATIONS REPORT	N/A	FOUNDATION INSPECTIONS	N/A	POST INSTALLED ANCHOR ROD PULL-OUT TESTING
N/A	FABRICATOR NDE INSPECTION	N/A	CONCRETE COMP. STRENGTH AND SLUMP TESTS	**REQUIRED**	PHOTOGRAPHS
REQUIRED	PACKING SLIPS	N/A	POST INSTALLED ANCHOR VERIFICATION	ADDITIONAL TESTING AND INSPECTIONS:	
ADDITIONAL TESTING AND INSPECTIONS:	ROOF CONSTRUCTION VERIFICATION. AS-BUILT DWGS PRIOR TO CONSTRUCTION	**REQUIRED**	CERTIFIED WELD INSPECTION		
		REQUIRED	ON SITE COLD GALVANIZING VERIFICATION		
		ADDITIONAL TESTING AND INSPECTIONS:			

NOTE:
ALL STRUCTURAL MEMBERS NEAR ANTENNAS SHALL BE MADE OF FRP MATERIAL UNLESS OTHERWISE STATED



STRUCTURAL NOTE:
STRUCTURAL INFORMATION TAKEN FROM
STRUCTURAL ANALYSIS
PERFORMED BY HUDSON DESIGN GROUP LLC
DATED: SEPTEMBER 1, 2016



1
S-1

STRUCTURAL FRAMING PLAN

SCALE: 1/8"=1'-0"

▬	– EXISTING MEMBER
▬	– PROPOSED MEMBER
(S) ▨	– STEEL
(F) ☐	– FIBERGLASS

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DEREK J. CREASER

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S2900-A
STAMFORD HARBOR

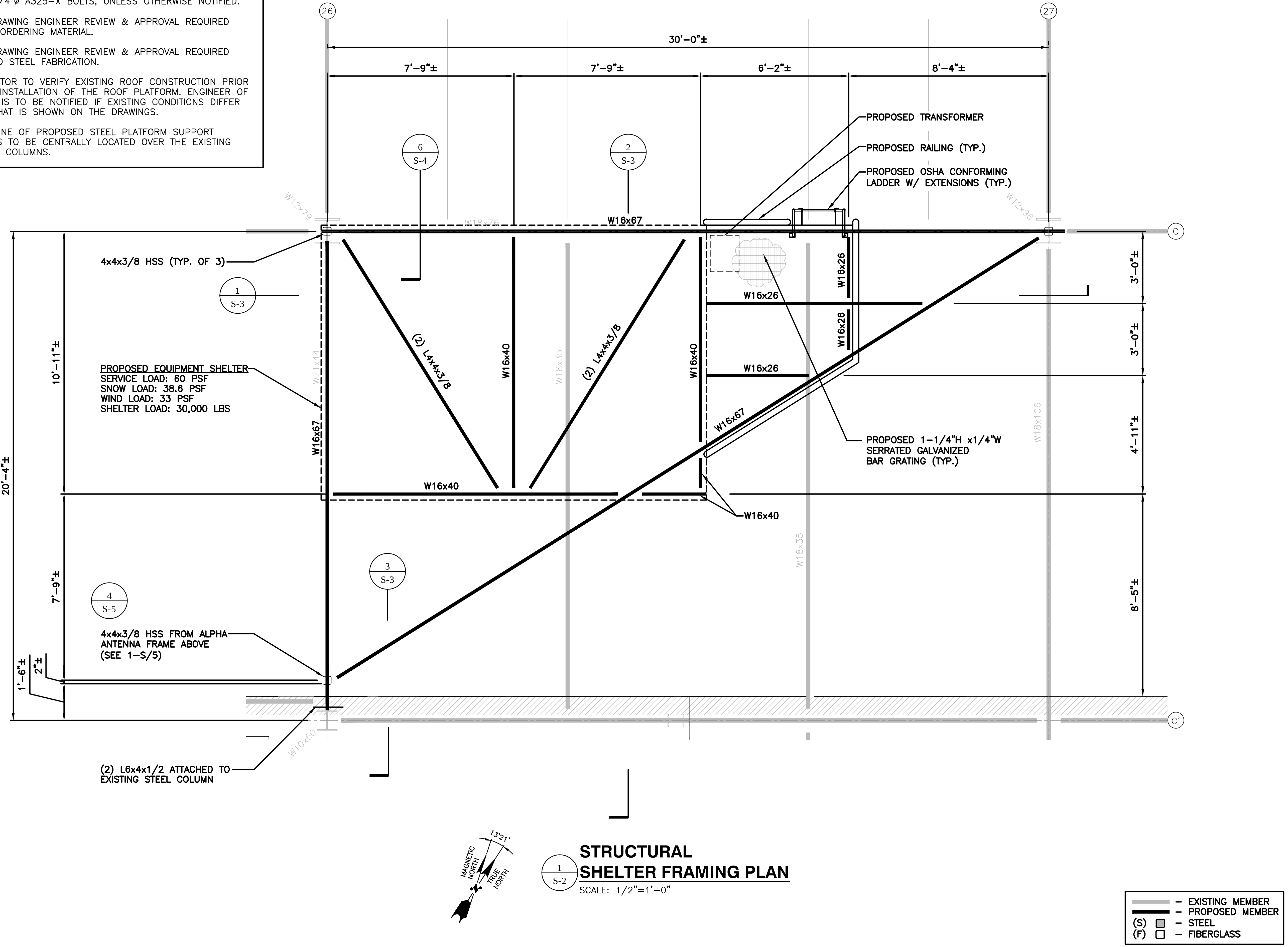
SITE ADDRESS:
208 HARBOR DRIVE
STAMFORD, CT 06902

SHEET TITLE:
STRUCTURAL FRAMING PLAN & NOTES

SHEET NO:
S-1

NOTES:

1. ALL CONNECTIONS TO BE SHOP WELDED & FIELD BOLTED USING 3/4"ø A325-X BOLTS, UNLESS OTHERWISE NOTIFIED.
2. SHOP DRAWING ENGINEER REVIEW & APPROVAL REQUIRED BEFORE ORDERING MATERIAL.
3. SHOP DRAWING ENGINEER REVIEW & APPROVAL REQUIRED PRIOR TO STEEL FABRICATION.
4. CONTRACTOR TO VERIFY EXISTING ROOF CONSTRUCTION PRIOR TO THE INSTALLATION OF THE ROOF PLATFORM. ENGINEER OF RECORD IS TO BE NOTIFIED IF EXISTING CONDITIONS DIFFER FROM WHAT IS SHOWN ON THE DRAWINGS.
5. CENTERLINE OF PROPOSED STEEL PLATFORM SUPPORT COLUMNS TO BE CENTRALLY LOCATED OVER THE EXISTING BUILDING COLUMNS.



1 S-2

STRUCTURAL SHELTER FRAMING PLAN

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

at&t

550 COCHITUATE RD.
FRAMINGHAM, MA, 01701

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DEREK J. CREASER
No. 28551

REVISIONS

REV. #	DATE	DESCRIPTION
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4	08/07/15	REVISED PER COMMENTS
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2	01/13/15	REVISED PER COMMENTS
1	11/24/14	ISSUED FOR CONSTRUCTION
0	10/28/14	ISSUED FOR REVIEW

PROJECT NO.		SCALE:
S2900-A	DESIGNED BY: DR DRAWN BY: NS CHECKED BY: RP	AS SHOWN

SITE NAME:

S2900-A
STAMFORD HARBOR

SITE ADDRESS:

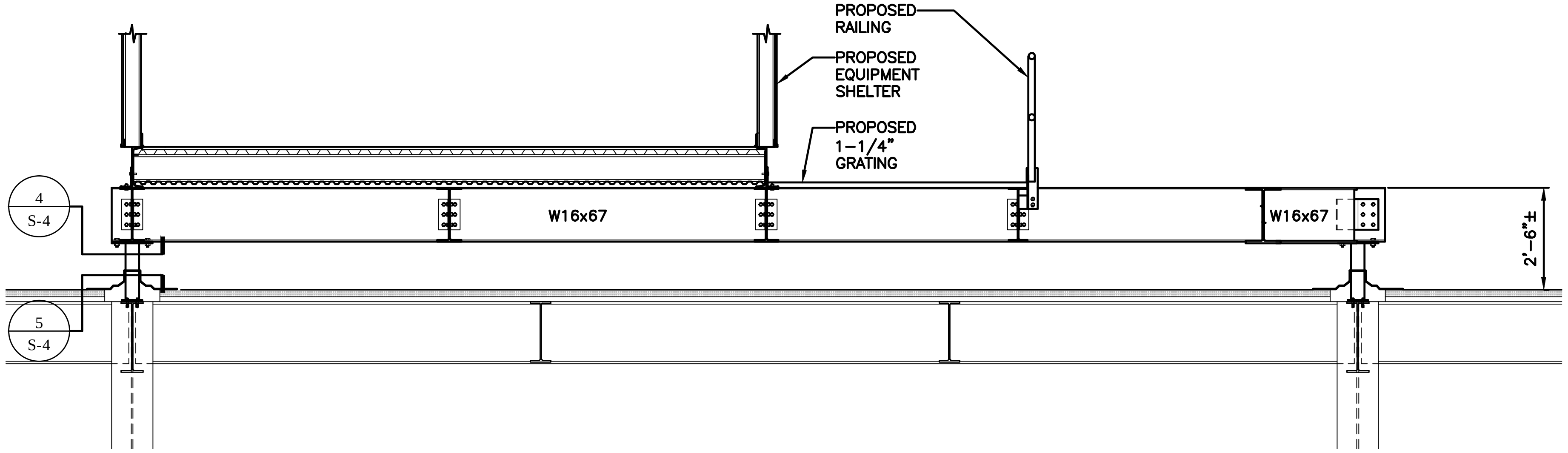
208 HARBOR DRIVE
STAMFORD, CT 06902

SHEET TITLE:

STRUCTURAL SHELTER
FRAMING PLAN

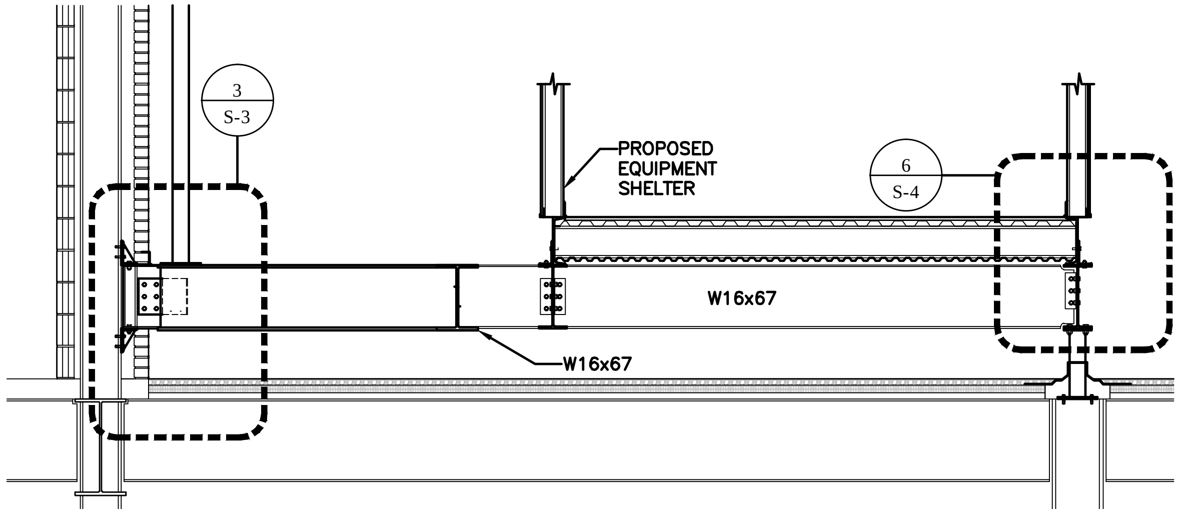
SHEET NO:

S-2



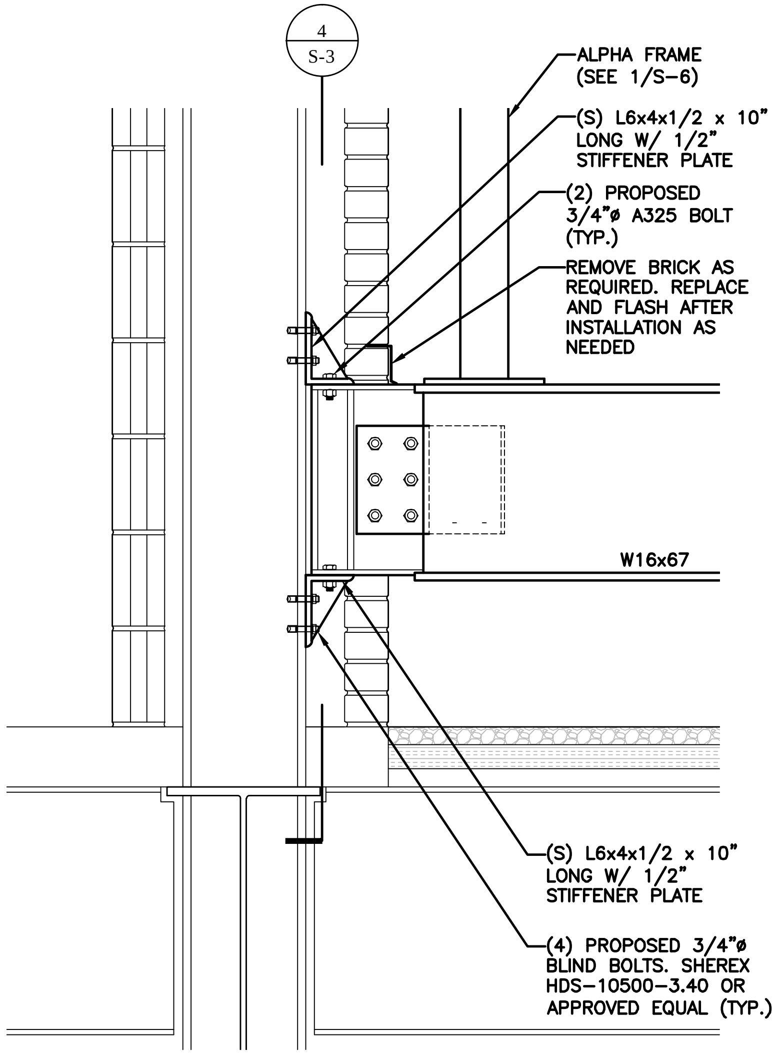
STRUCTURAL SHELTER FRAMING SECTION

1 S-3 SCALE: 1/2"=1'-0"



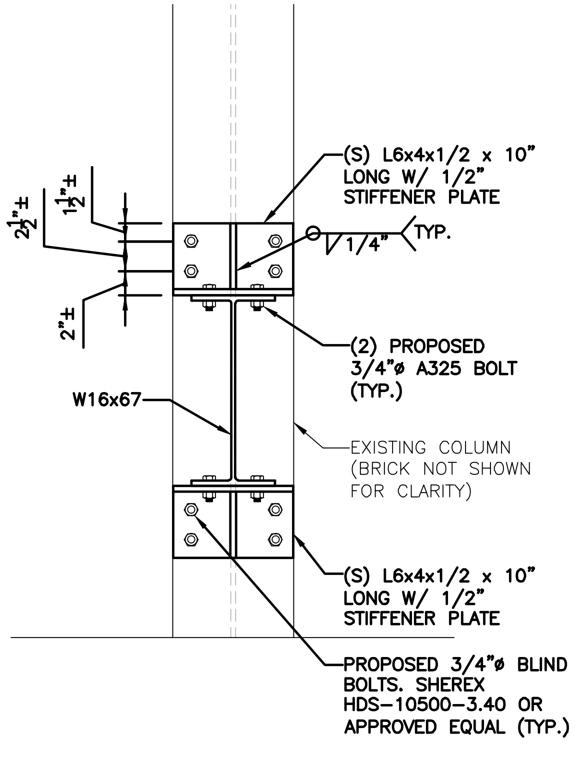
STRUCTURAL SHELTER FRAMING SECTION

2 S-3 SCALE: 1/2"=1'-0"


4 S-3
ALPHA FRAME (SEE 1/S-6)
(S) L6x4x1/2 x 10" LONG W/ 1/2" STIFFENER PLATE
(2) PROPOSED 3/4"ø A325 BOLT (TYP.)
REMOVE BRICK AS REQUIRED. REPLACE AND FLASH AFTER INSTALLATION AS NEEDED
W16x67
(S) L6x4x1/2 x 10" LONG W/ 1/2" STIFFENER PLATE
(4) PROPOSED 3/4"ø BLIND BOLTS. SHEREX HDS-10500-3.40 OR APPROVED EQUAL (TYP.)

STRUCTURAL SHELTER FRAMING SECTION

3 S-3 SCALE: 1-1/2"=1'-0"


2½"±
1½"±
2"±
(S) L6x4x1/2 x 10" LONG W/ 1/2" STIFFENER PLATE
1/4"
TYP.
(2) PROPOSED 3/4"ø A325 BOLT (TYP.)
W16x67
EXISTING COLUMN (BRICK NOT SHOWN FOR CLARITY)
(S) L6x4x1/2 x 10" LONG W/ 1/2" STIFFENER PLATE
PROPOSED 3/4"ø BLIND BOLTS. SHEREX HDS-10500-3.40 OR APPROVED EQUAL (TYP.)

CONNECTION DETAIL @ PENTHOUSE COLUMN

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

(S) – STEEL
(F) – FIBERGLASS

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FAX: (978) 336-5586

DEREK J. CREASER

REVISIONS

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0	10/28/14	ISSUED FOR REVIEW

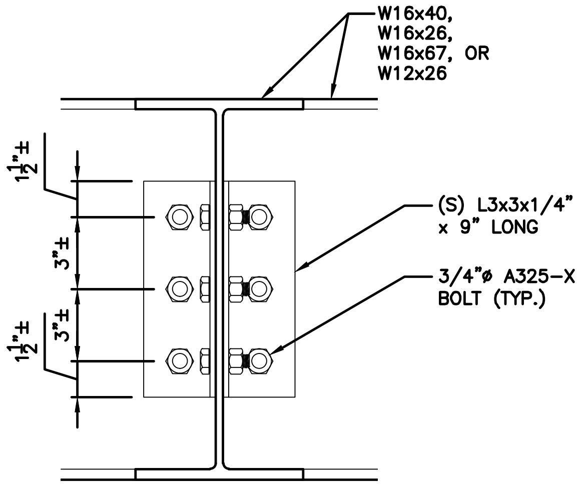
PROJECT NO. S2900-A
DESIGNED BY: DR
DRAWN BY: NS
CHECKED BY: RP
SCALE: AS SHOWN

SITE NAME:
S2900-A
STAMFORD HARBOR

SITE ADDRESS:
208 HARBOR DRIVE
STAMFORD, CT 06902

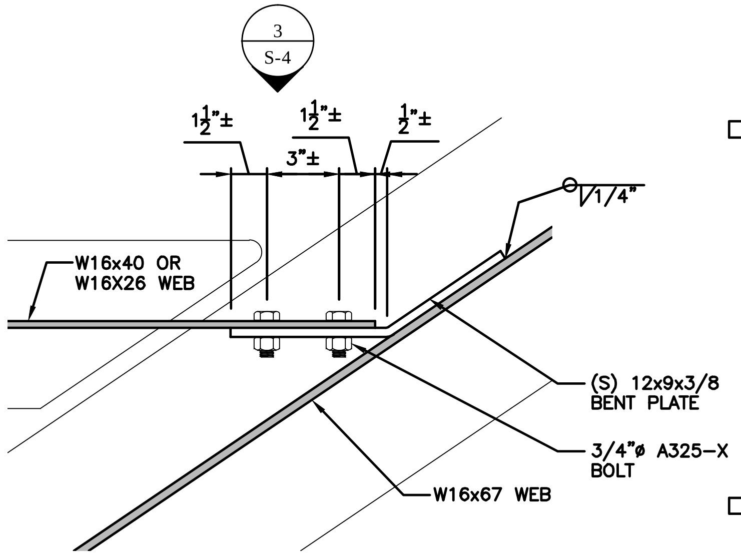
SHEET TITLE:
STRUCTURAL SHELTER FRAMING SECTION & DETAILS

SHEET NO:
S-3



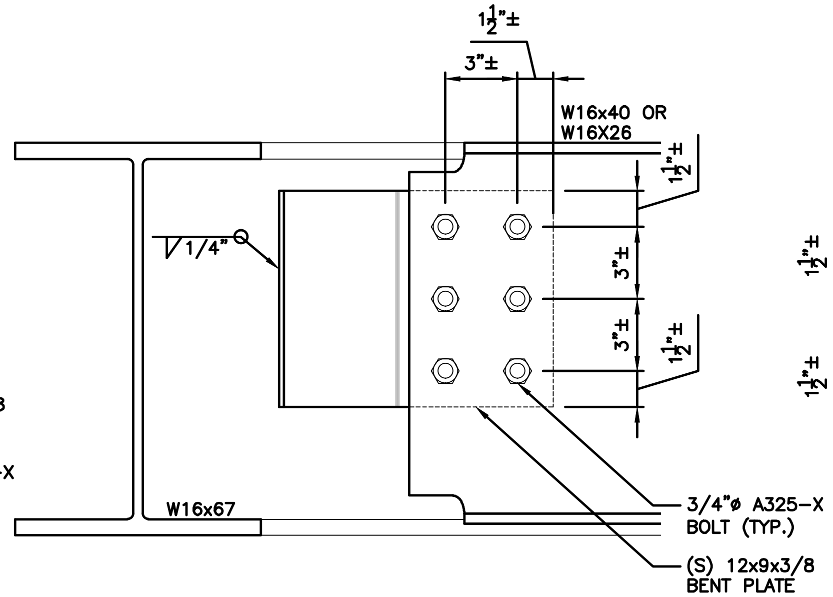
TYPICAL STRUCTURAL SHELTER FRAMING CONNECTION DETAIL

1 S-4 SCALE: 3"=1'-0"



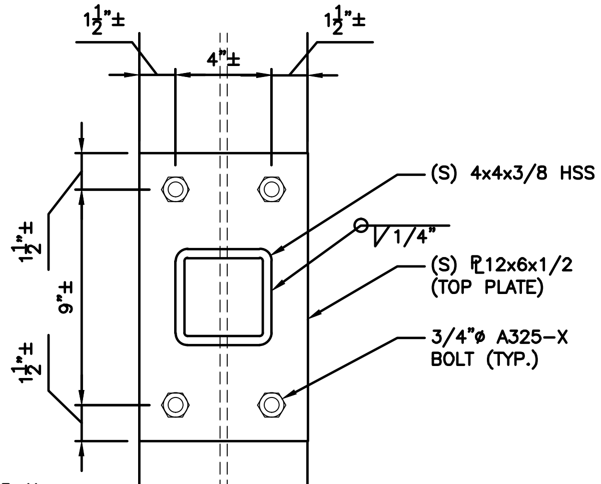
TYPICAL STRUCTURAL SHELTER FRAMING CONNECTION DETAIL

2 S-4 SCALE: 3"=1'-0"



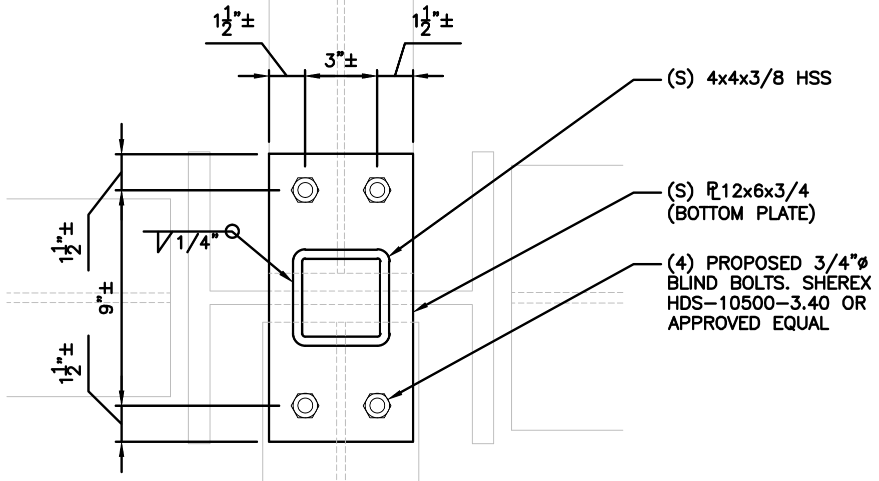
TYPICAL STRUCTURAL SHELTER FRAMING CONNECTION DETAIL

3 S-4 SCALE: 3"=1'-0"



SHELTER TOP PLATE DETAIL

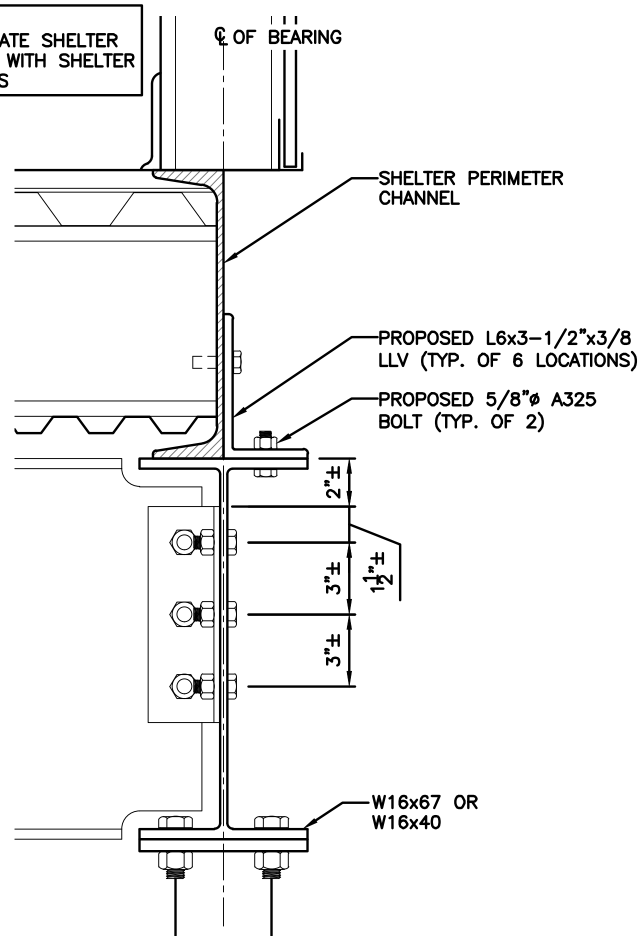
4 S-4 SCALE: 3"=1'-0"



SHELTER BOTTOM PLATE DETAIL

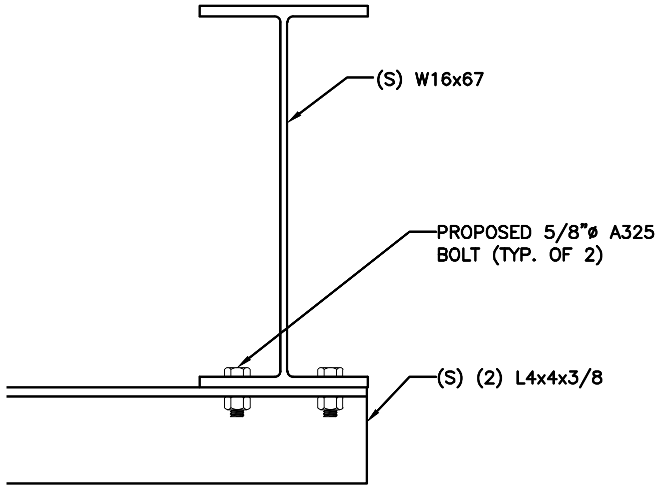
5 S-4 SCALE: 3"=1'-0"

NOTE:
COORDINATE SHELTER BEARING WITH SHELTER DRAWINGS



SHELTER FRAME CONNECTION DETAIL

6 S-4 SCALE: 3"=1'-0"



SHELTER ANGLE BRACING DETAIL

7 S-4 SCALE: 3"=1'-0"

(S) – STEEL
(F) – FIBERGLASS

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DEREK J. CREASER

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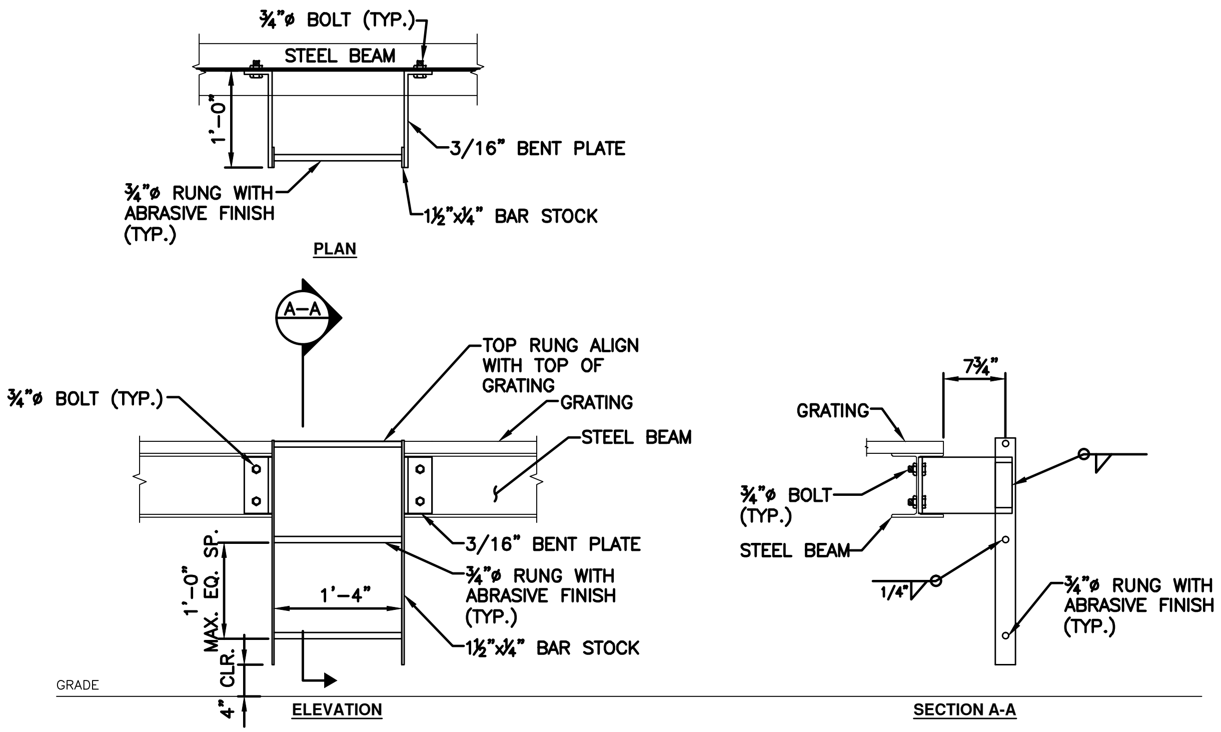
S2900-A	DESIGNED BY: DR DRAWN BY: NS CHECKED BY: RP	AS SHOWN

SITE NAME:
S2900-A
STAMFORD HARBOR

SITE ADDRESS:
208 HARBOR DRIVE
STAMFORD, CT 06902

SHEET TITLE:
STRUCTURAL SHELTER FRAMING DETAILS

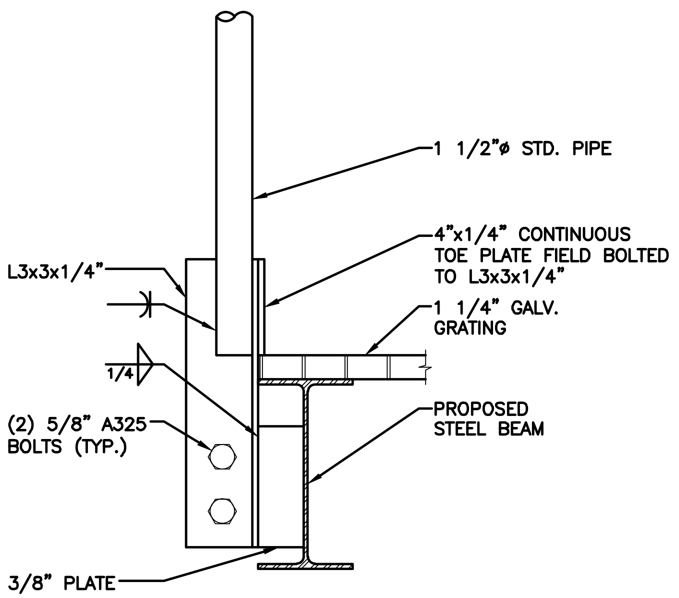
SHEET NO:
S-4



1
S-5

SHELTER LADDER DETAIL

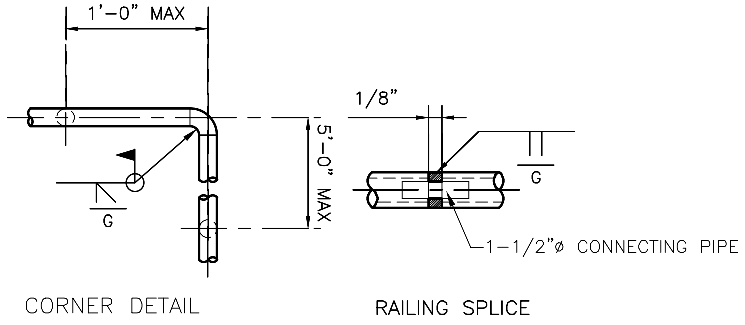
SCALE: N.T.S.


1 1/2"ø STD. PIPE
4"x1/4" CONTINUOUS TOE PLATE FIELD BOLTED TO L3x3x1/4"
1 1/4" GALV. GRATING
L3x3x1/4"
1/4
(2) 5/8" A325 BOLTS (TYP.)
PROPOSED STEEL BEAM
3/8" PLATE

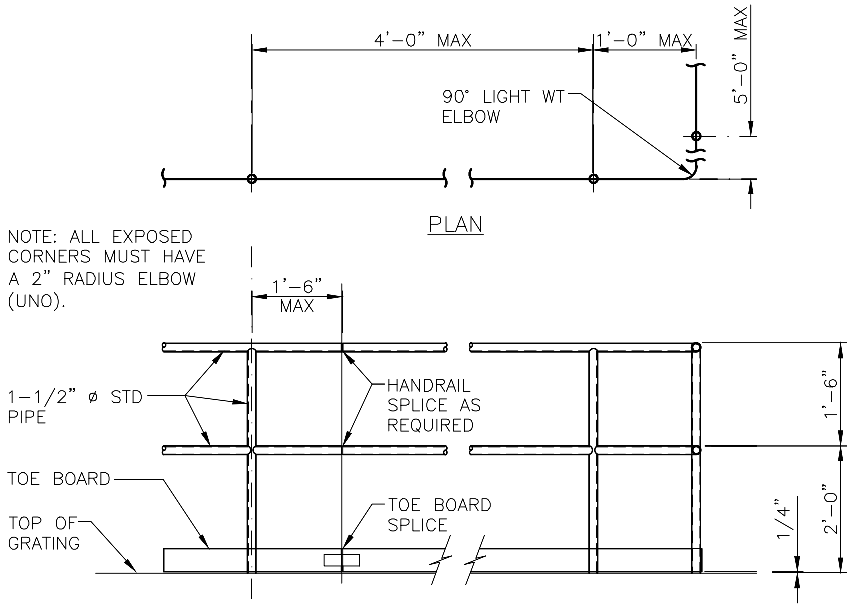
2
S-5

SHELTER HANDRAIL POST CONNECTION DETAIL

SCALE: N.T.S.



MISCELLANEOUS HANDRAIL DETAIL



3
S-5

SHELTER HANDRAIL DETAIL

SCALE: N.T.S.

(S) – STEEL
(F) – FIBERGLASS

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STATE OF CONNECTICUT
DEREK J. CREASER
LICENSED PROFESSIONAL ENGINEER

REVISIONS

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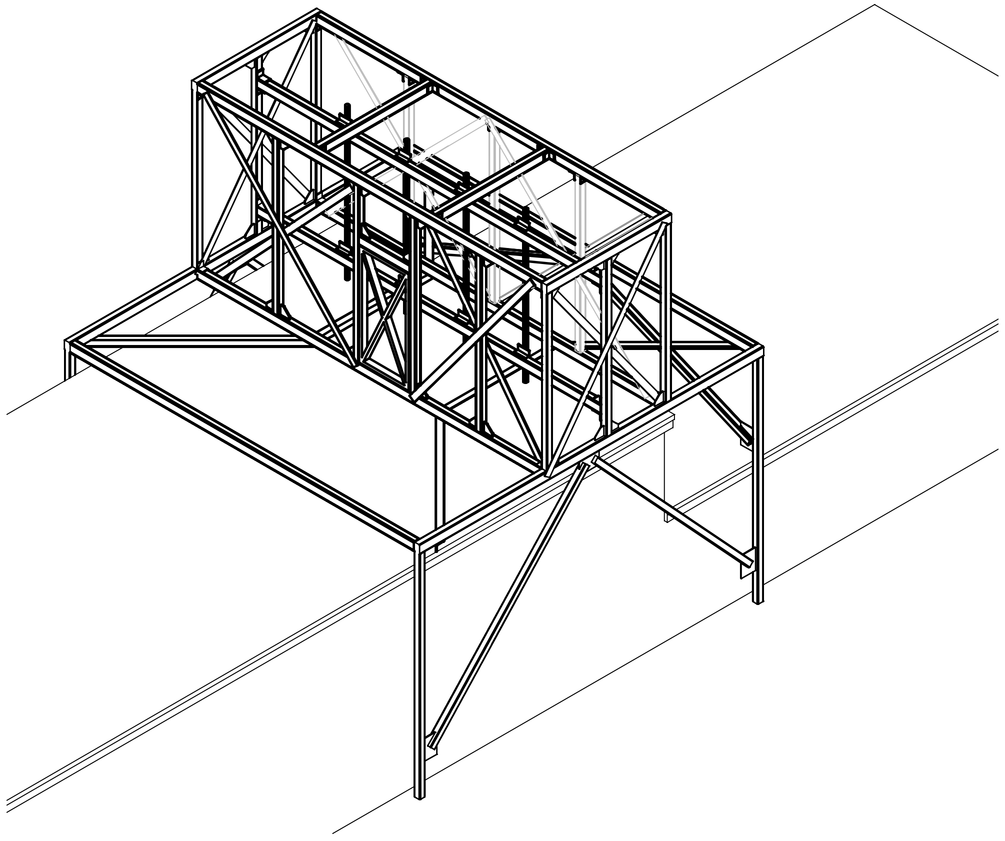
SITE NAME:
S2900-A
STAMFORD HARBOR

SITE ADDRESS:
208 HARBOR DRIVE
STAMFORD, CT 06902

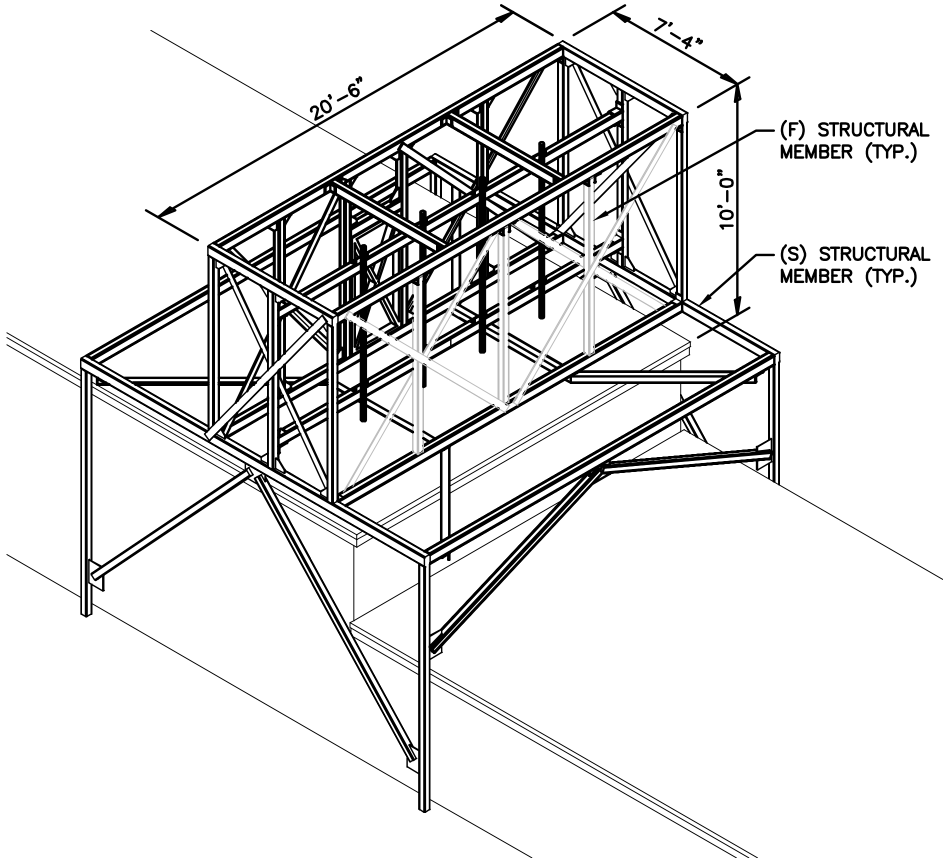
SHEET TITLE:
STRUCTURAL SHELTER FRAMING DETAILS

SHEET NO:
S-5



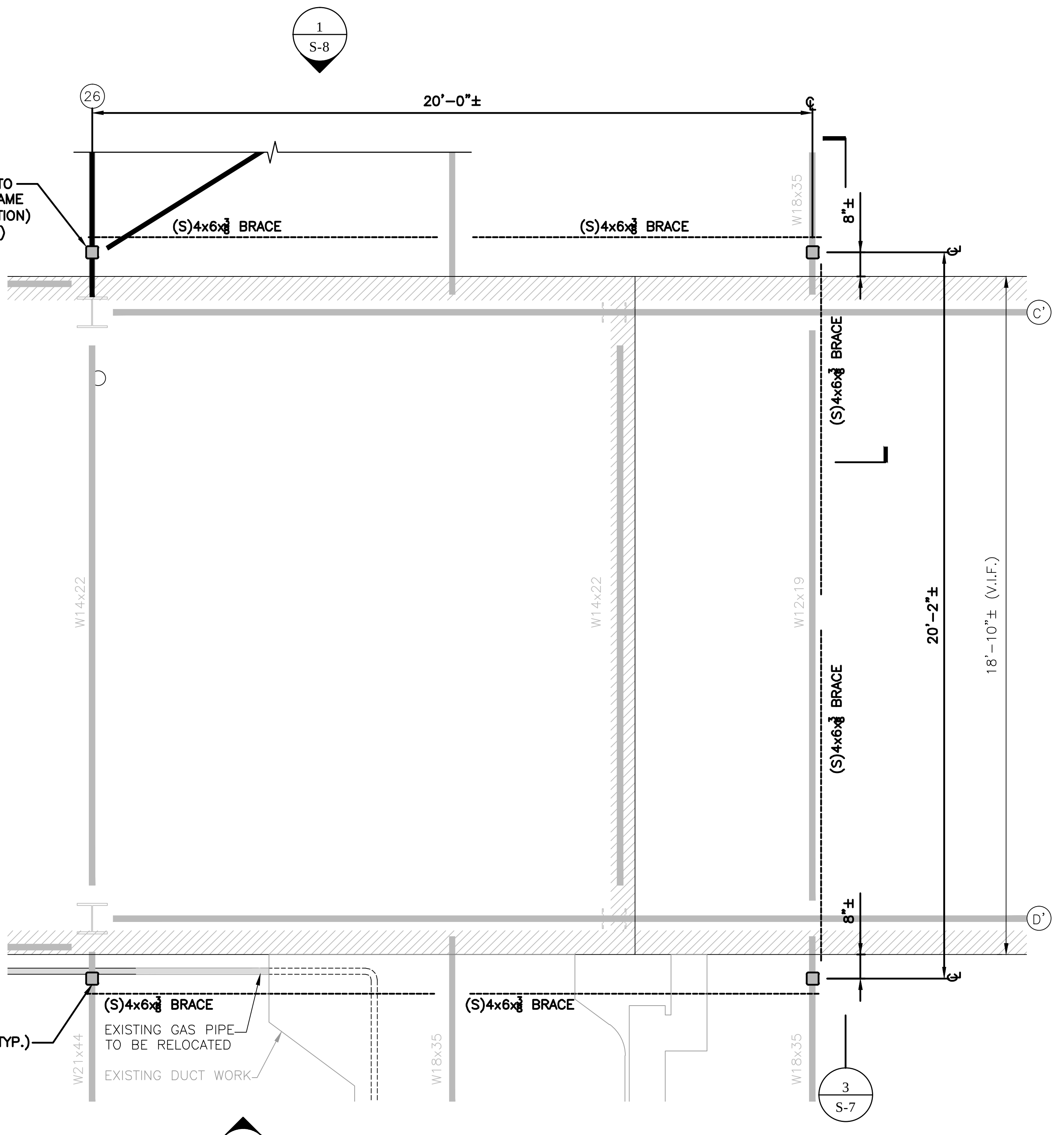
STRUCTURAL ALPHA FRAMING PERSPECTIVE

SCALE: N.T.S.



STRUCTURAL ALPHA FRAMING PERSPECTIVE

SCALE: N.T.S.



STRUCTURAL ALPHA BASE FRAMING PLAN

1
S-6A

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

- ▬ – EXISTING MEMBER
- ▬ – PROPOSED MEMBER
- (S) ▨ – STEEL
- (F) ☐ – FIBERGLASS

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PROJECT NO.	DESIGNED BY: DR DRAWN BY: NS CHECKED BY: RP	SCALE:
S2900-A		AS SHOWN

SITE NAME:

S2900-A
STAMFORD HARBOR

SITE ADDRESS:

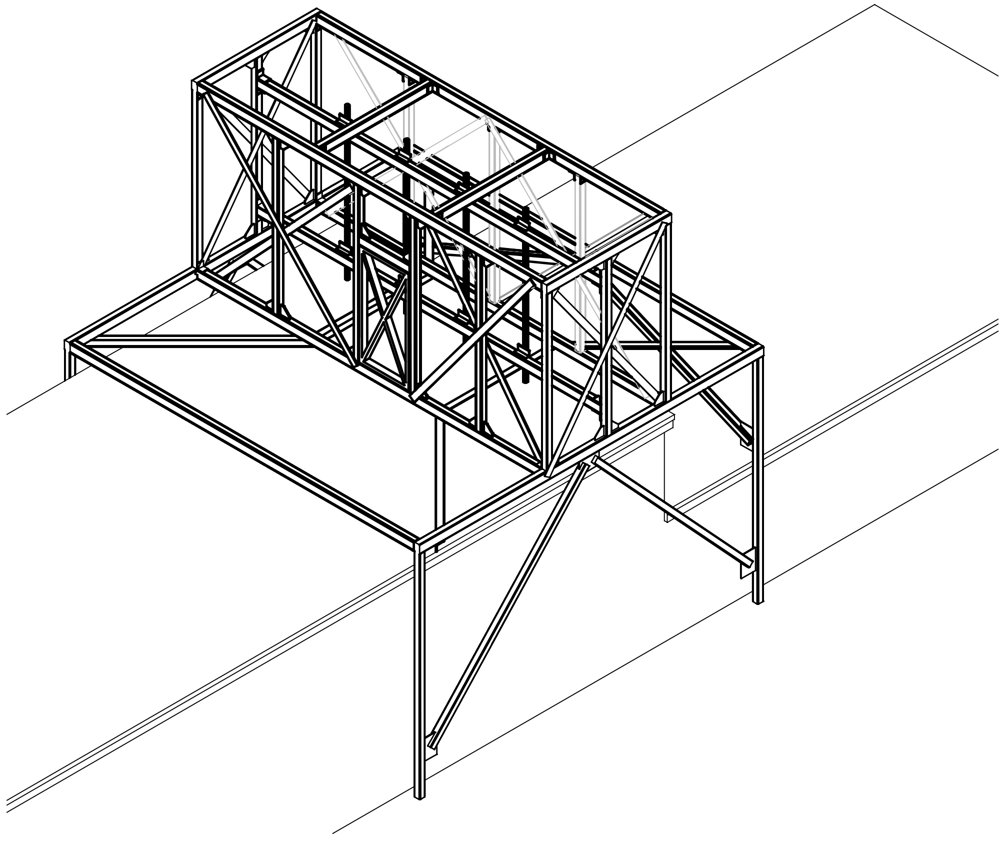
208 HARBOR DRIVE
STAMFORD, CT 06902

SHEET TITLE:

STRUCTURAL ALPHA
BASE FRAMING PLAN

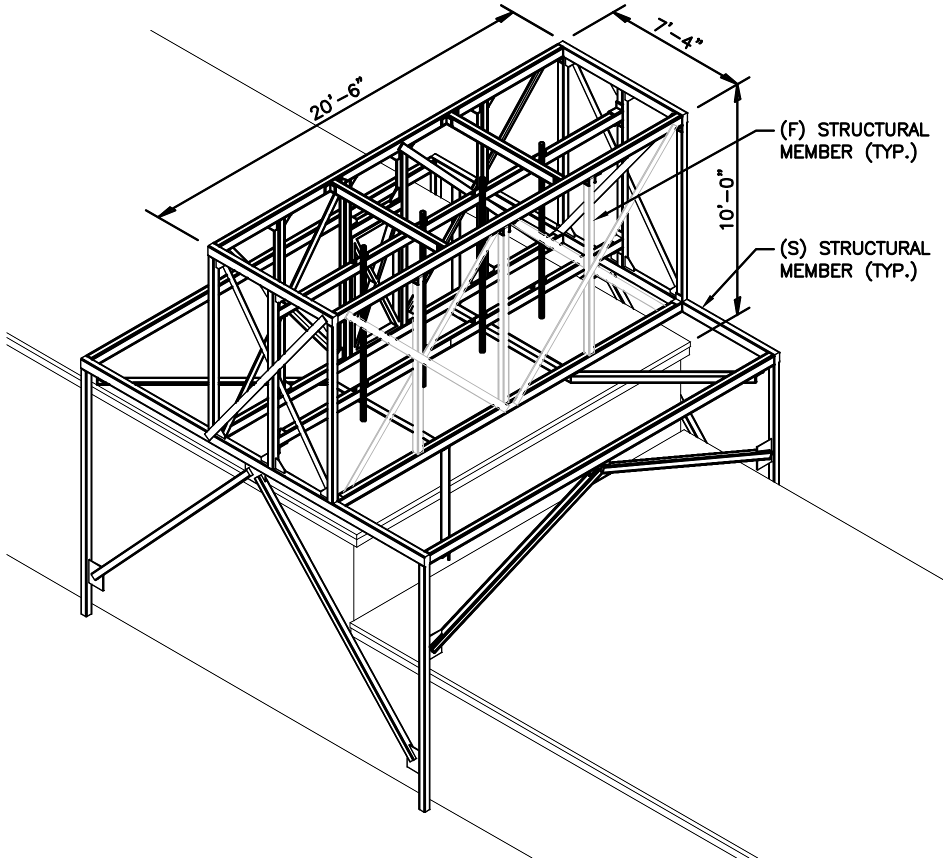
SHEET NO:

S-6A



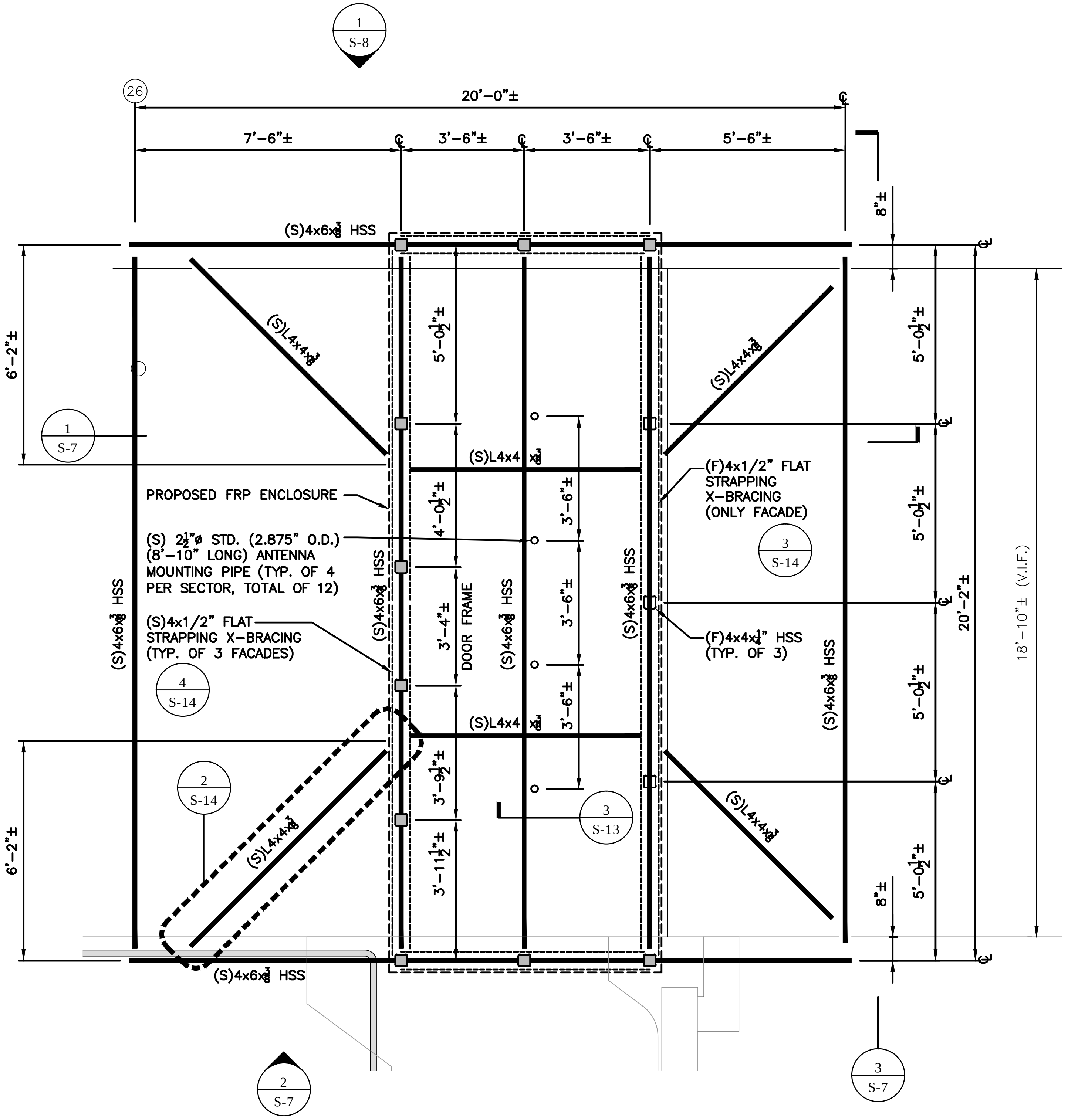
STRUCTURAL ALPHA FRAMING PERSPECTIVE

SCALE: N.T.S.



STRUCTURAL ALPHA FRAMING PERSPECTIVE

SCALE: N.T.S.



1 S-6B

STRUCTURAL ALPHA ANTENNA FRAMING PLAN

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

NOTE:
ALL STRUCTURAL MEMBERS NEAR ANTENNAS SHALL BE MADE OF FRP MATERIAL UNLESS OTHERWISE STATED

— EXISTING MEMBER
— PROPOSED MEMBER
(S) ☐ – STEEL
(F) ☐ – FIBERGLASS

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DEREK J. CREASER

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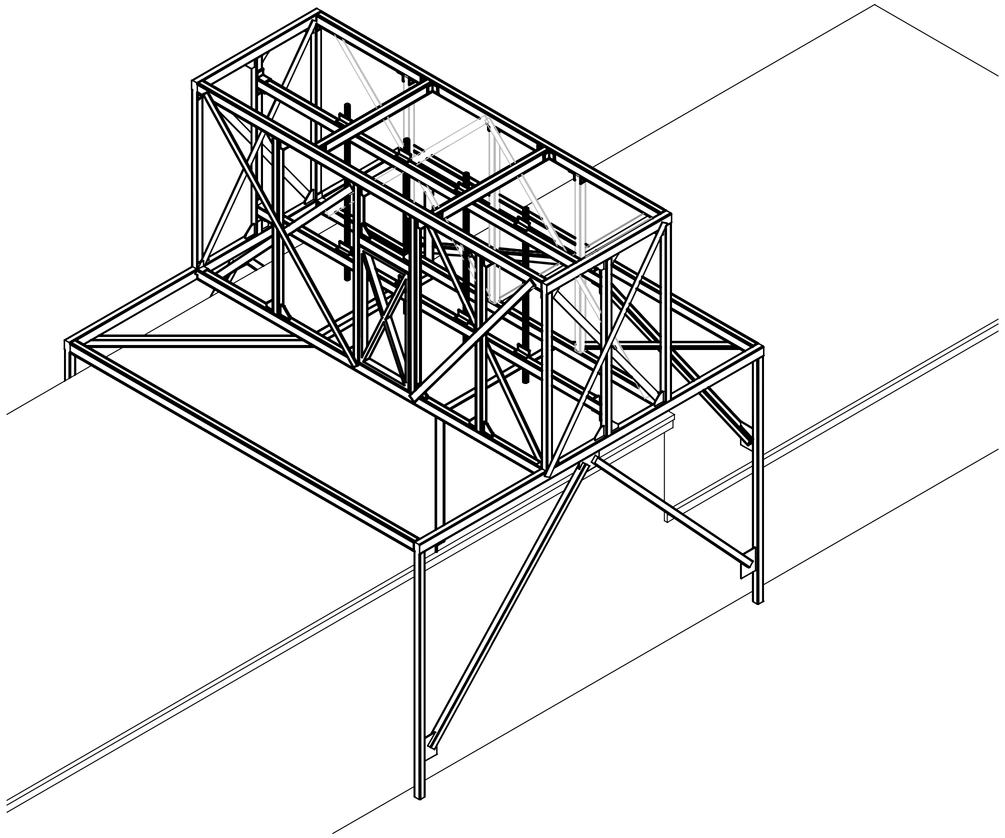
S2900-A
STAMFORD HARBOR

SITE ADDRESS:
208 HARBOR DRIVE
STAMFORD, CT 06902

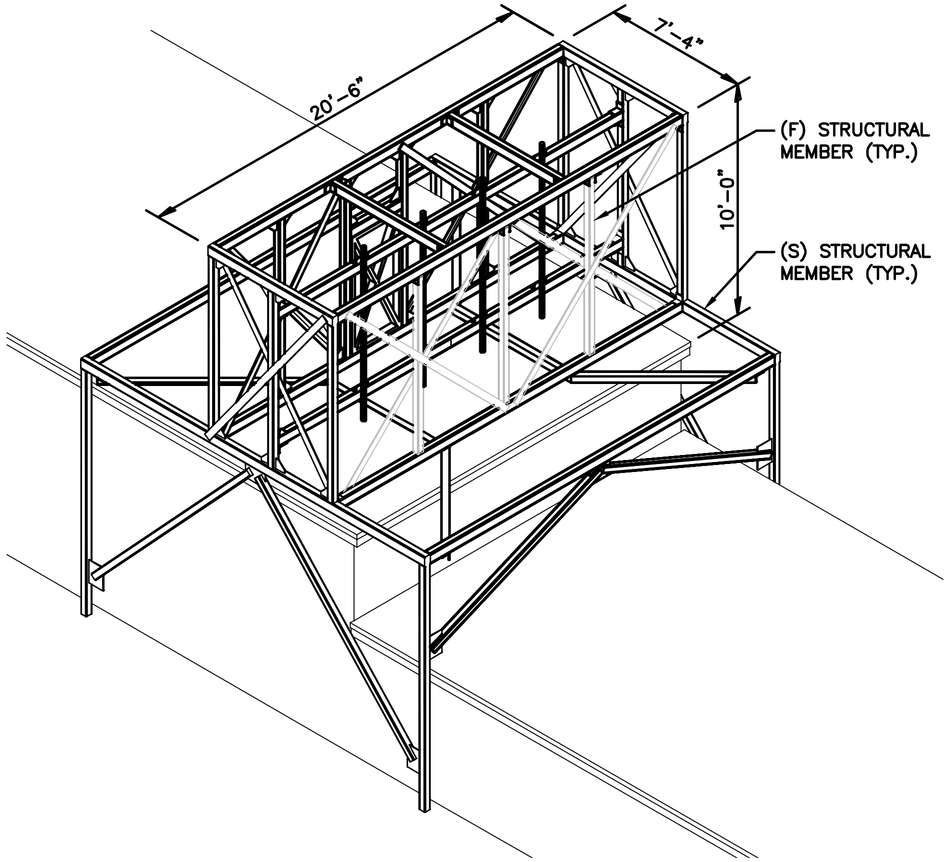
SHEET TITLE:
STRUCTURAL ALPHA ANTENNA FRAMING PLAN

SHEET NO:
S-6B



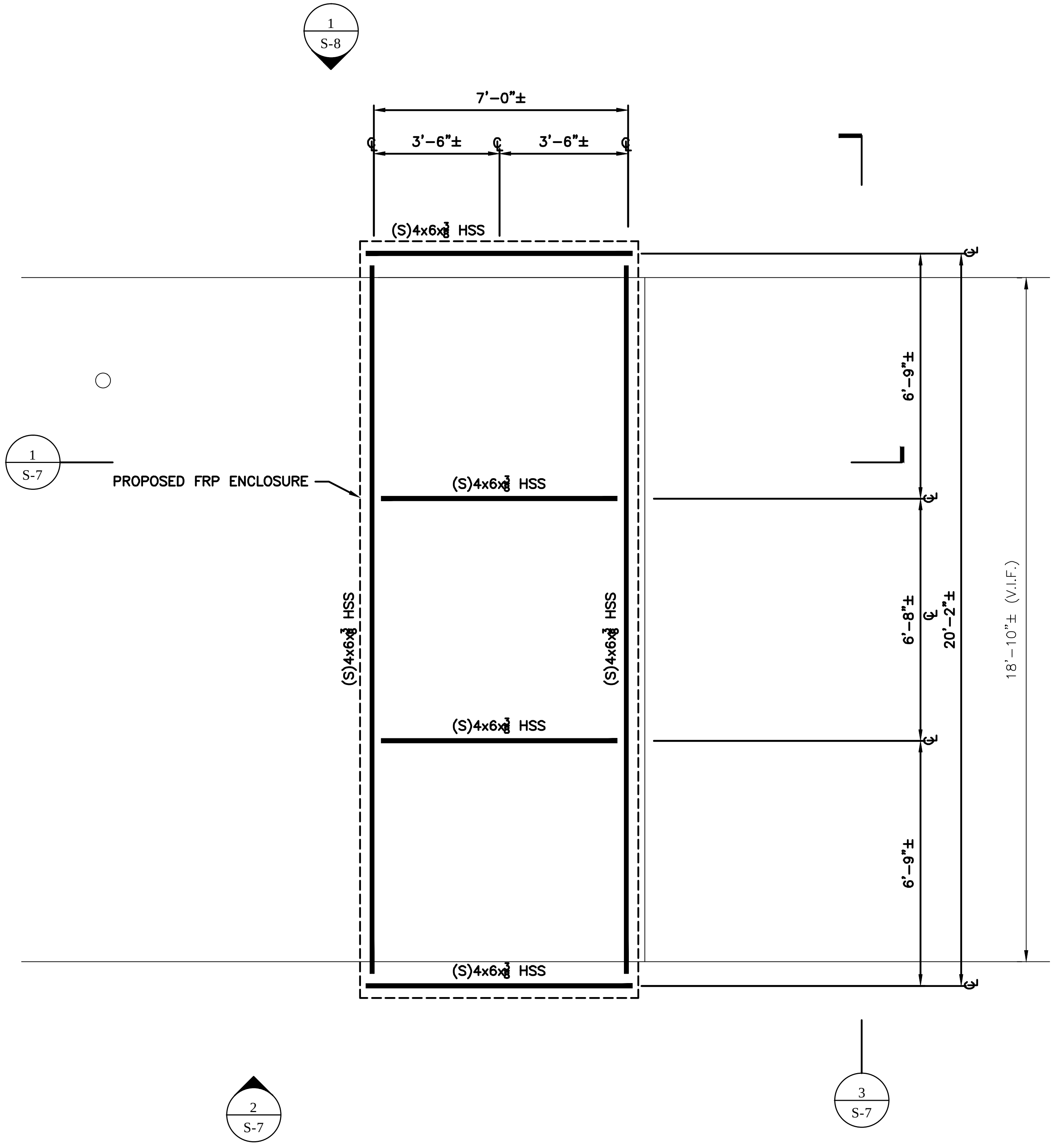
STRUCTURAL ALPHA FRAMING PERSPECTIVE

SCALE: N.T.S.



STRUCTURAL ALPHA FRAMING PERSPECTIVE

SCALE: N.T.S.



1
S-6C

STRUCTURAL ALPHA TOP FRAMING PLAN

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

NOTE:
ALL STRUCTURAL MEMBERS NEAR ANTENNAS SHALL BE MADE OF FRP MATERIAL UNLESS OTHERWISE STATED

— EXISTING MEMBER
— PROPOSED MEMBER
(S) ▣ – STEEL
(F) ☐ – FIBERGLASS

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STATE OF CONNECTICUT
DEREK J. CREASER
LICENSED PROFESSIONAL ENGINEER

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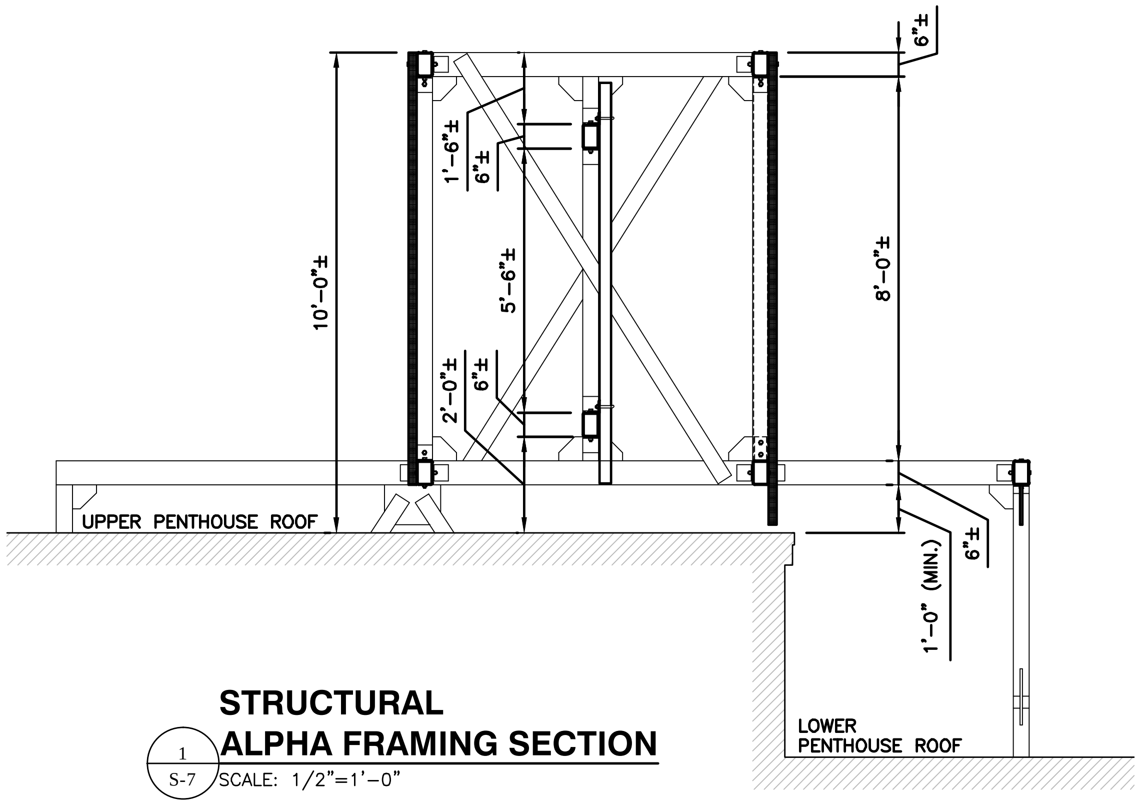
PROJECT NO. S2900-A	DESIGNED BY: DR DRAWN BY: NS CHECKED BY: RP	SCALE: AS SHOWN

SITE NAME:
S2900-A
STAMFORD HARBOR

SITE ADDRESS:
208 HARBOR DRIVE
STAMFORD, CT 06902

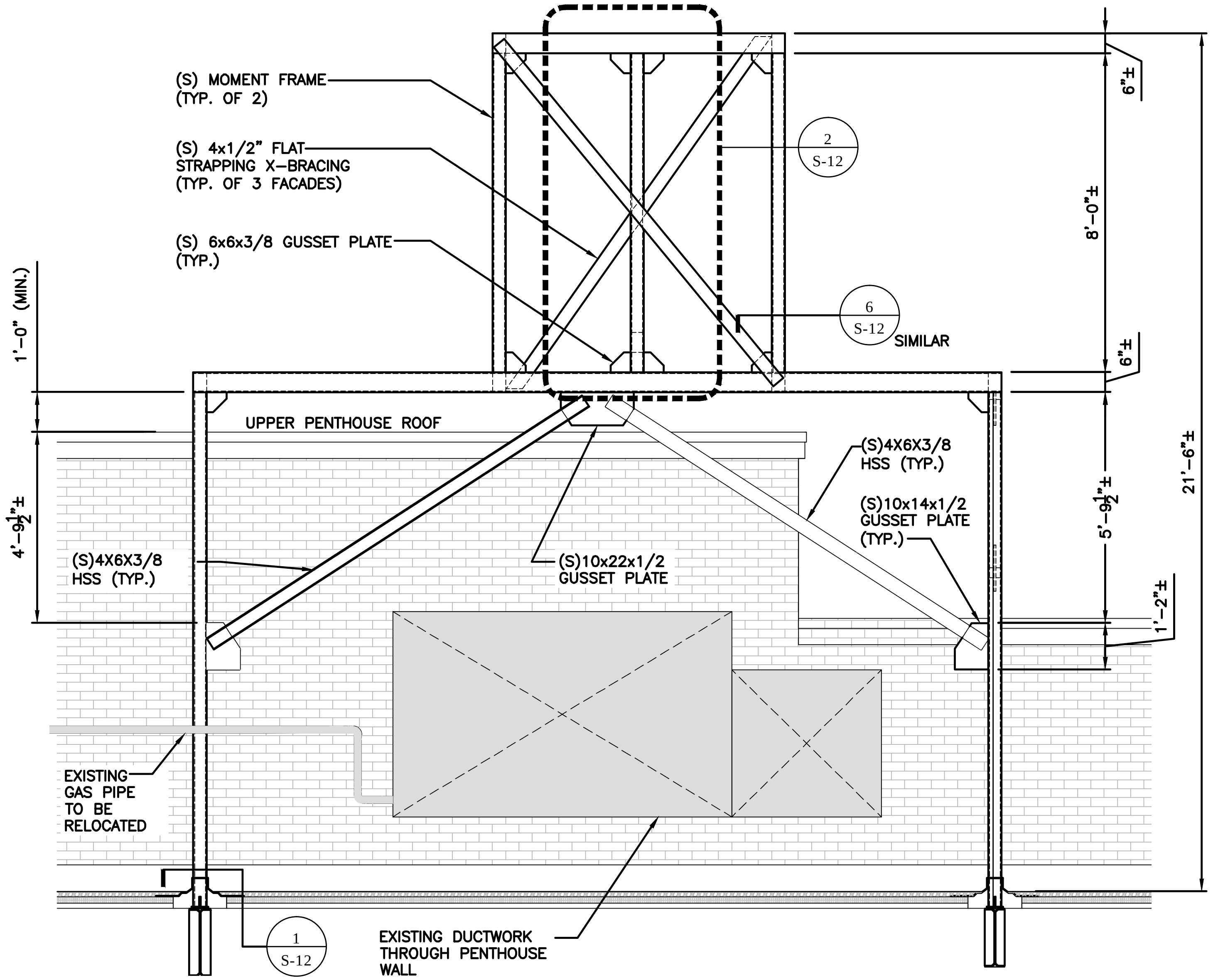
SHEET TITLE:
STRUCTURAL ALPHA
TOP FRAMING PLAN

SHEET NO:
S-6C



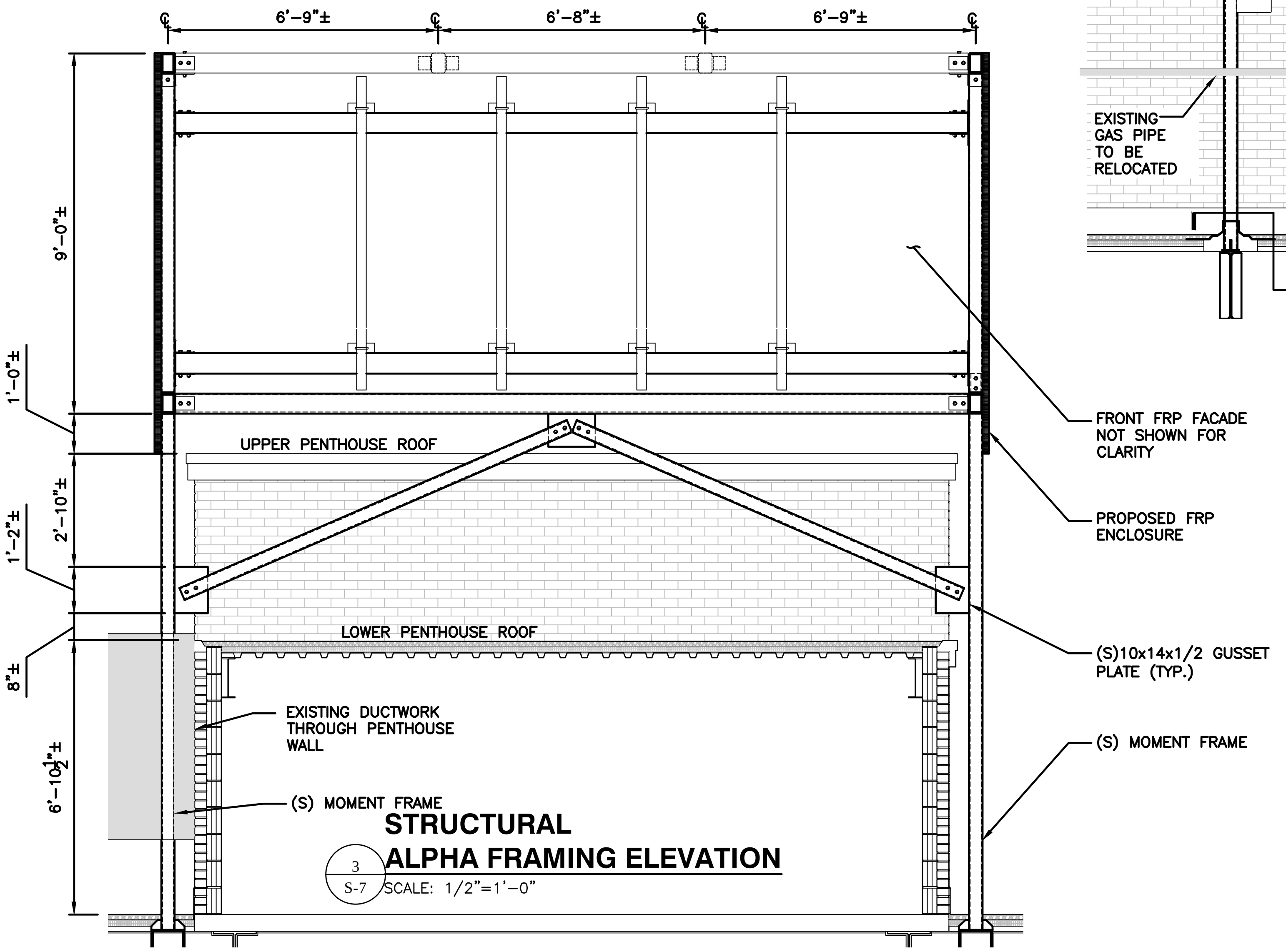
STRUCTURAL ALPHA FRAMING SECTION

1 S-7 SCALE: 1/2"=1'-0"


(S) MOMENT FRAME (TYP. OF 2)
(S) 4x1/2" FLAT STRAPPING X-BRACING (TYP. OF 3 FACADES)
(S) 6x6x3/8 GUSSET PLATE (TYP.)
2 S-12
6 S-12
SIMILAR
1'-0" (MIN.)
UPPER PENTHOUSE ROOF
6"±
8'-0"±
6"±
21'-6"±
5'-9½"±
1'-2"±
4'-9½"±
(S)4X6X3/8 HSS (TYP.)
(S)10x14x1/2 GUSSET PLATE (TYP.)
(S)4X6X3/8 HSS (TYP.)
(S)10x22x1/2 GUSSET PLATE
EXISTING GAS PIPE TO BE RELOCATED
1 S-12
EXISTING DUCTWORK THROUGH PENTHOUSE WALL

STRUCTURAL ALPHA FRAMING ELEVATION

2 S-7 SCALE: 1/2"=1'-0"



STRUCTURAL ALPHA FRAMING ELEVATION

3 S-7 SCALE: 1/2"=1'-0"

NOTE:
ALL STRUCTURAL MEMBERS NEAR ANTENNAS SHALL BE MADE OF FRP MATERIAL UNLESS OTHERWISE STATED

(S) – STEEL
(F) – FIBERGLASS

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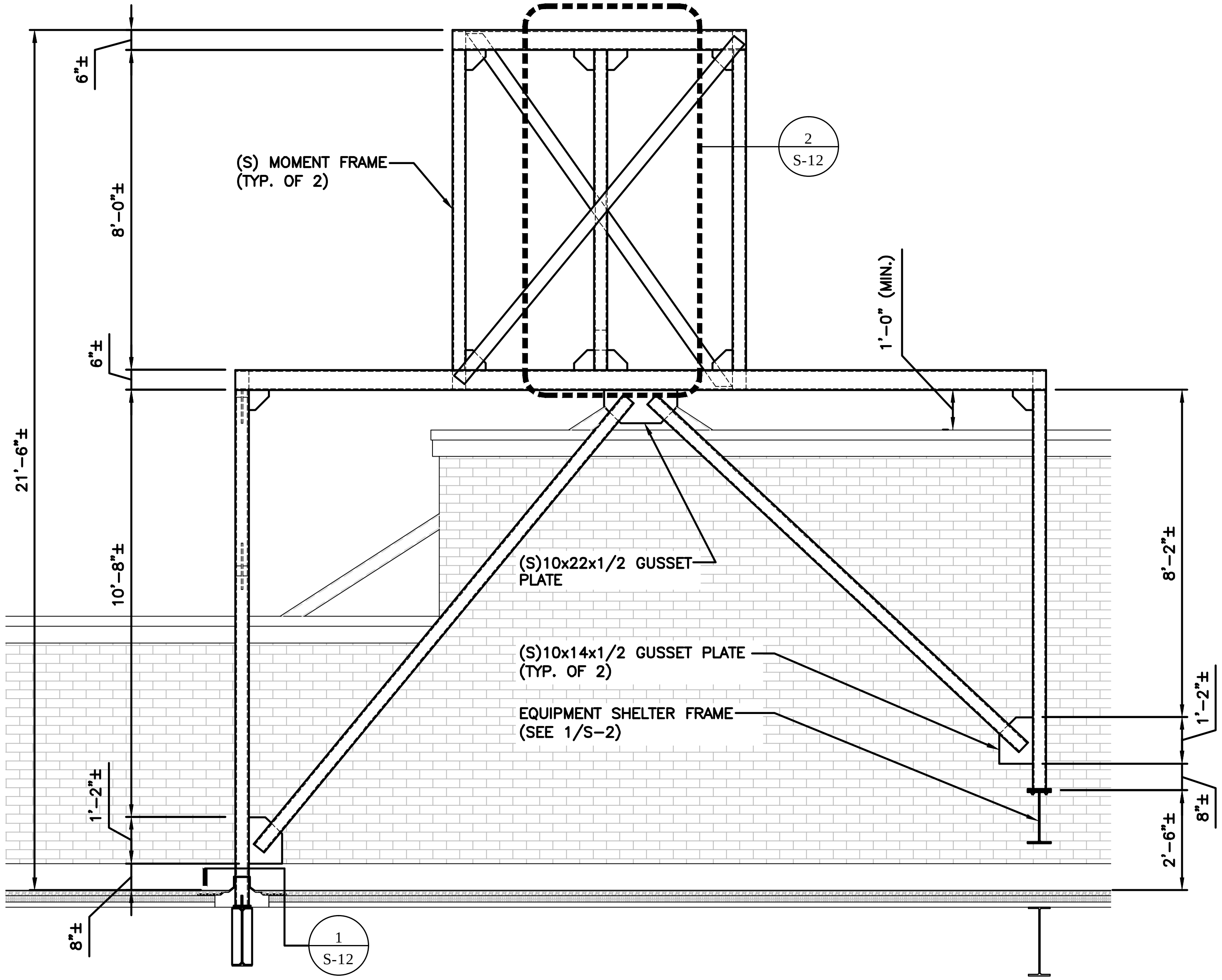
S2900-A		AS SHOWN

SITE NAME:
S2900-A
STAMFORD HARBOR

SITE ADDRESS:
208 HARBOR DRIVE
STAMFORD, CT 06902

SHEET TITLE:
STRUCTURAL ALPHA FRAMING SECTION & ELEVATIONS

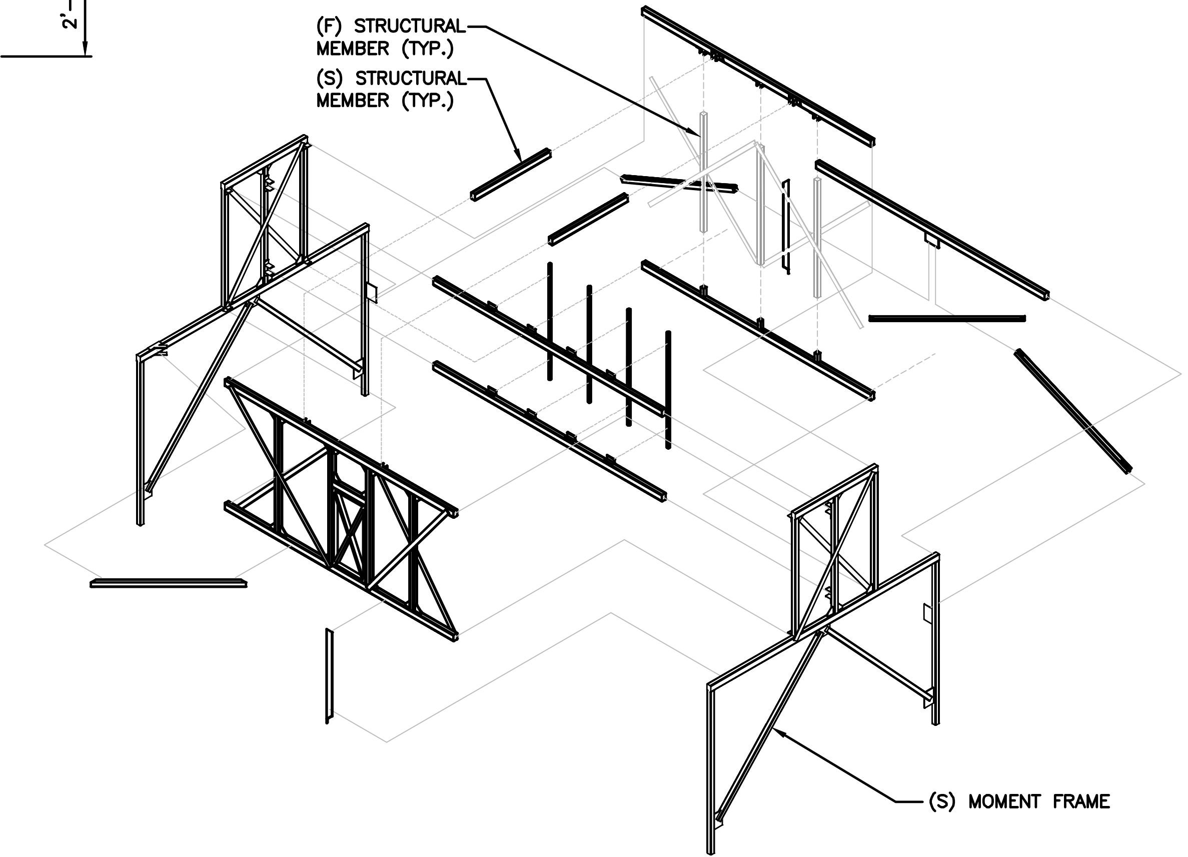
SHEET NO:
S-7



1
S-8

STRUCTURAL ALPHA FRAMING ELEVATION

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



ALPHA FRAME EXPLODED VIEW

SCALE: NTS

(S) – STEEL
(F) – FIBERGLASS

NOTE:
ALL STRUCTURAL MEMBERS NEAR ANTENNAS SHALL BE MADE OF FRP MATERIAL UNLESS OTHERWISE STATED

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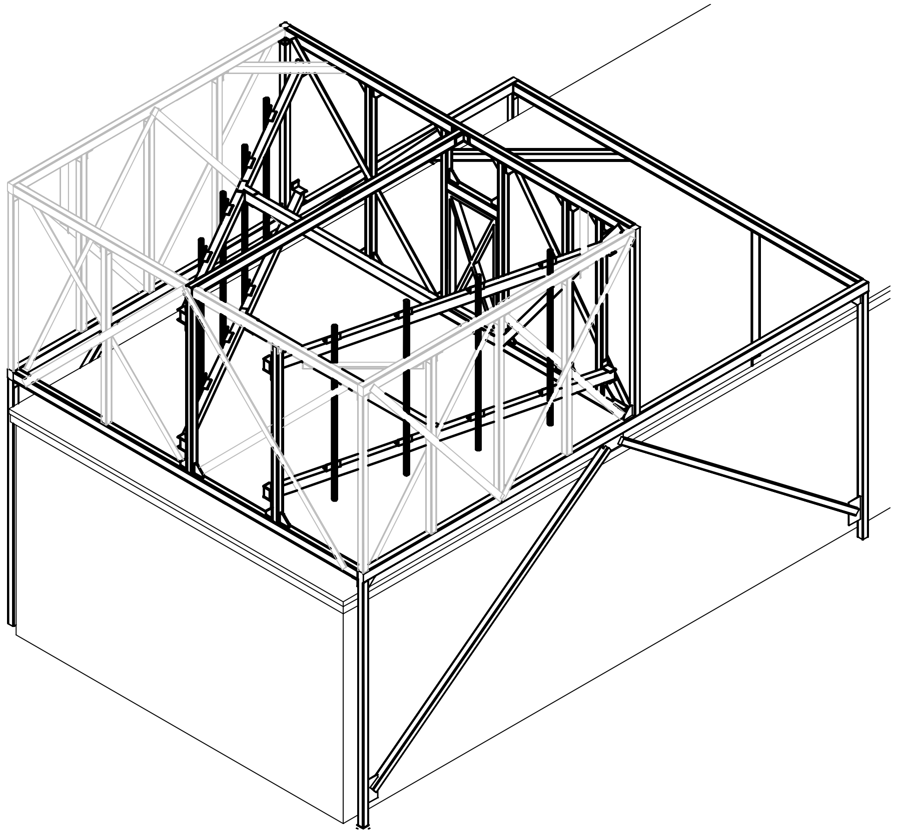
PROJECT NO. S2900-A
DESIGNED BY: DR
DRAWN BY: NS
CHECKED BY: RP
SCALE: AS SHOWN

SITE NAME:
S2900-A
STAMFORD HARBOR

SITE ADDRESS:
208 HARBOR DRIVE
STAMFORD, CT 06902

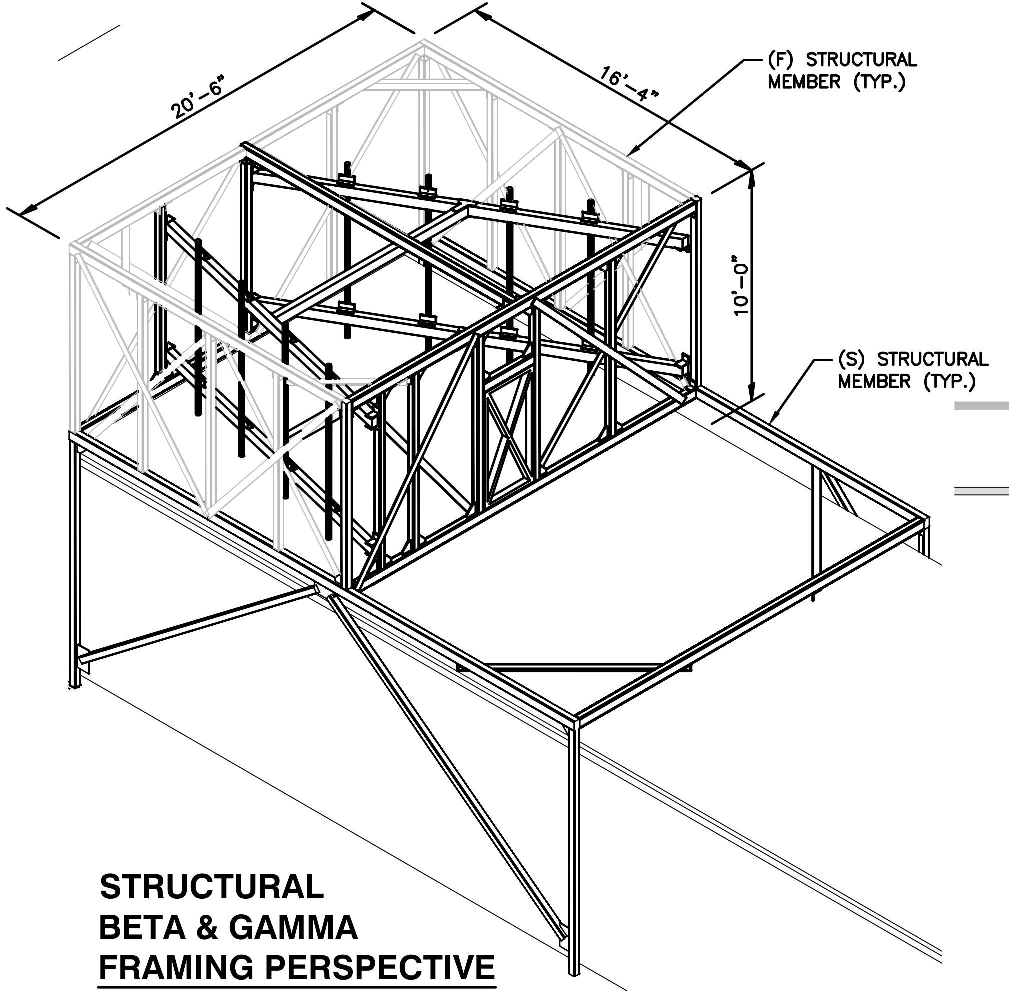
SHEET TITLE:
STRUCTURAL ALPHA FRAMING ELEVATION

SHEET NO:
S-8



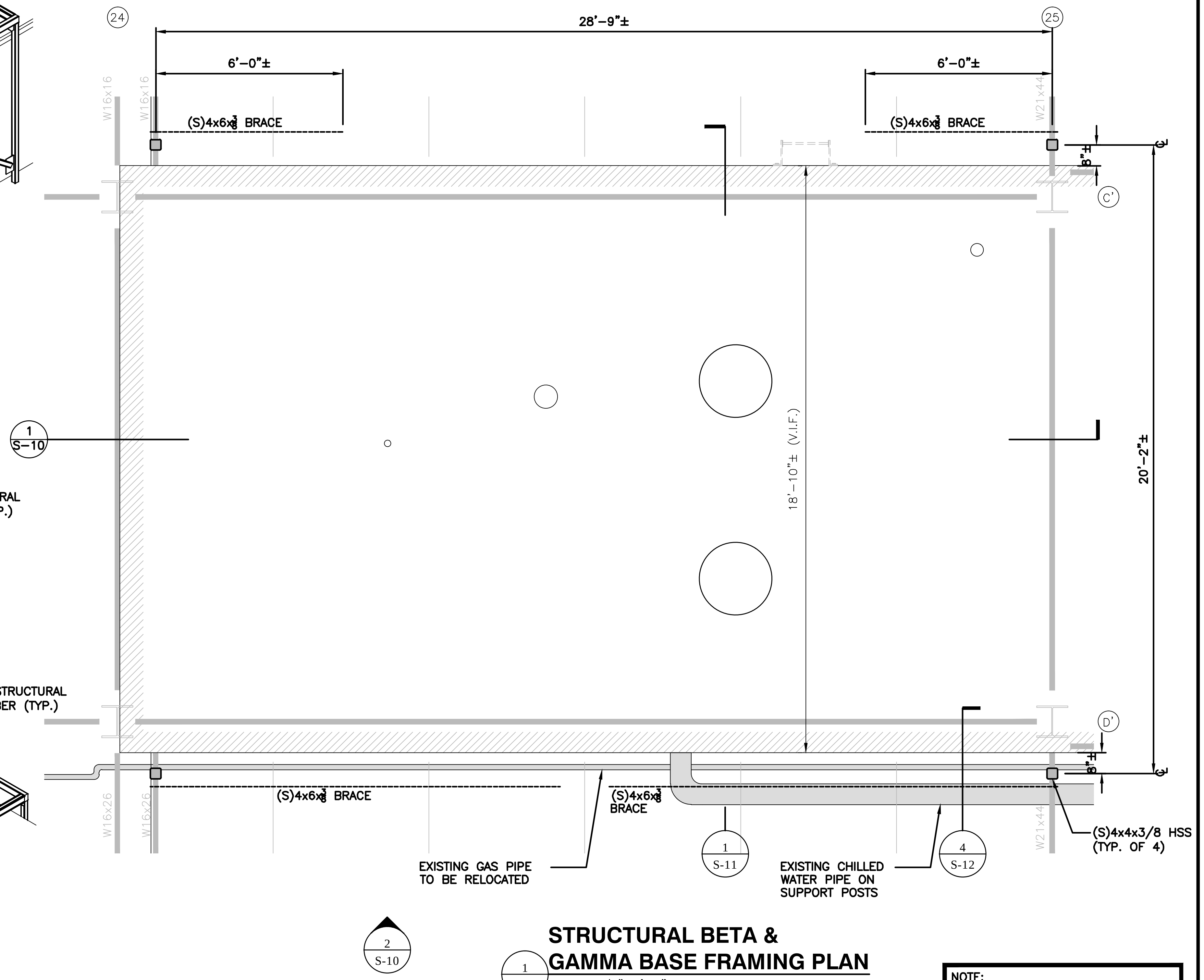
STRUCTURAL BETA & GAMMA FRAMING PERSPECTIVE

SCALE: N.T.S.



STRUCTURAL BETA & GAMMA FRAMING PERSPECTIVE

SCALE: N.T.S.



1
S-9A

STRUCTURAL BETA & GAMMA BASE FRAMING PLAN

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

NOTE:
ALL STRUCTURAL MEMBERS NEAR ANTENNAS SHALL BE MADE OF FRP MATERIAL UNLESS OTHERWISE STATED

▬	– EXISTING MEMBER
▬	– PROPOSED MEMBER
(S) ▣	– STEEL
(F) ☐	– FIBERGLASS

at&t
550 COCHITUATE RD.
FRAMINGHAM, MA, 01701

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1997 ANNAPOLIS EXCHANGE PKWY
SUITE 200
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Hudson Design Group
1600 OSGOOD STREET
BUILDING 20 NORTH, SUITE 3090
N. ANDOVER, MA 01845
TEL: (978) 557-5553
FAX: (978) 336-5586

DEREK J. CREASER
No. 28551

REVISIONS

REV. #	DATE	DESCRIPTION
5	09/02/16	REVISED PER COMMENTS
4	08/07/15	REVISED PER COMMENTS
3	03/31/15	REVISED PER COMMENTS
2	01/13/15	REVISED PER COMMENTS
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0	10/28/14	ISSUED FOR REVIEW

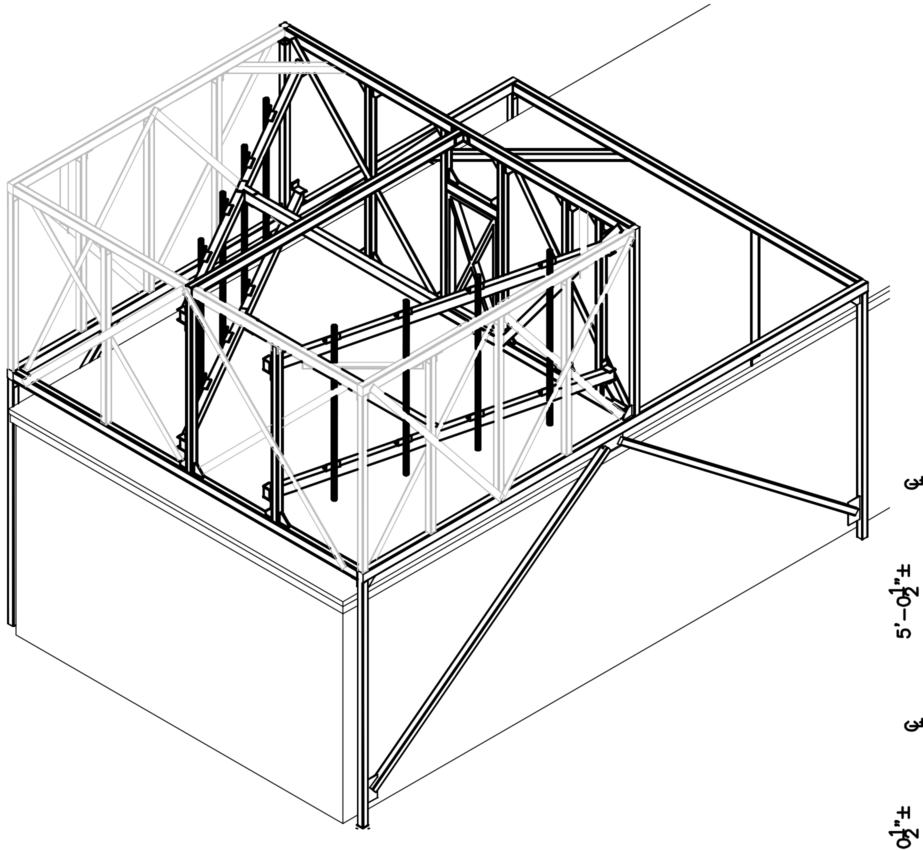
PROJECT NO.		SCALE:
S2900-A	DESIGNED BY: DR DRAWN BY: NS CHECKED BY: RP	AS SHOWN

SITE NAME:
S2900-A
STAMFORD HARBOR

SITE ADDRESS:
208 HARBOR DRIVE
STAMFORD, CT 06902

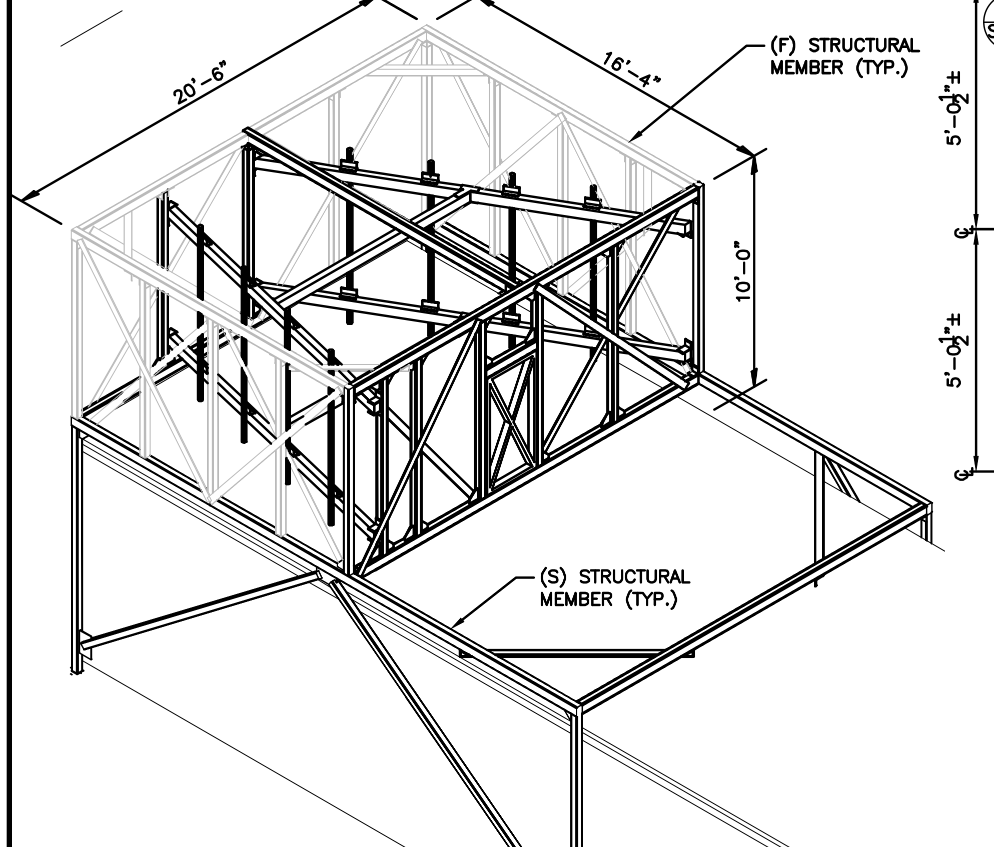
SHEET TITLE:
STRUCTURAL BETA & GAMMA BASE FRAMING PLAN

SHEET NO:
S-9A



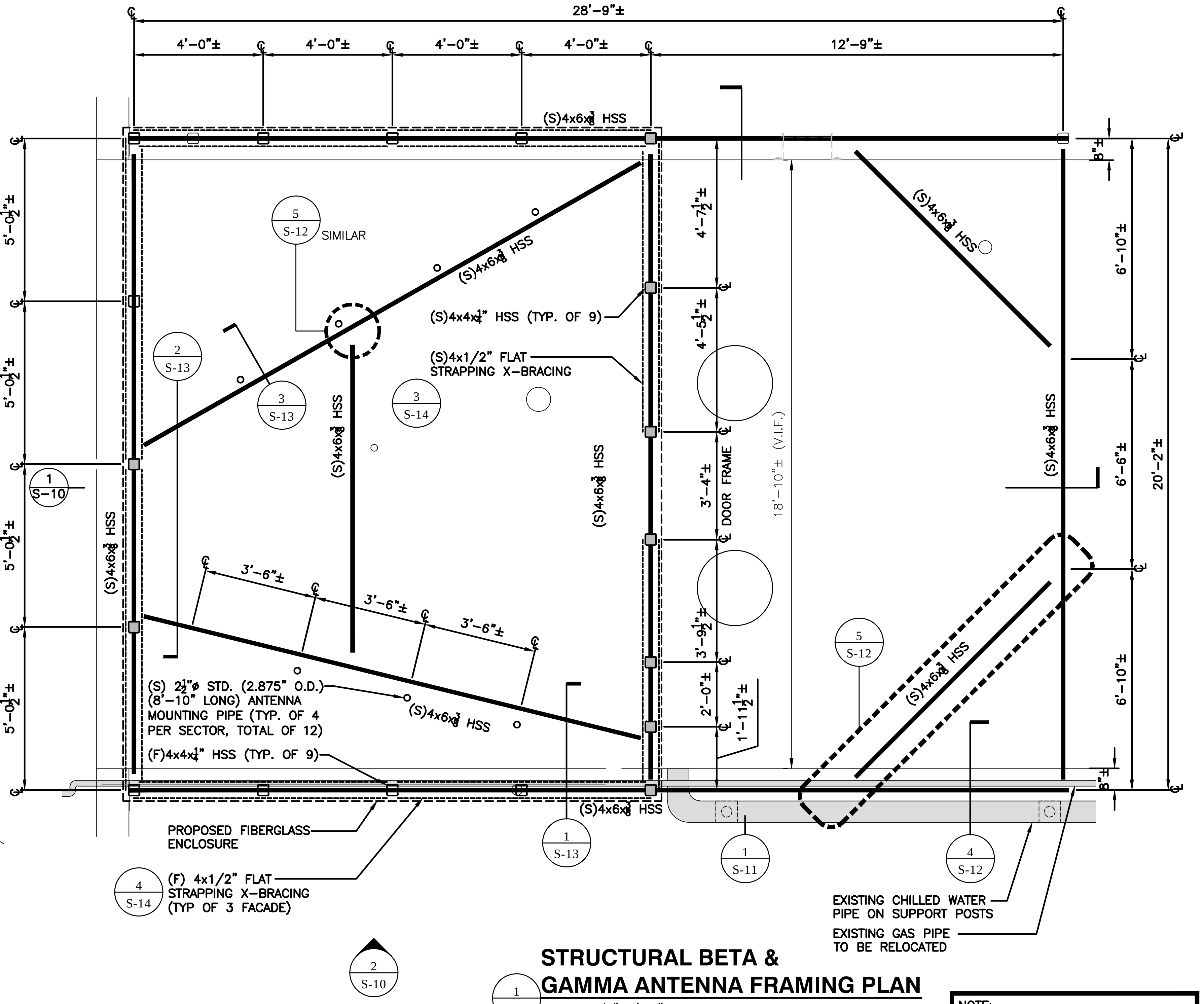
STRUCTURAL BETA & GAMMA FRAMING PERSPECTIVE

SCALE: N.T.S.



STRUCTURAL BETA & GAMMA FRAMING PERSPECTIVE

SCALE: N.T.S.



1 S-9B

STRUCTURAL BETA & GAMMA ANTENNA FRAMING PLAN

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

NOTE:
ALL STRUCTURAL MEMBERS NEAR ANTENNAS SHALL BE MADE OF FRP MATERIAL UNLESS OTHERWISE STATED

▬	– EXISTING MEMBER
▬	– PROPOSED MEMBER
(S) ■	– STEEL
(F) □	– FIBERGLASS

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DEREK J. CREASER

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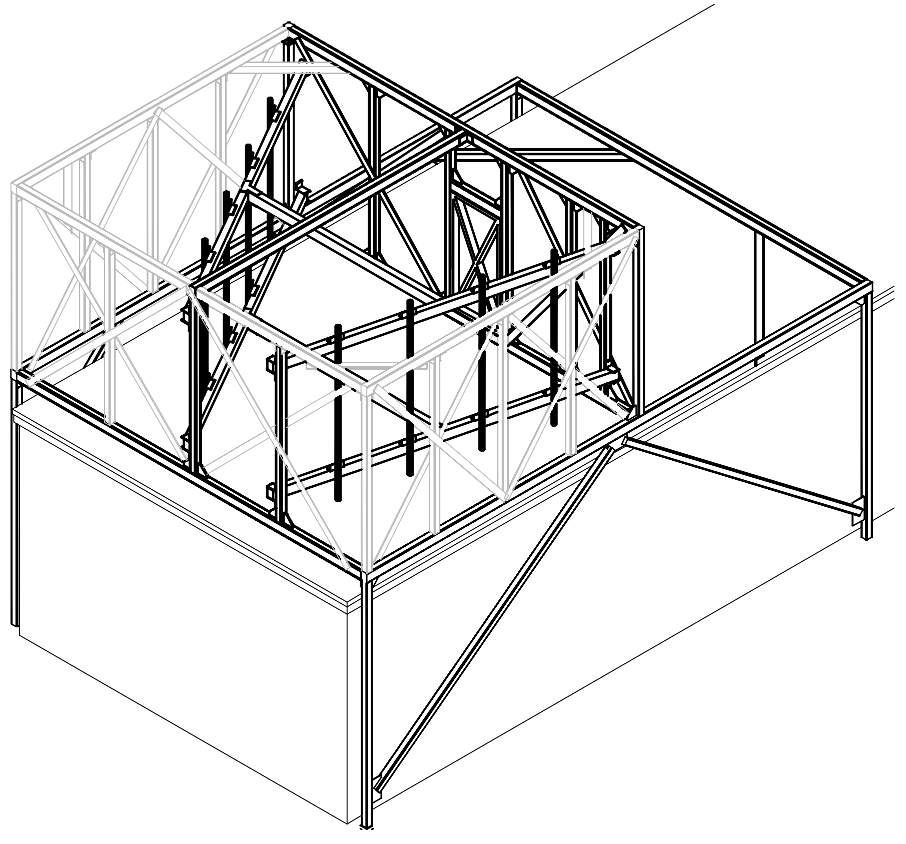
SITE NAME:
S2900-A
STAMFORD HARBOR

SITE ADDRESS:
208 HARBOR DRIVE
STAMFORD, CT 06902

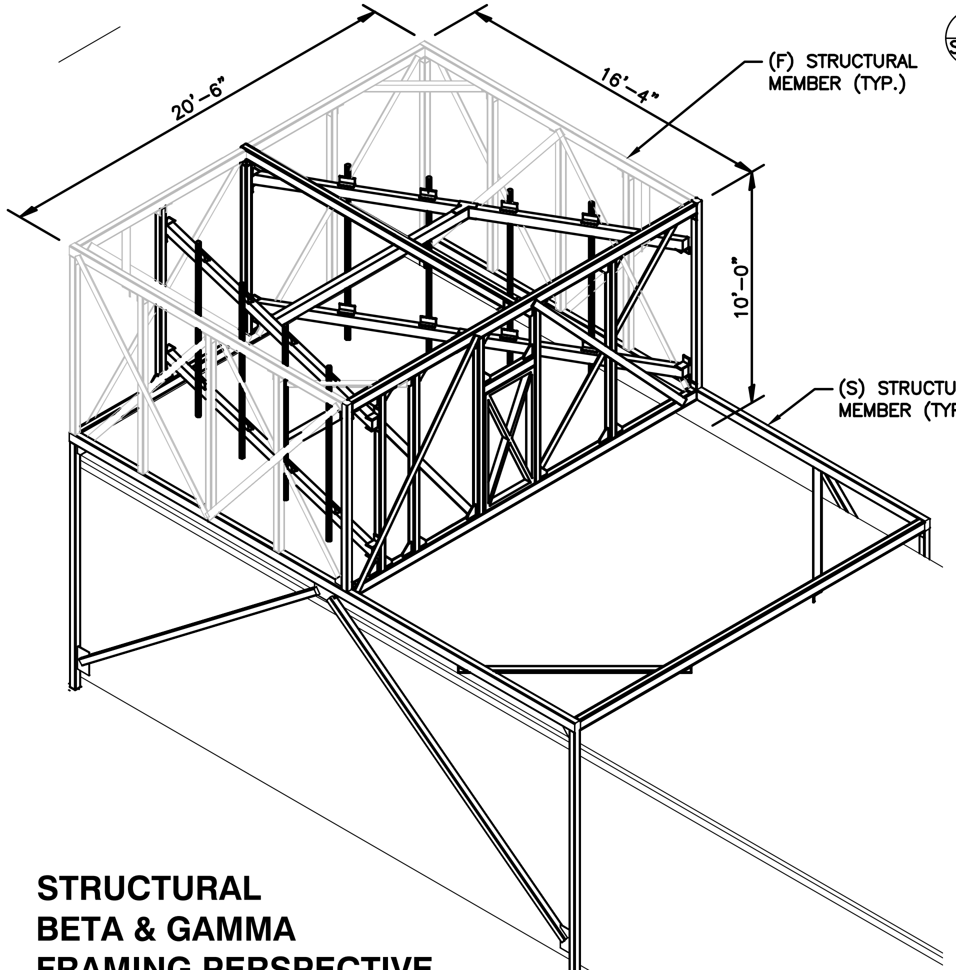
SHEET TITLE:
STRUCTURAL BETA & GAMMA ANTENNA FRAMING PLAN

SHEET NO:
S-9B



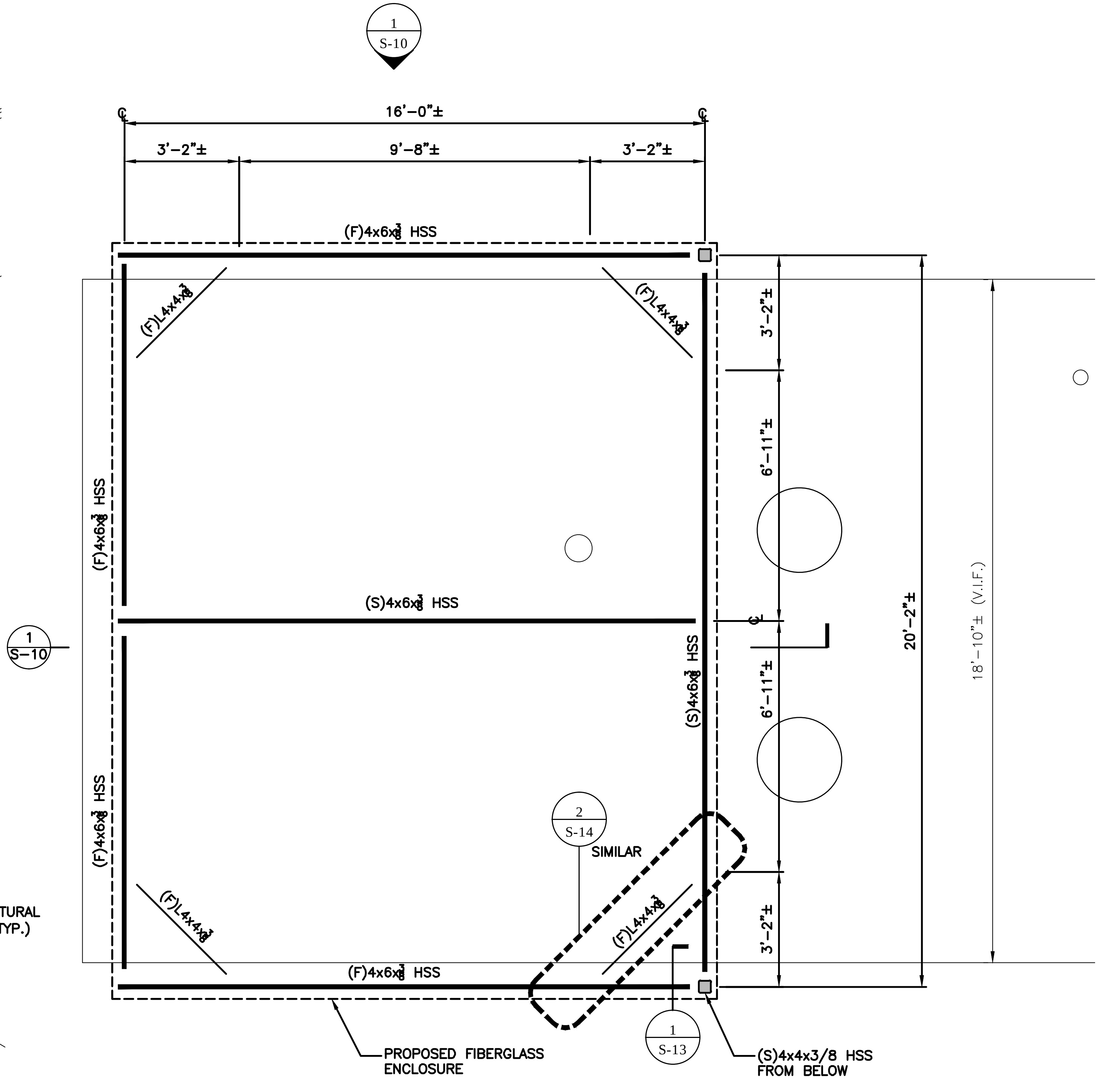
STRUCTURAL BETA & GAMMA FRAMING PERSPECTIVE

SCALE: N.T.S.



STRUCTURAL BETA & GAMMA FRAMING PERSPECTIVE

SCALE: N.T.S.



1 S-9C

STRUCTURAL BETA & GAMMA TOP FRAMING PLAN

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

NOTE:
ALL STRUCTURAL MEMBERS NEAR ANTENNAS SHALL BE MADE OF FRP MATERIAL UNLESS OTHERWISE STATED

▬	–	EXISTING MEMBER
▬	–	PROPOSED MEMBER
(S) ■	–	STEEL
(F) □	–	FIBERGLASS

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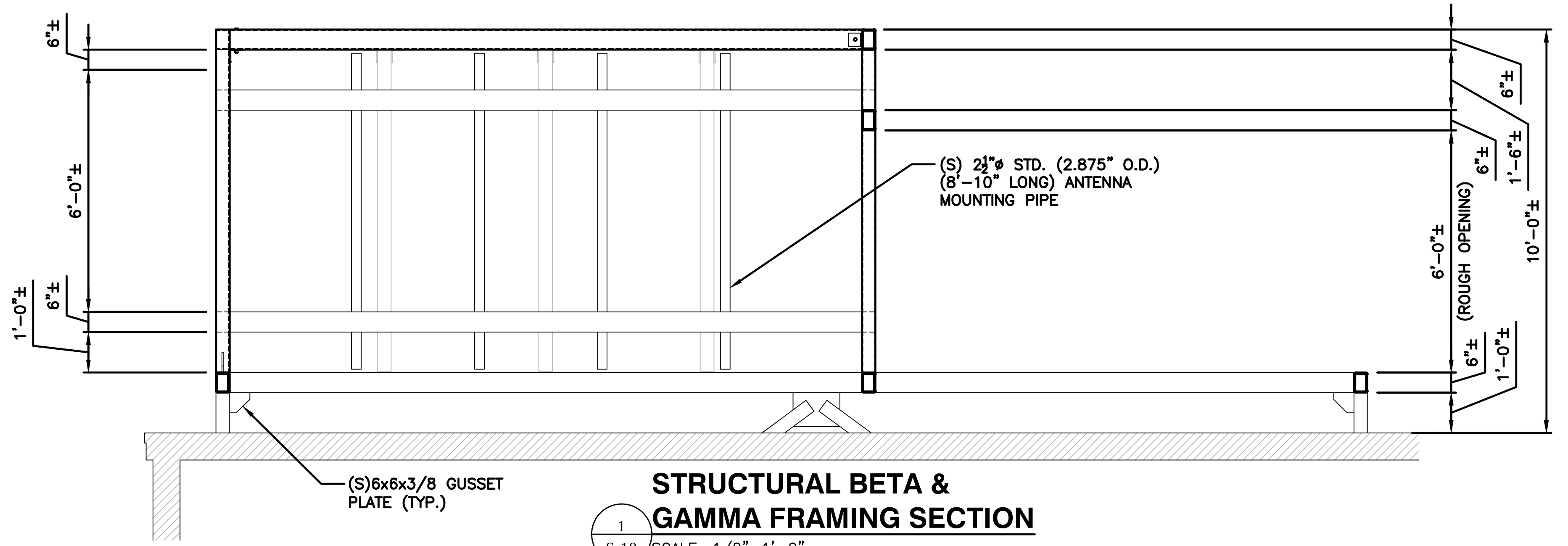
SITE NAME:
S2900-A
STAMFORD HARBOR

SITE ADDRESS:
208 HARBOR DRIVE
STAMFORD, CT 06902

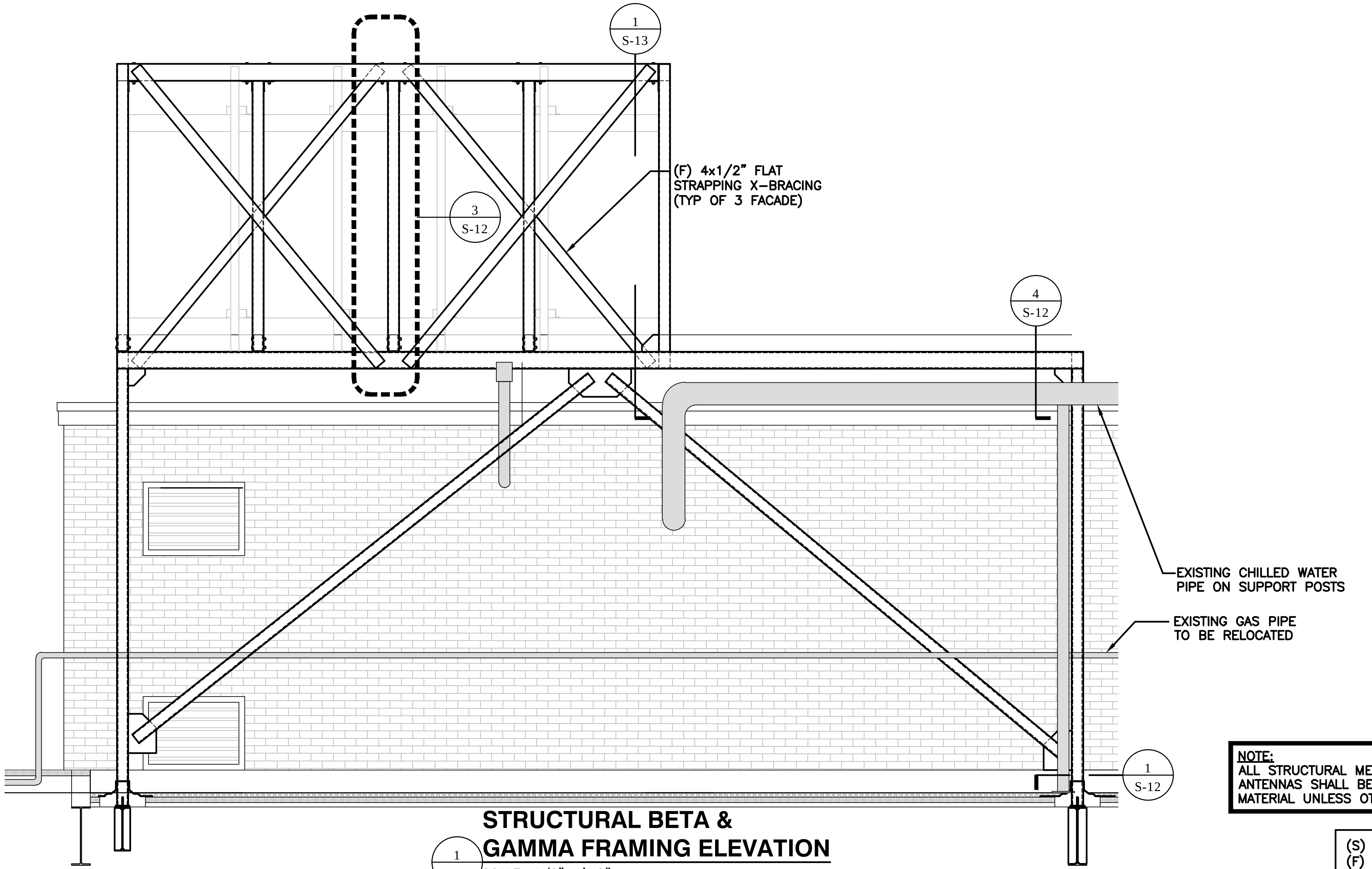
SHEET TITLE:
STRUCTURAL BETA & GAMMA TOP FRAMING PLAN

SHEET NO:
S-9C


6"±
6'-0"±
6"±
1'-0"±
(S) 2½"ø STD. (2.875" O.D.) (8'-10" LONG) ANTENNA MOUNTING PIPE
6"±
6"±
1'-6"±
6'-0"±
(ROUGH OPENING)
10'-0"±
6"±
1'-0"±
(S)6x6x3/8 GUSSET PLATE (TYP.)

STRUCTURAL BETA & GAMMA FRAMING SECTION

1
S-10
SCALE: 1/2"=1'-0"


1
S-13
3
S-12
(F) 4x1/2" FLAT STRAPPING X-BRACING (TYP OF 3 FACADE)
4
S-12
EXISTING CHILLED WATER PIPE ON SUPPORT POSTS
EXISTING GAS PIPE TO BE RELOCATED
1
S-12

STRUCTURAL BETA & GAMMA FRAMING ELEVATION

1
S-10
SCALE: 1/2"=1'-0"

NOTE:
ALL STRUCTURAL MEMBERS NEAR ANTENNAS SHALL BE MADE OF FRP MATERIAL UNLESS OTHERWISE STATED

(S) – STEEL
(F) – FIBERGLASS

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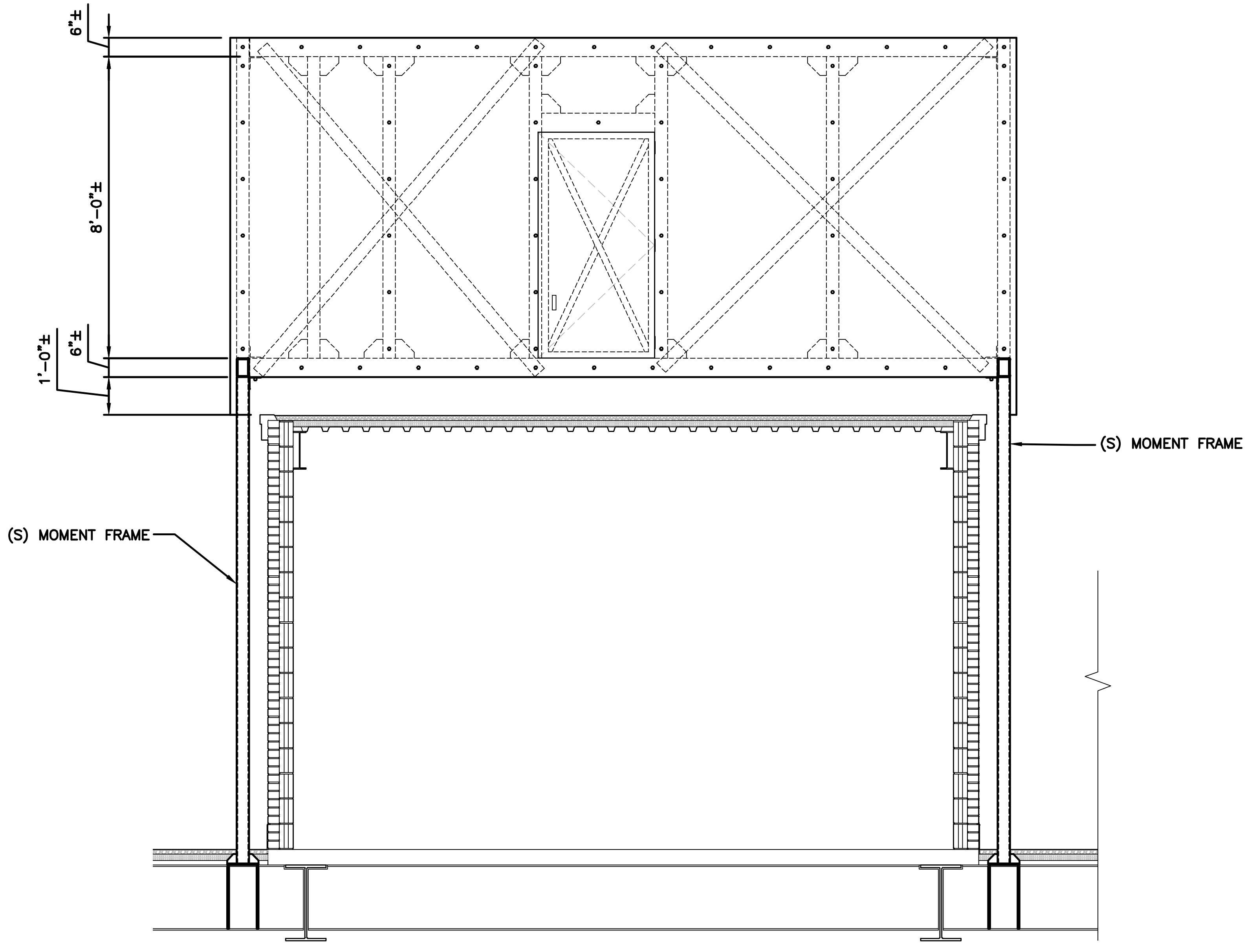
S2900-A
STAMFORD HARBOR

SITE ADDRESS:
208 HARBOR DRIVE
STAMFORD, CT 06902

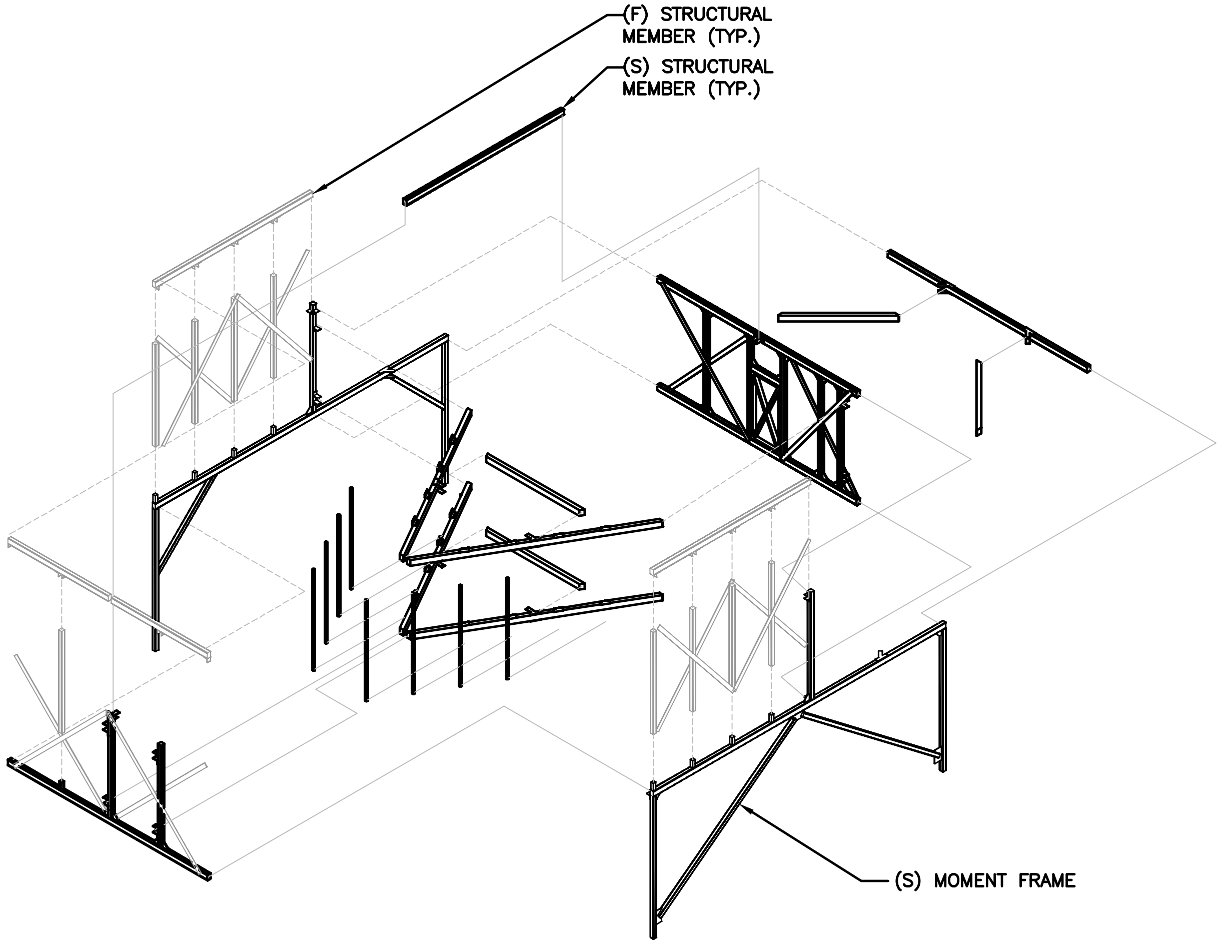
SHEET TITLE:
STRUCTURAL BETA & GAMMA FRAMING SECTION & ELEVATION

SHEET NO:
S-10



STRUCTURAL BETA & GAMMA FRAMING SECTION

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



BETA & GAMMA FRAME EXPLODED VIEW

SCALE: NTS

(S) – STEEL
(F) – FIBERGLASS

NOTE:
ALL STRUCTURAL MEMBERS NEAR ANTENNAS SHALL BE MADE OF FRP MATERIAL UNLESS OTHERWISE STATED

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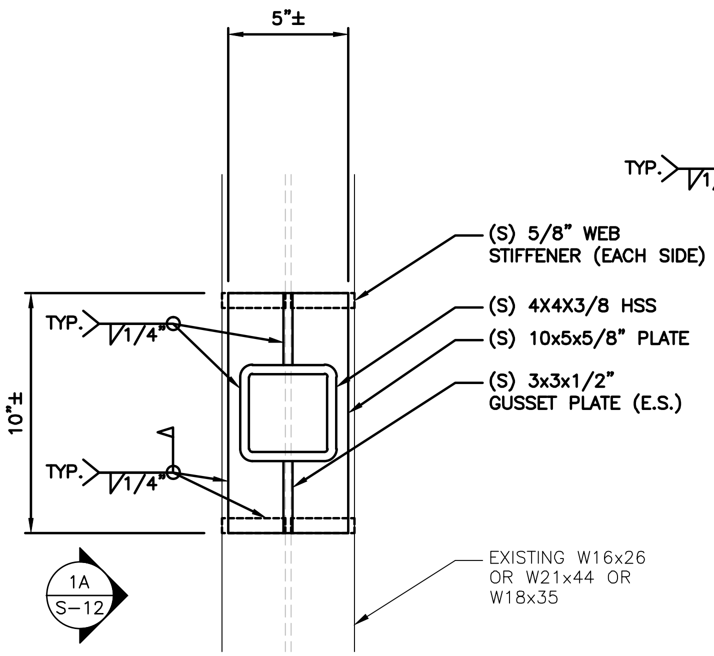
S2900-A
STAMFORD HARBOR

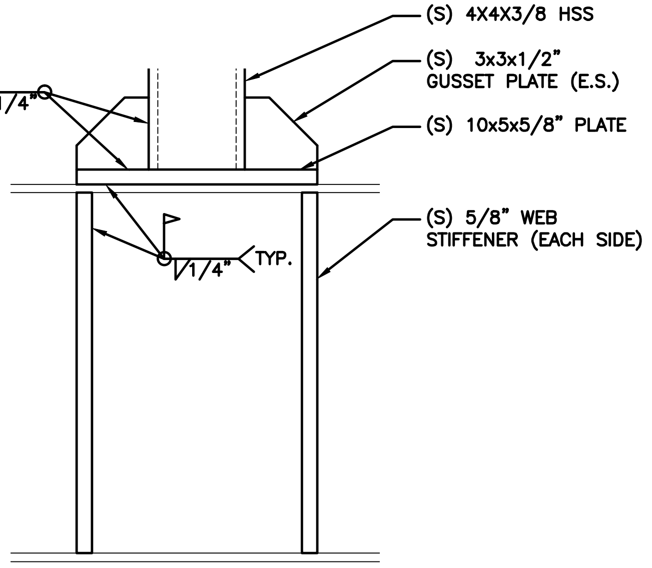
SITE ADDRESS:
208 HARBOR DRIVE
STAMFORD, CT 06902

SHEET TITLE:
STRUCTURAL BETA & GAMMA FRAMING PLAN

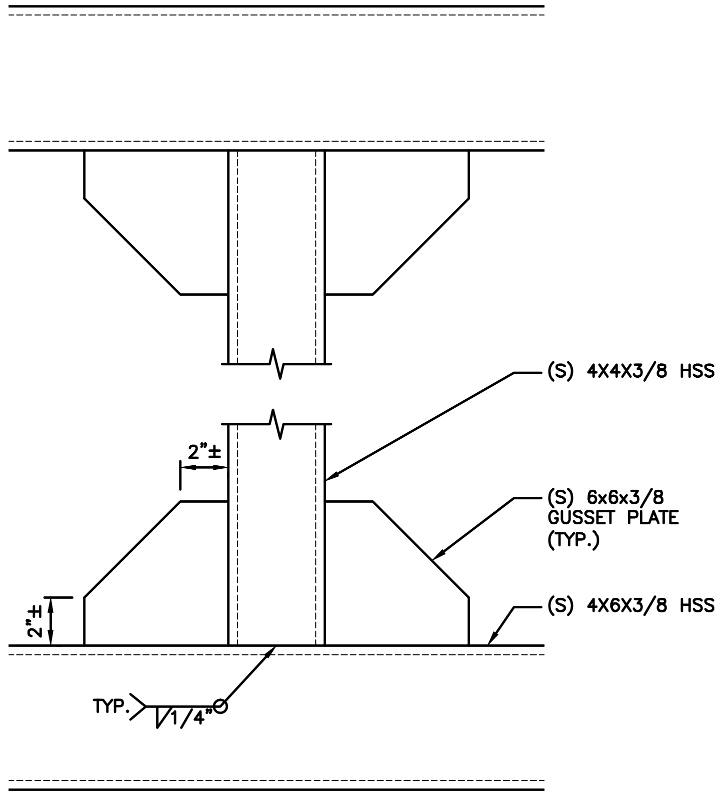
SHEET NO:
S-11


5"±
TYP.
1/4"
TYP.
1/4"
10"±
(S) 5/8" WEB STIFFENER (EACH SIDE)
(S) 4X4X3/8 HSS
(S) 10x5x5/8" PLATE
(S) 3x3x1/2" GUSSET PLATE (E.S.)
EXISTING W16x26 OR W21x44 OR W18x35
1A
S-12

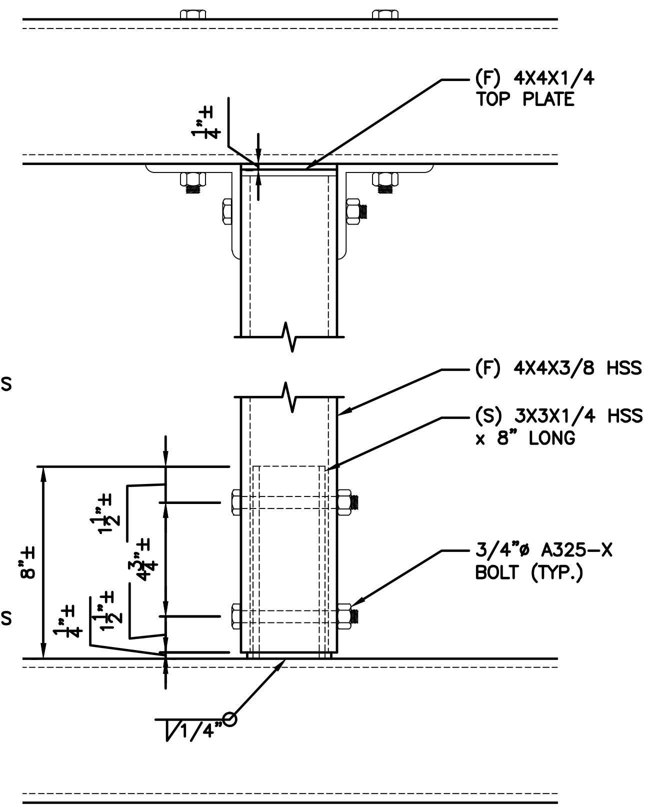
1 S-12 **BASE CONNECTION DETAIL**
SCALE: 3"=1'-0"


TYP.
1/4"
1/4"
TYP.
(S) 4X4X3/8 HSS
(S) 3x3x1/2" GUSSET PLATE (E.S.)
(S) 10x5x5/8" PLATE
(S) 5/8" WEB STIFFENER (EACH SIDE)

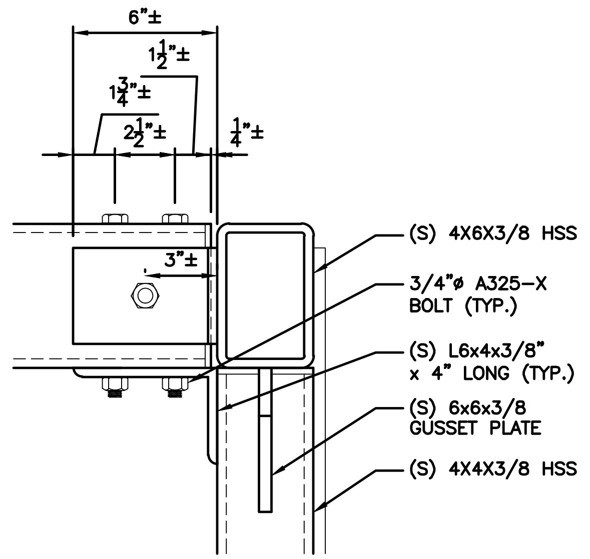
1A S-12 **BASE CONNECTION DETAIL**
SCALE: 3"=1'-0"



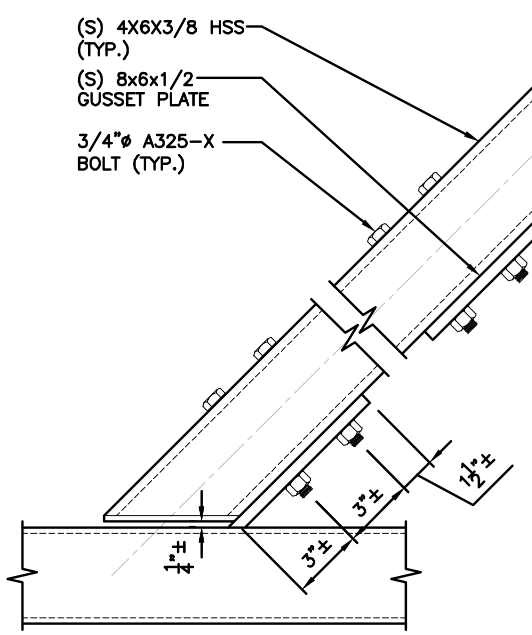
2 S-12 **TYPICAL STEEL CONNECTION DETAIL**
SCALE: 3"=1'-0"



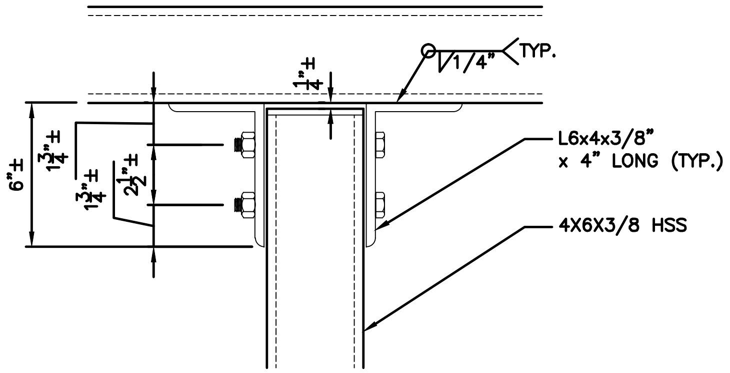
3 S-12 **TYPICAL FIBERGLASS CONNECTION DETAIL**
SCALE: 3"=1'-0"



4 S-12 **CONNECTION DETAIL**
SCALE: 3"=1'-0"



5 S-12 **CONNECTION DETAIL**
SCALE: 3"=1'-0"



6 S-12 **CONNECTION DETAIL**
SCALE: 3"=1'-0"

(S) – STEEL
(F) – FIBERGLASS

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ANNAPOLIS, MD 21401

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HDG
1600 OSGOOD STREET
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N. ANDOVER, MA 01845
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DEREK J. CREASER

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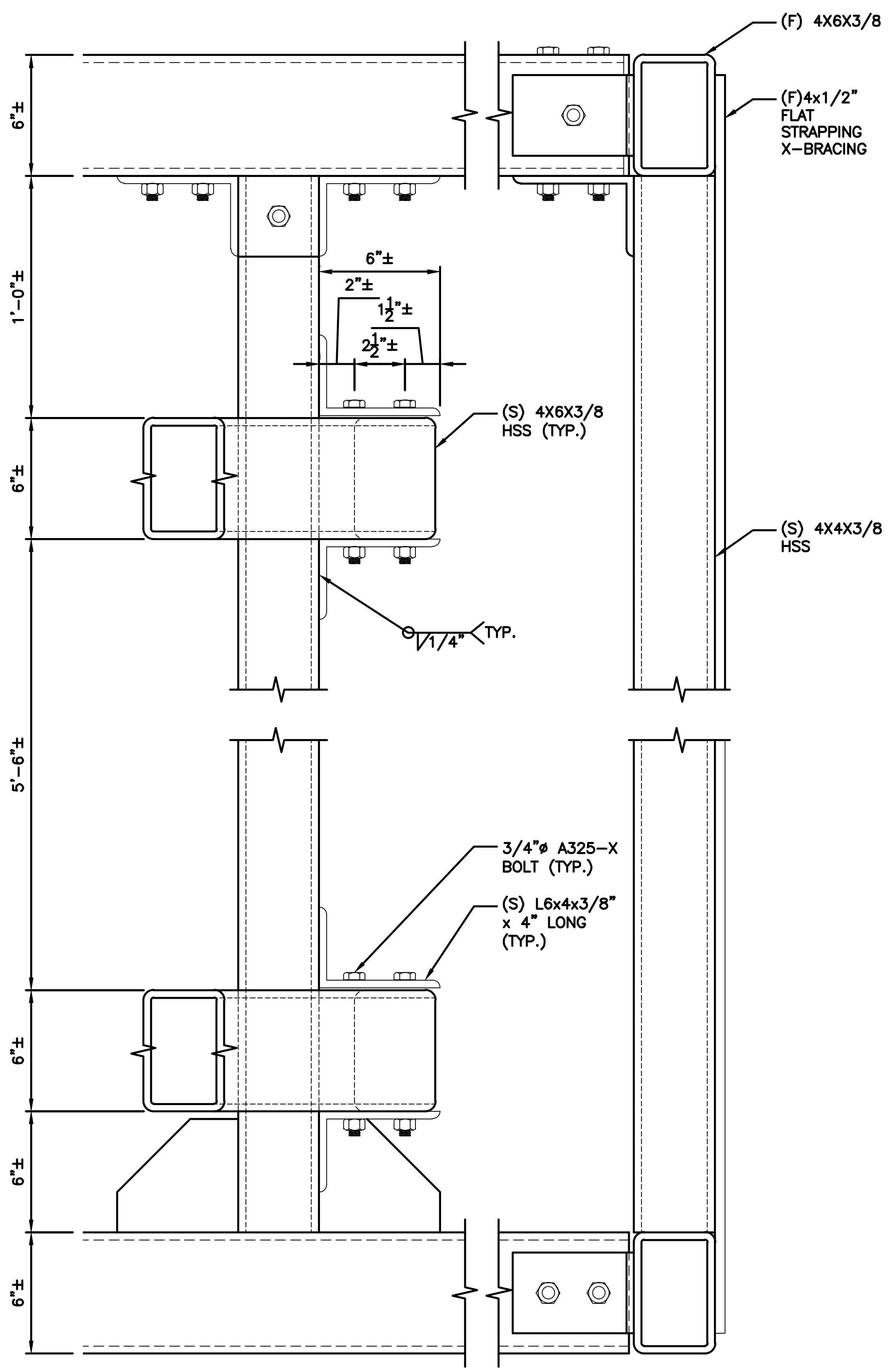
SITE NAME:
S2900-A
STAMFORD HARBOR

SITE ADDRESS:
208 HARBOR DRIVE
STAMFORD, CT 06902

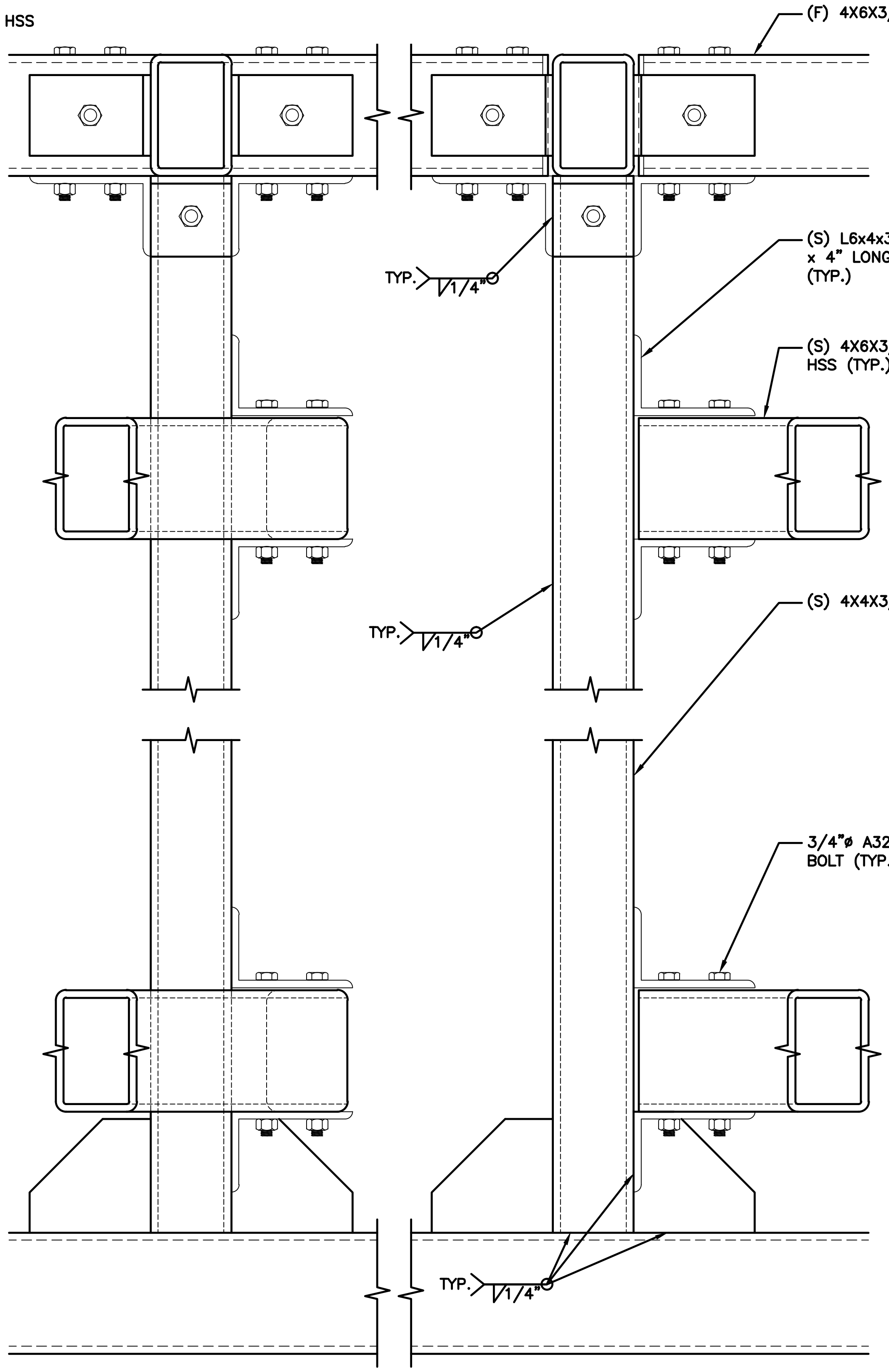
SHEET TITLE:
STRUCTURAL ANTENNA FRAMING DETAILS

SHEET NO:
S-12



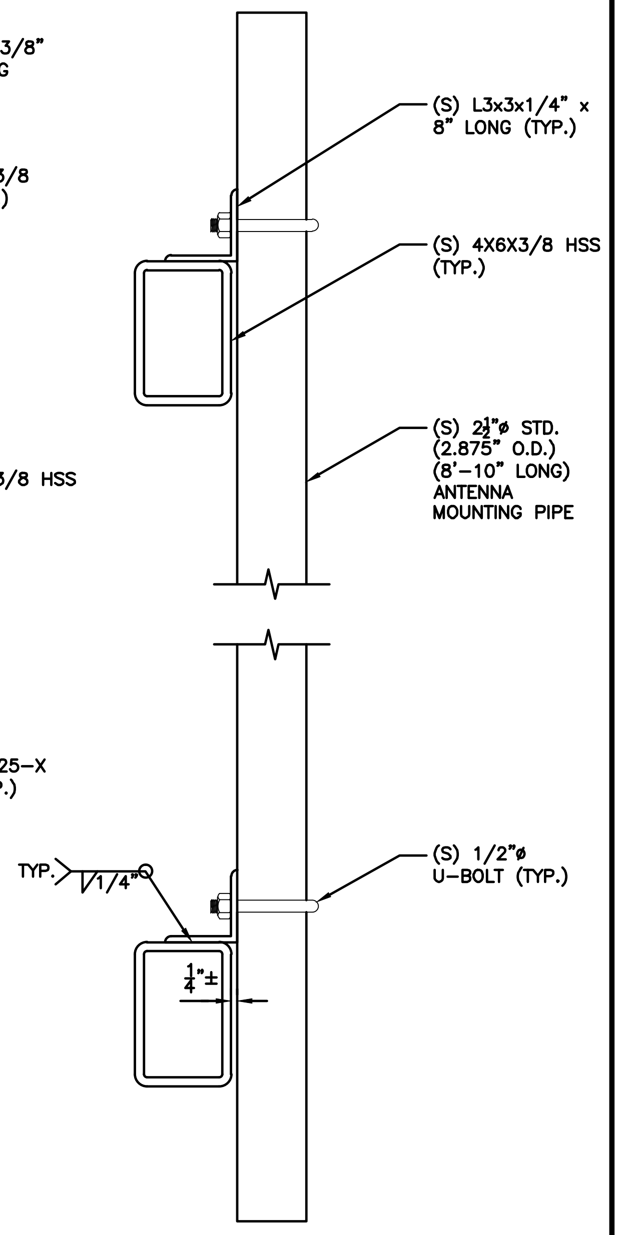
1 S-13 **CONNECTION DETAIL**

SCALE: 3"=1'–0"



2 S-13 **CONNECTION DETAIL**

SCALE: 3"=1'–0"


(S) L3x3x1/4" x 8" LONG (TYP.)
(S) 4X6X3/8 HSS (TYP.)
(S) 2½"ø STD. (2.875" O.D.) (8'–10" LONG) ANTENNA MOUNTING PIPE
TYP. 1/4"
(S) 1/2"ø U–BOLT (TYP.)
¼"±

3 S-13 **CONNECTION DETAIL**

SCALE: 3"=1'–0"

(S) – STEEL
(F) – FIBERGLASS

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PROJECT NO.	DESIGNED BY / DRAWN BY / CHECKED BY	SCALE:
S2900–A	DESIGNED BY: DR DRAWN BY: NS CHECKED BY: RP	AS SHOWN

SITE NAME:

S2900-A
STAMFORD HARBOR

SITE ADDRESS:

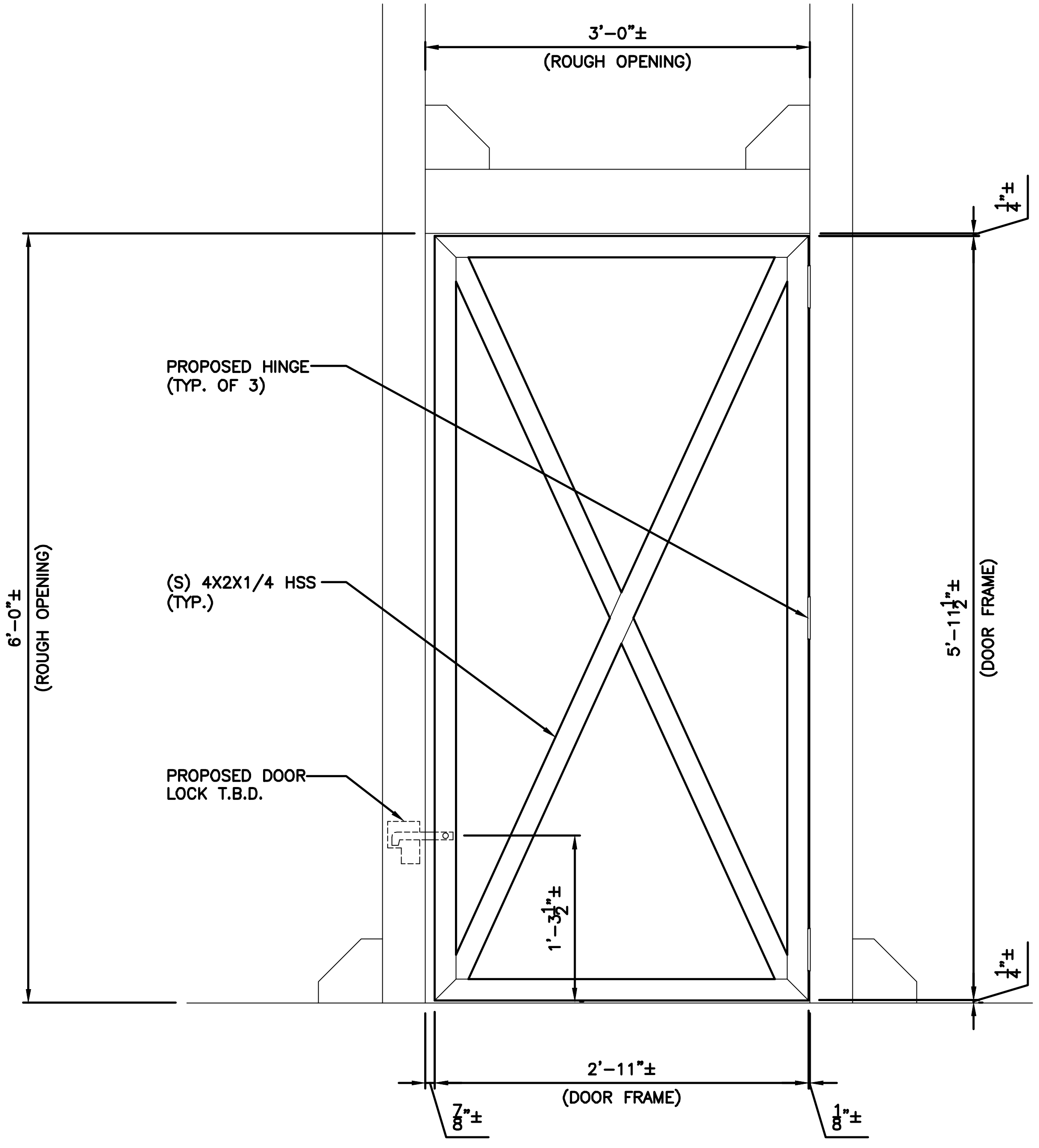
208 HARBOR DRIVE
STAMFORD, CT 06902

SHEET TITLE:

STRUCTURAL ANTENNA
FRAMING PLAN

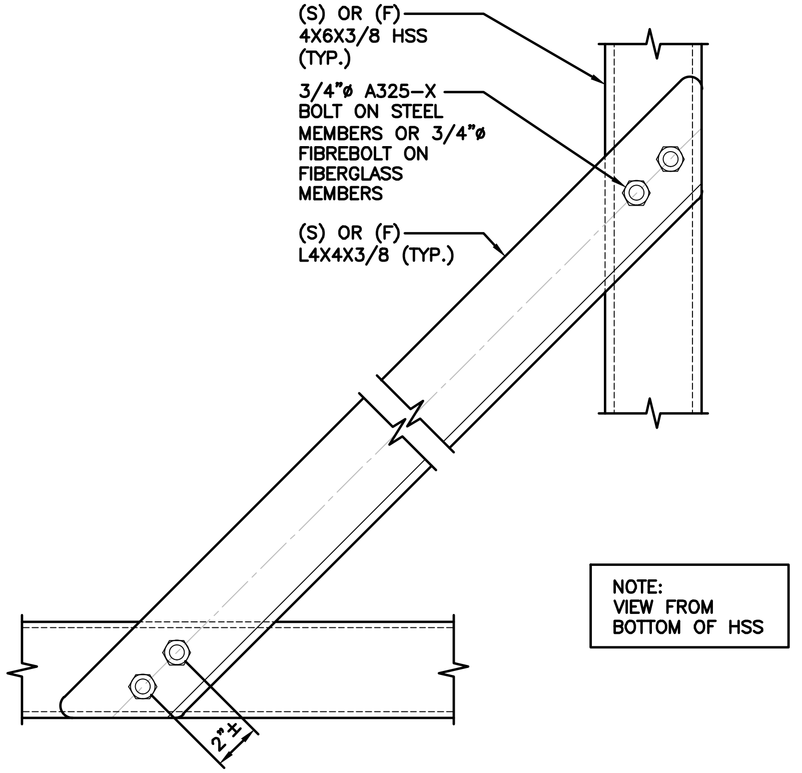
SHEET NO:

S-13



ANTENNA FRAME DOOR DETAIL

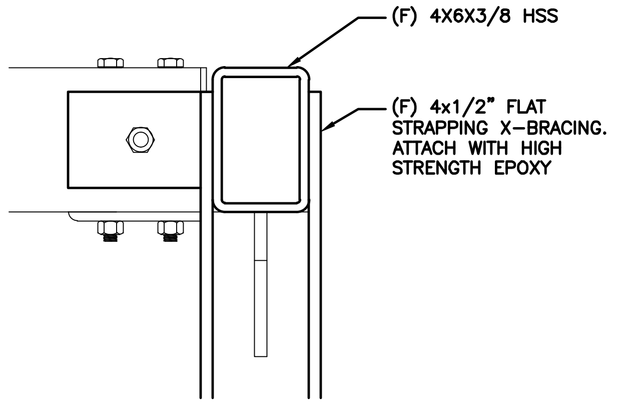
1 / S-14 SCALE: 1-1/2"=1'-0"


(S) OR (F) 4X6X3/8 HSS (TYP.)
3/4"ø A325-X BOLT ON STEEL MEMBERS OR 3/4"ø FIBREBOLT ON FIBERGLASS MEMBERS
(S) OR (F) L4X4X3/8 (TYP.)
2"±

NOTE:
VIEW FROM
BOTTOM OF HSS

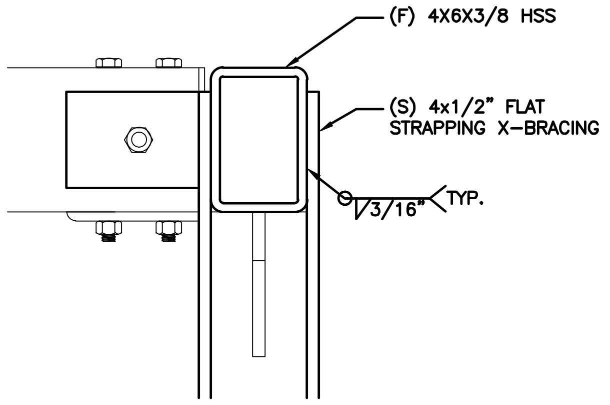
CONNECTION DETAIL

2 / S-14 SCALE: 3"=1'-0"


(F) 4X6X3/8 HSS
(F) 4x1/2" FLAT STRAPPING X-BRACING. ATTACH WITH HIGH STRENGTH EPOXY

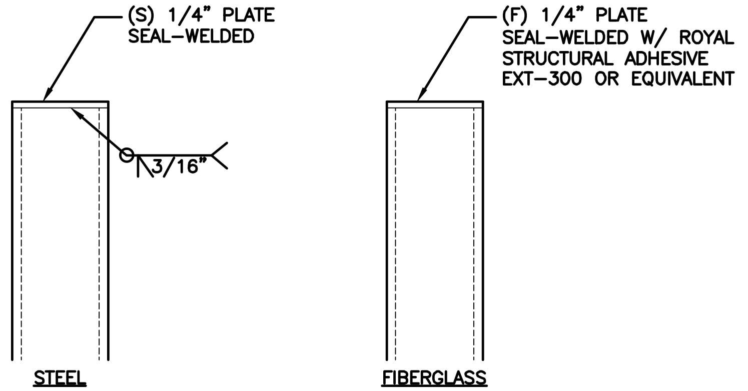
CONNECTION DETAIL

3 / S-14 SCALE: 3"=1'-0"



CONNECTION DETAIL

4 / S-14 SCALE: 3"=1'-0"


(S) 1/4" PLATE SEAL-WELDED
3/16"
(F) 1/4" PLATE SEAL-WELDED W/ ROYAL STRUCTURAL ADHESIVE EXT-300 OR EQUIVALENT
STEEL
FIBERGLASS

CAP PLATE CONNECTION DETAIL

4 / S-14 SCALE: 3"=1'-0"

(S) – STEEL
(F) – FIBERGLASS

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S2900-A
STAMFORD HARBOR

SITE ADDRESS:
208 HARBOR DRIVE
STAMFORD, CT 06902

SHEET TITLE:
STRUCTURAL ANTENNA FRAMING PLAN

SHEET NO:
S-14

GENERAL NOTES

ELECTRICAL:

1. ALL CONDUCTORS SHALL BE COPPER.
2. ALL WIRING DEVICES AND EQUIPMENT SHALL BE SPECIFICATION GRADE AND UL LISTED.
3. THE INSTALLATION OF ALL MATERIALS SHALL COMPLY WITH THE NATIONAL ELECTRIC CODE, 2011 EDITION WITH 527 CMR 12 AMENDMENTS.
4. ALL MATERIALS SHALL BE NEW.
5. OUTLETS AND JUNCTION BOXES SHALL BE ZINC–COATED OR CADMIUM PLATED SHEET STEEL BOXES NOT LESS THAN FOUR INCHES SQUARE AND SUITABLE FOR THE TYPE OF SERVICE OUTLET. ALL OUTLET AND JUNCTION BOXES SHALL BE SECURELY SURFACE MOUNTED.
6. THE ENTIRE SYSTEM SHALL BE SOLIDLY GROUNDED USING COMPRESSION–TYPE CONDUIT FITTINGS ON CONDUITS AND PROPERLY BONDED GROUND CONDUCTORS. CRIMP–TYPE AND SET SCREW–TYPE CONDUIT FITTINGS ARE NOT ALLOWED. ALL RECEPTACLES AND EQUIPMENT CIRCUITS SHALL BE GROUNDED USING A FULL–SIZE EQUIPMENT GROUNDING CONDUCTOR RUN WITH THE CURRENT CONDUCTORS.
7. ALL WALL PENETRATIONS FOR TELCO, POWER, AND GROUNDING SHALL REQUIRE RIGID STEEL SLEEVES.
8. ALL SWITCHES SHALL BE 48 INCHES A.F.F.
9. ALL RECEPTACLES SHALL BE 18 INCHES A.F.F.
10. ALL T–STATS SHALL BE 60 INCHES A.F.F.

CABLE TRAY:

11. BOTTOM OF CABLE TRAY SHALL BE 7'–6" A.F.F.
12. CABLE TRAY ANCHORS SHALL BE MOUNTED TO STRUCTURAL CEILING.
13. AFTER FINAL LEVELING OF CABLE TRAY, CUT THREADED RODS 1/2" BELOW NUT AND CAP OFF.

ALARM AND SIGNAL:

14 ALL ALARM WIRES SHALL BE RUN FROM EACH OF THE COMPONENTS TERMINAL STRIP. LEAVE ADDITIONAL ALARM WIRE COILED WITH SUFFICIENT LENGTH TO REACH THE FLOOR.
15. ALL ALARM WIRES SHALL BE TAGGED AND LABELED WITH THE APPROPRIATE ALARM ITEM. ALL CONTRACTORS WILL BE NORMALLY CLOSED, DRY, AND ISOLATED FROM GROUND, U.O.N.
16. ALL ALARM WIRING SHALL BE 1/2"C., 2 #22, UNLESS OTHERWISE NOTED.
17. ELECTRICAL CONTRACTOR TO CARRY POWER FEED OF LESSEE'S EQUIPMENT.
18. ALL ENCLOSURES TO BE NEMA.
19. INTEGRATED LOAD CENTER ASSEMBLY AND THE GENERATOR SUPPLIED BY LESSEE.

ABBREVIATIONS

AGB	COPPER ANTENNA GROUND BAR
AWG	AMERICAN WIRE GAUGE
BCW	BARE COPPER WIRE
BTS	BASE TRANSMISSION SYSTEM
CIGBE	COAX ISOLATED GROUND BAR EXTERNAL
DWG	DRAWING
EMT	ELECTRICAL METALLIC TUBING
GEN	GENERATOR
GPS	GLOBAL POSITIONING SYSTEM
GR	GROWTH
IGR	INTERIOR GROUND RING (HALO)
LAGB	LOWER ANTENNA COPPER GROUND BAR
MIGB	MASTER ISOLATED GROUND BAR
PCS	PERSONAL COMMUNICATION SYSTEM
PPC	POWER PROTECTION CABINET
PRC	PRIMARY RADIO CABINET
RGS	RIGID GALVANIZED STEEL
RWY	RACEWAY
TYP	TYPICAL
UAGB	UPPER ANTENNA COPPER GROUND BAR

PROPOSED EQUIPMENT SCHEDULE

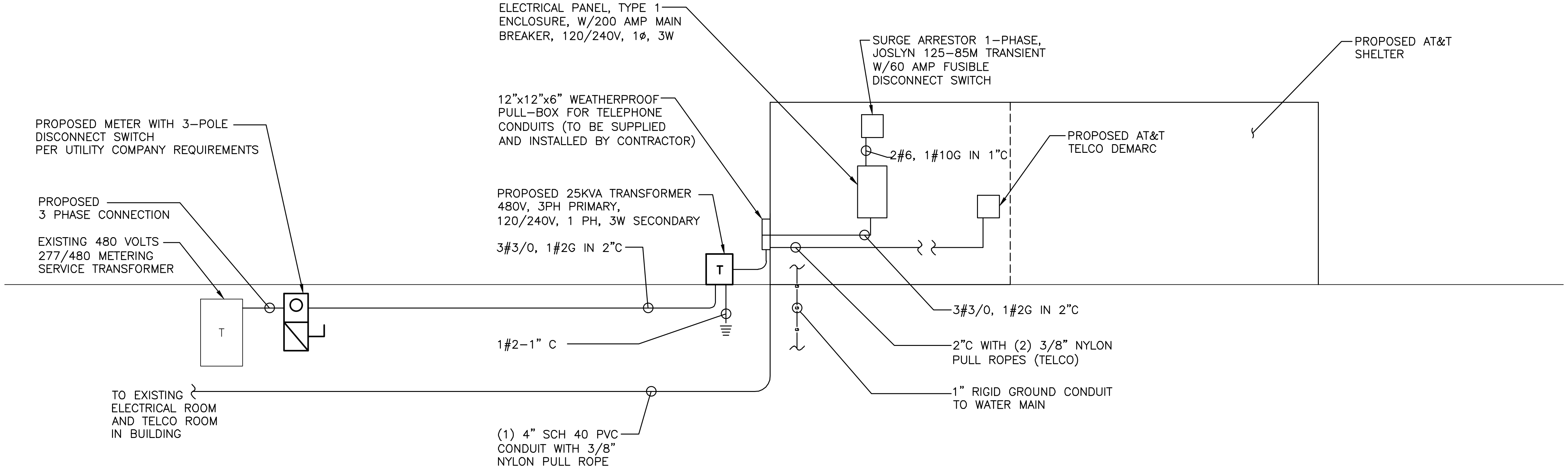
NAME OF EQUIPMENT	SIZE (INCHES)			WEIGHT (LBS)	INPUT POWER	AC BREAKER SIZE (AMPS)	DC BREAKER SIZE (AMPS)
	LENGTH	WIDTH	HEIGHT				
GE RBA72 DC POWER PLANT	39.3	30	*72.0	425	120/208/240 VAC	30A	–
ERICSSON 6601	14	19	*2.6	22	–48 DC	–	1x15A
RAYCAP DC6–48–60–RM	15.5	16.6	*3.3	–	–48 DC	–	6x25A
12 CELL ABSOLYTE BATTERY	40.25	26.38	*38.36	3000	–24 DC	–	–

200A PANELBOARD SCHEDULE

CIRCUIT	DESCRIPTION OF LOAD	USE	BREAKER		BREAKER		USE	DESCRIPTION OF LOAD	CIRCUIT
			STATE	AMP	AMP	STATE			
1	TELCO GFI	SINGLE POSITION	ON	20	15	ON	SINGLE POSITION	INT/EXT LIGHTS	2
3	RECEPTACLES	SINGLE POSITION	ON	20	–	–	–	–	4
5	OUTSIDE GFI	SINGLE POSITION	ON	20	–	–	–	–	6
7	SPARE	SINGLE POSITION	OFF	20	–	–	–	–	8
9	RECTIFIER 2	SINGLE POSITION	ON	30	–	–	–	–	10
11	–	BLANK	–	–	–	–	–	–	12
13	RECTIFIER 4	SINGLE POSITION	ON	30	–	–	–	–	14
15	–	BLANK	–	–	–	–	–	–	16
17	RECTIFIER 6	SINGLE POSITION	ON	30	–	–	–	–	18
19	–	BLANK	–	–	–	–	–	–	20
21	BLANK	–	–	–	20	OFF	SINGLE POSITION	SPARE	22
23	BLANK	–	–	–	–	–	–	–	24
25	BLANK	–	–	–	30	ON	SINGLE POSITION	RECTIFIER 1	26
27	BLANK	–	–	–	–	–	–	BLANK	28
29	BLANK	–	–	–	30	ON	SINGLE POSITION	RECTIFIER 3	30
31	BLANK	–	–	–	–	–	–	BLANK	32
33	BLANK	–	–	–	30	ON	SINGLE POSITION	RECTIFIER 5	34
35	BLANK	–	–	–	–	–	–	BLANK	36
37	BLANK	–	–	–	–	–	–	BLANK	38
39	BLANK	–	–	–	–	–	–	BLANK	40
41	BLANK	–	–	–	–	–	–	BLANK	42

NOTES

1. GENERAL CONTRACTOR IS TO VERIFY ACTUAL EQUIPMENT CABINET INSTALLATION WITH SMARTLINK/AT&T PRIOR TO ORDERING MATERIALS.
2. FURNISH AND INSTALL ADDITIONAL DS1 TVSS AS NEEDED. GROUND DS1 TVSS TO MGB OR GROUNDED EQUIPMENT FRAME.
3. ALL CABLES TO BE TERMINATED AT THE RBS END BY ERICSSON.


ELECTRICAL PANEL, TYPE 1 ENCLOSURE, W/200 AMP MAIN BREAKER, 120/240V, 1ø, 3W
SURGE ARRESTOR 1–PHASE, JOSLYN 125–85M TRANSIENT W/60 AMP FUSIBLE DISCONNECT SWITCH
PROPOSED AT&T SHELTER
12"x12"x6" WEATHERPROOF PULL–BOX FOR TELEPHONE CONDUITS (TO BE SUPPLIED AND INSTALLED BY CONTRACTOR)
PROPOSED METER WITH 3–POLE DISCONNECT SWITCH PER UTILITY COMPANY REQUIREMENTS
2#6, 1#10G IN 1"C
PROPOSED AT&T TELCO DEMARC
PROPOSED 3 PHASE CONNECTION
PROPOSED 25KVA TRANSFORMER 480V, 3PH PRIMARY, 120/240V, 1 PH, 3W SECONDARY
EXISTING 480 VOLTS 277/480 METERING SERVICE TRANSFORMER
3#3/0, 1#2G IN 2"C
T
T
3#3/0, 1#2G IN 2"C
1#2–1" C
2"C WITH (2) 3/8" NYLON PULL ROPES (TELCO)
TO EXISTING ELECTRICAL ROOM AND TELCO ROOM IN BUILDING
1" RIGID GROUND CONDUIT TO WATER MAIN
(1) 4" SCH 40 PVC CONDUIT WITH 3/8" NYLON PULL ROPE

1
E-1

POWER & TELCO RISER DIAGRAM

SCALE: N.T.S.

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DEREK J. CREASER

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PROJECT NO.
S2900–A

DESIGNED BY: DR
DRAWN BY: NS
CHECKED BY: RP

SCALE:
AS SHOWN

SITE NAME:

S2900-A
STAMFORD HARBOR

SITE ADDRESS:

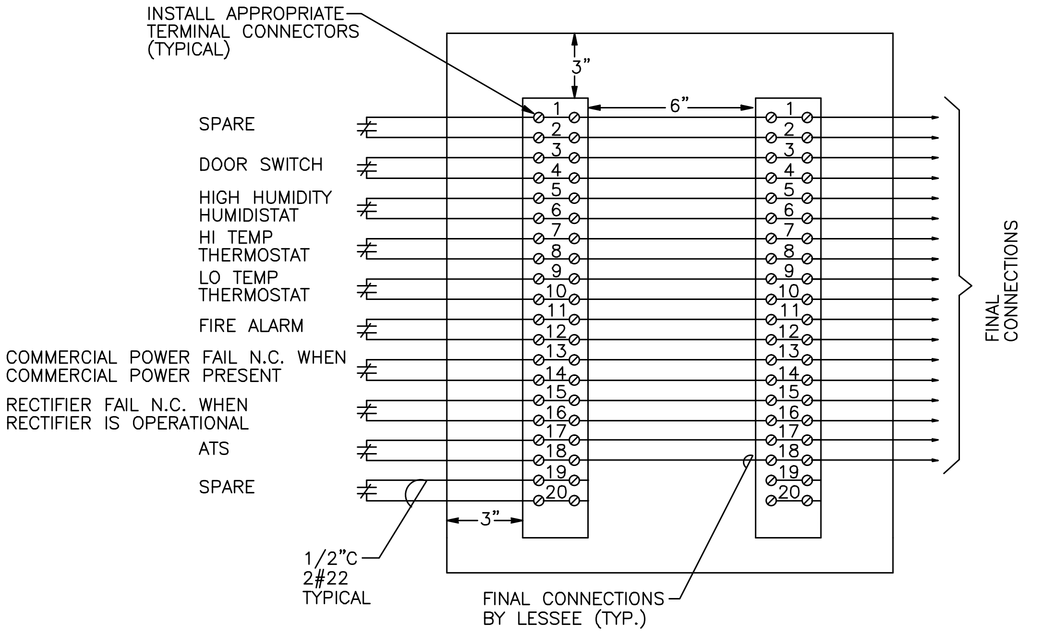
208 HARBOR DRIVE
STAMFORD, CT 06902

SHEET TITLE:

ELECTRICAL NOTES, DETAILS AND ONE LINE DIAGRAM

SHEET NO:

E-1

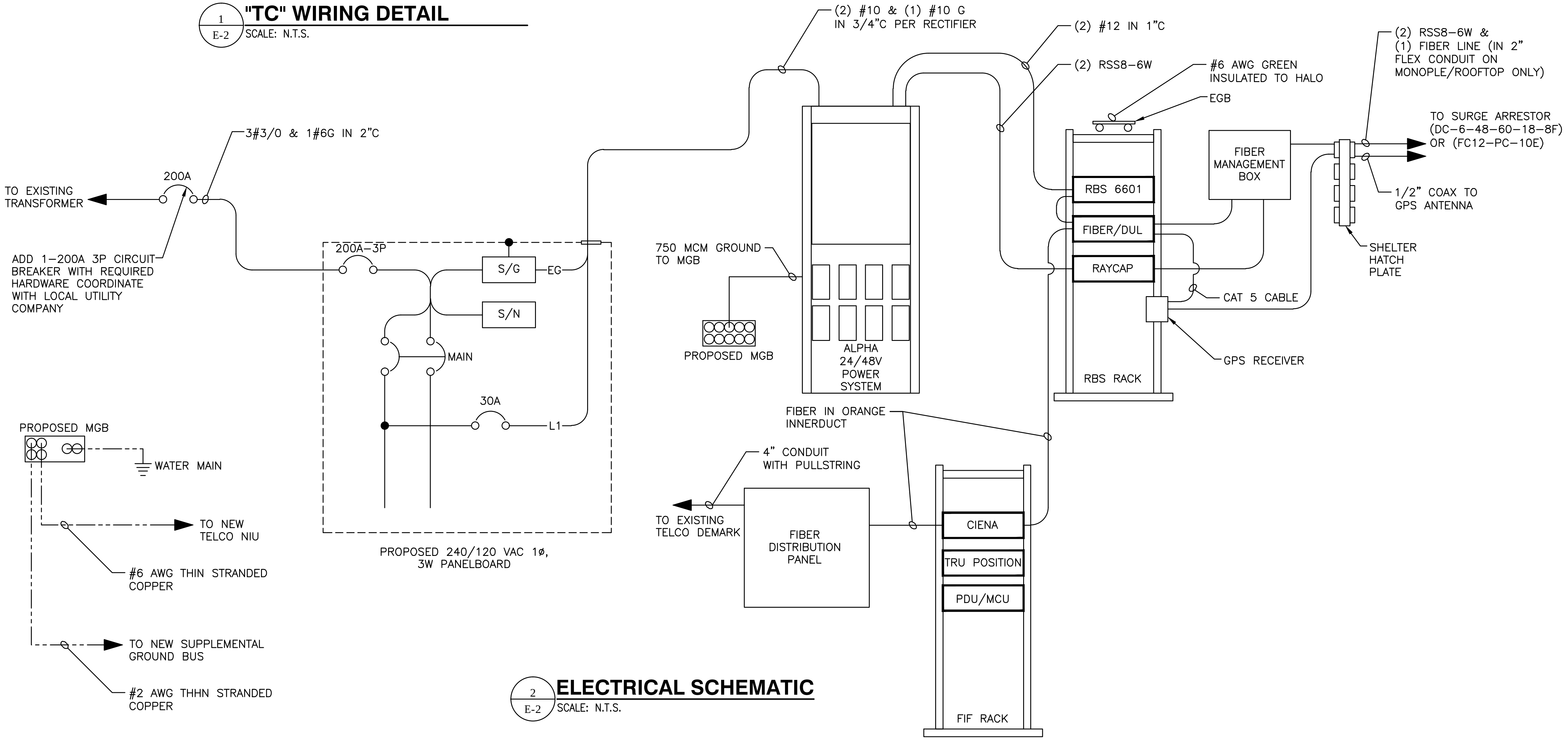

INSTALL APPROPRIATE TERMINAL CONNECTORS (TYPICAL)
3"
6"
SPARE
DOOR SWITCH
HIGH HUMIDITY HUMIDISTAT
HI TEMP THERMOSTAT
LO TEMP THERMOSTAT
FIRE ALARM
COMMERCIAL POWER FAIL N.C. WHEN COMMERCIAL POWER PRESENT
RECTIFIER FAIL N.C. WHEN RECTIFIER IS OPERATIONAL
ATS
SPARE
1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20
FINAL CONNECTIONS
3"
1/2"C 2#22 TYPICAL
FINAL CONNECTIONS BY LESSEE (TYP.)

ALARM TERMINAL CABINET "TC" WIRING DETAIL

1
E-2
SCALE: N.T.S.

ALARM TERMINAL NOTES:

1. TERMINAL STRIP SHALL BE SQUARE 'D' 9080GP620 WITH MOUNTING CHANNELS. EACH STRIP SHALL BE 20 CONTACT BLOCK TYPE.
2. MINIMUM #14 THW CONDUCTOR SIZE FOR ALARM WIRING.
3. MOUNT TERMINAL STRIP INTO 12"x12"X6" NEMA 1 HINGED DOOR ENCLOSURE McNISTRY #30-12126LP WITH BACK PANEL.
4. ALARM CONTACTS SHALL BE OPEN ON ALARM.


(2) #10 & (1) #10 G IN 3/4"C PER RECTIFIER
(2) #12 IN 1"C
(2) RSS8-6W
#6 AWG GREEN INSULATED TO HALO
EGB
(2) RSS8-6W & (1) FIBER LINE (IN 2" FLEX CONDUIT ON MONOPLE/ROOFTOP ONLY)
TO SURGE ARRESTOR (DC-6-48-60-18-8F) OR (FC12-PC-10E)
1/2" COAX TO GPS ANTENNA
SHELTER HATCH PLATE
FIBER MANAGEMENT BOX
RBS 6601
FIBER/DUL
RAYCAP
CAT 5 CABLE
GPS RECEIVER
RBS RACK
3#3/0 & 1#6G IN 2"C
200A
TO EXISTING TRANSFORMER
ADD 1-200A 3P CIRCUIT BREAKER WITH REQUIRED HARDWARE COORDINATE WITH LOCAL UTILITY COMPANY
200A-3P
S/G
EG
S/N
MAIN
30A
L1
PROPOSED 240/120 VAC 1ø, 3W PANELBOARD
750 MCM GROUND TO MGB
PROPOSED MGB
ALPHA 24/48V POWER SYSTEM
FIBER IN ORANGE INNERDUCT
4" CONDUIT WITH PULLSTRING
TO EXISTING TELCO DEMARK
FIBER DISTRIBUTION PANEL
CIENA
TRU POSITION
PDU/MCU
FIF RACK
PROPOSED MGB
WATER MAIN
TO NEW TELCO NIU
#6 AWG THIN STRANDED COPPER
TO NEW SUPPLEMENTAL GROUND BUS
#2 AWG THHN STRANDED COPPER

ELECTRICAL SCHEMATIC

2
E-2
SCALE: N.T.S.

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DEREK J. CREASER

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S2900-A
STAMFORD HARBOR

SITE ADDRESS:

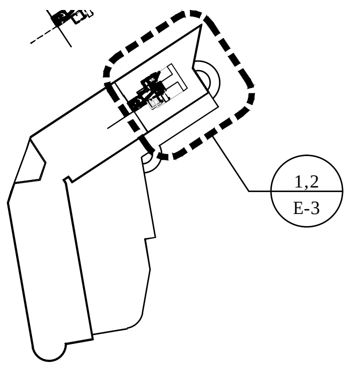
208 HARBOR DRIVE
STAMFORD, CT 06902

SHEET TITLE:

ELECTRICAL SCHEMATIC

SHEET NO:

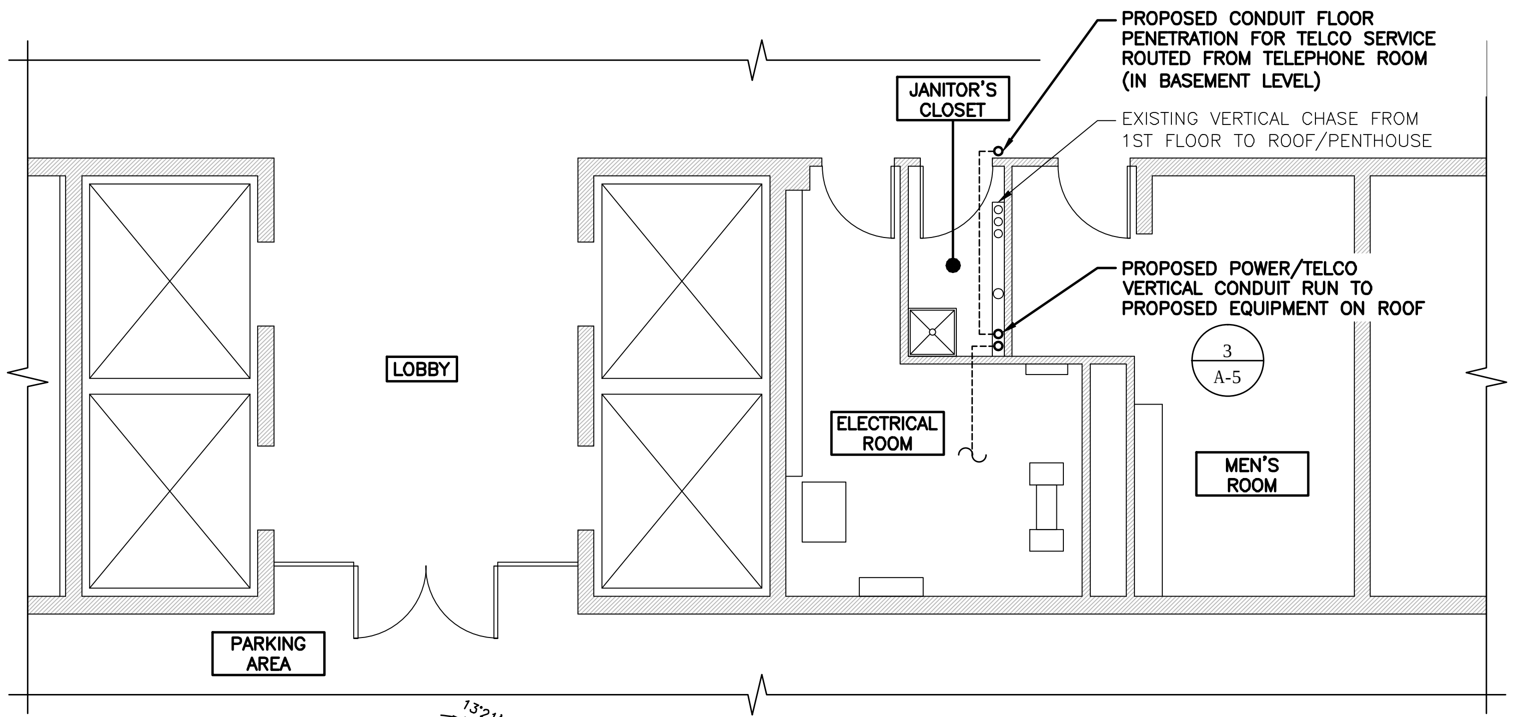
E-2



13°21'
MAGNETIC NORTH
TRUE NORTH

KEY PLAN

SCALE: 1/8"=1'-0"


PROPOSED CONDUIT FLOOR PENETRATION FOR TELCO SERVICE ROUTED FROM TELEPHONE ROOM (IN BASEMENT LEVEL)
JANITOR'S CLOSET
EXISTING VERTICAL CHASE FROM 1ST FLOOR TO ROOF/PENTHOUSE
PROPOSED POWER/TELCO VERTICAL CONDUIT RUN TO PROPOSED EQUIPMENT ON ROOF
3
A-5
LOBBY
ELECTRICAL ROOM
MEN'S ROOM
PARKING AREA

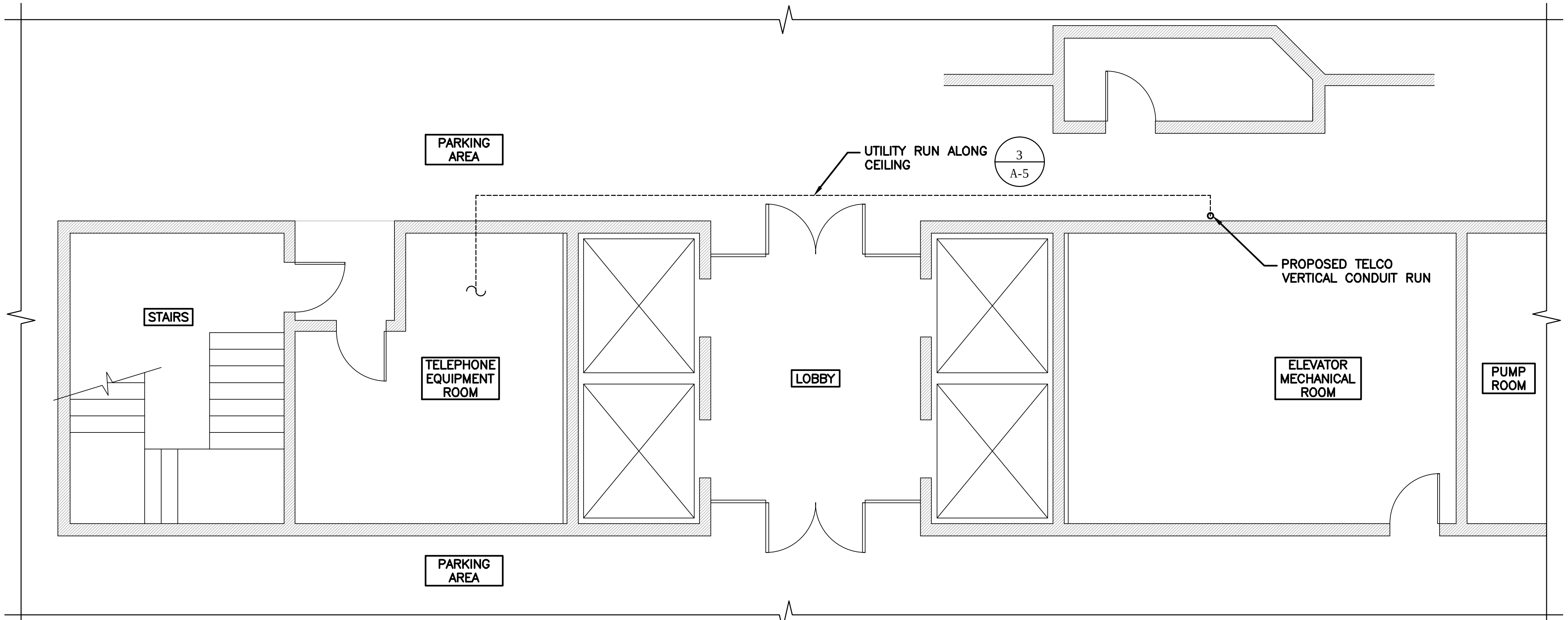
13°21'
MAGNETIC NORTH
TRUE NORTH

1
E-3

PARTIAL FIRST OFFICE LEVEL PLAN

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

0 2'-0" 4'-0" 8'-0" 12'-0"



13°21'
MAGNETIC NORTH
TRUE NORTH

2
E-3

PARTIAL BASEMENT PLAN

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

0 2'-0" 4'-0" 8'-0" 12'-0"

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STATE OF CONNECTICUT
DEREK J. CREASER
LICENSED PROFESSIONAL ENGINEER

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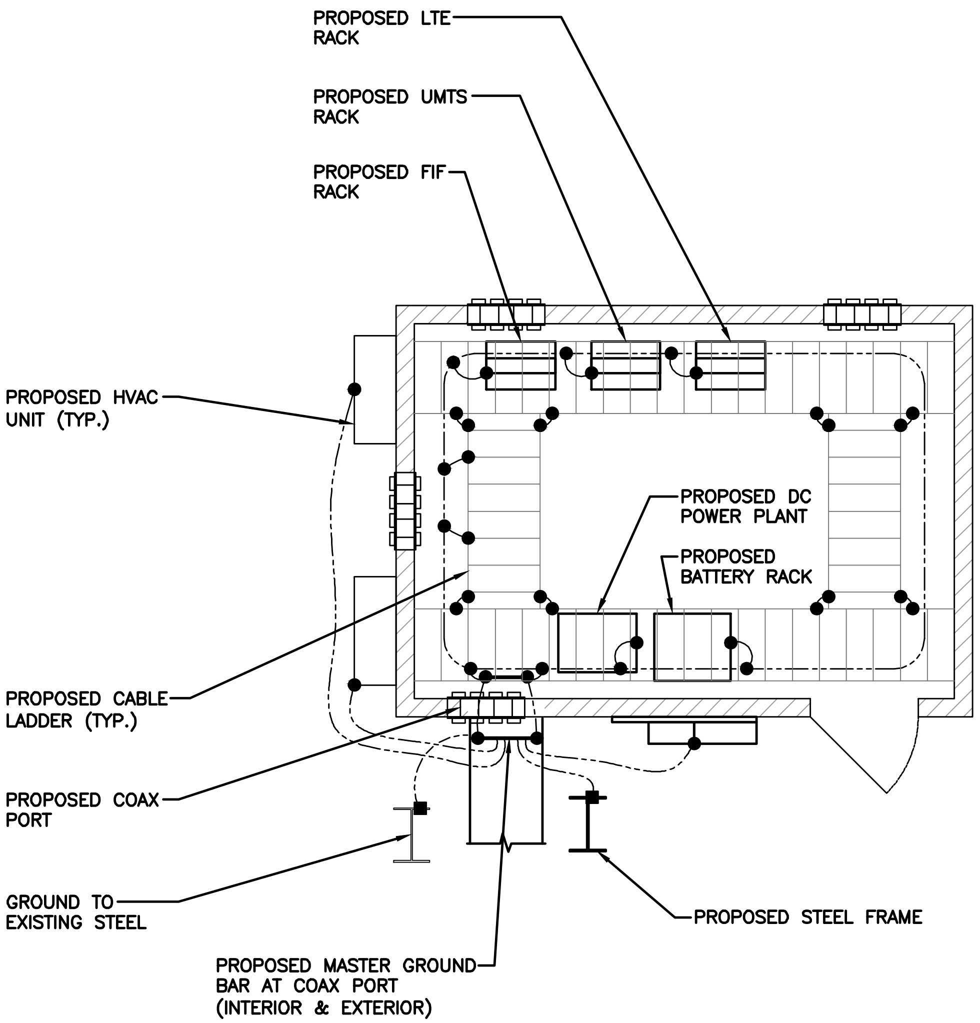
SITE NAME:
S2900-A
STAMFORD HARBOR

SITE ADDRESS:
208 HARBOR DRIVE
STAMFORD, CT 06902

SHEET TITLE:
UTILITY RUN PLAN

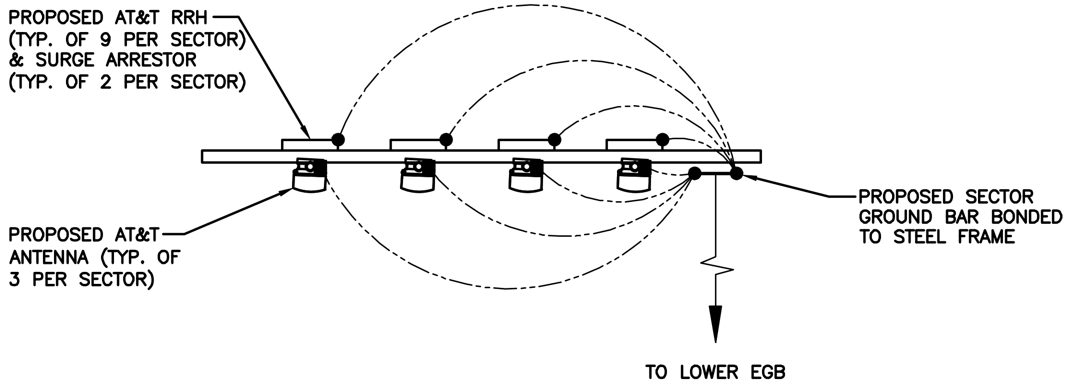
SHEET NO:
E-3



1
G-1

GROUNDING PLAN

SCALE: N.T.S.


PROPOSED AT&T RRH (TYP. OF 9 PER SECTOR) & SURGE ARRESTOR (TYP. OF 2 PER SECTOR)
PROPOSED AT&T ANTENNA (TYP. OF 3 PER SECTOR)
PROPOSED SECTOR GROUND BAR BONDED TO STEEL FRAME
TO LOWER EGB

2
G-1

TYPICAL SECTOR GROUNDING PLAN

SCALE: N.T.S.

GROUNDING LEGEND

●	COMPRESSION TYPE CONNECTION
■	EXOTHERMIC TYPE CONNECTION
– – – – –	GROUNDING CONDUCTOR
●—●	GROUNDING BAR
⊗	GROUND ROD

GROUNDING NOTES:

1. ALL GROUND WIRE SHALL BE BARE COPPER #2 AWG UNLESS OTHERWISE NOTED.
2. ALL GROUND WIRES SHALL PROVIDE A STRAIGHT, DOWNWARD PATH TO GROUND WITH GRADUAL BENDS AS REQUIRED. GROUND WIRES SHALL NOT BE LOOPED OR SHARPLY BENT.
3. ELECTRICAL CONTRACTOR SHALL COORDINATE INSTALLATION OF GROUND RODS AND GROUND RING WITH FOUNDATION AND UNDERGROUND CONDUIT.
4. EACH EQUIPMENT CABINET SHALL BE CONNECTED TO THE MASTER ISOLATION GROUND BAR (MIGB) WITH #2 AWG INSULATED STRANDED COPPER WIRE. EQUIPMENT CABINETS SHALL EACH HAVE (2) CONNECTIONS.
5. PROVIDE DEDICATED #2 AWG COPPER GROUND WIRE FROM EACH ANTENNA MOUNTING PIPE TO ASSOCIATED CIGBE (TYPICAL FOR FOUR MOUNTING PIPES PER SECTOR).
6. ANTENNA GROUND KITS SHALL BE FURNISHED AND INSTALLED BY ELECTRICAL CONTRACTOR.
7. COORDINATE NEW LICENSEE GROUND SYSTEM WITH EXISTING SITE GROUND SYSTEM.
8. EACH SECTION OF CABLE TRAY, ICE BRIDGE AND ICE SHIELD SHALL BE CONNECTED IN A FASHION TO PROVIDE A CONTINUOUS GROUND.
9. AT ALL TERMINATIONS AT EQUIPMENT ENCLOSURES, PANELS AND FRAMES OF EQUIPMENT, AND WHERE EXPOSED FOR GROUNDING, CONDUCTOR TERMINATION SHALL BE PERFORMED UTILIZING TWO HOLE BOLTED TONGUE COMPRESSION TYPE WITH STAINLESS STEEL SELF–TAPPING SCREWS.
10. ALL CLAMPS AND SUPPORTS USED TO SUPPORT THE GROUNDING SYSTEM CONDUCTORS AND PVC CONDUITS SHALL BE PVC TYPE (NON CONDUCTIVE). DO NOT USE METAL BRACKETS OR SUPPORTS WHICH WOULD FORM A COMPLETE RING AROUND ANY GROUNDING CONDUCTOR.
11. ALL GROUNDING CONNECTIONS SHALL BE COATED WITH A COPPER SHIELD ANTI–CORROSIVE AGENT SUCH AS T&B KOPR SHIELD. VERIFY PRODUCT WITH LICENSEE PROJECT MANAGER.
12. ALL BOLTS, WASHERS, AND NUTS USED ON GROUNDING CONNECTIONS SHALL BE STAINLESS STEEL.
13. INSTALL GROUND BUSHINGS ON ALL METALLIC CONDUITS AND BOND TO THE EQUIPMENT GROUND BUS IN THE PANELBOARD.
14. GROUND ANTENNA BASES, FRAMES, CABLE RACKS AND OTHER METALLIC COMPONENTS WITH #2 GROUNDING CONDUCTORS AND CONNECT TO INSULATED SURFACE MOUNTED GROUND BARS. CONNECTION DETAILS SHALL FOLLOW MANUFACTURER'S SPECIFICATIONS FOR GROUNDING.
15. GROUND COAXIAL SHIELD AT BOTH ENDS USING MANUFACTURER'S GUIDELINES.
16. REINFORCEMENT IN EQUIPMENT SLAB TO BE WELDED AND REINFORCEMENT TO BE BONDED TO GROUNDING RING.
17. ALL GROUND BARS SHALL BE GALVANIZED WITH ANTI–THEFT HARDWARE.

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DRAWN BY: NS
CHECKED BY: RP
SCALE: AS SHOWN

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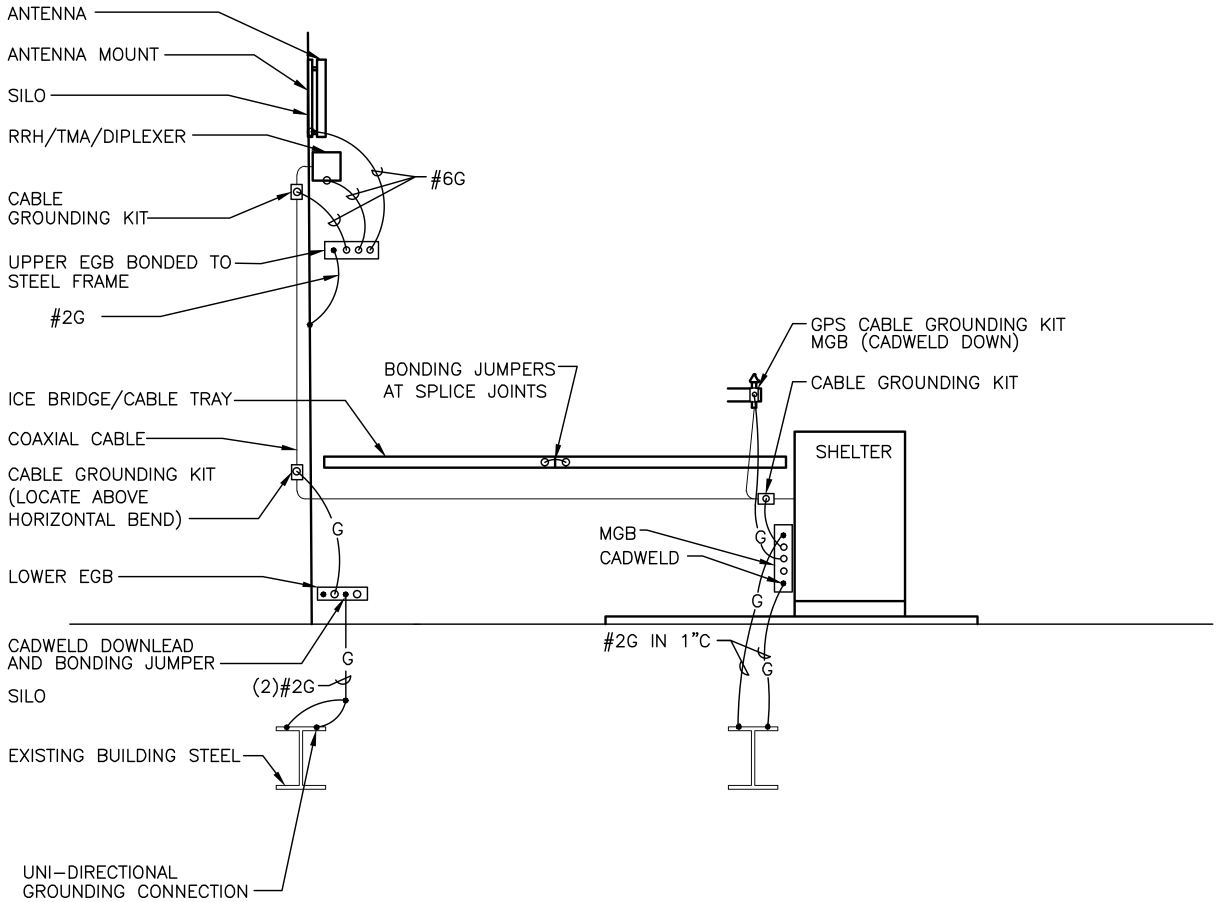
S2900-A
STAMFORD HARBOR

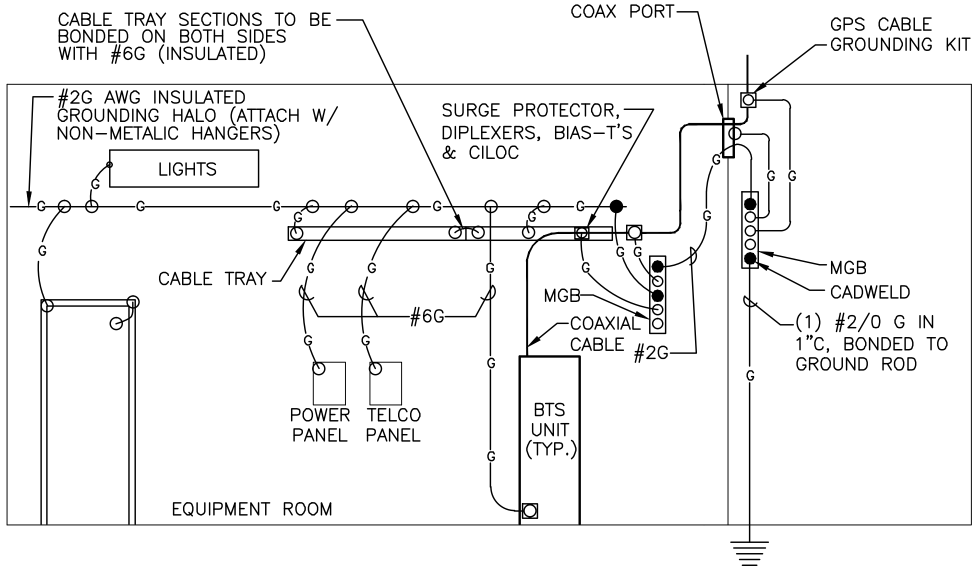
SITE ADDRESS:
208 HARBOR DRIVE
STAMFORD, CT 06902

SHEET TITLE:
GROUNDING DETAILS

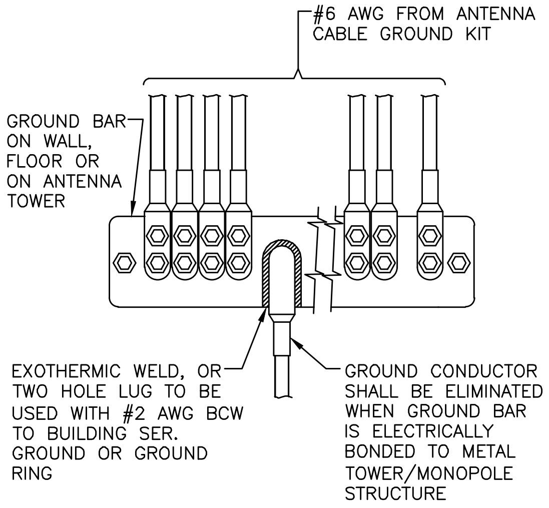
SHEET NO:
G-1


ANTENNA
ANTENNA MOUNT
SILO
RRH/TMA/DIPLEXER
#6G
CABLE GROUNDING KIT
UPPER EGB BONDED TO STEEL FRAME
#2G
ICE BRIDGE/CABLE TRAY
COAXIAL CABLE
CABLE GROUNDING KIT (LOCATE ABOVE HORIZONTAL BEND)
G
LOWER EGB
CADWELD DOWNLEAD AND BONDING JUMPER
SILO
(2)#2G
G
EXISTING BUILDING STEEL
UNI-DIRECTIONAL GROUNDING CONNECTION
BONDING JUMPERS AT SPLICE JOINTS
GPS CABLE GROUNDING KIT MGB (CADWELD DOWN)
CABLE GROUNDING KIT
SHELTER
MGB
CADWELD
G
#2G IN 1"C
G

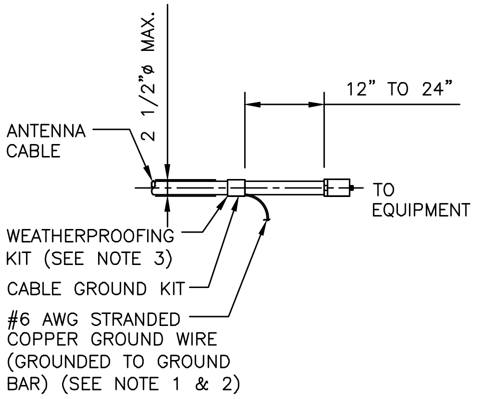
1
G-2
GROUNDING ONE-LINE DIAGRAM
SCALE: N.T.S.


CABLE TRAY SECTIONS TO BE BONDED ON BOTH SIDES WITH #6G (INSULATED)
COAX PORT
GPS CABLE GROUNDING KIT
#2G AWG INSULATED GROUNDING HALO (ATTACH W/ NON-METALIC HANGERS)
LIGHTS
SURGE PROTECTOR, DIPLEXERS, BIAS-T'S & CILOC
G
CABLE TRAY
#6G
MGB
COAXIAL CABLE
#2G
MGB
CADWELD
(1) #2/0 G IN 1"C, BONDED TO GROUND ROD
POWER PANEL
TELCO PANEL
BTS UNIT (TYP.)
EQUIPMENT ROOM

2
G-2
GROUNDING RISER DIAGRAM
SCALE: N.T.S.


#6 AWG FROM ANTENNA CABLE GROUND KIT
GROUND BAR ON WALL, FLOOR OR ON ANTENNA TOWER
EXOTHERMIC WELD, OR TWO HOLE LUG TO BE USED WITH #2 AWG BCW TO BUILDING SER. GROUND OR GROUND RING
GROUND CONDUCTOR SHALL BE ELIMINATED WHEN GROUND BAR IS ELECTRICALLY BONDED TO METAL TOWER/MONOPOLE STRUCTURE

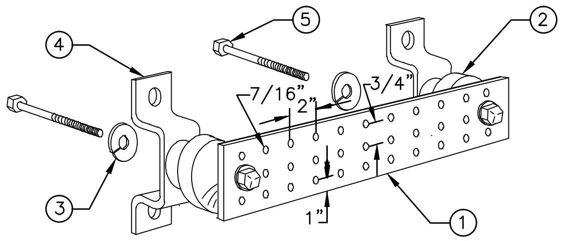
3
G-2
INSTALLATION OF GROUND WIRE TO GROUND BAR
SCALE: N.T.S.


2 1/2"Ø MAX.
12" TO 24"
ANTENNA CABLE
TO EQUIPMENT
WEATHERPROOFING KIT (SEE NOTE 3)
CABLE GROUND KIT
#6 AWG STRANDED COPPER GROUND WIRE (GROUNDED TO GROUND BAR) (SEE NOTE 1 & 2)

NOTES:

1. DO NOT INSTALL CABLE GROUND KIT AT A BEND AND ALWAYS DIRECT GROUND WIRE DOWN TO GROUND BAR.
2. GROUNDING KIT SHALL BE TYPE AND PART NUMBER AS SUPPLIED OR RECOMMENDED BY CABLE MANUFACTURER.
3. WEATHER PROOFING SHALL BE TWO-PART TAPE SUPPLIED WITH KIT. COLD SHRINK SHALL NOT BE USED.

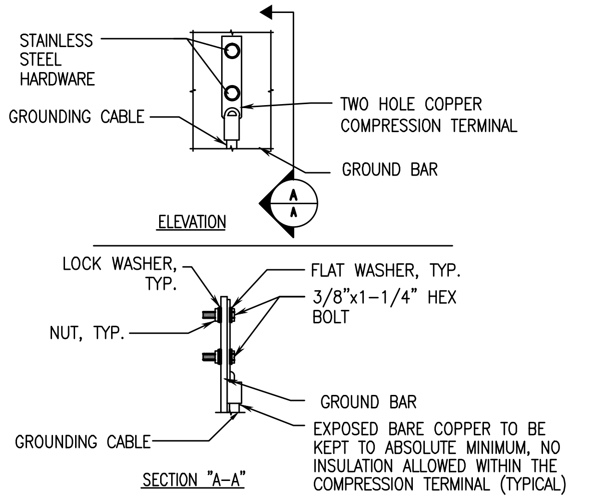
4
G-2
CONNECTION OF GPS CABLE GROUND KIT
SCALE: N.T.S.



LEGEND

1. COPPER GROUND BAR, 1/4"x4"x24", BY NEWTON INSTRUMENT CO. OR EQUAL. HOLE CENTERS TO MATCH NEMA DOUBLE LUG CONFIGURATION. (ACTUAL GROUND BAR SIZE WILL VARY BASED ON NUMBER OF GROUND CONNECTIONS)
2. INSULATORS, NEWTON INSTRUMENT CAT. NO. 3061-4 OR EQUAL
3. 5/8" LOCKWASHERS OR EQUAL
4. WALL MOUNTING BRACKET, NEWTON INSTRUMENT CO. CAT. NO. A-6056 OR EQUAL
5. 5/8-11x1" HHCS BOLTS, NEWTON INSTRUMENT CO. CAT. NO. 3012-1 OR EQUAL
6. INSULATORS SHALL BE ELIMINATED WHEN BONDING DIRECTLY TO TOWER/MONOPOLE STRUCTURE. CONNECTION TO TOWER/MONOPOLE STRUCTURE SHALL BE PER MANUFACTURERS RECOMMENDATIONS.

5
G-2
GROUND BAR DETAIL
SCALE: N.T.S.



NOTE:

1. "DOUBLING UP" OR "STACKING " OF CONNECTION IS NOT PERMITTED.
2. OXIDE INHIBITING COMPOUND TO BE USED AT ALL LOCATIONS.
3. CADWELD DOWNLEADS FROM UPPER EGB, LOWER EGB, AND MGB.

6
G-2
TYPICAL GROUND BAR CONNECTION DETAIL
SCALE: N.T.S.

at&t

550 COCHITUATE RD.
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1997 ANNAPOLIS EXCHANGE PKWY
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FAX: (978) 336-5586

DEREK J. CREASER
No. 28551

REVISIONS

REV. #	DATE	DESCRIPTION
5	09/02/16	REVISED PER COMMENTS
4	08/07/15	REVISED PER COMMENTS
3	03/31/15	REVISED PER COMMENTS
2	01/13/15	REVISED PER COMMENTS
1	11/24/14	ISSUED FOR CONSTRUCTION
0	10/28/14	ISSUED FOR REVIEW

PROJECT NO. S2900-A	DESIGNED BY: DR DRAWN BY: NS CHECKED BY: RP	SCALE: AS SHOWN

SITE NAME:

S2900-A
STAMFORD HARBOR

SITE ADDRESS:

208 HARBOR DRIVE
STAMFORD, CT 06902

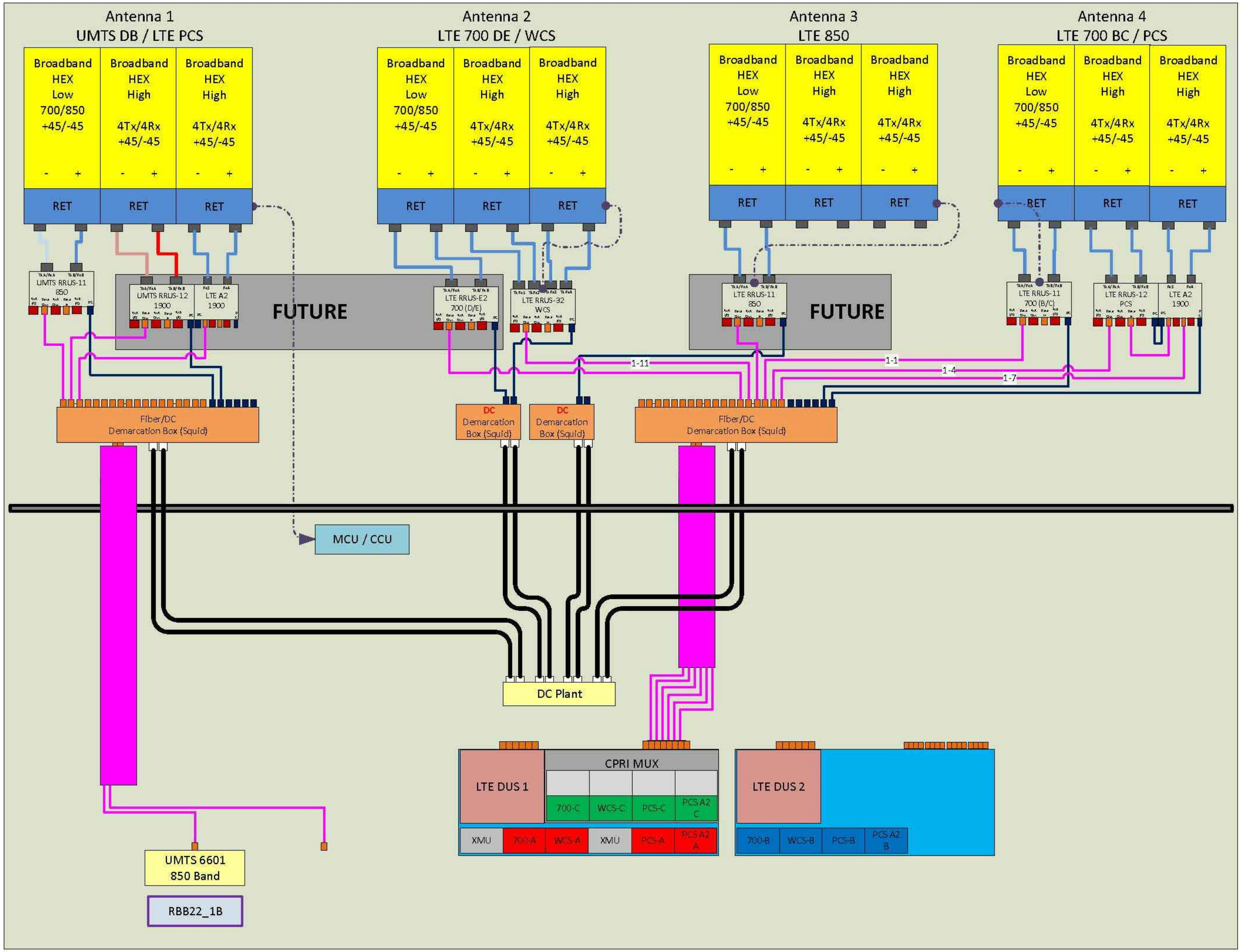
SHEET TITLE:

SHELTER GROUNDING DETAILS

SHEET NO:

G-2

ALPHA SECTOR


Antenna 1
UMTS DB / LTE PCS
Broadband HEX Low 700/850 +45/-45
Broadband HEX High 4Tx/4Rx +45/-45
Broadband HEX High 4Tx/4Rx +45/-45
Antenna 2
LTE 700 DE / WCS
Broadband HEX Low 700/850 +45/-45
Broadband HEX High 4Tx/4Rx +45/-45
Broadband HEX High 4Tx/4Rx +45/-45
Antenna 3
LTE 850
Broadband HEX Low 700/850 +45/-45
Broadband HEX High 4Tx/4Rx +45/-45
Broadband HEX High 4Tx/4Rx +45/-45
Antenna 4
LTE 700 BC / PCS
Broadband HEX Low 700/850 +45/-45
Broadband HEX High 4Tx/4Rx +45/-45
Broadband HEX High 4Tx/4Rx +45/-45
- +
RET
UMTS RRUS-11 850
UMTS RRUS-12 1900
LTE A2 1900
FUTURE
LTE RRUS-E2 700 (D/E)
LTE RRUS-32 WCS
LTE RRUS-11 850
FUTURE
LTE RRUS-11 700 (B/C)
LTE RRUS-12 PCS
LTE A2 1900
TxA/RxA
TxB/RxB
RxA I/O
Data Out
RxA Out
Data In
RxB I/O
DC
Rx3
Rx4
TxRx1
TxRx2
TxRx3
TxRx4
1-11
1-1
1-4
1-7
Fiber/DC Demarcation Box (Squid)
DC Demarcation Box (Squid)
DC Demarcation Box (Squid)
Fiber/DC Demarcation Box (Squid)
MCU / CCU
DC Plant
LTE DUS 1
CPRI MUX
700-C
WCS-C
PCS-C
PCS A2 C
XMU
700-A
WCS-A
XMU
PCS-A
PCS A2 A
LTE DUS 2
700-B
WCS-B
PCS-B
PCS A2 B
UMTS 6601 850 Band
RBB22_1B

NOTES:

1. CONTRACTOR TO CONFIRM ALL PARTS.
2. INSTALL ALL EQUIPMENT TO MANUFACTURER'S RECOMMENDATIONS.

1
RF-1

RF PLUMBING DIAGRAM

N.T.S.

at&t
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DEREK J. CREASER

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STAMFORD HARBOR

SITE ADDRESS:

208 HARBOR DRIVE
STAMFORD, CT 06902

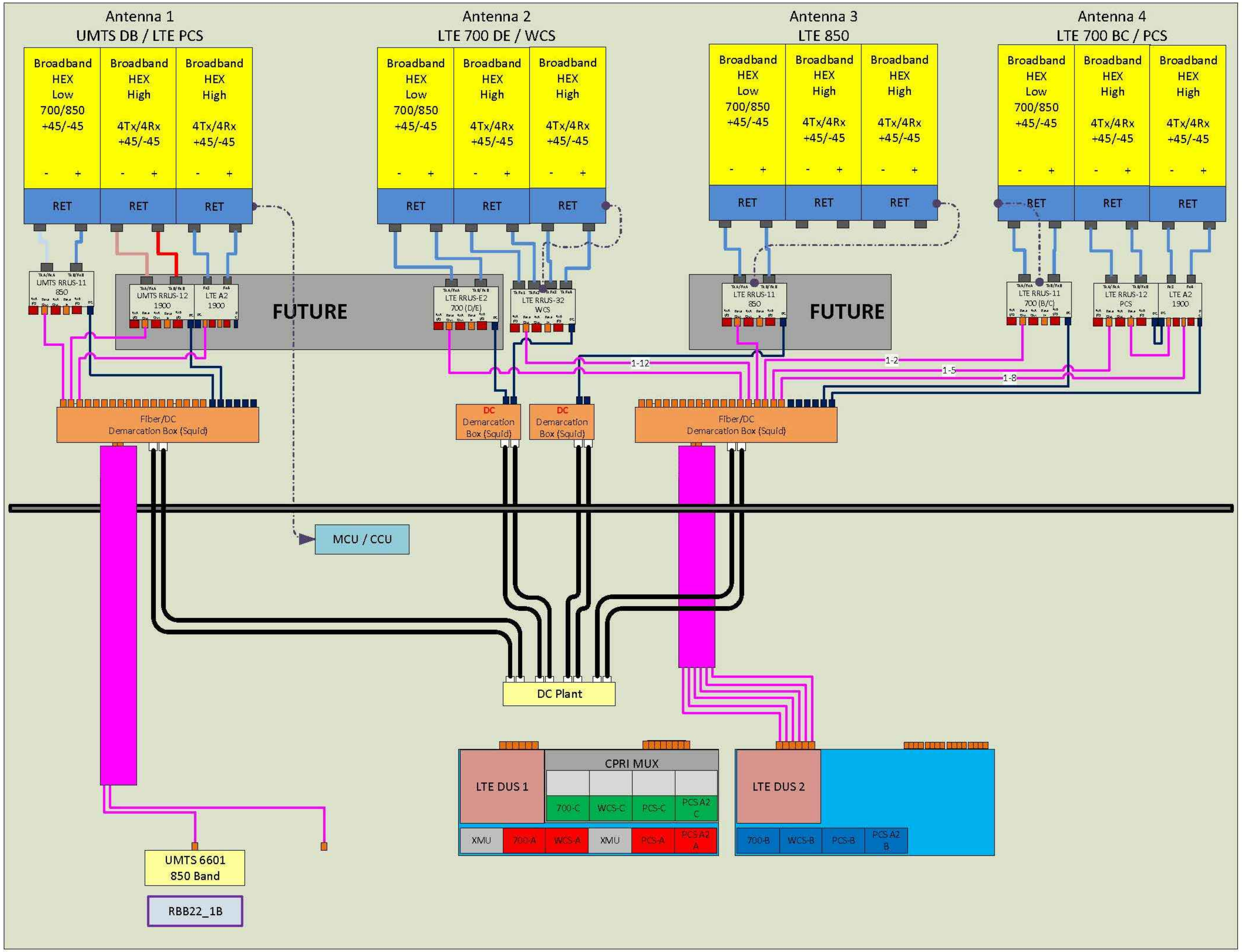
SHEET TITLE:

RF PLUMBING DIAGRAM

SHEET NO:

RF-1

BETA SECTOR



Antenna 1
UMTS DB / LTE PCS
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Broadband HEX High 4Tx/4Rx +45/-45
Broadband HEX High 4Tx/4Rx +45/-45
Antenna 2
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Broadband HEX High 4Tx/4Rx +45/-45
Antenna 4
LTE 700 BC / PCS
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Broadband HEX High 4Tx/4Rx +45/-45
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RET
UMTS RRUS-11 850
UMTS RRUS-12 1900
LTE A2 1900
FUTURE
LTE RRUS-E2 700 (D/E)
LTE RRUS-32 WCS
LTE RRUS-11 850
FUTURE
LTE RRUS-11 700 (B/C)
LTE RRUS-12 PCS
LTE A2 1900
1-12
1-2
1-5
1-8
Fiber/DC Demarcation Box (Squid)
DC Demarcation Box (Squid)
DC Demarcation Box (Squid)
Fiber/DC Demarcation Box (Squid)
MCU / CCU
DC Plant
LTE DUS 1
CPRI MUX
700-C
WCS-C
PCS-C
PCS A2 C
XMU
700-A
WCS-A
XMU
PCS-A
PCS A2 A
LTE DUS 2
700-B
WCS-B
PCS-B
PCS A2 B
UMTS 6601 850 Band
RBB22_1B

NOTES:

1. CONTRACTOR TO CONFIRM ALL PARTS.
2. INSTALL ALL EQUIPMENT TO MANUFACTURER'S RECOMMENDATIONS.

1
RF-2

RF PLUMBING DIAGRAM

N.T.S.

at&t

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STATE OF CONNECTICUT
DEREK J. CREASER
LICENSED PROFESSIONAL ENGINEER

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SITE NAME:

S2900-A
STAMFORD HARBOR

SITE ADDRESS:

208 HARBOR DRIVE
STAMFORD, CT 06902

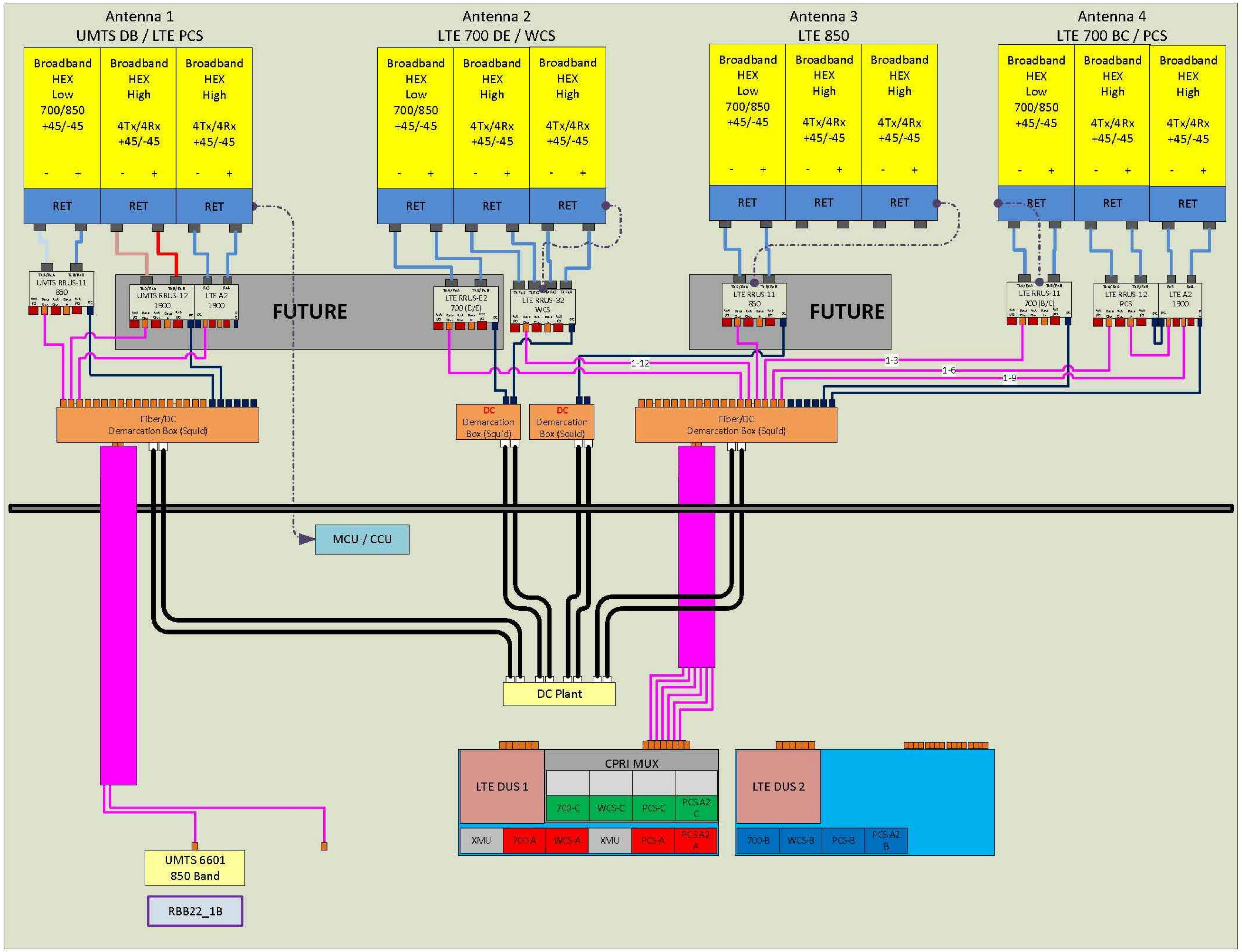
SHEET TITLE:

RF PLUMBING DIAGRAM

SHEET NO:

RF-2

GAMMA SECTOR



NOTES:

1. CONTRACTOR TO CONFIRM ALL PARTS.
2. INSTALL ALL EQUIPMENT TO MANUFACTURER'S RECOMMENDATIONS.

1
RF-3

RF PLUMBING DIAGRAM

N.T.S.

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STATE OF CONNECTICUT
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LICENSED PROFESSIONAL ENGINEER

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S2900-A		AS SHOWN

SITE NAME:

S2900-A
STAMFORD HARBOR

SITE ADDRESS:

208 HARBOR DRIVE
STAMFORD, CT 06902

SHEET TITLE:

RF PLUMBING DIAGRAM

SHEET NO:

RF-3

ATTACHMENT 3

C&F: 1287916.1

STRUCTURAL ANALYSIS REPORT

For

S2900 (NSB)

STAMFORD HARBOR
208 Harbor Drive
Stamford, CT 06902

Antennas within FRP Enclosures on Steel Frames; Equipment Shelter on Steel Platform on the Roof

Prepared for:

smartlink at&t

Dated: December 2, 2014

STATE OF CONNECTICUT
DANIEL HAMM
24178
LICENSED
PROFESSIONAL ENGINEER

12-2-2014

Prepared by:

Hudson Design Group LLC
1600 Osgood Street Building 20 North, Suite 3090
North Andover, MA 01845
Phone: (978) 557-5553
www.hudsondesigngroupllc.com

TABLE OF CONTENTS

SCOPE OF WORK:

Hudson Design Group LLC (HDG) has been authorized by AT&T to conduct a structural evaluation of the structure that will support the existing AT&T equipment located in the areas depicted in the latest HDG's construction drawings.

This report represents this office's findings, conclusions and recommendations pertaining to the support of AT&T's proposed equipment.

An on-site visual survey and structural mapping of the existing building structure was performed by ProVertic on October 9, 2014.

CONCLUSION SUMMARY:

Partial building plans prepared by Yankee Planning dated June 25, 1979 and partial building plans prepared by Pelliccione & Associates, LLC dated July 22, 2014 were available and were obtained for our use. A limited visual survey of the structure was completed in or near the areas of the Proposed Work.

Based on our evaluation, we have determined that the existing building structure **IS CAPABLE** of supporting the proposed equipment loading.

APPURTENACE/EQUIPMENT CONFIGURATION:

(12) HPA-65R-BUU-H8 Antennas (93"x15"x7" - Wt. = 68 lbs. /each) (Four per sector)

(6) A2 Module (16.4"x15.2"x3.4" – Wt. = 22 lbs. /each) (Two per sector)

(9) RRH (RRUS-11) (19.7"x17"x7.2" – Wt. = 50 lbs. /each) (Three per sector)

(6) RRH (RRUS-12) (20.4"x18.5"x7.5" – Wt. = 58 lbs. /each) (Two per sector)

(3) RRH (RRUS-E2) (20.4"x18.5"x7.5" – Wt. = 58 lbs. /each) (One per sector)

(3) RRH (RRUS-32) (29.9"x13.3"x9.5" – Wt. = 77 lbs. /each) (One per sector)

(4) Surge Suppressor (Wt. = 43.5 lbs. / each)

(1) 11'-6" x 16'-0" Equipment Shelter (Wt. = 30000 lbs.) (Includes Equipment)

(1) 50kW Generator (Wt. = 2812 lbs)

Referenced documents are attached.

ANALYSIS RESULTS SUMMARY → EXISTING CONDITIONS

- **Roof Beams**

Beam	Controlling Factor	Required (ft-lb)	Provided (ft-lb)	Ratio (%)	Pass/Fail
24-C-C'	Moment	18,259	238,024	7.7	PASS
24-D'-E	Moment	21,501	238,024	9.0	PASS
25-C-C'	Moment	15,631	238,024	6.6	PASS
25-D'-E	Moment	19,093	238,024	8.0	PASS
26-D'-E	Moment	75,462	238,024	31.7	PASS
26a-C-C'	Moment	72,025	165,918	43.4	PASS
26a-D'-E	Moment	89,235	165,918	53.8	PASS
C'-26-27	Moment	457,965	830,838	55.1	PASS
D'-26-27	Moment	419,567	830,838	50.5	PASS
27-C-D	Moment	526,253	573,852	91.7	PASS
27-D-E	Moment	422,580	573,852	73.6	PASS

- **4th Floor Building Columns**

Column	Axial Load Applied (lbs.)	Allowable Axial Load (lbs.)	Ratio (%)	Pass/Fail
C'24	73,802	324,000	22.8	PASS
D'24	75,628	324,000	23.3	PASS
C'25	105,043	291,000	36.1	PASS
D'25	112,173	291,000	38.5	PASS
C'26	139,240	207,000	67.3	PASS
D'26	131,211	207,000	63.4	PASS
C26	101,056	358,000	28.2	PASS
C27	108,912	443,000	24.6	PASS
D27	218,858	239,000	91.6	PASS

**** SEE PAGE 136 FOR BEAM AND COLUMN LAYOUT ****

DESIGN CRITERIA:

1. International Building Code 2003 with 2005 Connecticut Supplement with 2009 Amendments; ASCE 7-05 Minimum Design Loads for Buildings and Other Structures.

Wind Analysis:

Reference Wind Speed:	105 mph	(includes 3-second gust)
Category:	B	

Roof:

Live Loads:

Roof Snow Load:	30 psf	(Connecticut Supplement)
Service Load:	25 psf	(Equipment Platform Only)
Penthouse Floor Load:	150 psf	(Assumed)

Dead Loads:

Roof Snow Load:	30 psf	(Connecticut Supplement)
Roof (Type 0):	5 psf	(See pg. 170 for Breakdown)
Roof (Type 1):	46 psf	(See pg. 170 for Breakdown)
Roof (Type 2):	85 psf	(See pg. 170 for Breakdown)
Roof (Type 3):	95 psf	(See pg. 170 for Breakdown)
Penthouse Wall:	50 psf	
Penthouse Roof:	10 psf	
FRP Enclosure:	30 plf	

2. EIA/TIA -222- F Structural Standards for Steel Antenna Towers and Antenna Supporting Structures

City/Town:	Stamford	
County:	Fairfield	
Wind Load:	85 mph	(fastest mile)
Nominal Ice Thickness:	3/4 inch	

3. Approximate height above grade to the top of the FRP enclosures:

105'-9"+/-

ANTENNA / RRH SUPPORT RECOMMENDATIONS:

The new antennas and RRH's are proposed to be mounted on new pipe masts within new FRP enclosures. The FRP enclosures are proposed to be mounted on new steel frames secured to the existing building structure.

EQUIPMENT SUPPORT RECOMMENDATIONS:

The new equipment shelter and generator are proposed to be mounted on a new steel equipment platform secured to the existing building structure.

Limitations and assumptions:

1. Reference the latest HDG construction drawings for all the equipment locations and details.
2. Mount all equipment per manufacturer's specifications.
3. All structural members and their connections are assumed to be in good condition and are free from defects with no deterioration to its member capacities.
4. All antennas, coax cables and waveguide cables are assumed to be properly installed and supported as per the manufacturer requirements.
5. HDG is not responsible for any modifications completed prior to and hereafter which HDG was not directly involved.
6. If field conditions differ from what is assumed in this report, then the engineer of record is to be notified as soon as possible.

FIELD PHOTOS:

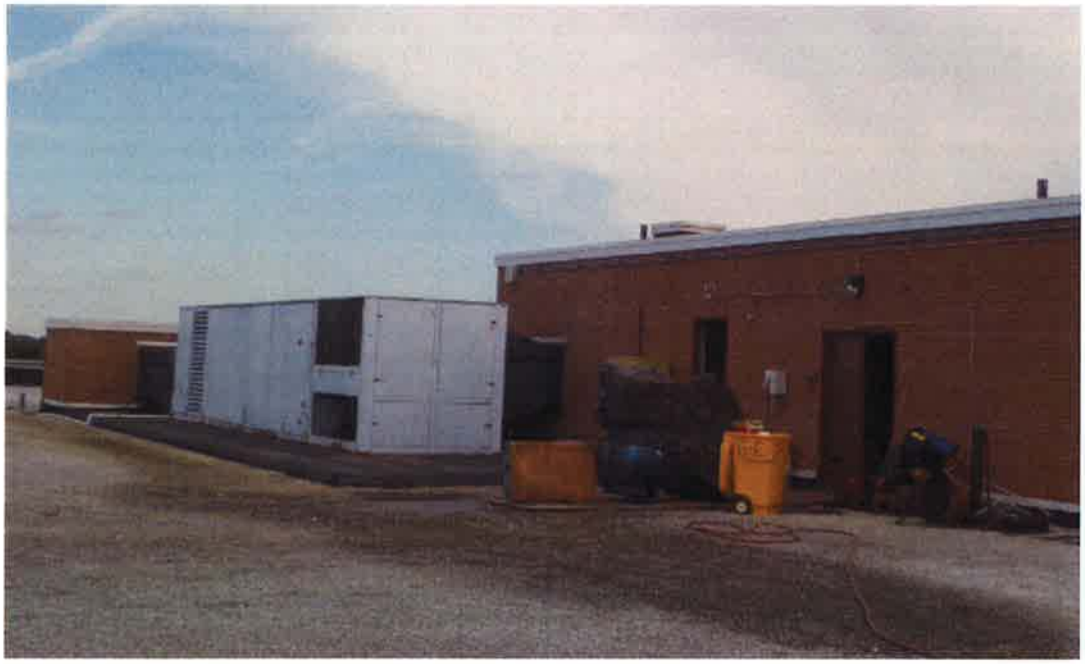

Photo 1: Sample photo illustrating the location of the proposed Alpha sector frame and the new equipment platform (existing HVAC unit to be removed).

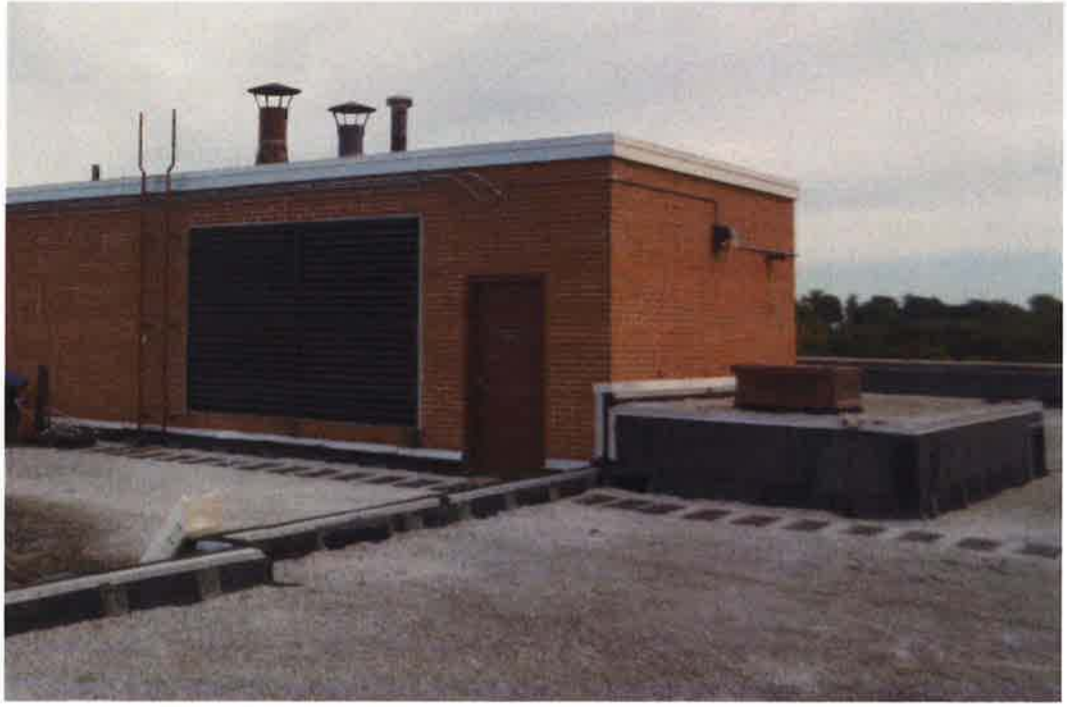

Photo 2: Sample photo illustrating the location of the proposed Beta/Gamma sector frame (existing ladder to be relocated).

FIELD PHOTOS (CONT.):

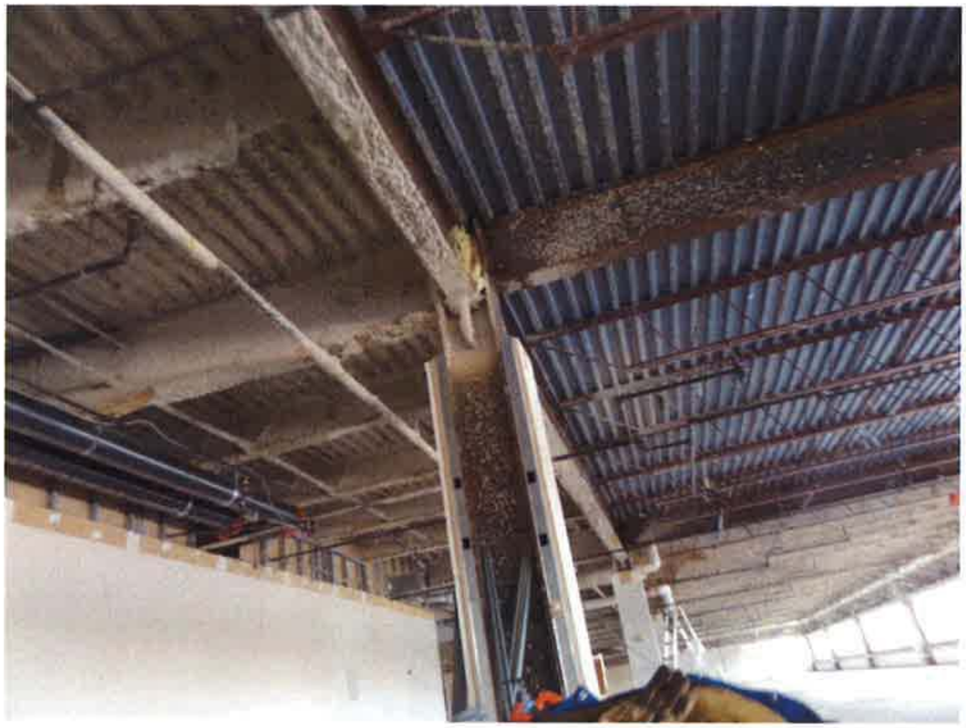

Photo 3: Sample photo illustrating the existing roof construction.

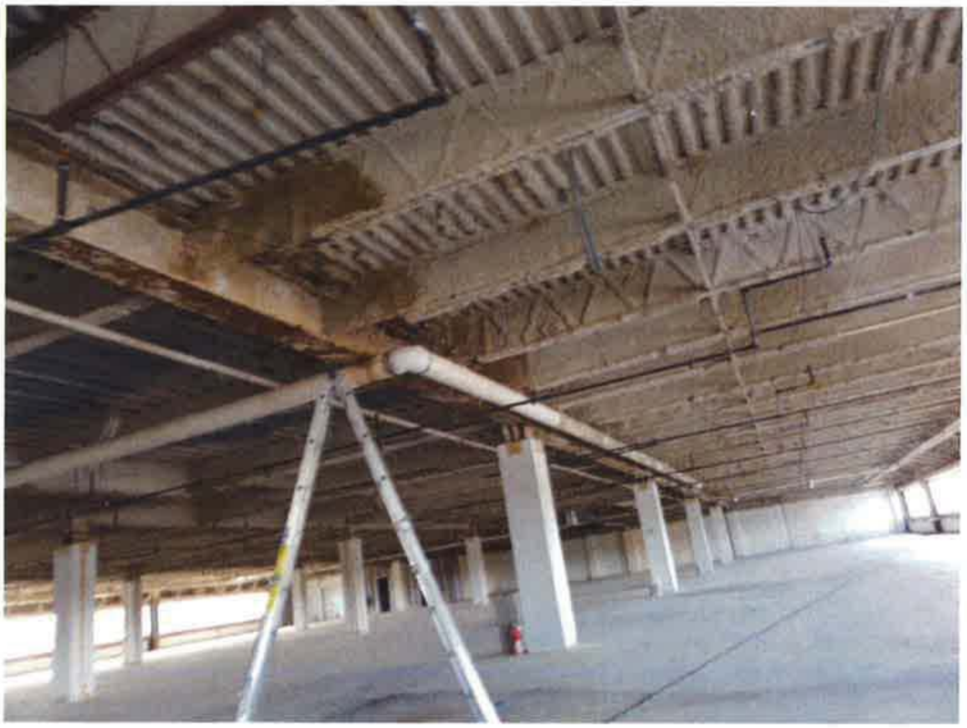

Photo 4: Sample photo illustrating the existing roof construction.

ATTACHMENT 4

C&F: 1287916.1

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65 Dartmouth Drive
Auburn, NH 03032
(603) 644-2800
support@csquaredsystems.com

RADIO FREQUENCY EXPOSURE REPORT

S2900
(STAMFORD HARBOR)

208 HARBOR DRIVE
STAMFORD, CT 06902

December 6, 2013

Table of Contents

List of Tables

List of Figures

1. Introduction

The purpose of this report is to investigate compliance with applicable FCC regulations for the proposed installation of AT&T antenna arrays on the rooftop located at 208 Harbor Drive in Stamford, CT. Figure 1 below is a view of the proposed site.

AT&T is proposing the following installation:

1) Install twelve multi-band (700/850/1900/2300 MHz) antennas for their UMTS and LTE networks (four per sector).

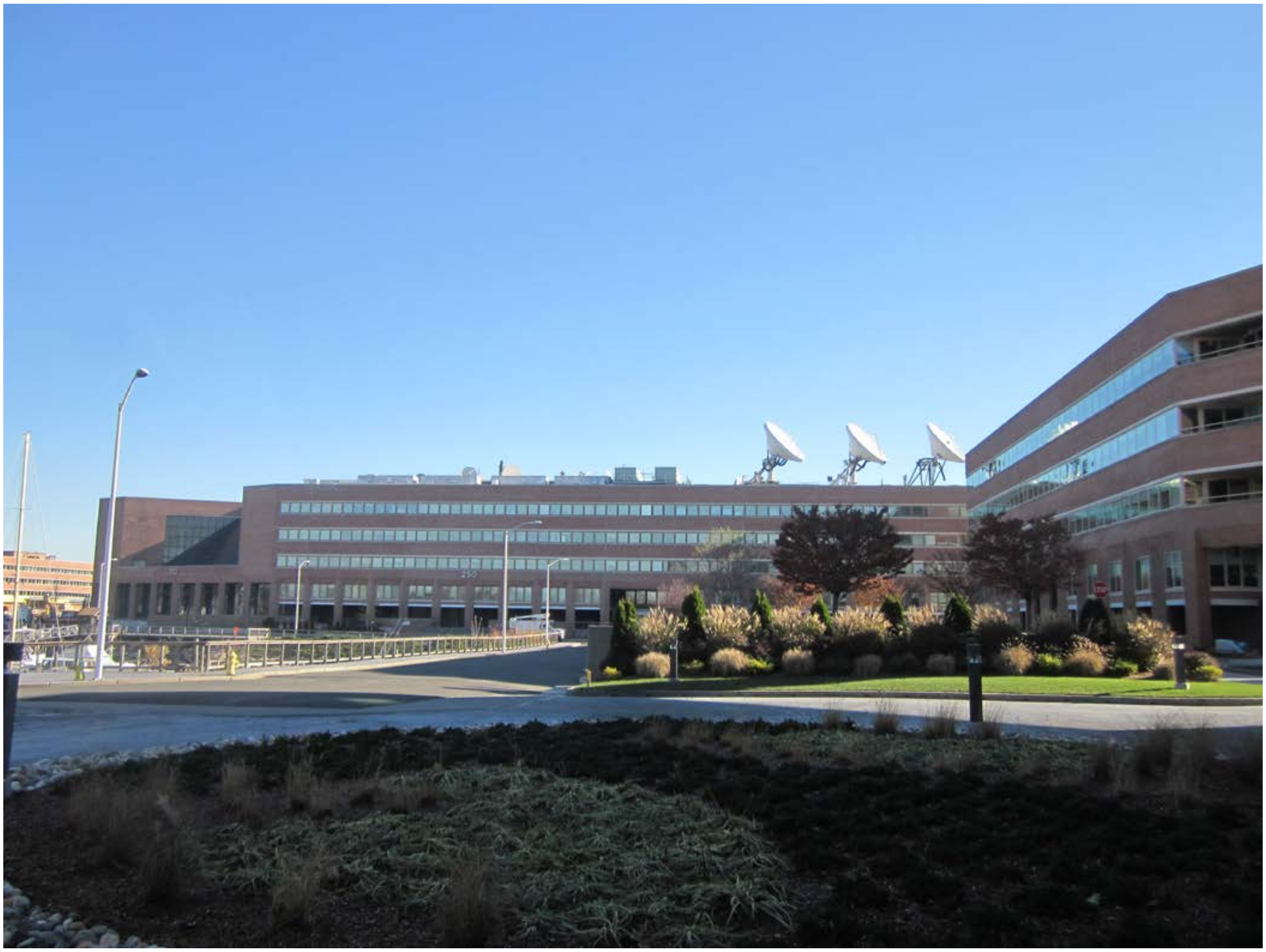

Figure 1: Stamford Harbor

Site Address	208 Harbor Drive, Stamford, CT
Latitude	41° 02' 05.0"N
Longitude	73° 31' 58.1"W
Site Elevation AMSL	36’
Cellular License Information	KNKA256
PCS License Information	KNLG502/WPSL626/WQGG892
LTE License Information	WPWV368/WQIZ617/WQJU459
WCS License Information	KNLB204/KNLB297/KNLB312
Name of Individual Conducting Survey	Logan Ferguson
Date and Time of Survey	11/14/2013; 10:00 AM – 12:00 PM

Table 1: Site Specific Data

2. FCC Guidelines for Evaluating RF Radiation Exposure Limits

In 1985, the FCC established rules to regulate radio frequency (RF) exposure from FCC licensed antenna facilities. In 1996, the FCC updated these rules, which were further amended in August 1997 by OET Bulletin 65 Edition 97-01. These new rules include Maximum Permissible Exposure (MPE) limits for transmitters operating between 300 kHz and 100 GHz. The FCC MPE limits are based upon those recommended by the National Council on Radiation Protection and Measurements (NCRP), developed by the Institute of Electrical and Electronics Engineers, Inc., (IEEE) and adopted by the American National Standards Institute (ANSI).

The FCC general population/uncontrolled limits set the maximum exposure to which most people may be subjected. General population/uncontrolled exposures apply in situations in which the general public may be exposed, or in which persons that are exposed as a consequence of their employment may not be fully aware of the potential for exposure or cannot exercise control over their exposure.

Public exposure to radio frequencies is regulated and enforced in units of milliwatts per square centimeter (mW/cm^2). The general population exposure limits for the various frequency ranges are defined in the attached “FCC Limits for Maximum Permissible Exposure (MPE)” in Attachment B of this report.

Higher exposure limits are permitted under the occupational/controlled exposure category, but only for persons who are exposed as a consequence of their employment provided they are fully aware of the potential for exposure, and are able to exercise control over their exposure. General population/uncontrolled limits are five times more stringent than the levels considered acceptable for occupational, or radio frequency trained individuals. Attachment B contains excerpts from OET Bulletin 65 and defines the Maximum Exposure Limit.

Finally, it should be noted that the MPE limits adopted by the FCC for both general population / uncontrolled exposure and for occupational / controlled exposure incorporate a substantial margin of safety and have been established to be well below levels generally accepted as having the potential to cause adverse health effects.

3. Roof Access & Site Signage

Access to the roof is by way of an elevator to a staircase accessible from the fourth floor. This access door was locked at the time of the survey. There is currently no signage posted at this door. This roof access door is shown below in Figure 2

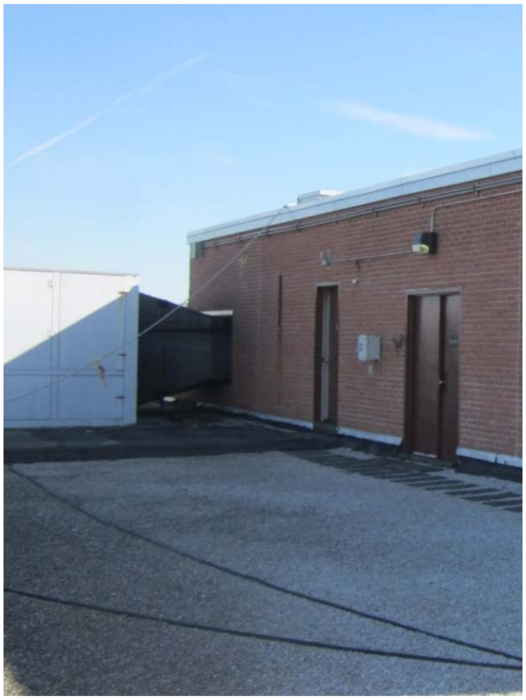

Figure 2: Main Roof Access Door (Locked)

There are two additional access points to the main roof, which are accessible from a fourth floor stairwell in each of the attached buildings. Both of the access doors were locked at the time of the survey. These doors are shown below in Figure 3.

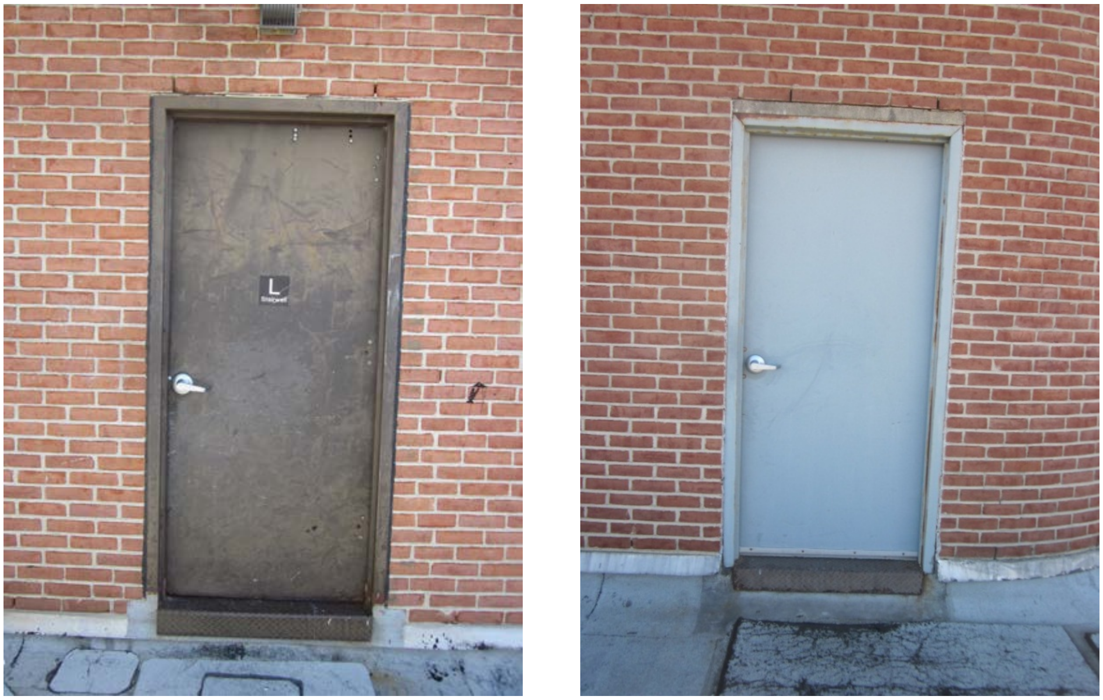

Figure 3: Alternate Roof Access Doors (Locked)

Each penthouse has a permanent access ladder installed, which provides access to the penthouse rooftop. Each of the access ladders are shown below in Figure 4.

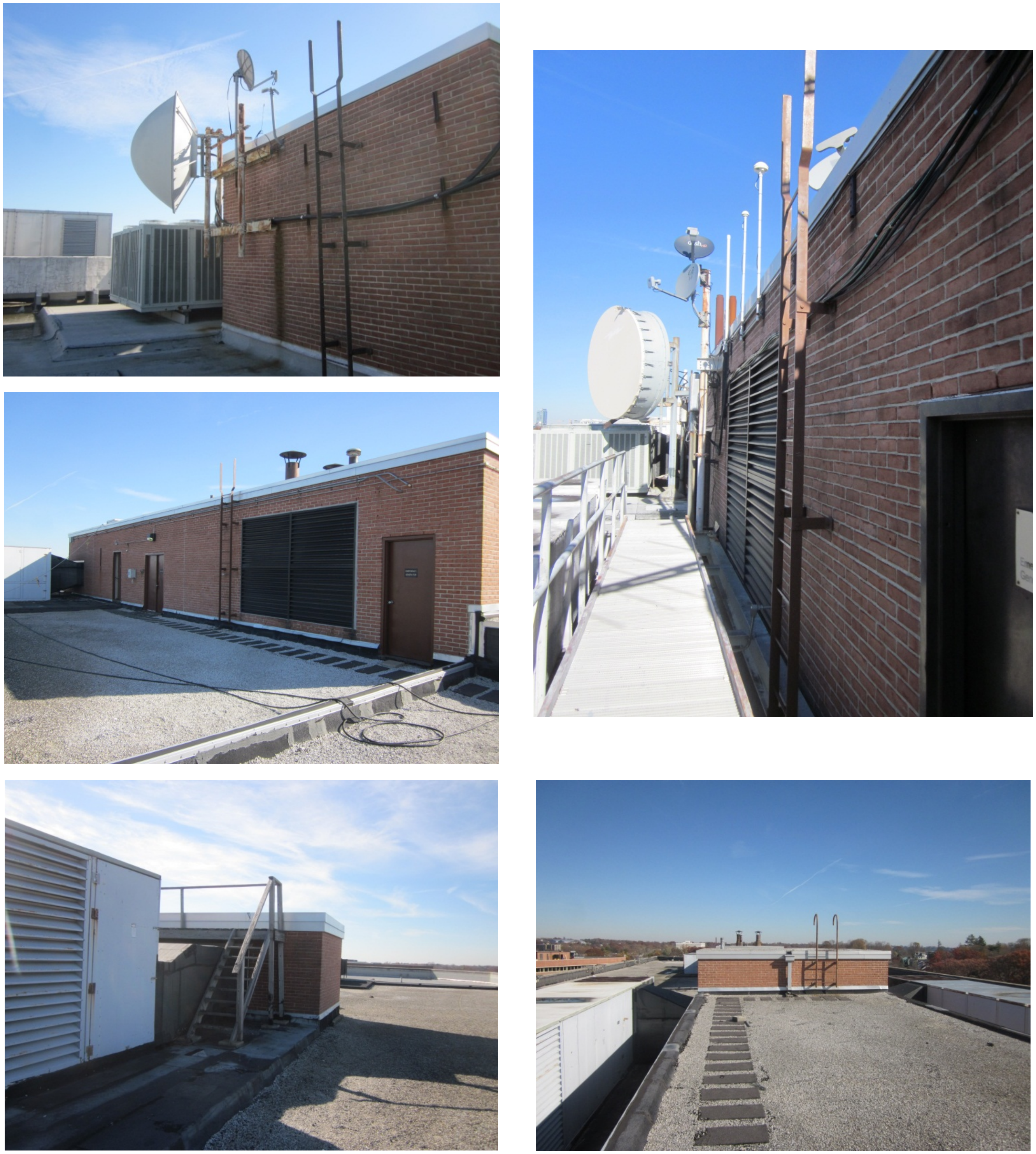

Figure 4: Penthouse Access Ladders

4. Directional Photos

The photos below document the view from each end of the penthouse roof to show all neighboring structures, foliage, and possible RF sources.

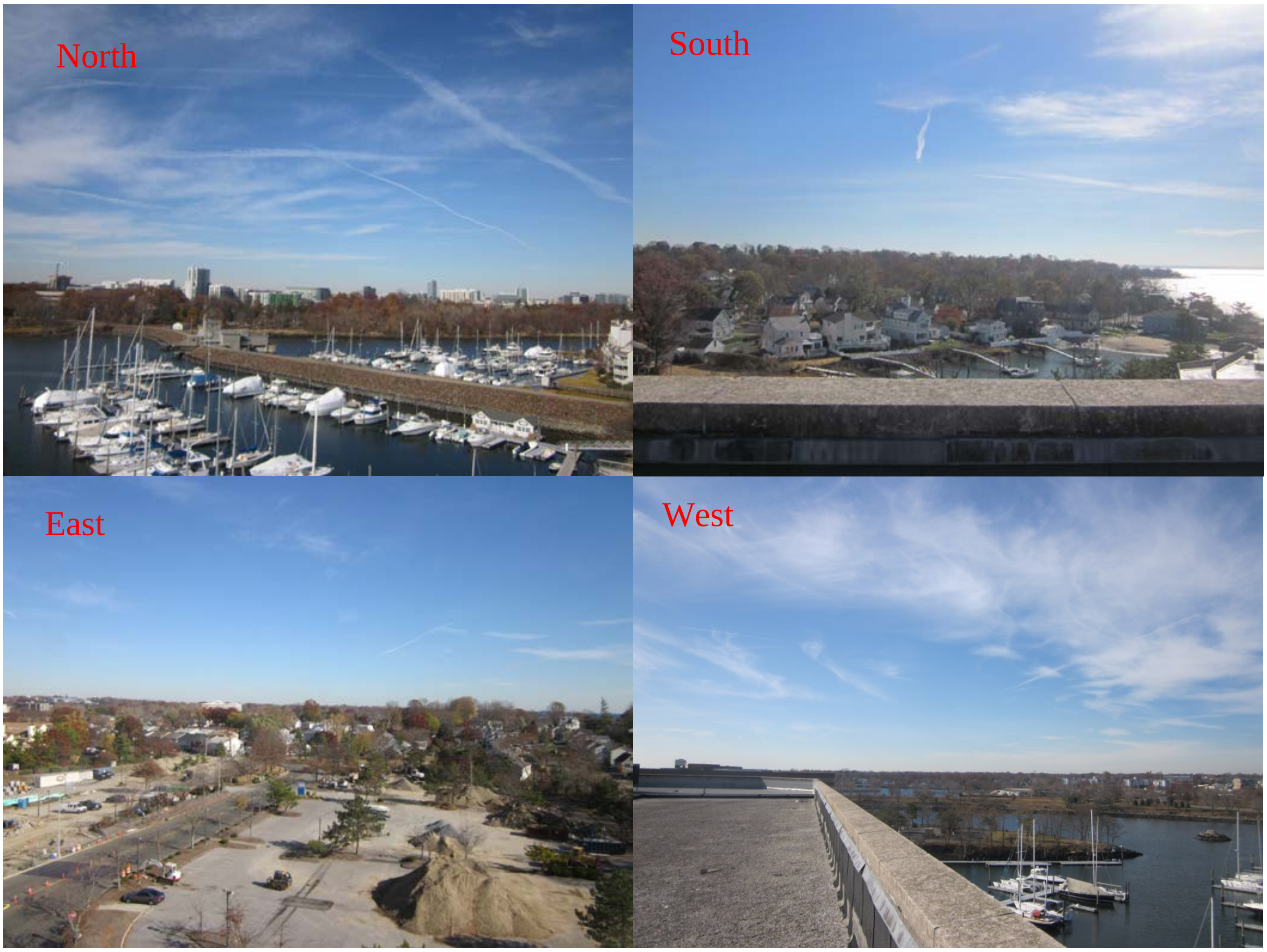

Figure 5: Directional Photos – North, South, East, & West

An overview of the rooftop is shown below in Figure 6. This photo is taken from the eastern side of 208 Harbor Drive, looking in a southwesterly direction.

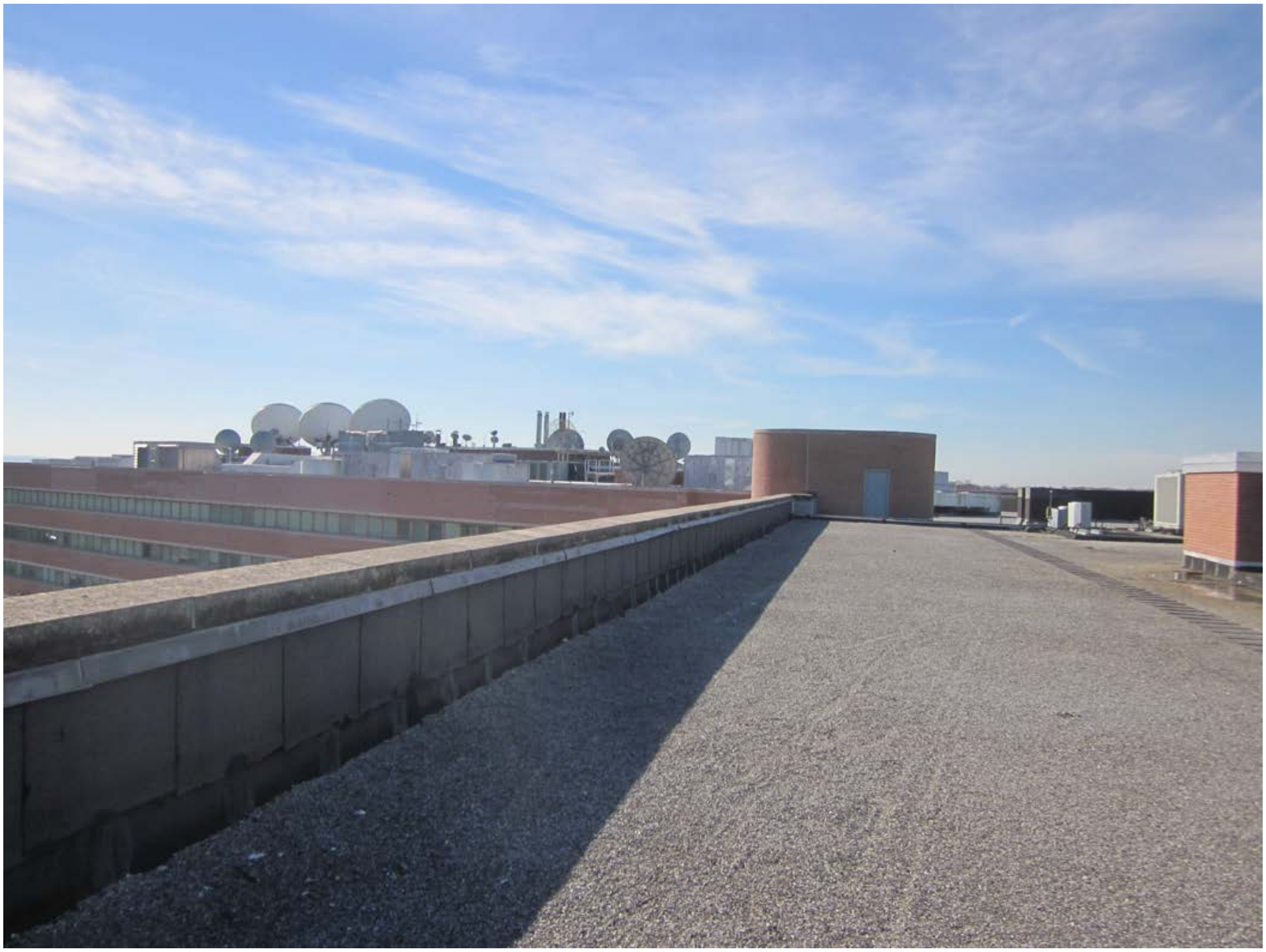

Figure 6: Rooftop Overview

5. Antenna Inventory, Locations & Photos

Table 2 below details the transmit antenna currently installed on the roof of 208 & 250 Harbor Drive. This inventory was taken on November 14, 2013. The height of the main roof is 63.75' AGL, in reference to the Centek Engineering Zoning Drawings, dated December 5, 2013. The penthouse roof heights are 71.0' and 76.0', as measured on-site during the survey relative to the main roof.

There are approximately 25-30 antennas on the rooftop of 250 Harbor Drive. Based upon conversations during the field survey and subsequent correspondence with Encompass Digital Media, only one of these antennas is transmitting and is listed in Table 2 below. All other existing antennas on the rooftop are reported to be receive-only and are not included in this analysis.

Operator	TX Freq (MHz)	Power at Antenna (Watts)	Ant Gain (dBi)	Power EIRP (Watts)	Antenna Model	Beam Width	Mech. Downtilt	Length (ft)	Antenna Centerline Height (ft)
Encompass	6887.5	0.50	43.2	10471.3	UHX10-59J*	1.1	0	10	73
	6962.5	1.41	43.2	29512.1		1.1			

Table 2: Existing Antenna Inventory[1] [2]

Table 3 below outlines the proposed AT&T antenna configuration. These AT&T antennas, and the antenna listed above in Table 2, were utilized to perform the theoretical calculations as described in the Modeling Procedure section of this report.

Operator	Sector	Tx Freq (MHz)	Power at Antenna (Watts)	Ant Gain (dBi)	Power EIRP (Watts)	Antenna Model	Beam Width	Mech. Downtilt	Length (ft)	Antenna Centerline Height (ft)
AT&T	Alpha	850	40	16.2	1667	HPA-65R-BUU-H8	61	0	8	81
		1900	80	17.1	4103		62			
		1900*	60	17.1	3077		62			
		700*	60	15.3	2033	HPA-65R-BUU-H8	65	0	8	81
		2300*	60	17.7	3533		60			
		850	60	16.2	2501	HPA-65R-BUU-H8	61	0	8	81
		700	60	15.3	2033	HPA-65R-BUU-H8	65	0	8	81
		1900	120	17.1	6154		62			
	Beta	850	40	16.2	1667	HPA-65R-BUU-H8	61	0	8	81
		1900	80	17.1	4103		62			
		1900*	60	17.1	3077		62			
		700*	60	15.3	2033	HPA-65R-BUU-H8	65	0	8	81
		2300*	60	17.7	3533		60			
		850	60	16.2	2501	HPA-65R-BUU-H8	61	0	8	81
		700	60	15.3	2033	HPA-65R-BUU-H8	65	0	8	81
		1900	120	17.1	6154		62			
	Gamma	850	40	16.2	1667	HPA-65R-BUU-H8	61	0	8	81
		1900	80	17.1	4103		62			
		1900*	60	17.1	3077		62			
		700*	60	15.3	2033	HPA-65R-BUU-H8	65	0	8	81
		2300*	60	17.7	3533		60			
		850	60	16.2	2501	HPA-65R-BUU-H8	61	0	8	81
		700	60	15.3	2033	HPA-65R-BUU-H8	65	0	8	81
		1900	120	17.1	6154		62			

Table 3: Proposed AT&T Antenna Configuration[3]

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[1] Transmit power assumes 0 dB of cable loss.

[2] Antenna specifications for the Encompass transmitters are based upon data provided by Encompass, as well as the max allowable EIRP specified in the corresponding FCC licenses.

[3] Antenna information listed is in reference to the AT&T RFDS dated 12/3/2013. Asterisks indicate particular transmitters that will not be included in the initial site deployment; however, these frequency bands have been included in the calculations for completeness.

Figure 7 below shows the transmitting antenna on the roof of 250 Harbor Drive.

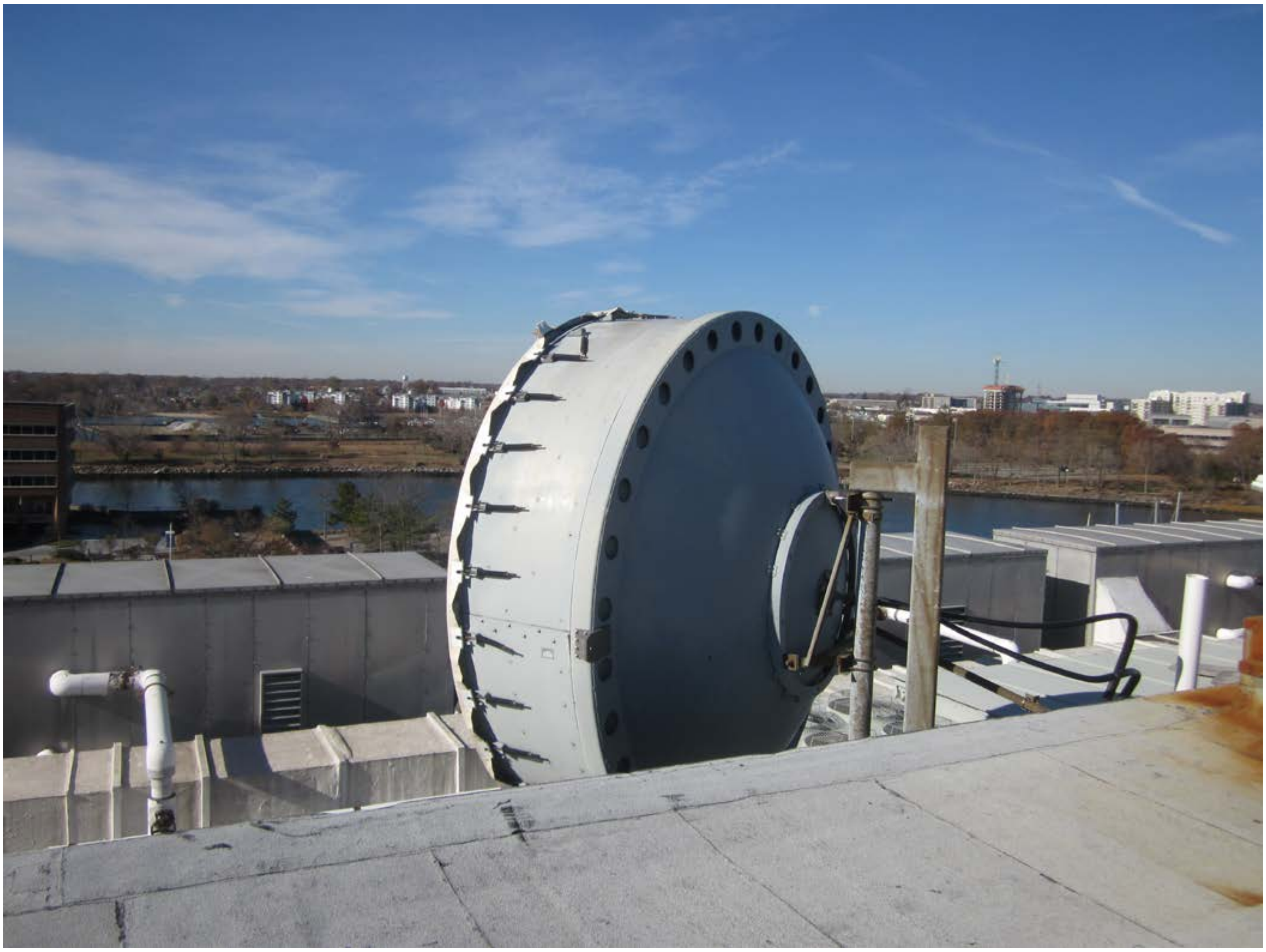

Figure 7: Encompass Microwave Dish (Transmit)

6. Calculated Values

6.1. Modeling Procedure for the Calculations

The emission field calculation results displayed in the following figures were generated using proprietary computer software modeling prediction tool, PDCalc, as developed and provided by C Squared Systems, LLC. PDCalc uses the following power density calculation formulas:

Dish Antennas:

Near Field

$$\text{End of Near Field} = \frac{D^2}{(4 \times \lambda)}$$

$$\text{Power Density Near} = \text{PDN} = \frac{16 \times A \times P}{\pi \times D^2}$$

Where:

D = Antenna Diameter
λ = Wavelength
A = Aperture Efficiency
P = Power Input to the Antenna

- 20 dB of attenuation is added for any points greater than one antenna diameter from the main beam.

Transition Region:

$$\text{End of Transition Region} = \frac{\text{D}^2}{\lambda} \times FarFieldFactor$$

$$\text{Power Density Transition} = \frac{PDN \times \text{Near Region}}{R}$$

Where:

D = Antenna Diameter
Far Field Factor =multiplier which expands or contracts transition region to determine start of Far Field
λ = Wavelength
PDN = Power Density Near
R = Radial Distance

$$\textit{Near Region} = \frac{D^2}{(4 \times \lambda)}$$

- 20 dB of attenuation is added for any points greater than one antenna diameter from the main beam.

Far Field:

$$\text{Power Density} = \left(\frac{\text{EIRP}}{\pi \times R^2}\right) \times \text{Off Beam Loss}$$

Where:

Off Beam Loss is determined by the selected antenna patterns
R = Radial Distance

Directional and Omni Antennas:

Near Field:

$$S = \frac{P_t \times K(H_a, L_a)}{20 \times \pi \times L_a \times R_h \times \left(\frac{BW}{360}\right)}$$

Where:

S = Power Density in mw/cm^2
P_t = Actual (or worst case assumed) power delivered to the antenna (watts)
$K(H_a, La)$ = Correction factor for antenna mounting height
Ha = Antenna mounting height in feet
L_a = Antenna length in meters
R_h = the horizontal distance along roof from antenna to point of interest
BW = Antenna beamwidth

$K(H_a, L_a) = 0.99013 - 0.14656 \times H_a$ for $0 \leq H_a \leq 6$
$= 1/ H_a$ for $H_a > 6$

- If the horizontal distance from the bottom of the antenna is < 1 foot, then 1 foot is used for the distance.

In order to deal with directional antennas, a modified cylindrical model is used. This is done by approximating the horizontal pattern with a model that is conservative, and applying the results to the cylindrical model above. The equation to be used is:

$$A = \cos^n\left(\phi/2\right)$$

Where:

A = Attenuation
ϕ = Angle between antenna azimuth and point in question
n = Factor to shape the function for a particular beamwidth
BW = Antenna beamwidth

By setting the attenuation equal to 0.5 at the half power point $(\phi = BW/2)$, n can be solved. However, in order to ensure that the attenuation model is conservative, n is solved when $\phi = (BW/2) \times (4/3)$. This essentially assumes a larger beamwidth for margin. Therefore, solving for n, we have

$$n = \frac{\ln(0.5)}{\ln(\cos(BW/3))}$$

As a result, antennas with a beamwidth wider than 270° will be treated as an omni-directional antenna. Finally, the maximum attenuation is capped at 15 dB to assure a conservative result in the rear of the antenna.

Far Field:

$$\text{Power Density} = \left(\frac{EIRP}{\pi \times R^2}\right) \times \text{Off Beam Loss}$$

Where:

EIRP = Effective Isotropic Radiated Power Watts
R = *Radial Distance* = $\sqrt{\left(H^2 + V^2\right)}$ meters
H = Horizontal Distance from antenna in meters
V = Vertical Distance from radiation center of antenna in meters
Off Beam Loss is determined by the selected antenna patterns
Ground Reflection factor of 2.0

These calculations assume that the antennas are operating at 100 percent capacity, that all antenna channels are transmitting simultaneously, and that the radio transmitters are operating at full power.

For the ground level calculations presented, obstructions (trees, buildings, etc.) that would normally attenuate the signal are not taken into account. The calculations assume even terrain in the area of study and do not take into account actual terrain elevations which could attenuate the signal. As a result, the predicted signal levels reported in Section 6.3 are much higher than the actual signal levels will be from the finished installation.

The percent of MPE values presented in this report at ground level reflect levels that one may encounter from one sector of each carrier's antennas. Most carriers use 3 sectors per site with azimuths approximately 120 degrees apart, therefore one could not be standing in the main beam of all 3 sectors at the same time. In cases where downtilt and antenna models are not uniform across all 3 sectors, the downtilt and antenna model with the highest gain was used for the calculations. This results in a conservative or "worst case" assumption for percent of MPE calculations.

6.2. Calculated Results for Rooftop Emissions

Figures 8 and 9 show the predicted RF environment on the rooftop of 208 & 250 Harbor Drive once AT&T's proposed modifications are complete. The maximum calculated %MPE with respect to the FCC General Population limit is 2,627% and is on the penthouse rooftop, directly in front of where the proposed AT&T alpha sector antennas are to be located. Please note that there is approximately 1' of space between the alpha frame and the stealth screening at the edge of the penthouse. The maximum calculated %MPE with respect to the FCC General Population limit in front of the beta and gamma antennas on the penthouse roof is 1,989% and 2,365%, respectively.

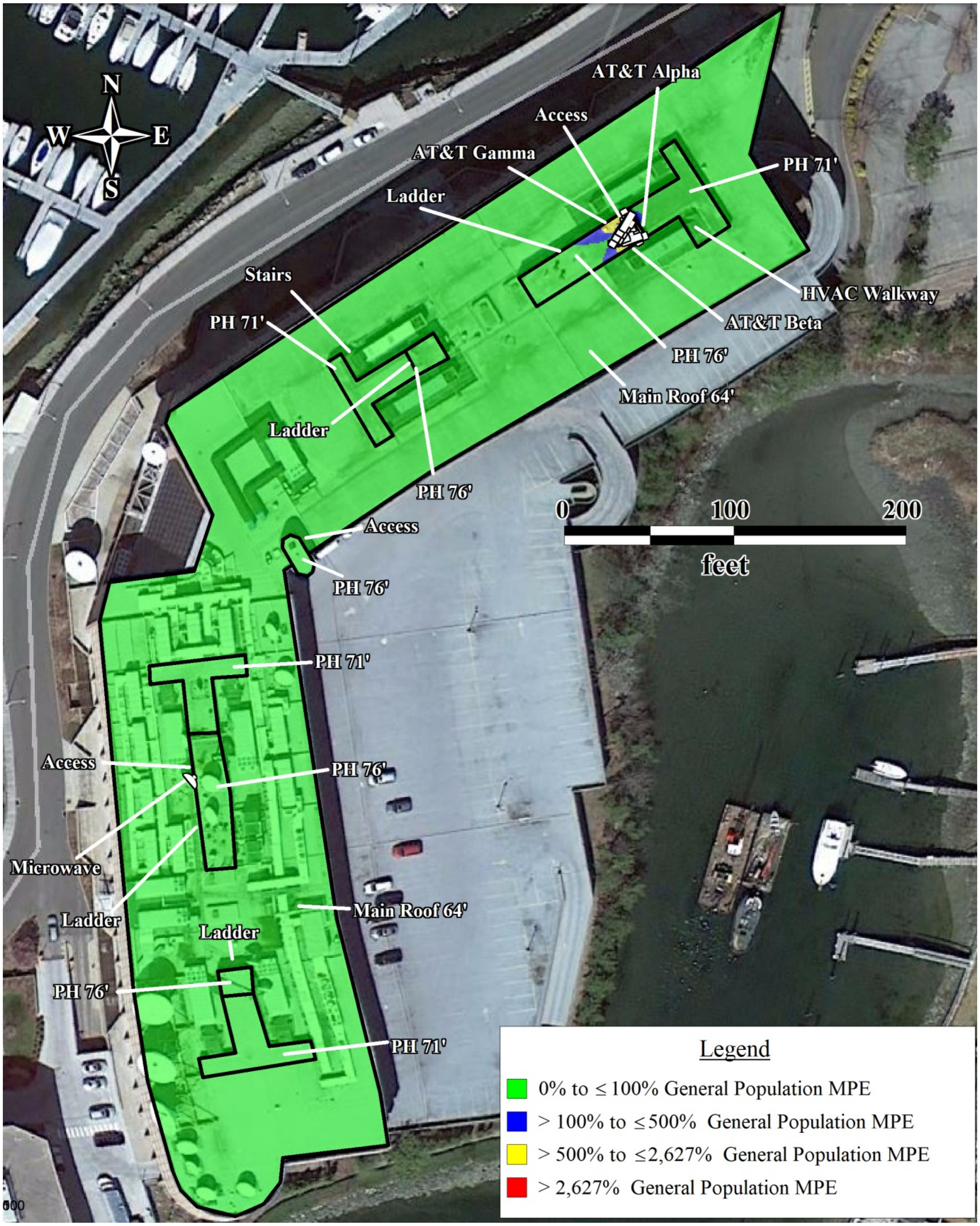

Figure 8: Predicted Power Density Levels on Rooftop (Post-Modification)

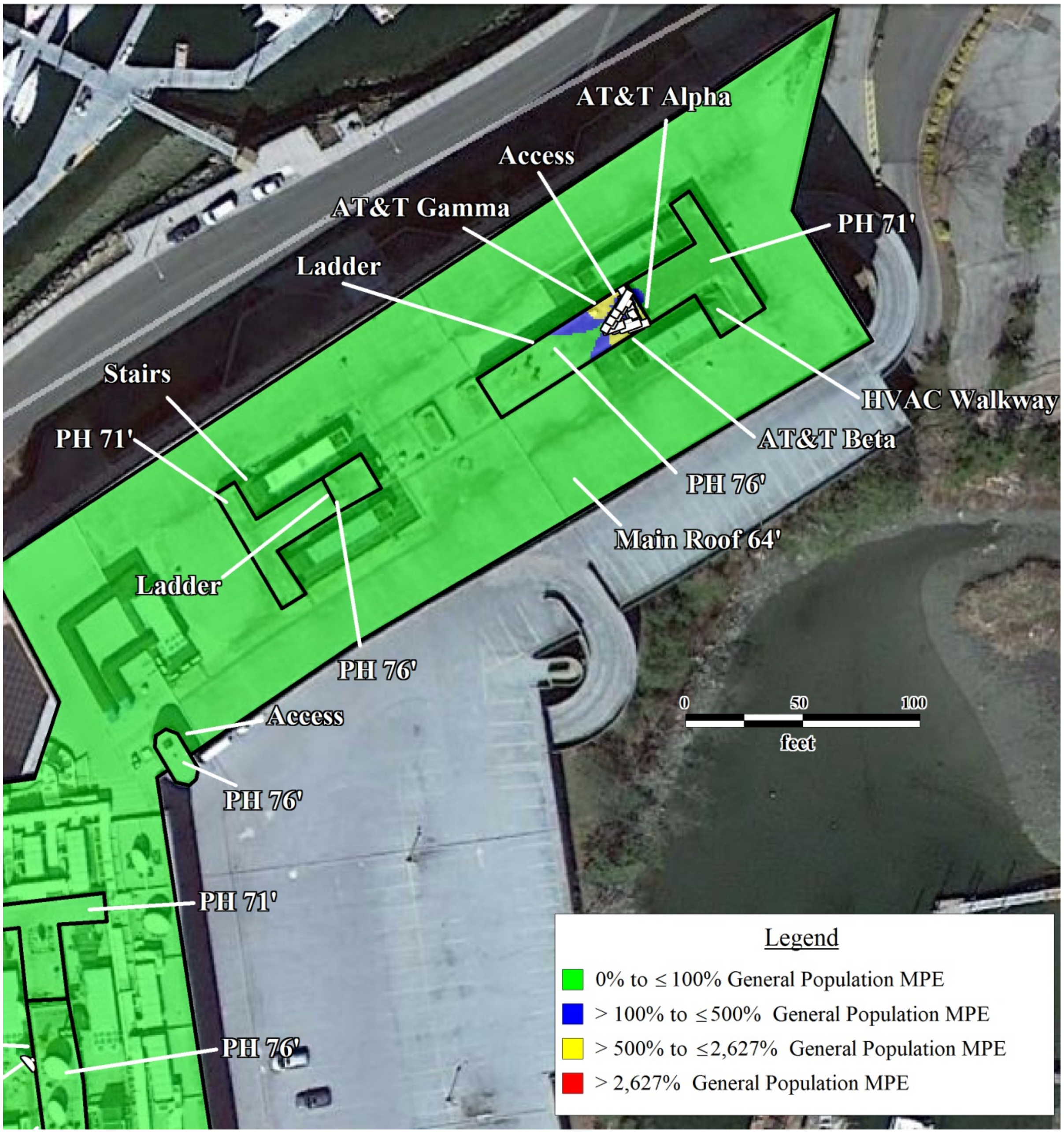
AT&T Alpha
Access
AT&T Gamma
Ladder
PH 71'
HVAC Walkway
AT&T Beta
Stairs
PH 71'
PH 76'
Main Roof 64'
Ladder
PH 76'
Access
PH 76'
PH 71'
PH 76'
0
50
100
feet
Legend
🟩 0% to ≤ 100% General Population MPE
🟦 > 100% to ≤ 500% General Population MPE
🟨 > 500% to ≤ 2,627% General Population MPE
🟥 > 2,627% General Population MPE

Figure 9: Predicted Power Density Levels on Rooftop (Post-Modification- Zoom View)

The rules adopted by the FCC specify that, in general, at multiple transmitter sites, actions necessary to bring the area into compliance with the guidelines are the shared responsibility of all licensees whose transmitters produce field strengths or power density levels at the area in question in excess of 5% of the exposure limit applicable to their particular transmitter. Figures 10 and 11 below show the 5% boundary from the proposed AT&T Wireless antennas.

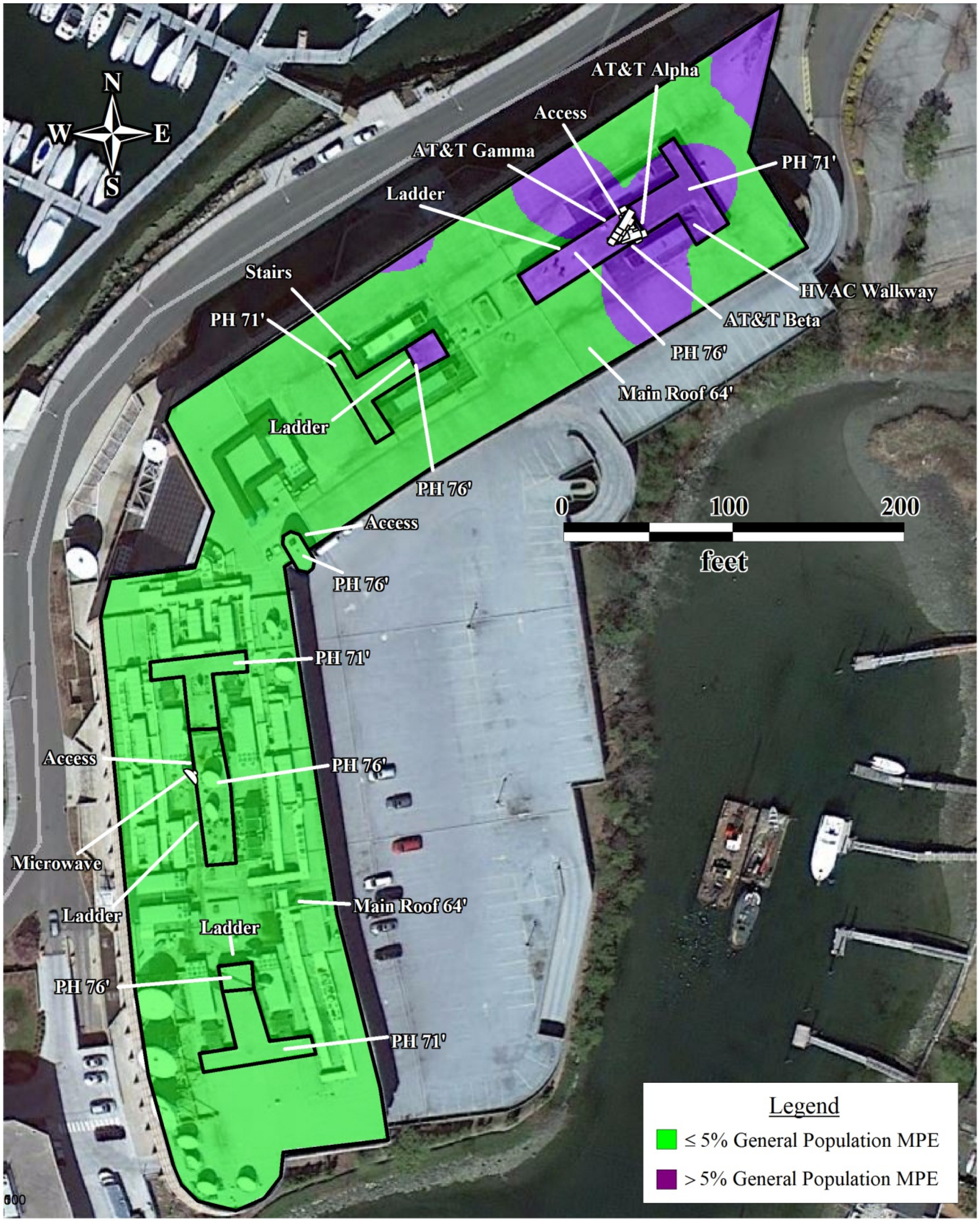

Figure 10: Predicted 5% Levels on Rooftop – AT&T Antennas Only (Full Rooftop View)

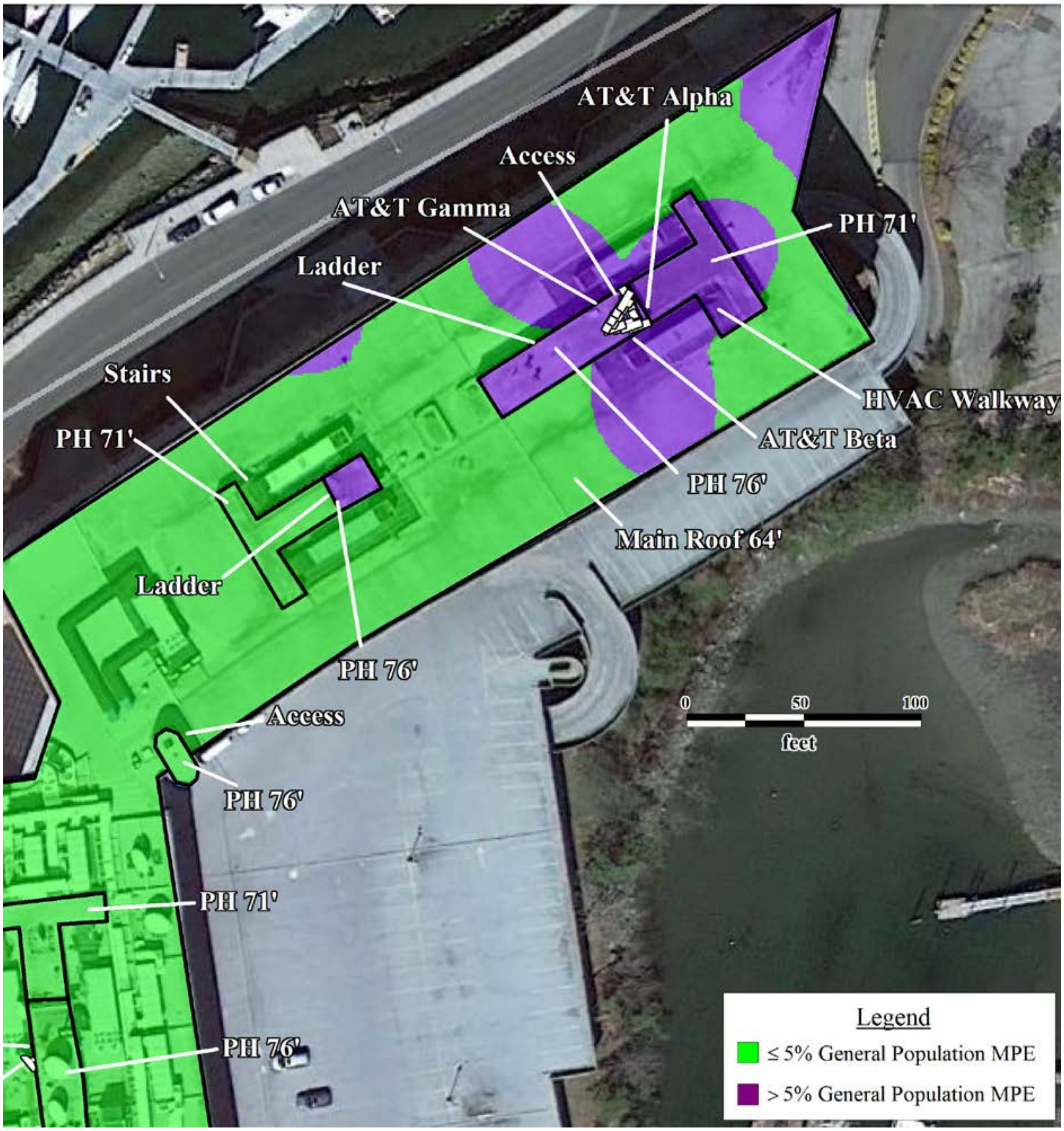

Figure 11: Predicted 5% Levels on Rooftop – AT&T Antennas Only (AT&T Portion of the Roof)

6.3. Calculated Results at Ground Level

The calculated power density results are shown in Figure 12 below. Each frequency band and technology is calculated as well as the resulting total percent of MPE. For completeness, the calculations for this analysis range from 0 feet horizontal distance (directly below the antennas) to a value of 3,000 feet horizontal distance from the building. In addition to the other worst case scenario considerations that were previously mentioned, the power density calculations to each horizontal distance point away from the antennas were completed using a local maximum off beam antenna gain (within ± 5 degrees of the true mathematical angle) to incorporate a realistic worst-case scenario[4].

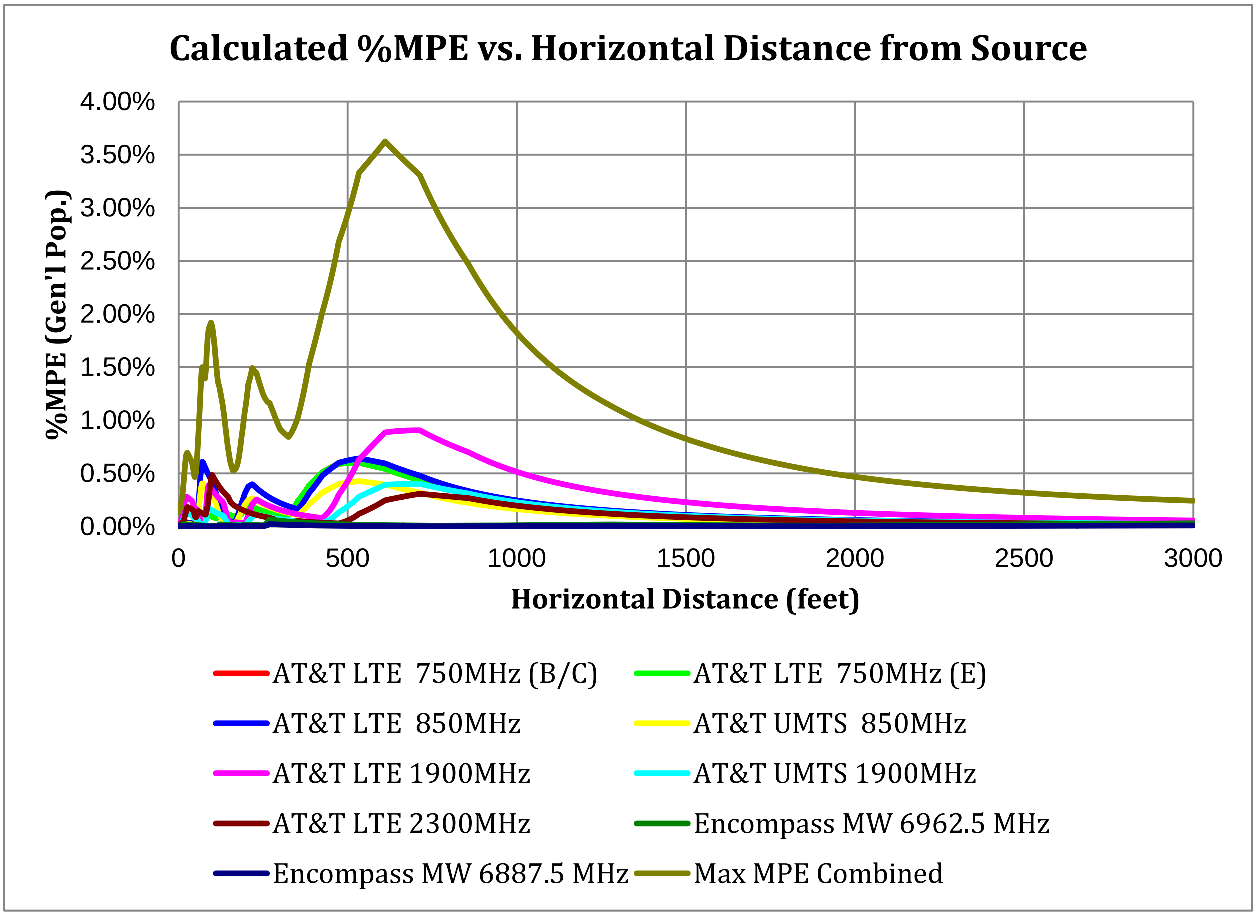

Figure 12: Graph of %MPE (Gen'l Pop.) vs. Distance

The highest composite percent of MPE (< 3.63% Uncontrolled/General Population) was calculated to occur at a horizontal distance of 611 feet from the building. Please note that the percent of MPE calculations close to the site take into account off beam loss, which is determined from the vertical pattern of the antennas used. Therefore, RF power density levels may increase as the distance from the site increases. At distances of approximately 800 feet and beyond, one would now be in the main beam of the antenna patterns and off beam loss is no longer considered. Beyond this point, RF levels become calculated solely on distance from the site and the percent of MPE decreases significantly as distance from the site increases.

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[4] Localized off-beam loss of ±5° was not applied to the highly directional Encompass microwave antenna (1.1° vertical beamwidth).

Table 4 below lists the percent of MPE value for each technology and carrier as well as the associated parameters that were included in the calculations. The highest composite percent of MPE value was calculated to occur at a horizontal distance of 611 feet from the building (reference Figure 12).

As stated in Section 6, all calculations assume that the antennas are operating at 100 percent capacity, that all antenna channels are transmitting simultaneously, and that the radio transmitters are operating at full power. Obstructions (trees, buildings etc.) that would normally attenuate the signal are not taken into account. In addition, 6 feet was subtracted from the height of the antennas for this analysis to account for average human height. As a result, the predicted signal levels are significantly higher than the actual signal levels will be from the finished installation.

Carrier	Number of Trans.	Power out of Base Station Per Transmitter (Watts)	Antenna Height (Feet)	Distance to the Base of Antennas (Feet)	Power Density (mW/cm^2)	Limit (mW/cm^2)	% Gen'l Pop. MPE
AT&T LTE 750MHz (B/C)	2	30.0	81.0	611	0.002719	0.500	0.54%
AT&T LTE 750MHz (E)	2	30.0	81.0	611	0.002719	0.500	0.54%
AT&T LTE 850MHz	2	30.0	81.0	611	0.003369	0.567	0.59%
AT&T LTE 1900MHz	6	30.0	81.0	611	0.008867	1.000	0.89%
AT&T LTE 2300MHz	2	30.0	81.0	611	0.002477	1.000	0.25%
AT&T UMTS 850MHz	1	40.0	81.0	611	0.002246	0.567	0.40%
AT&T UMTS 1900MHz	2	40.0	81.0	611	0.003941	1.000	0.39%
Encompass MW 6887.5MHz	1	0.50	73.0	611	0.000049	1.000	< 0.01%
Encompass MW 6962.5MHz	1	1.41	73.0	611	0.000139	1.000	0.01%
						Total	**< 3.63%**

Table 4: Maximum Percent of Emissions Values[5]

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[5] Transmit power assumes 0 dB of cable loss. Results include transmitters that are part of both initial and future deployment.

7. Recommendations

- All three main roof access doors were locked at the time of the survey. **These access points should remain locked at all times and roof access should be restricted to authorized personnel only.**
- **A yellow RF "CAUTION" sign[6] should be posted at the ladder used to access the penthouse rooftop where AT&T's proposed antennas are to be located**. The sign is necessary to caution personnel that RF exposure levels may exceed the General Population and Occupational limits, as defined by the FCC.
- **A yellow RF "CAUTION" sign should be posted at the entrance to the HVAC stairway,** located on the main roof to the southeast of the HVAC unit and the proposed AT&T installation. This stairway is intended for personnel to access the other side of the HVAC unit, but could be reasonably used to access to the penthouse roof near the proposed AT&T antennas.
- **Yellow RF "CAUTION" signs should be posted on each face of the AT&T's stealth screening.** These signs are necessary to caution personnel of the presence of antennas behind the screening. The locations of these signs are not depicted in Figure 13 below.
- **A 10 Point "GUIDELINES" sign should also be posted at the ladder used to access the penthouse rooftop where AT&T's proposed antennas are to be located, as well as the HVAC stairway**. These signs are necessary to provide safety guidelines to personnel working in areas that may exceed the FCC's exposure limits.
- **A ladder cage/lock should be installed on the penthouse ladder leading to the proposed AT&T installation as an additional engineering control** to prevent unauthorized access to the penthouse rooftop where exposure levels may exceed the FCC General Population and Occupational MPE limits.
- **A locked gate or other form of engineering control should be installed at the bottom of the HVAC stairway** to prevent unauthorized access to the penthouse rooftop where exposure levels may exceed the FCC General Population and Occupational MPE limits.
- The results of the rooftop analysis should be presented to the appropriate building management contact to ensure all personnel accessing the rooftop areas are made fully aware of the particular areas that may potentially exceed the FCC exposure limits.
- Personnel accessing areas on the penthouse where the AT&T antennas are located or within close proximity to the stealth enclosure should coordinate with AT&T and rooftop management to ensure that the risk of exceeding the FCC exposure limits are mitigated through reduction of transmitter power or other appropriate means.

The following guidelines should be followed by all persons accessing the rooftop at 208 Harbor Drive:

- All personnel accessing the rooftop must be authorized and have the necessary intellectual and physical tools to allow them to control or mitigate their exposure.
- Obey all posted signs.
- Assume all antennas are active**.**
- Do not stop in front of antennas (where possible).

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[6] Signage recommendation is based upon the IEEE Std. C95.7-2005, Recommended Practice for Radio Frequency Safety Programs, 3 kHz to 300 GHz, §4.3.2.1 "Use of Signs"

Figure 13 below shows the recommended signage, as referenced in Section 7: Recommendations. As mentioned above, the “CAUTION” signs to be posted on the each face of the stealth enclosure are not shown.

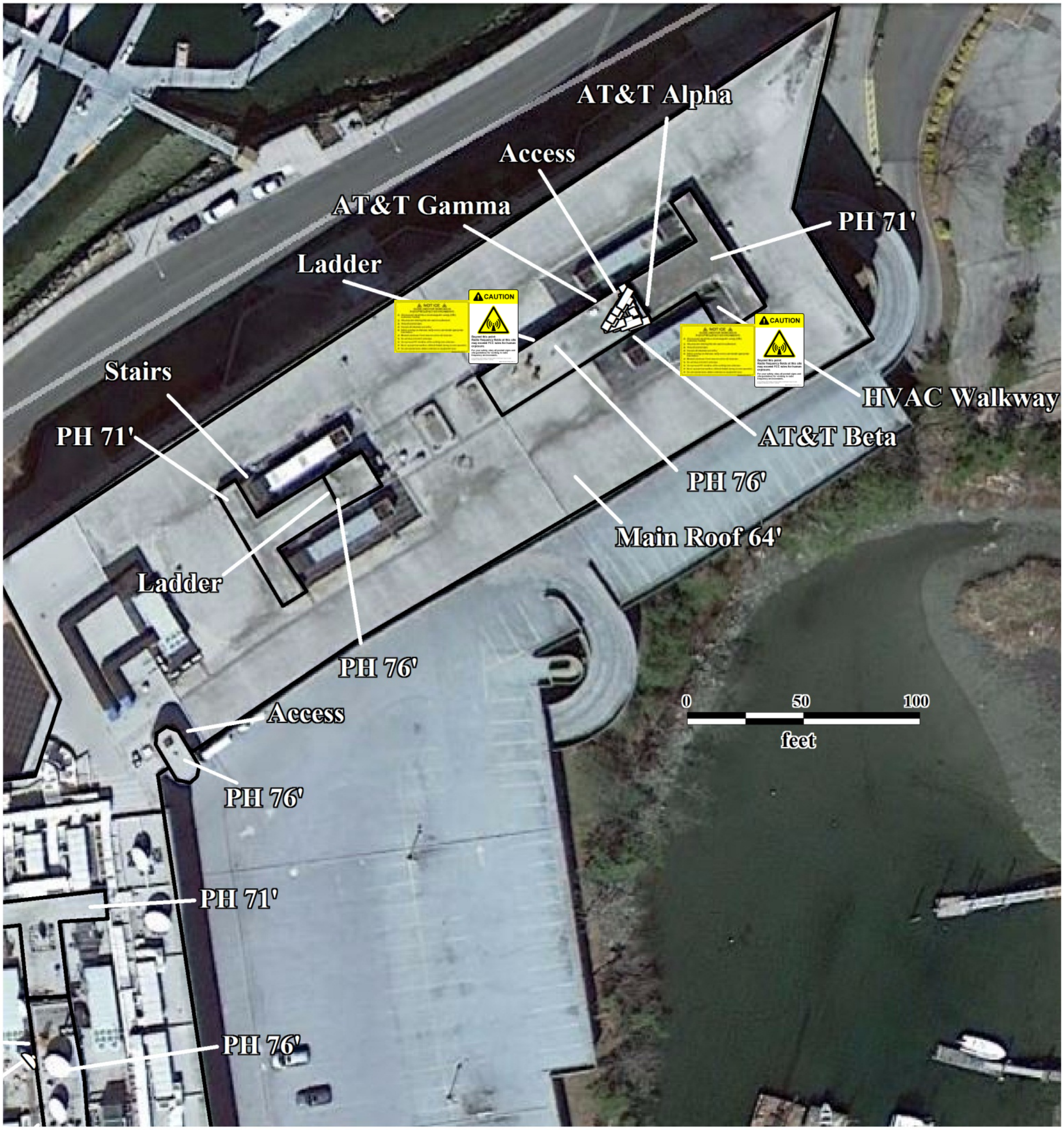

Figure 13: Recommended Signage Locations

8. Summary of Findings

The predicted analysis for this site finds that there are some areas of the rooftop that may exceed the general population and occupational exposure limits as defined by the FCC. These areas are limited to the penthouse rooftop where AT&T's proposed antennas would be located, and the lower penthouse adjacent to AT&T's alpha sector antennas. The maximum calculated value of %MPE with respect to the **FCC's General Population limit** based on the conservative modeling procedures described above is **2,627%**. The recommendations noted in Section 7 of this report should be implemented for compliance.

The above analysis also concludes that the cumulative emissions from the existing transmit antenna on site and the proposed AT&T installation will be well below the maximum levels at ground level as outlined by the FCC in the OET Bulletin 65 Ed. 97-01. Using the conservative calculation methods and parameters detailed above, the maximum percent of MPE calculated at ground level is **< 3.63%** of the **General Population FCC limit**. This maximum percent of MPE is calculated to occur 611 feet away from the site.

9. Statement of Certification

I certify to the best of my knowledge that the statements in this report are true and accurate. The findings in this report follow guidelines set forth in ANSI/IEEE Std. C95.7, ANSI/IEEE Std. C95.1 and FCC OET Bulletin 65 Edition 97-01.

Keith Vellante

December 6, 2013
Date

Keith Vellante
C Squared Systems, LLC

Attachment A: References

OET Bulletin 65 - Edition 97-01 - August 1997   Federal Communications Commission Office of Engineering & Technology

ANSI C95.1-1982, American National Standard Safety Levels With Respect to Human Exposure to Radio Frequency Electromagnetic Fields, 300 kHz to 100 GHz.   IEEE-SA Standards Board

IEEE Std C95.3-1991 (Reaff 1997), IEEE Recommended Practice for the Measurement of Potentially Hazardous Electromagnetic Fields - RF and Microwave.   IEEE-SA Standards Board

IEEE Std C95.7-2005, IEEE Recommended Practice for Radio Frequency Safety Programs, 3 kHz to 300 GHz. IEEE-SA Standards Board

Attachment B: FCC Limits for Maximum Permissible Exposure (MPE)

(A) Limits for Occupational/Controlled Exposure[7]

Frequency Range (MHz)	Electric Field Strength (E) (V/m)	Magnetic Field Strength (E) (A/m)	Power Density (S) (mW/cm^2)	Averaging Time $\lvert E\rvert^2$, $\lvert H\rvert^2$ or S (minutes)
0.3-3.0	614	1.63	(100)*	6
3.0-30	1842/f	4.89/f	(900/f^2)*	6
30-300	61.4	0.163	1.0	6
300-1500	-	-	f/300	6
1500-100,000	-	-	5	6

(B) Limits for General Population/Uncontrolled Exposure[8]

Frequency Range (MHz)	Electric Field Strength (E) (V/m)	Magnetic Field Strength (E) (A/m)	Power Density (S) (mW/cm^2)	Averaging Time $\lvert E\rvert^2$, $\lvert H\rvert^2$ or S (minutes)
0.3-1.34	614	1.63	(100)*	30
1.34-30	824/f	2.19/f	(180/f^2)*	30
30-300	27.5	0.073	0.2	30
300-1500	-	-	f/1500	30
1500-100,000	-	-	1.0	30

f = frequency in MHz   * Plane-wave equivalent power density

Table 5: FCC Limits for Maximum Permissible Exposure

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[7] Occupational/controlled limits apply in situations in which persons are exposed as a consequence of their employment provided those persons are fully aware of the potential for exposure and can exercise control over their exposure. Limits for occupational/controlled exposure also apply in situations when an individual is transient through a location where occupational/controlled limits apply provided he or she is made aware of the potential for exposure.

[8] General population/uncontrolled exposures apply in situations in which the general public may be exposed, or in which persons that are exposed as a consequence of their employment may not be fully aware of the potential for exposure or cannot exercise control over their exposure.

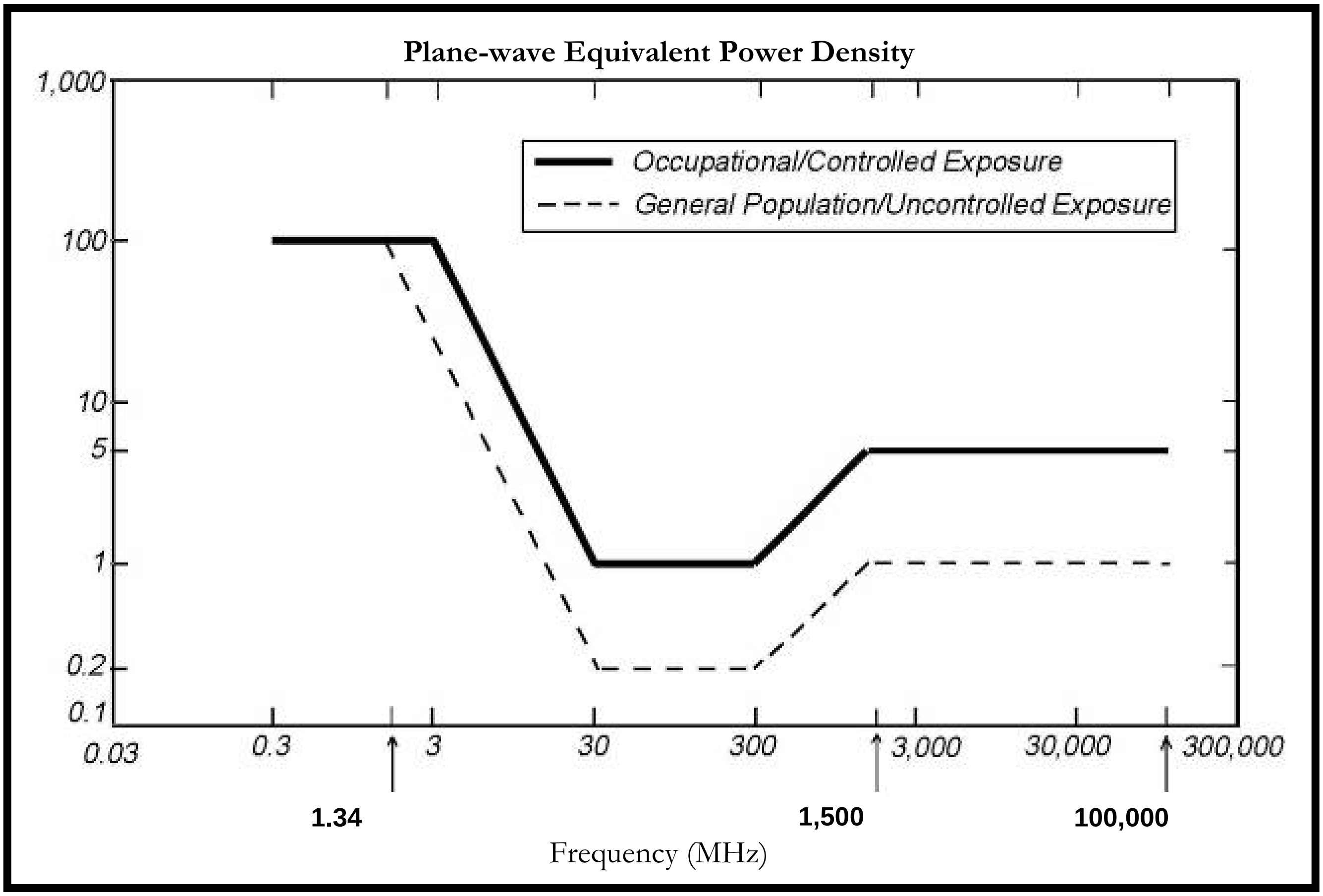


Figure 14: Graph of FCC Limits for Maximum Permissible Exposure (MPE)

ATTACHMENT 5

C&F: 1287916.1

CERTIFICATION OF SERVICE

I hereby certify that on the 9thth day of December 2016, a copy of the following letter and notice of the intended filing of a Petition with the Connecticut Siting Council for a declaratory ruling was sent by certified mail, return receipt requested, to the attached list of abutting property owners:

Dated: 12/12/16

Cuddy & Feder LLP
45 Hamilton Avenue, 14th Floor
White Plains, New York 10601
Attorneys for:
New Cingular Wireless PCS, LLC (AT&T)

Abutting Property Owners - Number Corresponds to Notations on Accompanying Maps

1.	CITY OF STAMFORD	888 WASHINGTON BLVD	STAMFORD	CT	06901-2930
2.	CITY OF STAMFORD	888 WASHINGTON BLVD	STAMFORD	CT	06901-2930
3.	THOMAS KONSTANTINOS ET AL	59 MITCHELL ST	STAMFORD	CT	06902-7832
4.	FOSTER CISLYN	60 MITCHELL STREET	STAMFORD	CT	06902-7832
5.	LECLUE CHRISTINE MARY ET AL	66 MITCHELL ST	STAMFORD	CT	06902-7832
6.	CHANG NANCY L ET AL	74 MITCHELL STREET	STAMFORD	CT	06902
7.	DANG RICHARD K ET AL	82 MITCHELL ST	STAMFORD	CT	06902-7832
8.	RATH TIMOTHY D	20 HARBOR VIEW AVENUE	NORWALK	CT	06854-4821
9.	MALLOY ALISON J	89 MITCHELL STREET	STAMFORD	CT	06902-7832
10.	CONDLIN JOHN D ET AL	95 DOWNS AVE	STAMFORD	CT	06902-0000
11.	DARIANO JENNIFER	101 DOWNS AVENUE	STAMFORD	CT	06902-7802
12.	ZALESKI WALDEMAR ET AL	105 DOWNS AVENUE	STAMFORD	CT	06902-7802
13.	MALLOY JULIE K ET AL	111 DOWNS AVENUE	STAMFORD	CT	06902
14.	CALCANO GLADYS	115 DOWNS AVENUE	STAMFORD	CT	06902
15.	MOSER IRENE	121 DOWNS AVENUE	STAMFORD	CT	06902-7802
16.	CARTER RICHARD J ET AL	129 DOWNS AVENUE	STAMFORD	CT	06902-7802
17.	DOWNS AVENUE LLC	83 ROGERS ROAD	STAMFORD	CT	06902
18.	DOWNS AVENUE LLC	83 ROGERS ROAD	STAMFORD	CT	06902
19.	KARP ROBERT M ET AL	139 DOWNS AVE	STAMFORD	CT	06902-7802
20.	HOILES PAMELA J	141 DOWNS AVENUE	STAMFORD	CT	06902-7802
21.	SH LEASE CORP	PO BOX 931	STAMFORD	CT	06904-0931
22.	CITY OF STAMFORD	888 WASHINGTON BLVD	STAMFORD	CT	06901-2930
23.	CITY OF STAMFORD	888 WASHINGTON BLVD	STAMFORD	CT	06901-2930
24.	CITY OF STAMFORD	888 WASHINGTON BLVD	STAMFORD	CT	06901-2930
25.	AG-GCS Shippan Landing Owner LLC	245 Park Avenue, 25th Fl	New York	NY	10167

December 9, 2016

VIA CERTIFIED MAIL/
RETURN RECEIPT REQUESTED
ADDRESSEE
ADDRESS

Re: New Cingular Wireless PCS, LLC ("AT&T")
Proposed Wireless Facility
208 Harbor Drive, Stamford, Connecticut

Dear Sir or Madam:

We are writing to you on behalf of our client New Cingular Wireless PCS, LLC ("AT&T") with respect to the above referenced matter and our client's intent to file a petition with the State of Connecticut Siting Council for approval of a wireless communications tower facility (the "Facility") on the rooftop of the captioned property.

State law requires that record owners of property abutting a parcel on which a facility is proposed be sent notice of an applicant's intent to file a petition with the Siting Council.

Included with this letter please find a Notice of this submission and details of the proposal. Of note, the location, height and other features of the Facility are subject to review and potential change by the Connecticut Siting Council under the provisions of Connecticut General Statutes §16-50g et seq.

If you have any questions concerning this petition, please contact the Connecticut Siting Council or the undersigned after December 13, 2016, the date that the petition is expected to be on file.

Very truly yours,

Daniel M. Laub
Enclosure

NOTICE

Notice is hereby given, pursuant to Section 16-50j-40(a) of the Regulations of Connecticut State Agencies of a Petition being filed with the Connecticut Siting Council ("Siting Council") on or after December 13th, 2016 by New Cingular Wireless PCS, LLC ("AT&T"). AT&T seeks a declaratory ruling that installation of a rooftop wireless facility at 208 Harbor Drive, Stamford, Connecticut does not have significant adverse environmental effects that might otherwise require a certificate of environmental compatibility and public need ("Certificate").

AT&T's proposed Facility consists of installing up to twelve (12) panel antennas behind two proposed RF transparent screen enclosures on steel support structures on top of the existing rooftop, at a centerline height of approximately 78' 9" above grade level. AT&T's proposed RF transparent screen enclosures on the rooftop will reach an overall height of 82' 9" and completely conceal AT&T's proposed antennas from view. The proposed enclosures will be painted to match the existing building. AT&T's 11' 5" x 16' equipment shelter and generator is proposed to be located on a steel frame on the building's rooftop.

The Petition will provide additional details of the proposal and explain why AT&T submits that this modification presents no significant adverse environmental effects. The location, height and other features of the facility are subject to review and potential change under provisions Connecticut General Statutes Sections 16-50g et. seq.

Copies of the Petition will be available for review during normal business hours on or after December 13, 2016 at the following:

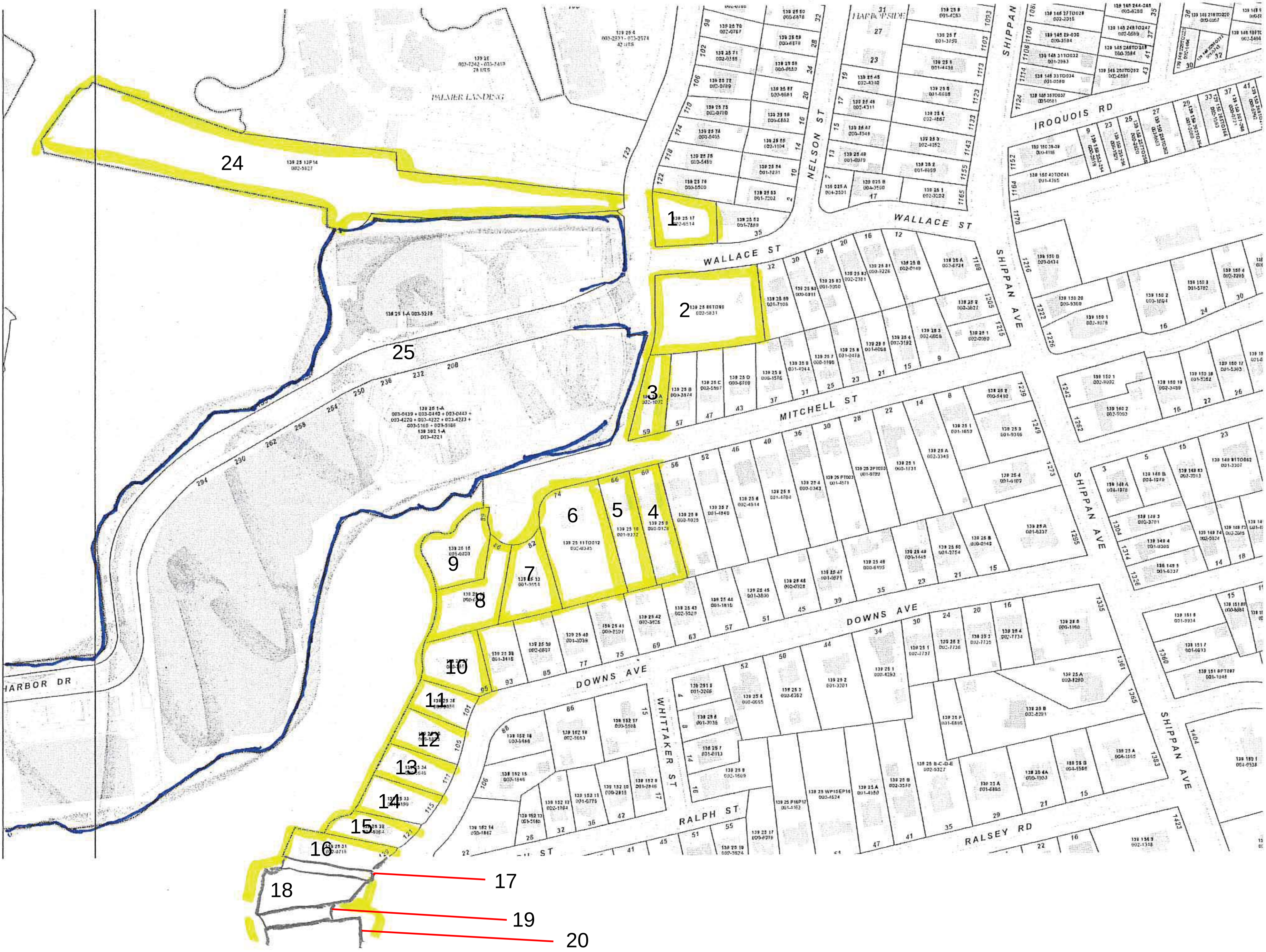
Connecticut Siting Council
10 Franklin Square
New Britain, Connecticut 06051

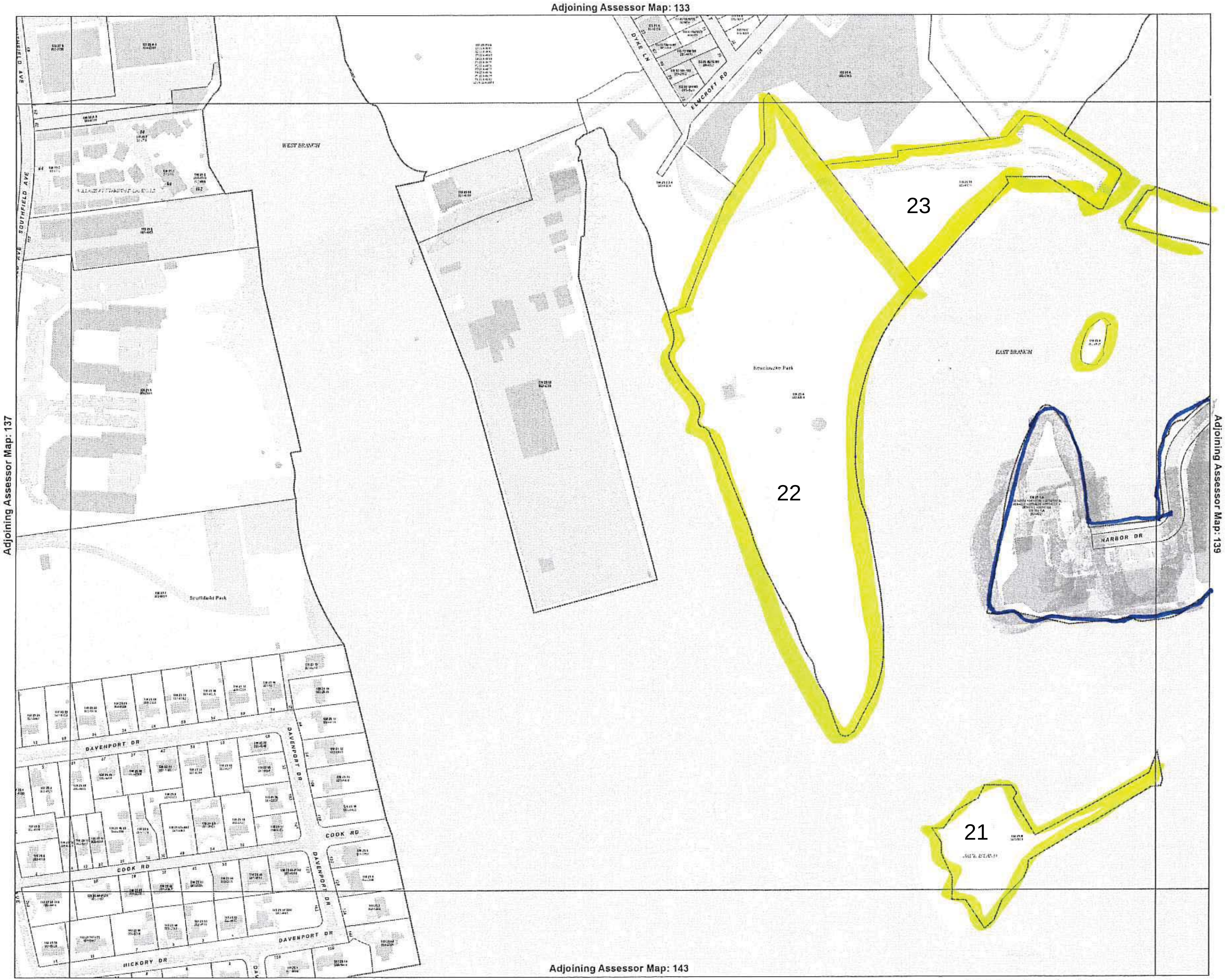
City and Town Clerk of Stamford
Donna M. Loglisci
888 Washington Boulevard,
Stamford, CT 06901

or the offices of the undersigned. All inquiries should be addressed to the Connecticut Siting Council or to the undersigned.

Daniel M. Laub, Esq.
Cuddy & Feder LLP
445 Hamilton Ave, 14th Floor
White Plains, New York 10601
(914) 761-1300
Attorneys for the Petitioner

Adjoining Assessor Map: 138





Map: 138

Map Produced September 2010

1 inch = 100 feet

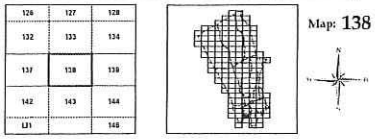
0 100 200 300 400 500 Feet

City of Stamford, Connecticut

Assessment Parcel Map

Parcel data current as of October 2009.
Buildings and Paved Roads based on aerial flight from April 2005.
Map Coordinates based on NAD 83 Connecticut State Plane Feet.

111 216 84	Map Block Lot	☐	City Boundaries	▨	Buildings
17	Address		Water Bodies		Paved Roads
003-6569	Parcel Id		Streams and Rivers	—	Railroad
▱	Parcels		Residential Condos		Parks



Map: 138

ATTACHMENT 6

C&F: 1287916.1

NOTICE

Notice is hereby given, pursuant to Section 16-50j-40(a) of the Regulations of Connecticut State Agencies of a Petition being filed with the Connecticut Siting Council ("Siting Council") on or after December 14th, 2016 by New Cingular Wireless PCS, LLC ("AT&T"). AT&T seeks a declaratory ruling that installation of a rooftop wireless facility at 208 Harbor Drive, Stamford, Connecticut does not have significant adverse environmental effects that might otherwise require a certificate of environmental compatibility and public need ("Certificate").

AT&T's proposed Facility consists of installing up to twelve (12) panel antennas behind two proposed RF transparent screen enclosures on steel support structures on top of the existing rooftop, at a centerline height of approximately 78' 9" above grade level. AT&T's proposed RF transparent screen enclosures on the rooftop will reach an overall height of 82' 9" and completely conceal AT&T's proposed antennas from view. The proposed enclosures will be painted to match the existing building. AT&T's 11' 5" x 16' equipment shelter and generator is proposed to be located on a steel frame on the building's rooftop.

The Petition will provide additional details of the proposal and explain why AT&T submits that this modification presents no significant adverse environmental effects. The location, height and other features of the facility are subject to review and potential change under provisions Connecticut General Statutes Sections 16-50g et. seq.

Copies of the Petition will be available for review during normal business hours on or after December 14, 2016 at the following:

Connecticut Siting Council
10 Franklin Square
New Britain, Connecticut 06051

City and Town Clerk of Stamford
Donna M. Loglisci
888 Washington Boulevard,
Stamford, CT 06901

or the offices of the undersigned. All inquiries should be addressed to the Connecticut Siting Council or to the undersigned.

Daniel M. Laub, Esq.
Cuddy & Feder LLP
445 Hamilton Ave, 14th Floor
White Plains, New York 10601
(914) 761-1300
Attorneys for the Petitioner

CERTIFICATION OF SERVICE

I hereby certify that on the 12 th day of December 2016, a copy of the foregoing notice of the filing of a Petition with the Connecticut Siting Council for a declaratory ruling was sent by certified mail, return receipt requested, to the list below:

Dated: 12/15/16

Cuddy & Feder LLP
45 Hamilton Avenue, 14th Floor
White Plains, New York 10601
Attorneys for:
New Cingular Wireless PCS, LLC (AT&T)

State and Regional

The Honorable George Jepsen Attorney General Office of the Attorney General 55 Elm Street Hartford, CT 06106	Department of Economic and Community Development Catherine Smith, Commissioner 505 Hudson Street Hartford, CT 06106
Department of Public Health Dr. Raul Pino, Commissioner 410 Capitol Avenue P.O. Box 340308 Hartford, CT 06134	Department of Energy and Environmental Protection Public Utilities Regulatory Authority Chairman Arthur House Ten Franklin Square New Britain, CT 06051
Council on Environmental Quality Karl J. Wagener, Executive Director 79 Elm Street Hartford, CT 06106	Department of Transportation James P. Redeker, Commissioner 2800 Berlin Turnpike Newington, CT 06111

Department of Energy & Environmental Protection Rob Klee, Commissioner 79 Elm Street Hartford, CT 06106	Department of Agriculture Steven K. Reviczky, Commissioner 165 Capitol Avenue Hartford, CT 06106
Office of Policy and Management Benjamin Barnes, Secretary 450 Capitol Avenue Hartford, CT 06106	State House Representative - 146th Terry B. Adams Legislative Office Building Room 4000 Hartford, CT 06106
Department of Emergency Services & Public Protection Division of Emergency Management and Homeland Security William Shea, Deputy Commissioner 25 Sigourney Street, 6th Floor Hartford, CT 06106-5042	State Senator - 27th District Carlo Leone Legislative Office Building Room 3500 Hartford, CT 06106
Department of Economic and Community Development-Offices of Culture and Tourism Todd Levine, State Historic Preservation Officer, Historian/Environmental Reviewer One Constitution Plaza, 2nd Floor Hartford, CT 06103	Western Connecticut Council of Governments Francis Pickering, Executive Director One River Road Sandy Hook, CT 06482

Federal

Federal Communications Commission 445 12th Street SW Washington, D.C. 20554	Federal Aviation Administration 800 Independence Avenue, SW Washington, DC 20591
U.S. Congresswoman Elizabeth Esty 1 Grove St. Suite 600 New Britain, CT 06053	U.S. Senator Richard Blumenthal 90 State House Square, 10th Floor Hartford, CT 06103
U.S. Senator Christopher Murphy One Constitution Plaza, 7th Floor Hartford, CT 06103	

City of Stamford

David R. Martin, Mayor Stamford Government Center 888 Washington Boulevard 10th Floor Stamford, CT 06901	Planning Board Stamford Government Center 888 Washington Boulevard 7th Floor Stamford, CT 06901
Zoning Board Stamford Government Center 888 Washington Boulevard, 7th Floor 7th Floor Stamford, CT 06901	Environmental Protection Board Stamford Government Center 888 Washington Boulevard 7th Floor Stamford, CT 06901
Ralph Blessing - Land Use Bureau Chief Stamford Government Center 888 Washington Boulevard, 7th Floor 7th Floor Stamford, CT 06901	

STRUCTURAL ANALYSIS REPORT

For

S2900 (NSB)

STAMFORD HARBOR

208 Harbor Drive
Stamford, CT 06902

Antennas within FRP Enclosures on Steel Frames; Equipment Shelter on Steel Platform on the Roof

Prepared for:

smartlink

at&t

Dated: December 2, 2014

STATE OF CONNECTICUT
DANIEL HAMM
24178
LICENSED
PROFESSIONAL ENGINEER

12-2-2014

Prepared by:

Hudson Design Group LLC

1600 Osgood Street Building 20 North, Suite 3090
North Andover, MA 01845
Phone: (978) 557-5553
www.hudsondesigngroupllc.com

TABLE OF CONTENTS

SCOPE OF WORK:

Hudson Design Group LLC (HDG) has been authorized by AT&T to conduct a structural evaluation of the structure that will support the existing AT&T equipment located in the areas depicted in the latest HDG's construction drawings.

This report represents this office's findings, conclusions and recommendations pertaining to the support of AT&T's proposed equipment.

An on-site visual survey and structural mapping of the existing building structure was performed by ProVertic on October 9, 2014.

CONCLUSION SUMMARY:

Partial building plans prepared by Yankee Planning dated June 25, 1979 and partial building plans prepared by Pelliccione & Associates, LLC dated July 22, 2014 were available and were obtained for our use. A limited visual survey of the structure was completed in or near the areas of the Proposed Work.

Based on our evaluation, we have determined that the existing building structure **IS CAPABLE** of supporting the proposed equipment loading.

APPURTENACE/EQUIPMENT CONFIGURATION:

(12) HPA-65R-BUU-H8 Antennas (93"x15"x7" - Wt. = 68 lbs. /each) (Four per sector)

(6) A2 Module (16.4"x15.2"x3.4" – Wt. = 22 lbs. /each) (Two per sector)

(9) RRH (RRUS-11) (19.7"x17"x7.2" – Wt. = 50 lbs. /each) (Three per sector)

(6) RRH (RRUS-12) (20.4"x18.5"x7.5" – Wt. = 58 lbs. /each) (Two per sector)

(3) RRH (RRUS-E2) (20.4"x18.5"x7.5" – Wt. = 58 lbs. /each) (One per sector)

(3) RRH (RRUS-32) (29.9"x13.3"x9.5" – Wt. = 77 lbs. /each) (One per sector)

(4) Surge Suppressor (Wt. = 43.5 lbs. / each)

(1) 11'-6" x 16'-0" Equipment Shelter (Wt. = 30000 lbs.) (Includes Equipment)

(1) 50kW Generator (Wt. = 2812 lbs)

Referenced documents are attached.

ANALYSIS RESULTS SUMMARY → EXISTING CONDITIONS

- **Roof Beams**

Beam	Controlling Factor	Required (ft-lb)	Provided (ft-lb)	Ratio (%)	Pass/Fail
24-C-C'	Moment	18,259	238,024	7.7	PASS
24-D'-E	Moment	21,501	238,024	9.0	PASS
25-C-C'	Moment	15,631	238,024	6.6	PASS
25-D'-E	Moment	19,093	238,024	8.0	PASS
26-D'-E	Moment	75,462	238,024	31.7	PASS
26a-C-C'	Moment	72,025	165,918	43.4	PASS
26a-D'-E	Moment	89,235	165,918	53.8	PASS
C'-26-27	Moment	457,965	830,838	55.1	PASS
D'-26-27	Moment	419,567	830,838	50.5	PASS
27-C-D	Moment	526,253	573,852	91.7	PASS
27-D-E	Moment	422,580	573,852	73.6	PASS

- **4th Floor Building Columns**

Column	Axial Load Applied (lbs.)	Allowable Axial Load (lbs.)	Ratio (%)	Pass/Fail
C'24	73,802	324,000	22.8	PASS
D'24	75,628	324,000	23.3	PASS
C'25	105,043	291,000	36.1	PASS
D'25	112,173	291,000	38.5	PASS
C'26	139,240	207,000	67.3	PASS
D'26	131,211	207,000	63.4	PASS
C26	101,056	358,000	28.2	PASS
C27	108,912	443,000	24.6	PASS
D27	218,858	239,000	91.6	PASS

**** SEE PAGE 136 FOR BEAM AND COLUMN LAYOUT ****

DESIGN CRITERIA:

1. International Building Code 2003 with 2005 Connecticut Supplement with 2009 Amendments; ASCE 7-05 Minimum Design Loads for Buildings and Other Structures.

Wind Analysis:

Reference Wind Speed:	105 mph	(includes 3-second gust)
Category:	B	

Roof:

Live Loads:

Roof Snow Load:	30 psf	(Connecticut Supplement)
Service Load:	25 psf	(Equipment Platform Only)
Penthouse Floor Load:	150 psf	(Assumed)

Dead Loads:

Roof Snow Load:	30 psf	(Connecticut Supplement)
Roof (Type 0):	5 psf	(See pg. 170 for Breakdown)
Roof (Type 1):	46 psf	(See pg. 170 for Breakdown)
Roof (Type 2):	85 psf	(See pg. 170 for Breakdown)
Roof (Type 3):	95 psf	(See pg. 170 for Breakdown)
Penthouse Wall:	50 psf	
Penthouse Roof:	10 psf	
FRP Enclosure:	30 plf	

2. EIA/TIA -222- F Structural Standards for Steel Antenna Towers and Antenna Supporting Structures

City/Town:	Stamford	
County:	Fairfield	
Wind Load:	85 mph	(fastest mile)
Nominal Ice Thickness:	3/4 inch	

3. Approximate height above grade to the top of the FRP enclosures:

105'-9"+/-

ANTENNA / RRH SUPPORT RECOMMENDATIONS:

The new antennas and RRH's are proposed to be mounted on new pipe masts within new FRP enclosures. The FRP enclosures are proposed to be mounted on new steel frames secured to the existing building structure.

EQUIPMENT SUPPORT RECOMMENDATIONS:

The new equipment shelter and generator are proposed to be mounted on a new steel equipment platform secured to the existing building structure.

Limitations and assumptions:

1. Reference the latest HDG construction drawings for all the equipment locations and details.
2. Mount all equipment per manufacturer's specifications.
3. All structural members and their connections are assumed to be in good condition and are free from defects with no deterioration to its member capacities.
4. All antennas, coax cables and waveguide cables are assumed to be properly installed and supported as per the manufacturer requirements.
5. HDG is not responsible for any modifications completed prior to and hereafter which HDG was not directly involved.
6. If field conditions differ from what is assumed in this report, then the engineer of record is to be notified as soon as possible.

FIELD PHOTOS:

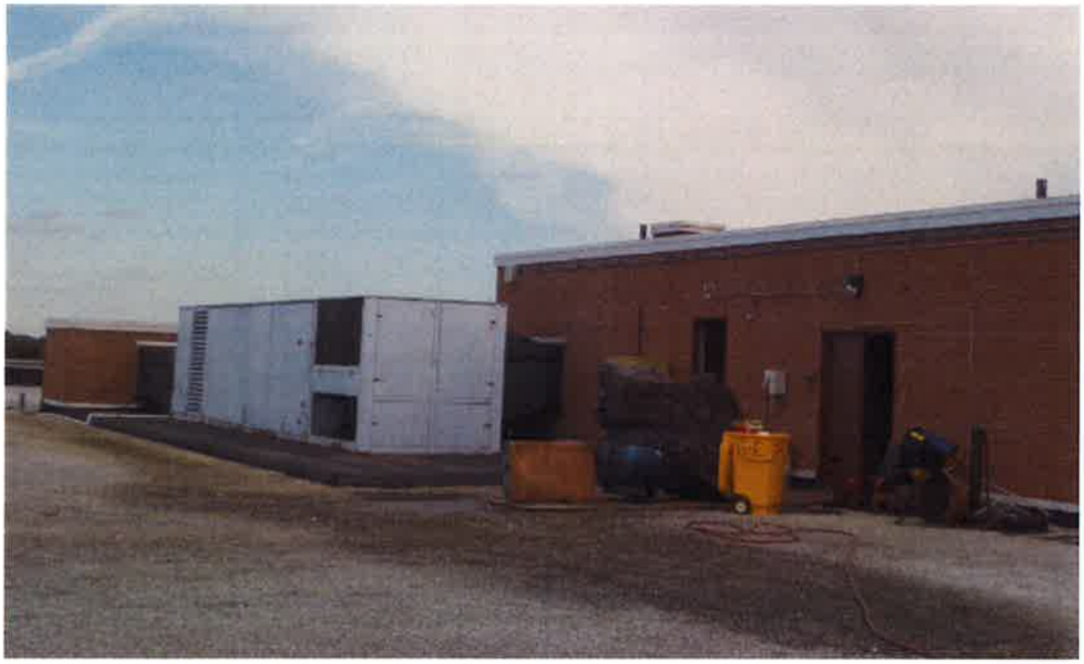


Photo 1: Sample photo illustrating the location of the proposed Alpha sector frame and the new equipment platform (existing HVAC unit to be removed).

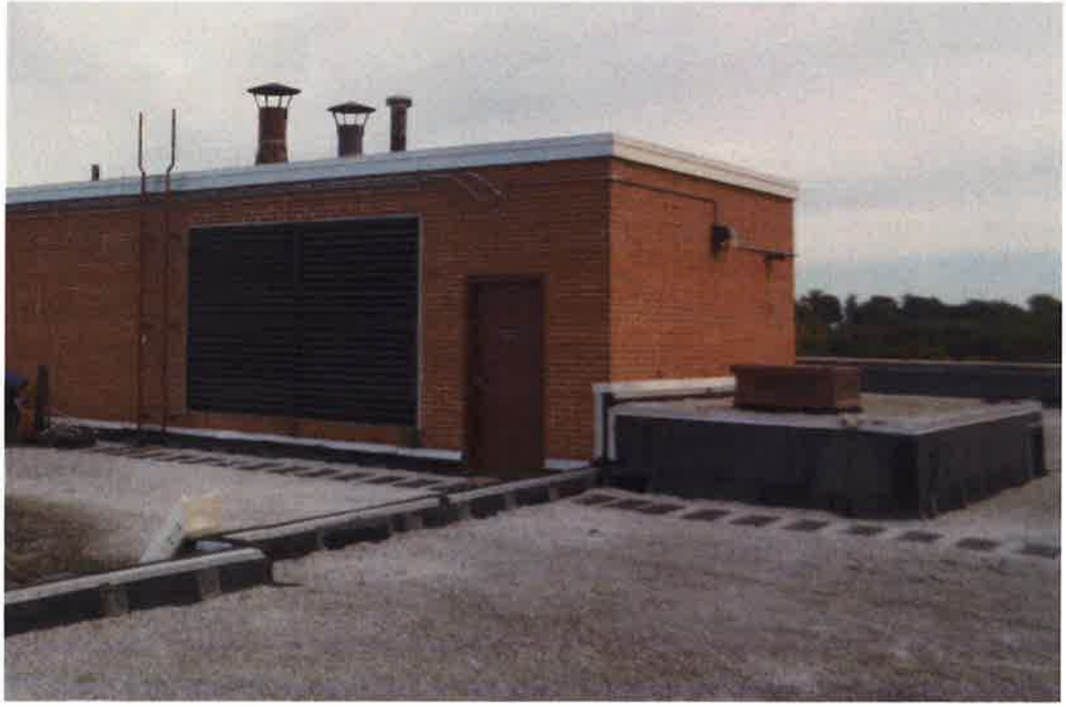


Photo 2: Sample photo illustrating the location of the proposed Beta/Gamma sector frame (existing ladder to be relocated).

FIELD PHOTOS (CONT.):

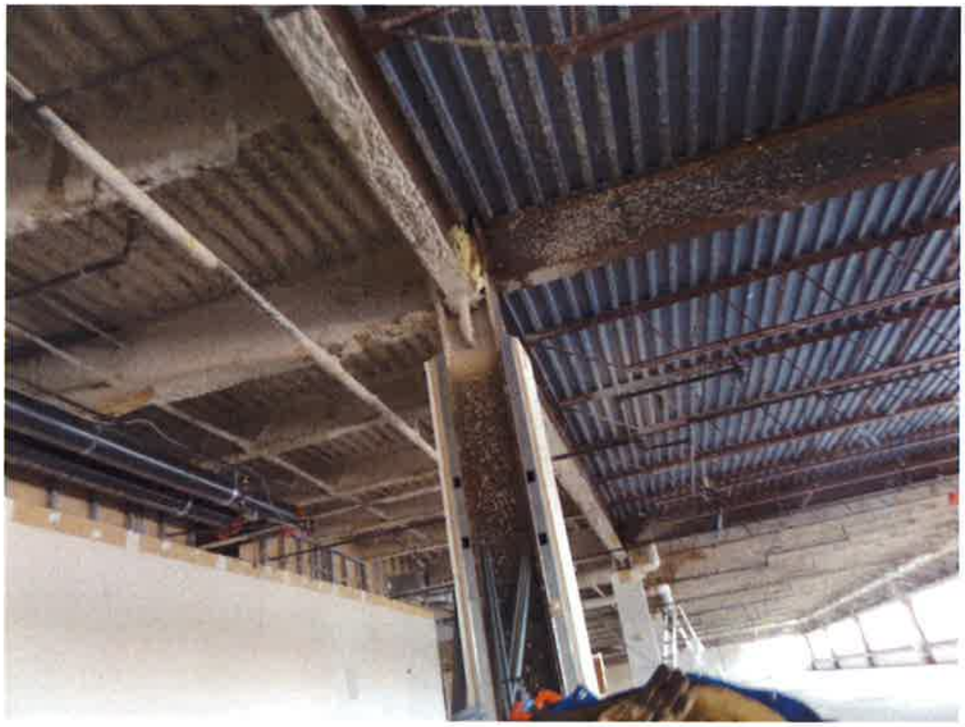


Photo 3: Sample photo illustrating the existing roof construction.

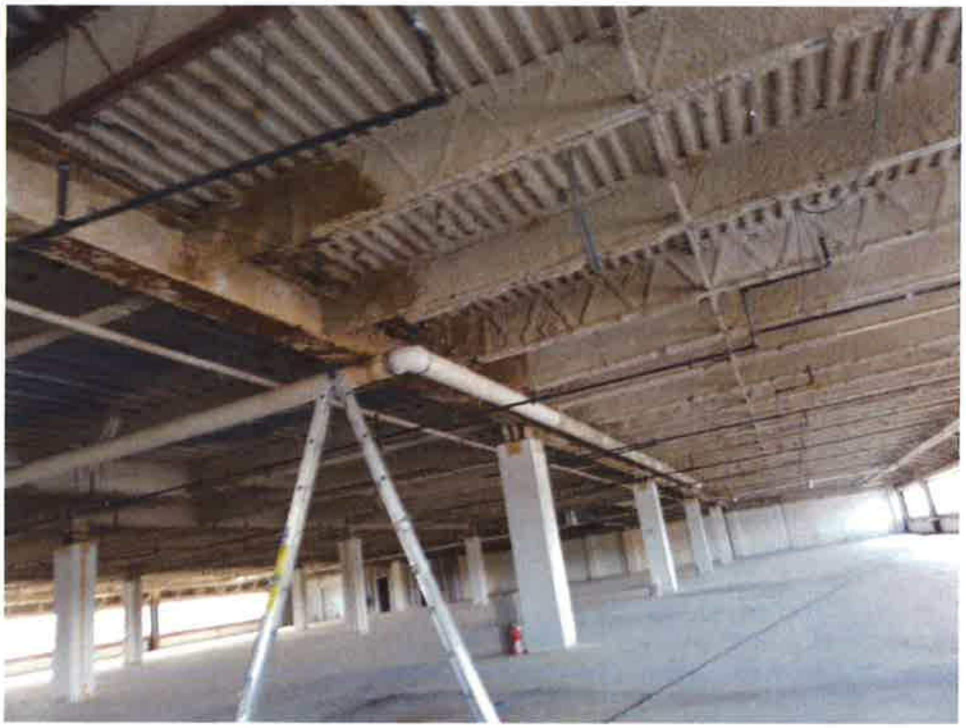


Photo 4: Sample photo illustrating the existing roof construction.

Alpha Sector
Antenna Frame Calculations

Date: 11-04-2014
Project Name: Stamford Harbor
Project Number: S2900
Designed By: GH Checked By: MSC

Hudson Design Group LLC

Wind Analysis → FRP Enclosure (ALPHA Sector)

Wind Blowing East - West

Reference Codes:

-IBC 2003 with 2005 Connecticut Supplement with 2009 Amendments

-Minimum Design Loads for Buildings and Other Structures (ASCE 7-05)

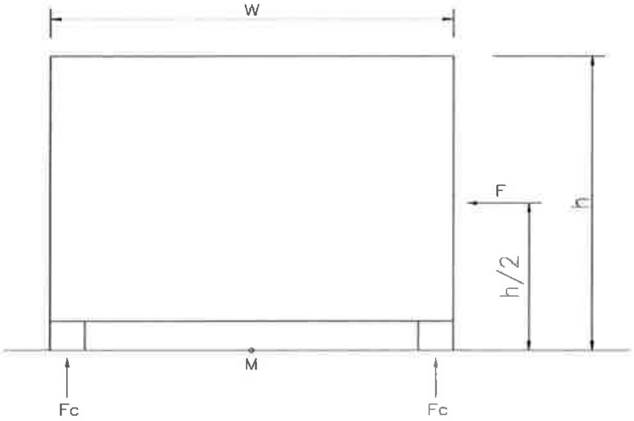
Structure Classification	II		(ASCE 7-05 Table 1-1)
Basic Wind Speed, V	105	mph	(Connecticut Supplement)
Importance Factor, I	1		(ASCE 7-05 Table 6-1)
Exposure Category	D		(ASCE 7-05 Section 6.5.6.3)
Height Above Ground Level, z	106.75	ft	(Top of Enclosure)
Exposure Coeficient, K_z	1.46		(ASCE 7-05 Table 6-3)
Wind Directionality Coef., K_d	0.90		(ASCE 7-05 Table 6-4)
Topographic Facto, K_{zt}	1.00		(ASCE 7-05 Section 6.5.7.2)
Velocity Pressure, q_z	$= 0.00256K_zK_{zt}K_dV^2I$ = **37.16** **psf**		(ASCE 7-05 Equation 6-15)
Gust Factor, G	0.85		(ASCE 7-05 Section 6.5.8)
Net Force Coeficient, C_f	1.31		(ASCE 7-05 Figure 6.21)
Projected Area Normal to Wind, A_f	198	ft^2	(20.83 ft. W x 9.5 ft. H)
Wind Force, F	$= q_zGC_fA_f$ = **8193.34** **lbs**		(ASCE 7-05 Equation 6-28)

Date: 11-04-2014
Project Name: Stamford Harbor
Project Number: S2900
Designed By: GH Checked By: MSC

Calculate Overturning Moment of Proposed FRP Enclosure (ALPHA)

Wind Blowing East - West

Dimensions (ft)	Wide, w	Depth, d	Height, h
	20.83	7.67	9.5



Moment, M = F x h/2
= **38918.35** **lb-ft**

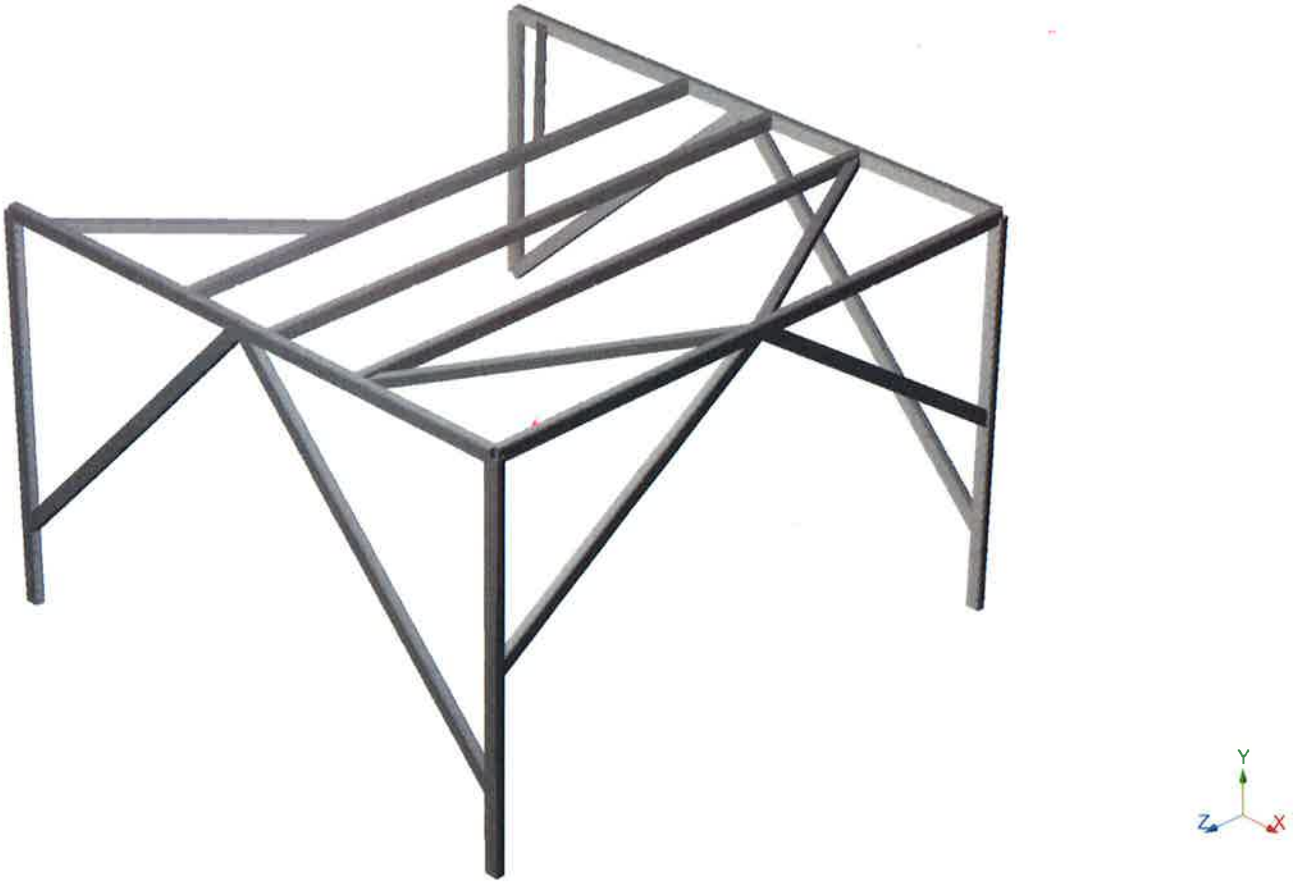
Calculate Force Couple

Force Couple, F_c = M / w
= **5074.10** **lbs.**

Length of Frame: **20.1667** **ft.**

Loading = **251.61** **plf**

Current Date: 10/24/2014 9:23 AM
Units system: English
File name: R:\STRUCTURAL DEPT\Analysis Software\RAM Elements\RAM Projects\S2900 Alpha Frame (Wind East).etz\



ALPHA FRAME
(WIND BLOWING EAST)

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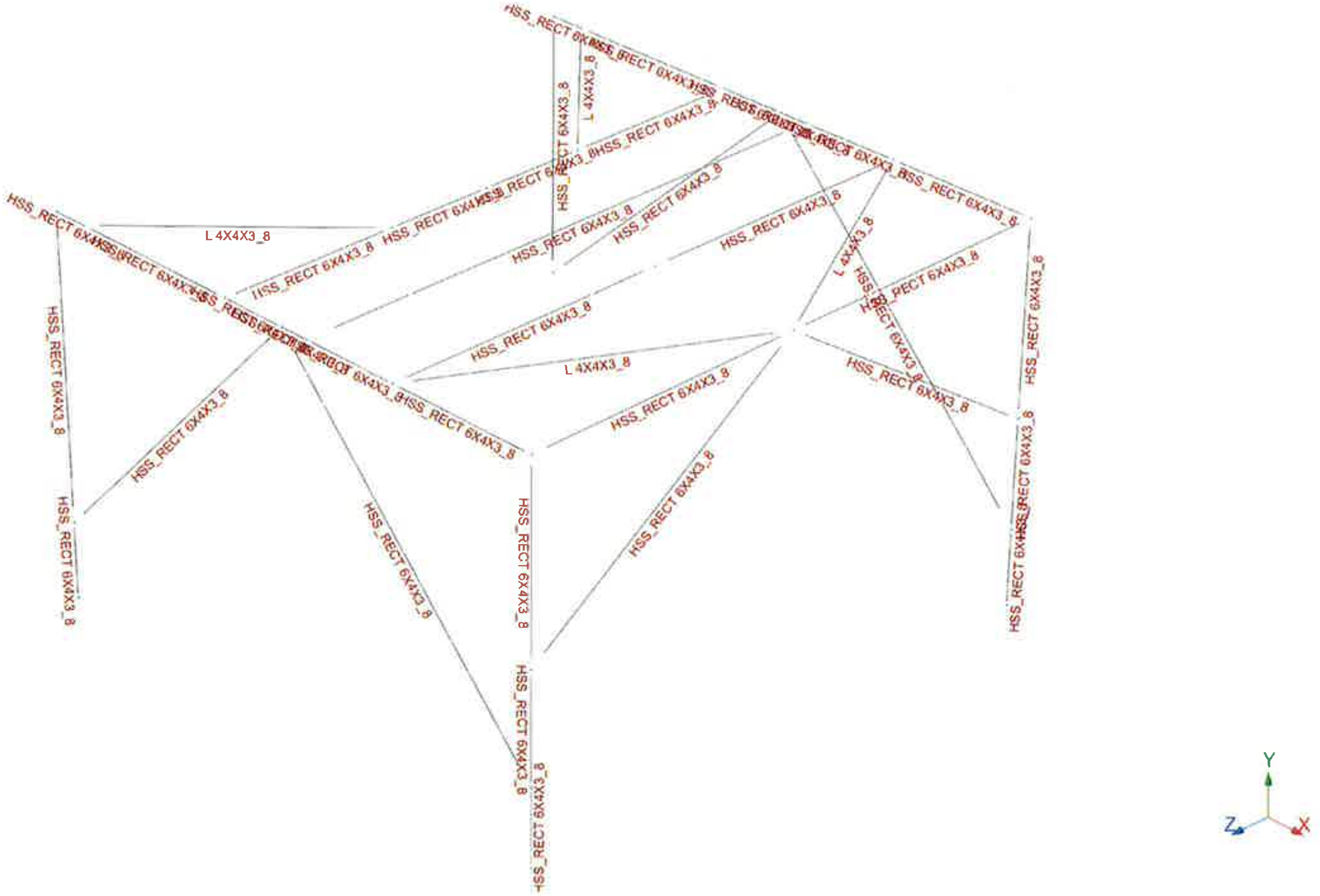
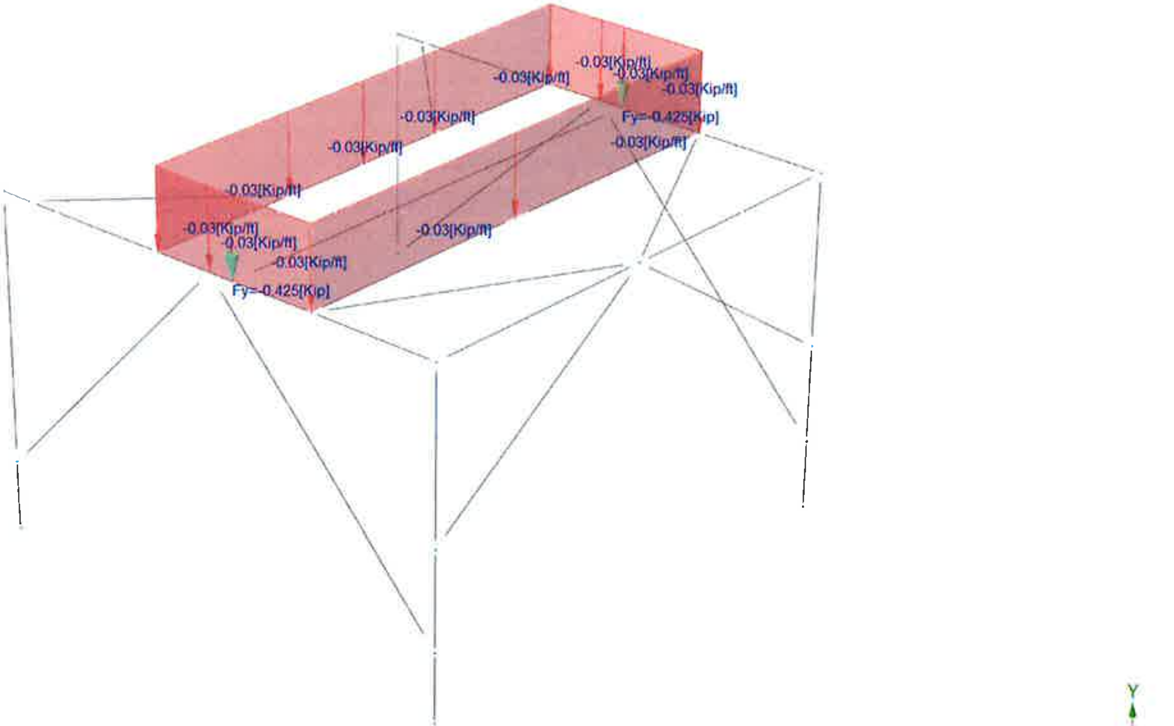


ALPHA FRAME
(WIND BLOWING EAST)

Current Date: 11/4/2014 10:21 AM
Units system: English
File name: R:\STRUCTURAL DEPT\Analysis Software\RAM Elements\RAM Projects\S2900 Alpha Frame (Wind East).etz\
Load condition: DL=Dead Load

Loads

- 🟥 Global distributed - Members
- 🟩 Local distributed - Members
- 🟩 Concentrated - Nodes

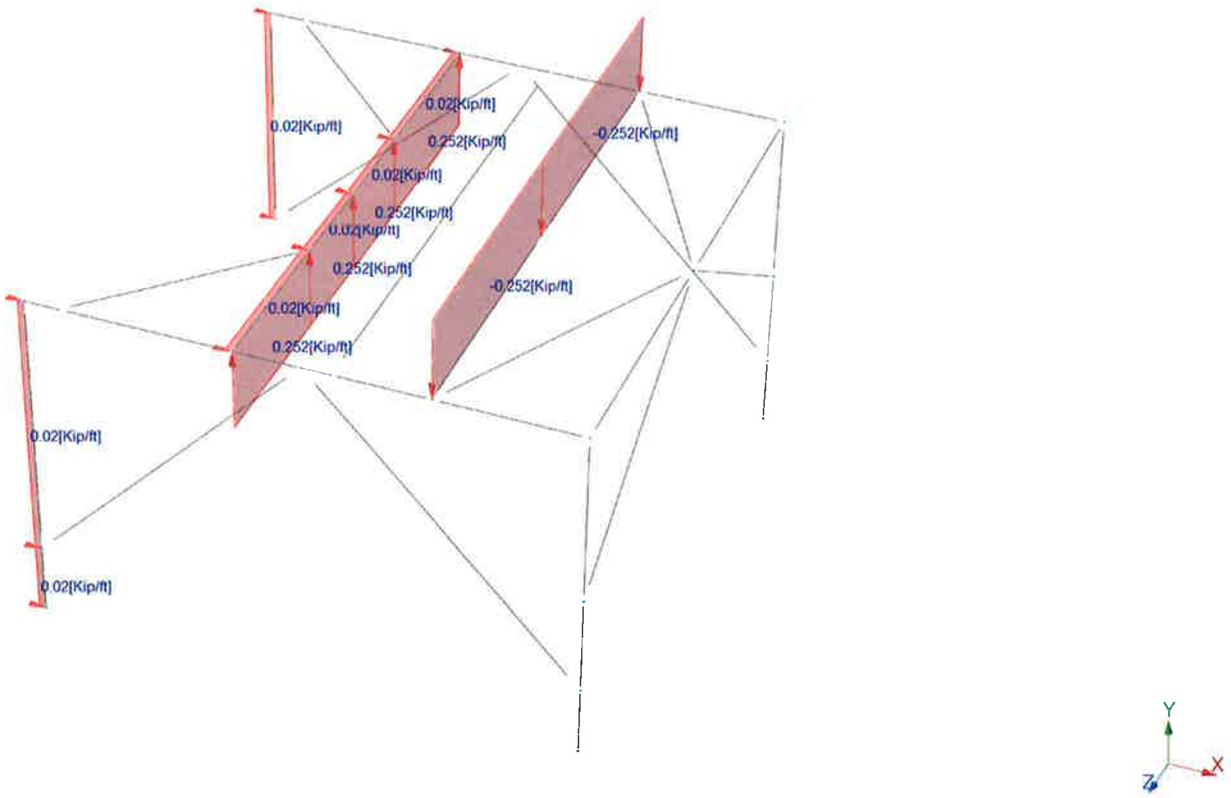


Bentley

Current Date: 11/4/2014 10:17 AM
Units system: English
File name: R:\STRUCTURAL DEPT\Analysis Software\RAM Elements\RAM Projects\S2900 Alpha Frame (Wind East).etz\
Load condition: W=Wind

Loads

🟥 Global distributed - Members
🟩 Local distributed - Members

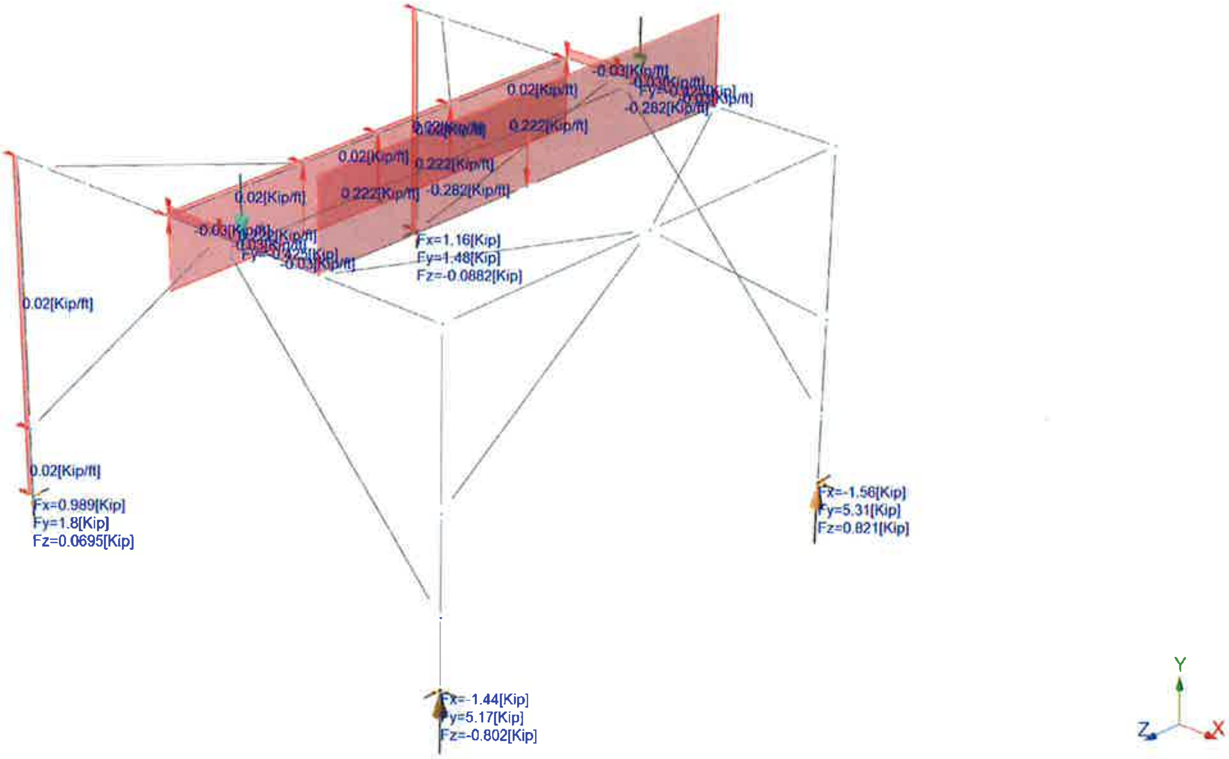


ALPHA FRAME
(WIND BLOWING EAST)

Current Date: 11/4/2014 10:18 AM
Units system: English
File name: R:\STRUCTURAL DEPT\Analysis Software\RAM Elements\RAM Projects\S2900 Alpha Frame (Wind East).etz\
Load condition: D2=DL+W

Loads

🟥 Global distributed - Members
🟩 Local distributed - Members
🟩 Concentrated - Nodes



ALPHA FRAME
(WIND BLOWING EAST)

Current Date: 11/4/2014 10:19 AM
Units system: English
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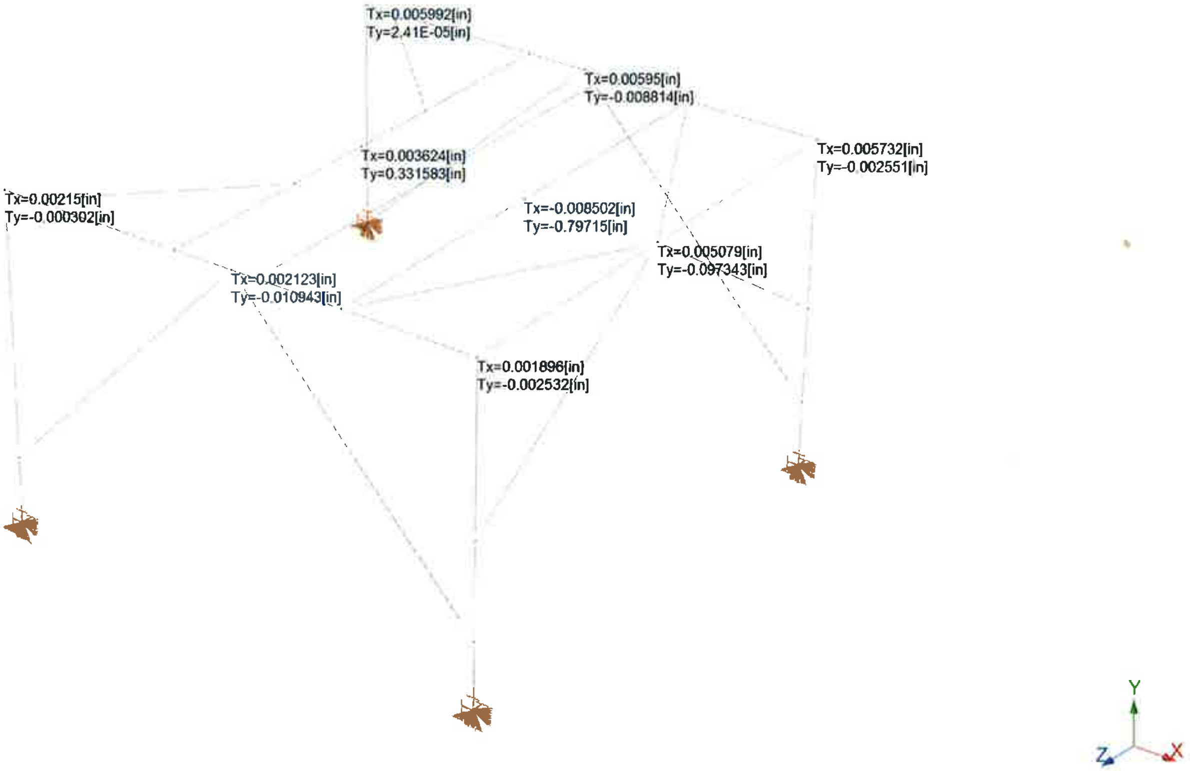
Load condition: D2=DL+W

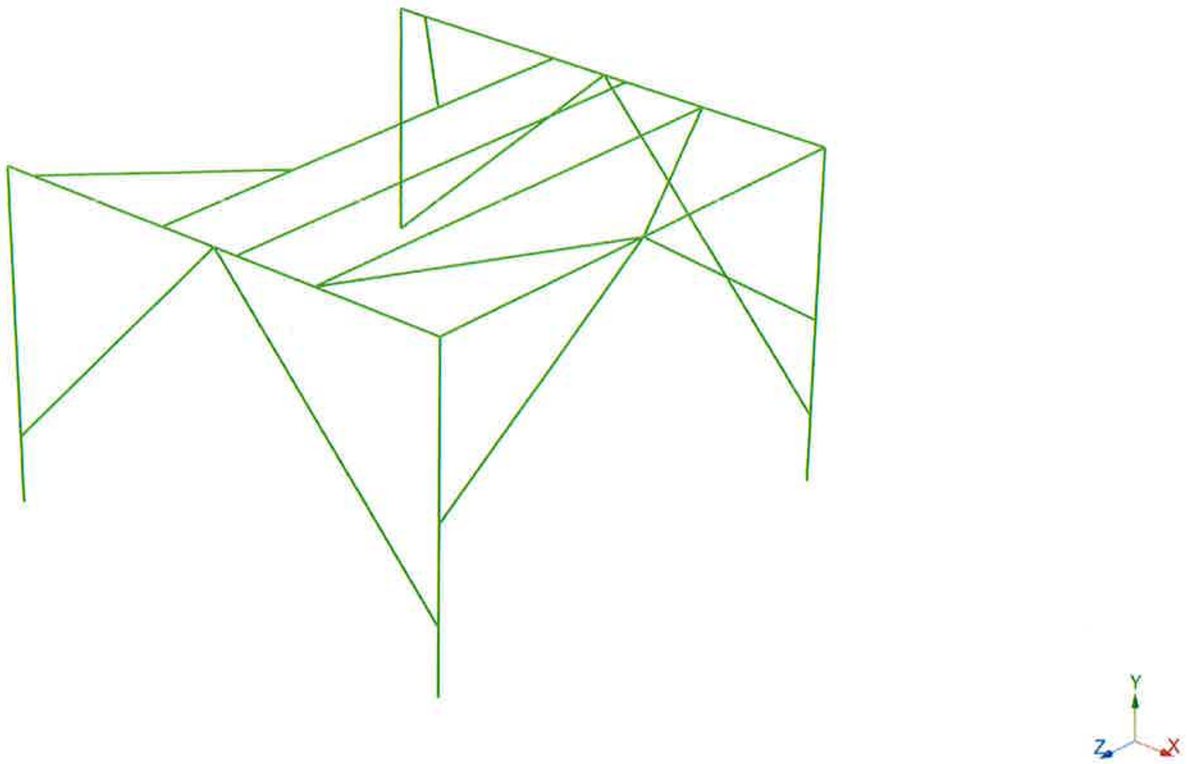


ALPHA FRAME
(WIND BLOWING EAST)

Current Date: 11/4/2014 10:19 AM
Units system: English
File name: R:\STRUCTURAL DEPT\Analysis Software\RAM Elements\RAM Projects\S2900 Alpha Frame (Wind East).etz\
Load condition: D2=DL+W

Design status

⬛ Not designed
🟥 Error on design
🟩 Design O.K.
🟨 With warnings



ALPHA FRAME
(WIND BLOWING EAST)

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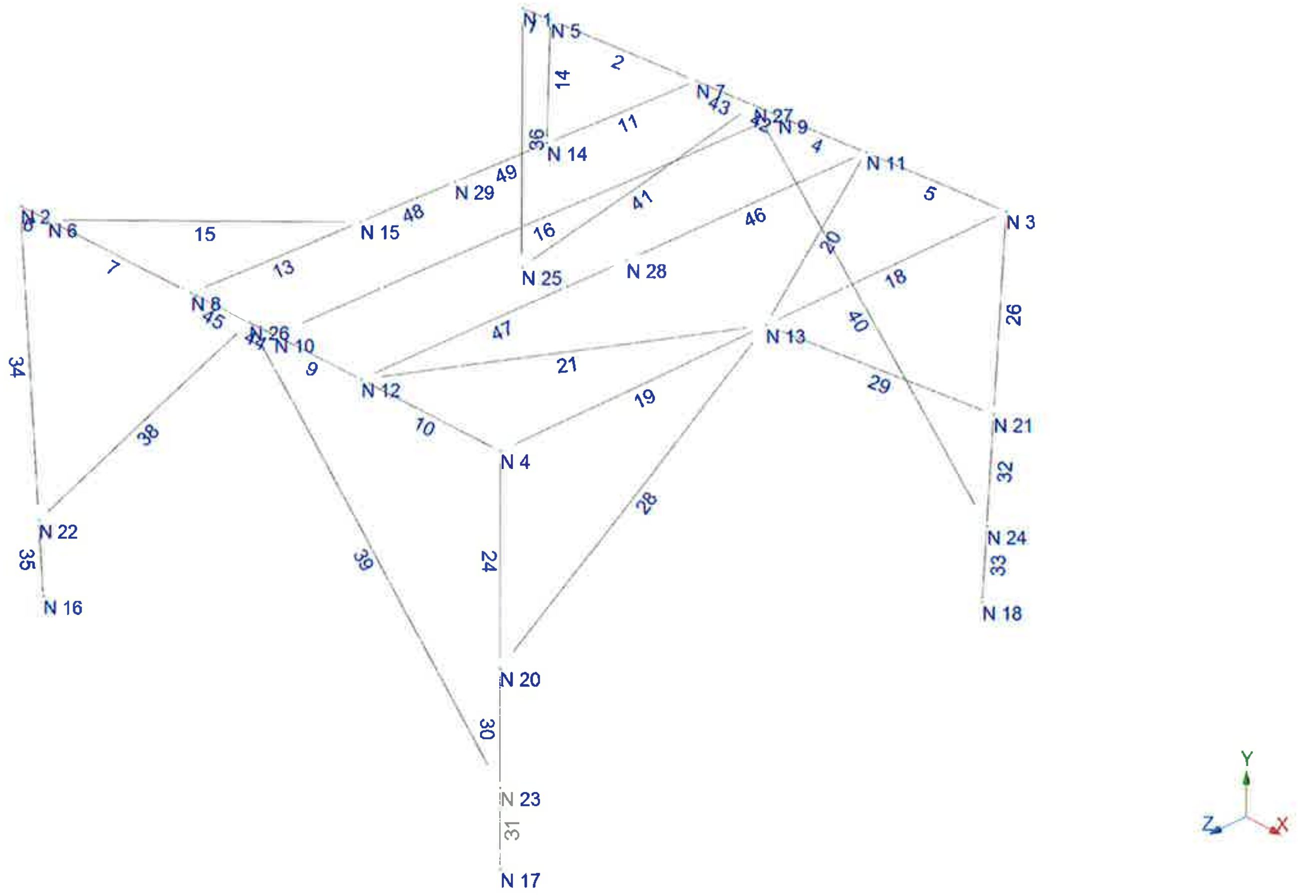
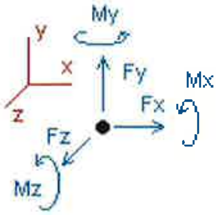


ALPHA FRAME
(WIND BLOWING EAST)

Current Date: 11/4/2014 10:19 AM
Units system: English
File name: R:\STRUCTURAL DEPT\Analysis Software\RAM Elements\RAM Projects\S2900 Alpha Frame (Wind East).etz\

Analysis result

Reactions



Direction of positive forces and moments

	Forces [Kip]			Moments [Kip*ft]		
Node	**FX**	**FY**	**FZ**	**MX**	**MY**	**MZ**
Condition **D1=DL**						
16	0.96996	1.69055	-0.08918	-0.26148	0.18408	-1.67919
17	-0.99626	2.43495	-0.34626	-0.97172	-0.05452	1.72115
18	-1.08100	2.47963	0.31124	0.85638	0.06501	1.91449
25	1.10730	1.51442	0.12420	0.16583	-0.36455	0.20692
SUM	0.00000	8.11956	0.00000	-0.21099	-0.16998	2.16336
Condition **D2=DL+W**						
16	0.98857	1.80478	0.06948	0.32148	0.09918	-1.67384
17	-1.43514	5.16713	-0.80201	-2.27444	0.19418	2.48455
18	-1.56352	5.31015	0.82077	2.33951	-0.18029	2.75774
25	1.15876	1.47704	-0.08823	-0.25017	-0.12298	0.36554
SUM	-0.85133	13.75911	0.00000	0.13638	-0.00992	3.93399
Condition **D3=0.6DL+W**						
16	0.60059	1.12856	0.10515	0.42607	0.02555	-1.00216
17	-1.03664	4.19315	-0.66351	-1.88575	0.21598	1.79609
18	-1.13112	4.31830	0.69627	1.99696	-0.20630	1.99194
25	0.71584	0.87127	-0.13791	-0.31650	0.02284	0.28278
SUM	-0.85133	10.51129	0.00000	0.22077	0.05807	3.06864

Bentley

Current Date: 11/4/2014 10:19 AM
Units system: English
File name: R:\STRUCTURAL DEPT\Analysis Software\RAM Elements\RAM Projects\S2900 Alpha Frame (Wind East).etz\

Steel Code Check

Report: Summary - For all selected load conditions

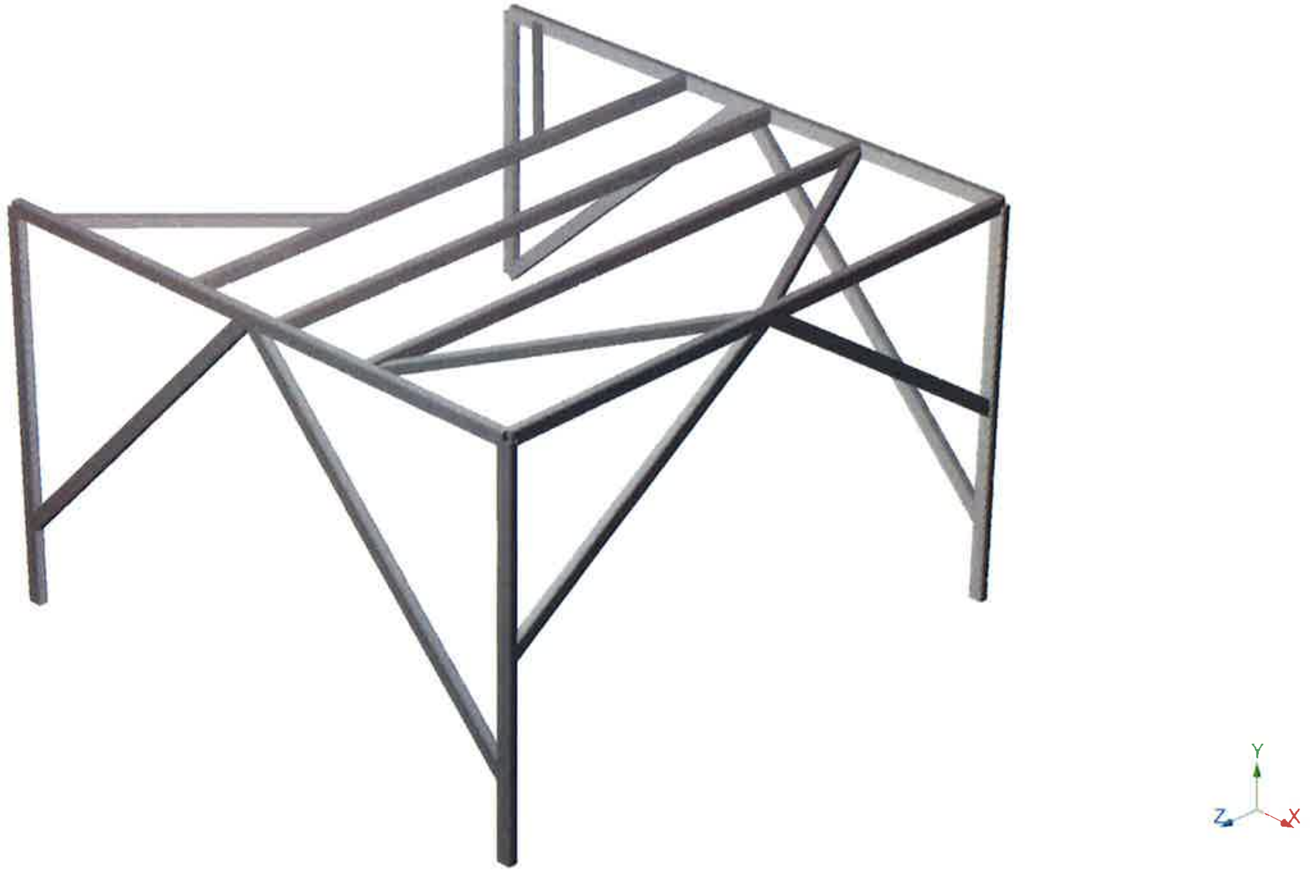
Load conditions to be included in design :

D1=DL
D2=DL+W
D3=0.6DL+W

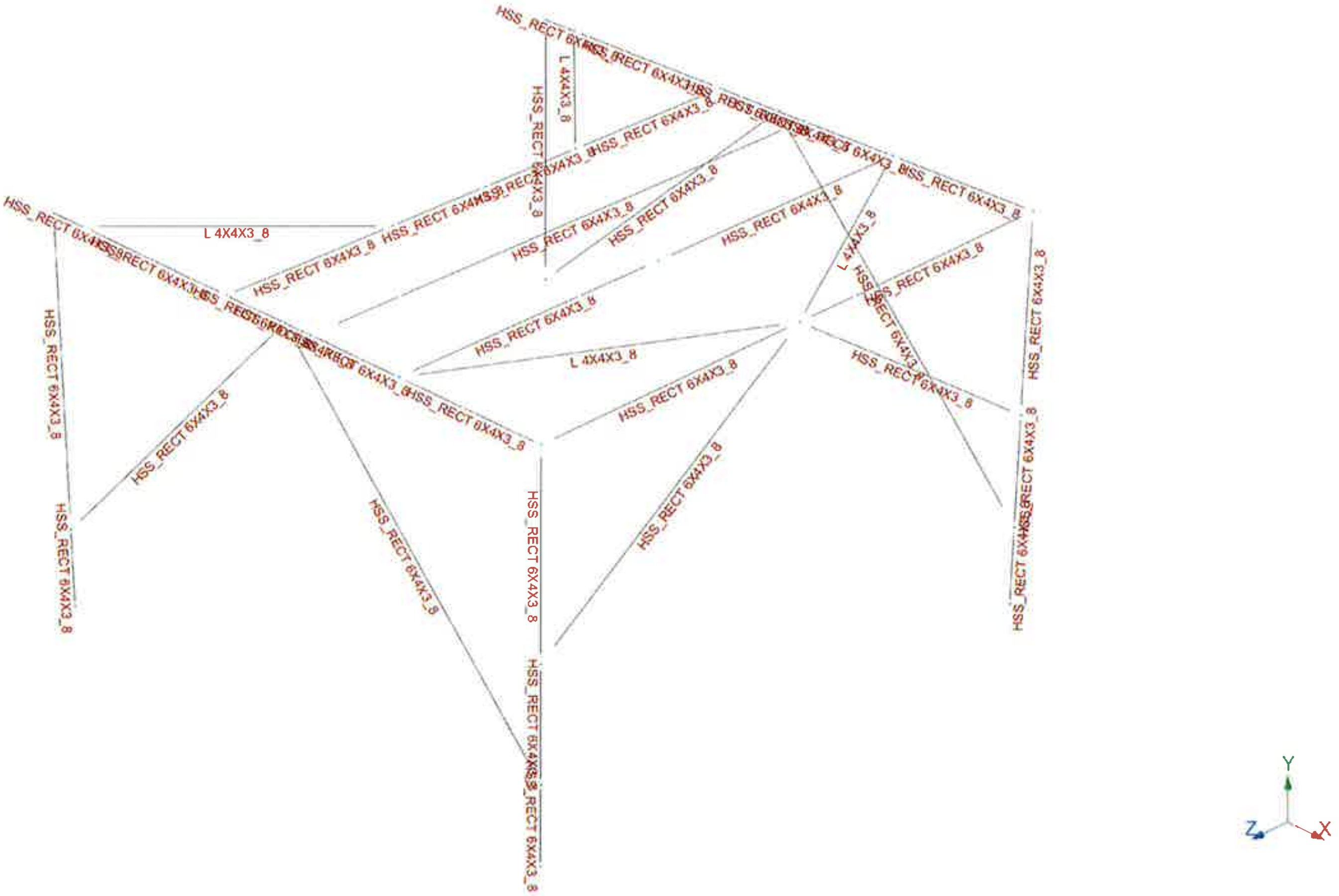
Description	Section	Member	Ctrl Eq.	Ratio	Status	Reference
	HSS_RECT 6X4X3_8	1	D1 at 0.00%	0.02	OK	
			D2 at 0.00%	0.04	OK	
			D3 at 0.00%	**0.05**	**OK**	
		2	D1 at 0.00%	0.02	OK	
			D2 at 100.00%	0.09	OK	Eq. H1-1b
			D3 at 100.00%	**0.10**	**OK**	Eq. H1-1b
		4	D1 at 100.00%	0.05	OK	Eq. H1-1b
			D2 at 100.00%	**0.24**	**OK**	Eq. H1-1b
			D3 at 100.00%	0.22	OK	Eq. H1-1b
		5	D1 at 100.00%	0.04	OK	Eq. H1-1b
			D2 at 100.00%	**0.21**	**OK**	Eq. H1-1b
			D3 at 100.00%	0.20	OK	Eq. H1-1b
		6	D1 at 0.00%	0.02	OK	
			D2 at 0.00%	0.04	OK	
			D3 at 0.00%	**0.05**	**OK**	
		7	D1 at 50.00%	0.02	OK	Eq. H1-1b
			D2 at 100.00%	0.09	OK	Eq. H1-1b
			D3 at 100.00%	**0.09**	**OK**	Eq. H1-1b
		9	D1 at 100.00%	0.04	OK	Eq. H1-1b
			D2 at 100.00%	**0.25**	**OK**	Eq. H1-1b
			D3 at 100.00%	0.23	OK	Eq. H1-1b
		10	D1 at 100.00%	0.04	OK	Eq. H1-1b
			D2 at 100.00%	**0.21**	**OK**	Eq. H1-1b
			D3 at 100.00%	0.19	OK	Eq. H1-1b
		11	D1 at 100.00%	0.05	OK	Eq. H1-1b
			D2 at 0.00%	0.15	OK	Eq. H1-1b
			D3 at 0.00%	**0.16**	**OK**	Eq. H1-1b
		13	D1 at 100.00%	0.05	OK	Eq. H1-1b
			D2 at 0.00%	0.15	OK	Eq. H1-1b
			D3 at 0.00%	**0.16**	**OK**	Eq. H1-1b
		16	D1 at 50.00%	0.04	OK	Eq. H1-1b
			D2 at 50.00%	**0.07**	**OK**	Eq. H1-1b
			D3 at 50.00%	0.06	OK	Eq. H1-1b
		18	D1 at 50.00%	0.02	OK	Eq. H1-1b
			D2 at 25.00%	**0.05**	**OK**	Eq. H1-1b

	D3 at 18.75%	0.04	OK	Eq. H1-1b
19	D1 at 50.00%	0.02	OK	Eq. H1-1b
	D2 at 25.00%	**0.05**	**OK**	Eq. H1-1b
	D3 at 18.75%	0.04	OK	Eq. H1-1b
24	D1 at 0.00%	0.03	OK	Eq. H1-1b
	D2 at 0.00%	**0.16**	**OK**	Eq. H1-1b
	D3 at 0.00%	0.15	OK	Eq. H1-1b
26	D1 at 0.00%	0.03	OK	Eq. H1-1b
	D2 at 0.00%	**0.16**	**OK**	Eq. H1-1b
	D3 at 0.00%	0.14	OK	Eq. H1-1b
28	D1 at 0.00%	0.03	OK	Eq. H1-1b
	D2 at 0.00%	**0.09**	**OK**	Eq. H1-1b
	D3 at 0.00%	0.08	OK	Eq. H1-1b
29	D1 at 100.00%	0.03	OK	Eq. H1-1b
	D2 at 100.00%	**0.10**	**OK**	Eq. H1-1b
	D3 at 100.00%	0.08	OK	Eq. H1-1b
30	D1 at 0.00%	0.06	OK	Eq. H1-1b
	D2 at 0.00%	**0.16**	**OK**	Eq. H1-1b
	D3 at 0.00%	0.13	OK	Eq. H1-1b
31	D1 at 0.00%	0.11	OK	Eq. H1-1b
	D2 at 0.00%	**0.22**	**OK**	Eq. H1-1b
	D3 at 0.00%	0.17	OK	Eq. H1-1b
32	D1 at 0.00%	0.06	OK	Eq. H1-1b
	D2 at 0.00%	**0.16**	**OK**	Eq. H1-1b
	D3 at 0.00%	0.14	OK	Eq. H1-1b
33	D1 at 0.00%	0.11	OK	Eq. H1-1b
	D2 at 0.00%	**0.23**	**OK**	Eq. H1-1b
	D3 at 0.00%	0.18	OK	Eq. H1-1b
34	D1 at 0.00%	0.03	OK	Eq. H1-1b
	D2 at 0.00%	0.07	OK	Eq. H1-1b
	D3 at 0.00%	**0.08**	**OK**	Eq. H1-1b
35	D1 at 0.00%	0.07	OK	Eq. H1-1b
	D2 at 0.00%	**0.08**	**OK**	Eq. H1-1b
	D3 at 0.00%	0.06	OK	Eq. H1-1b
36	D1 at 0.00%	0.03	OK	Eq. H1-1b
	D2 at 0.00%	0.07	OK	Eq. H1-1b
	D3 at 0.00%	**0.09**	**OK**	Eq. H1-1b
38	D1 at 100.00%	0.03	OK	Eq. H1-1b
	D2 at 100.00%	**0.09**	**OK**	Eq. H1-1b
	D3 at 100.00%	0.08	OK	Eq. H1-1b
39	D1 at 100.00%	0.04	OK	Eq. H1-1b
	D2 at 100.00%	**0.10**	**OK**	Eq. H1-1b
	D3 at 100.00%	0.09	OK	Eq. H1-1b
40	D1 at 100.00%	0.04	OK	Eq. H1-1b
	D2 at 100.00%	**0.10**	**OK**	Eq. H1-1b
	D3 at 100.00%	0.09	OK	Eq. H1-1b
41	D1 at 0.00%	0.05	OK	Eq. H1-1b

		D2 at 0.00%	**0.10**	**OK**	Eq. H1-1b
		D3 at 0.00%	0.09	OK	Eq. H1-1b
	42	D1 at 100.00%	0.06	OK	Eq. H1-1b
		D2 at 0.00%	**0.19**	**OK**	
		D3 at 0.00%	0.18	OK	
	43	D1 at 100.00%	0.05	OK	Eq. H1-1b
		D2 at 0.00%	0.17	OK	
		D3 at 0.00%	**0.18**	**OK**	
	44	D1 at 100.00%	0.06	OK	Eq. H1-1b
		D2 at 0.00%	**0.19**	**OK**	
		D3 at 0.00%	0.18	OK	
	45	D1 at 100.00%	0.05	OK	Eq. H1-1b
		D2 at 0.00%	0.17	OK	
		D3 at 0.00%	**0.18**	**OK**	
	46	D1 at 100.00%	0.06	OK	Eq. H1-1b
		D2 at 100.00%	**0.35**	**OK**	Eq. H1-1b
		D3 at 100.00%	0.32	OK	Eq. H1-1b
	47	D1 at 100.00%	0.06	OK	Eq. H1-1b
		D2 at 100.00%	**0.35**	**OK**	Eq. H1-1b
		D3 at 100.00%	0.32	OK	Eq. H1-1b
	48	D1 at 100.00%	0.07	OK	Eq. H1-1b
		D2 at 100.00%	0.16	OK	Eq. H1-1b
		D3 at 100.00%	**0.19**	**OK**	Eq. H1-1b
	49	D1 at 93.75%	0.07	OK	Eq. H1-1b
		D2 at 100.00%	0.16	OK	Eq. H1-1b
		D3 at 100.00%	**0.19**	**OK**	Eq. H1-1b
L 4X4X3_8	**14**	D1 at 0.00%	0.11	OK	Eq. H1-1b
		D2 at 100.00%	0.21	OK	Eq. H1-1b
		D3 at 0.00%	**0.24**	**OK**	Eq. H1-1b
	15	D1 at 0.00%	0.10	OK	Eq. H1-1b
		D2 at 100.00%	0.20	OK	Eq. H1-1b
		D3 at 0.00%	**0.23**	**OK**	Eq. H1-1b
	20	D1 at 0.00%	0.12	OK	Eq. H1-1b
		D2 at 0.00%	**0.75**	**OK**	Eq. H1-1b
		D3 at 0.00%	0.70	OK	Eq. H1-1b
	21	D1 at 0.00%	0.12	OK	Eq. H1-1b
		D2 at 0.00%	**0.75**	**OK**	Eq. H1-1b
		D3 at 0.00%	0.71	OK	Eq. H1-1b

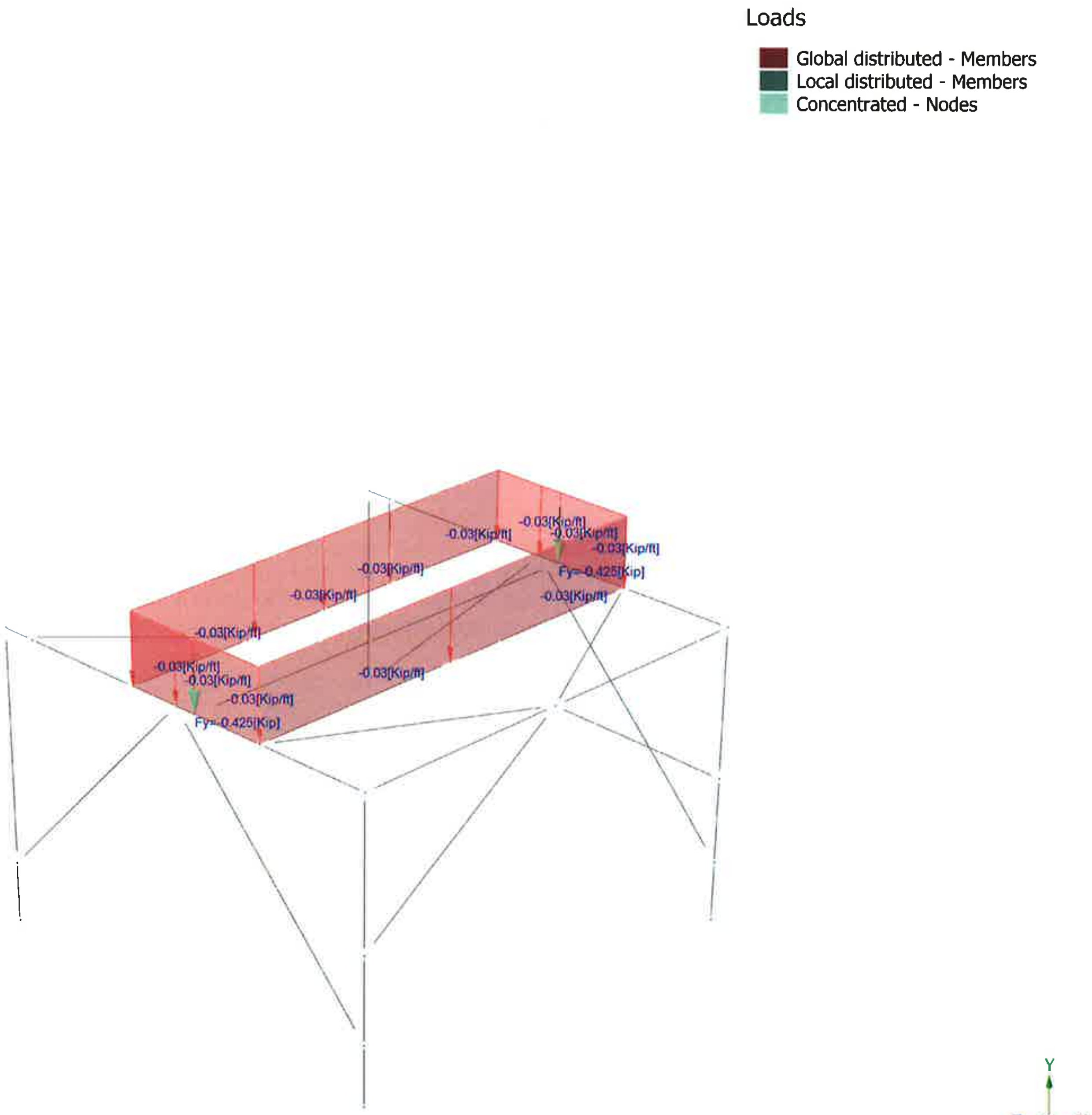


ALPHA FRAME
(WIND BLOWING WEST)

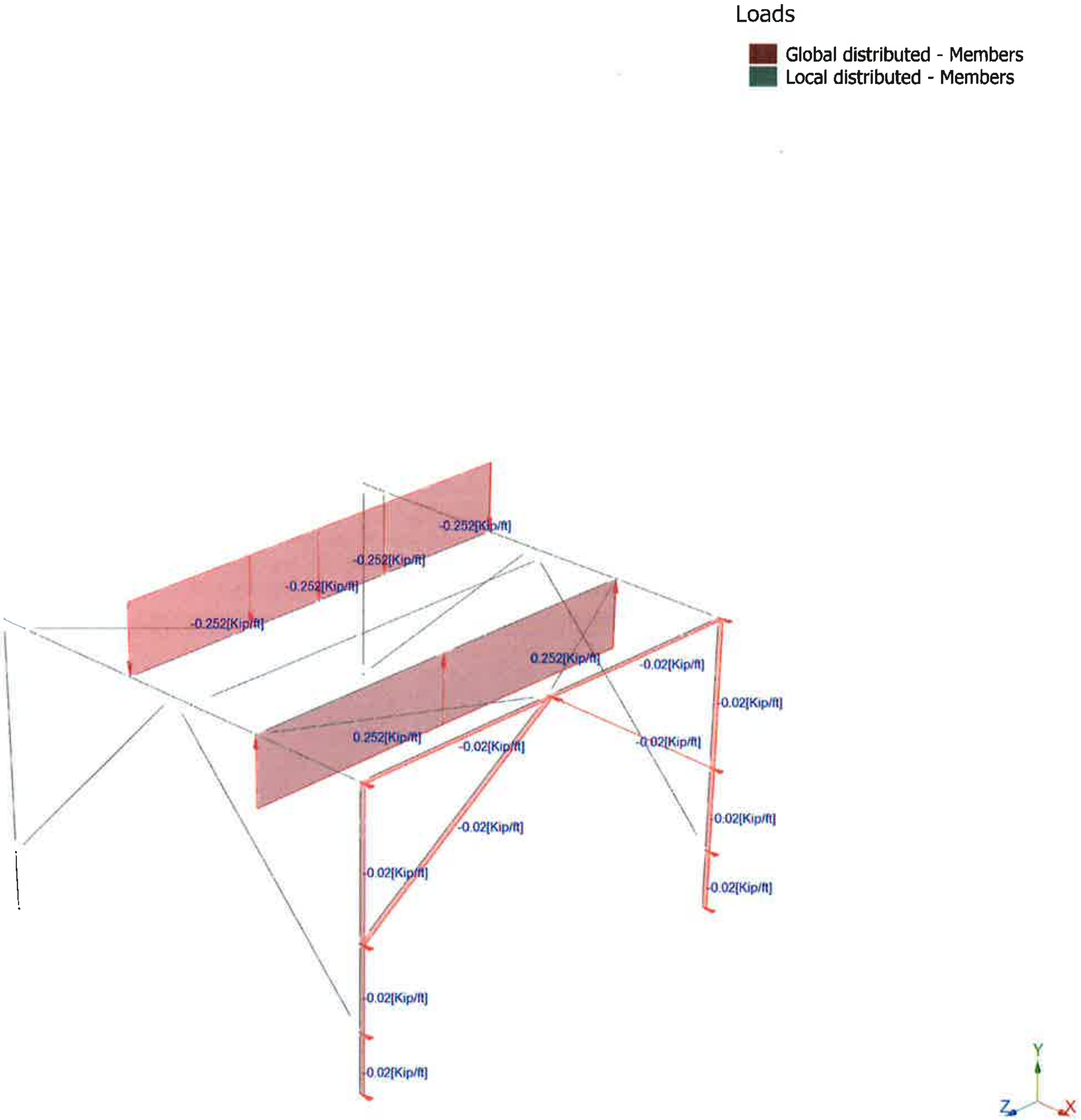


ALPHA FRAME
(WIND BLOWING WEST)

Current Date: 11/4/2014 10:33 AM
Units system: English
File name: R:\STRUCTURAL DEPT\Analysis Software\RAM Elements\RAM Projects\S2900 Alpha Frame (Wind West).etz\
Load condition: DL=Dead Load

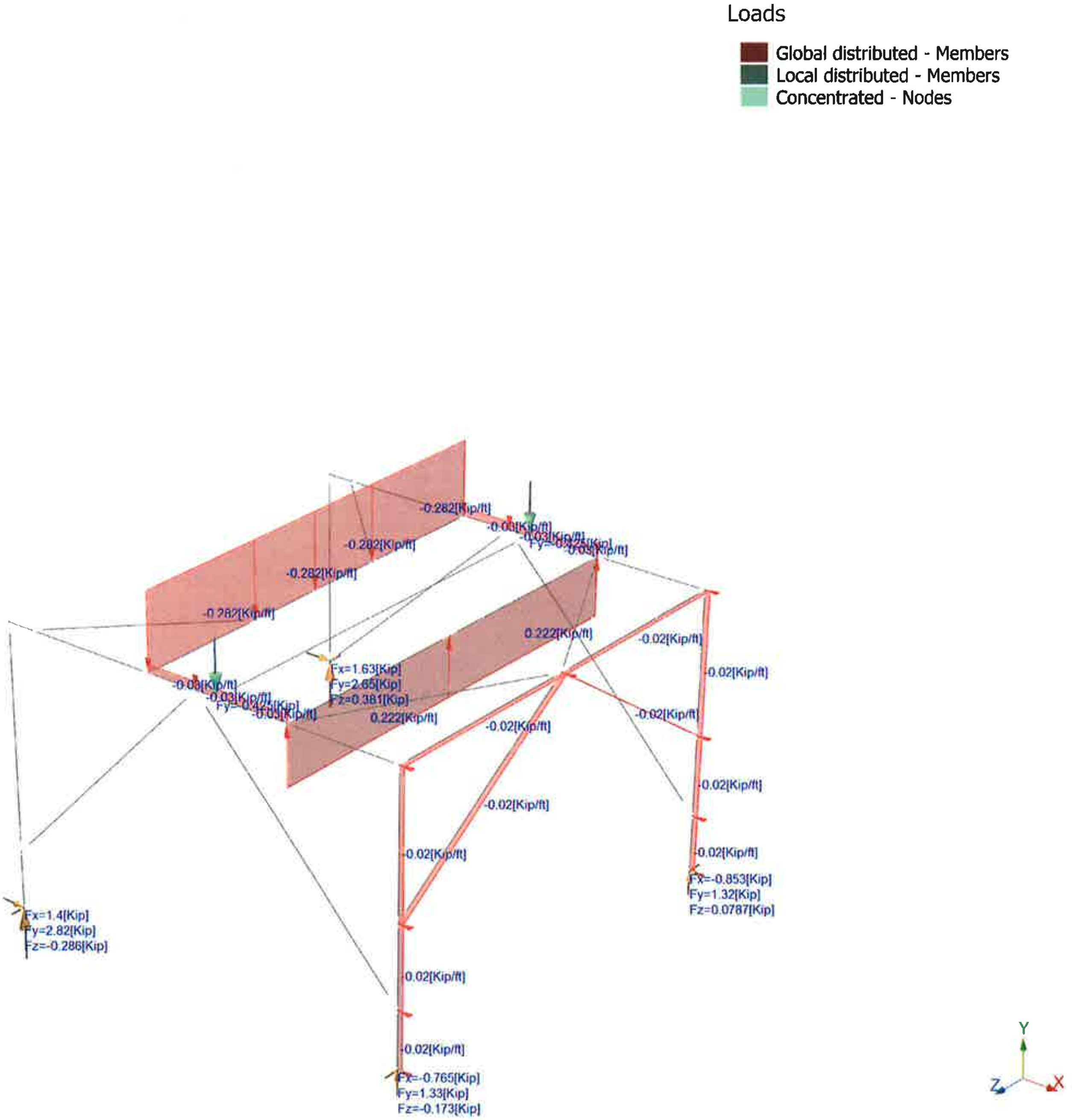


Current Date: 11/4/2014 10:33 AM
Units system: English
File name: R:\STRUCTURAL DEPT\Analysis Software\RAM Elements\RAM Projects\S2900 Alpha Frame (Wind West).etz\
Load condition: W=Wind



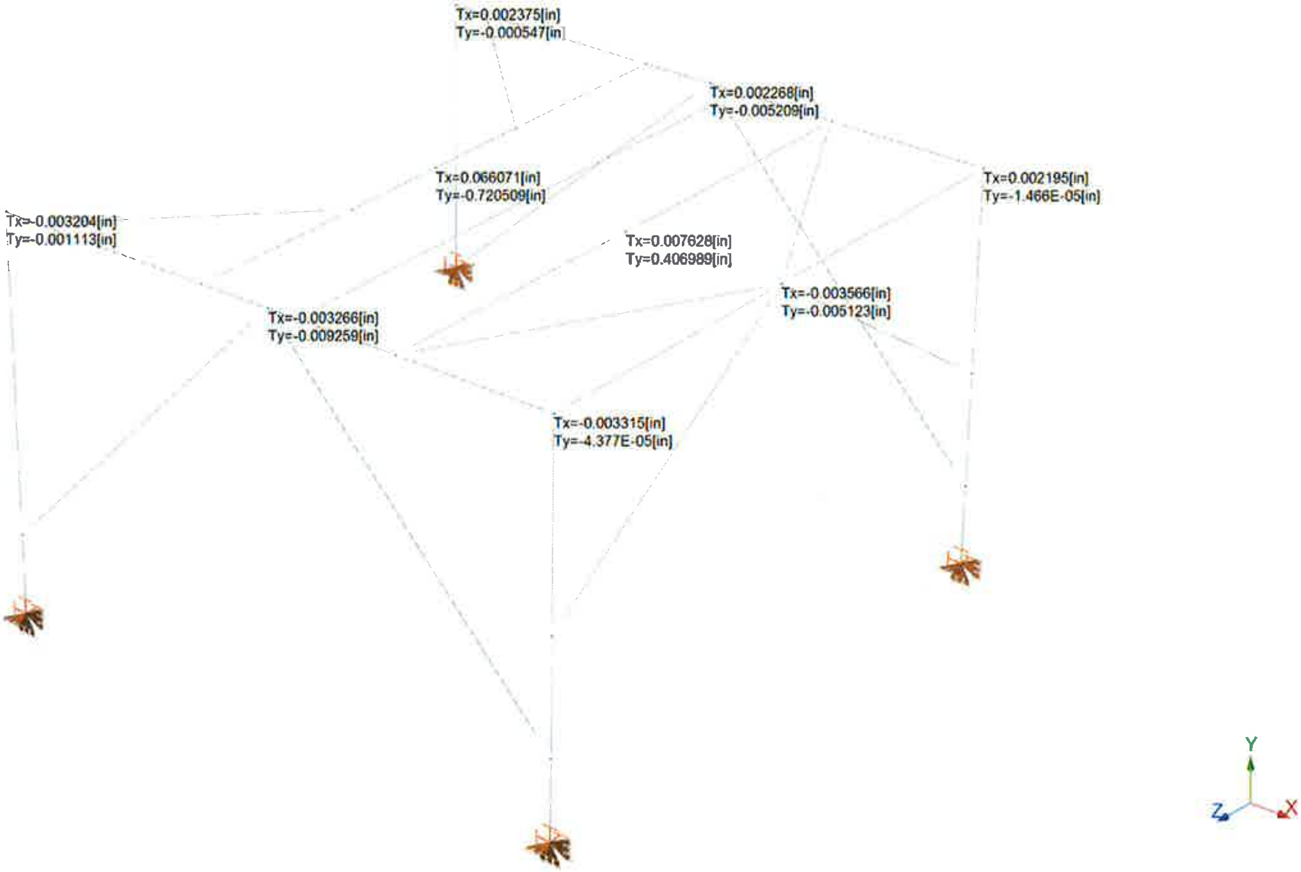
ALPHA FRAME
(WIND BLOWING WEST)

Current Date: 11/4/2014 10:33 AM
Units system: English
File name: R:\STRUCTURAL DEPT\Analysis Software\RAM Elements\RAM Projects\S2900 Alpha Frame (Wind West).etz\
Load condition: D2=DL+W



ALPHA FRAME
(WIND BLOWING WEST)

Current Date: 11/4/2014 10:34 AM
Units system: English
File name: R:\STRUCTURAL DEPT\Analysis Software\RAM Elements\RAM Projects\S2900 Alpha Frame (Wind West).etz\
Load condition: D2=DL+W

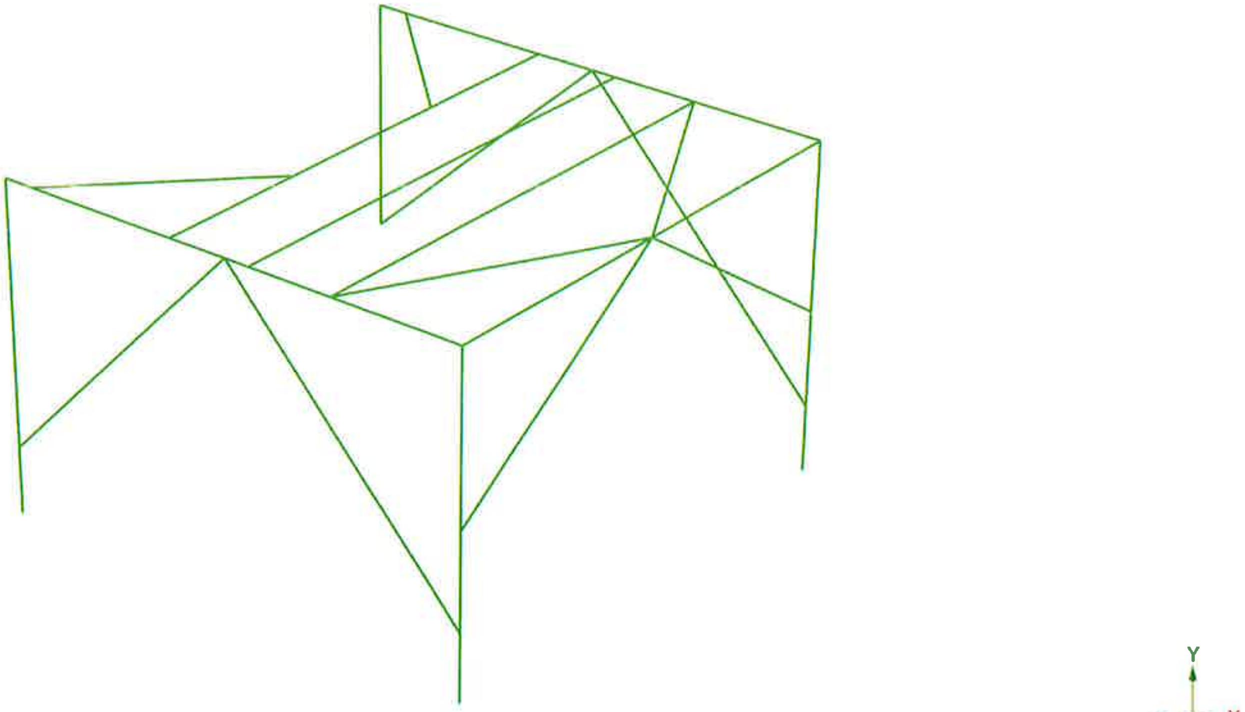


ALPHA FRAME
(WIND BLOWING WEST)

Current Date: 11/4/2014 10:34 AM
Units system: English
File name: R:\STRUCTURAL DEPT\Analysis Software\RAM Elements\RAM Projects\S2900 Alpha Frame (Wind West).etz\

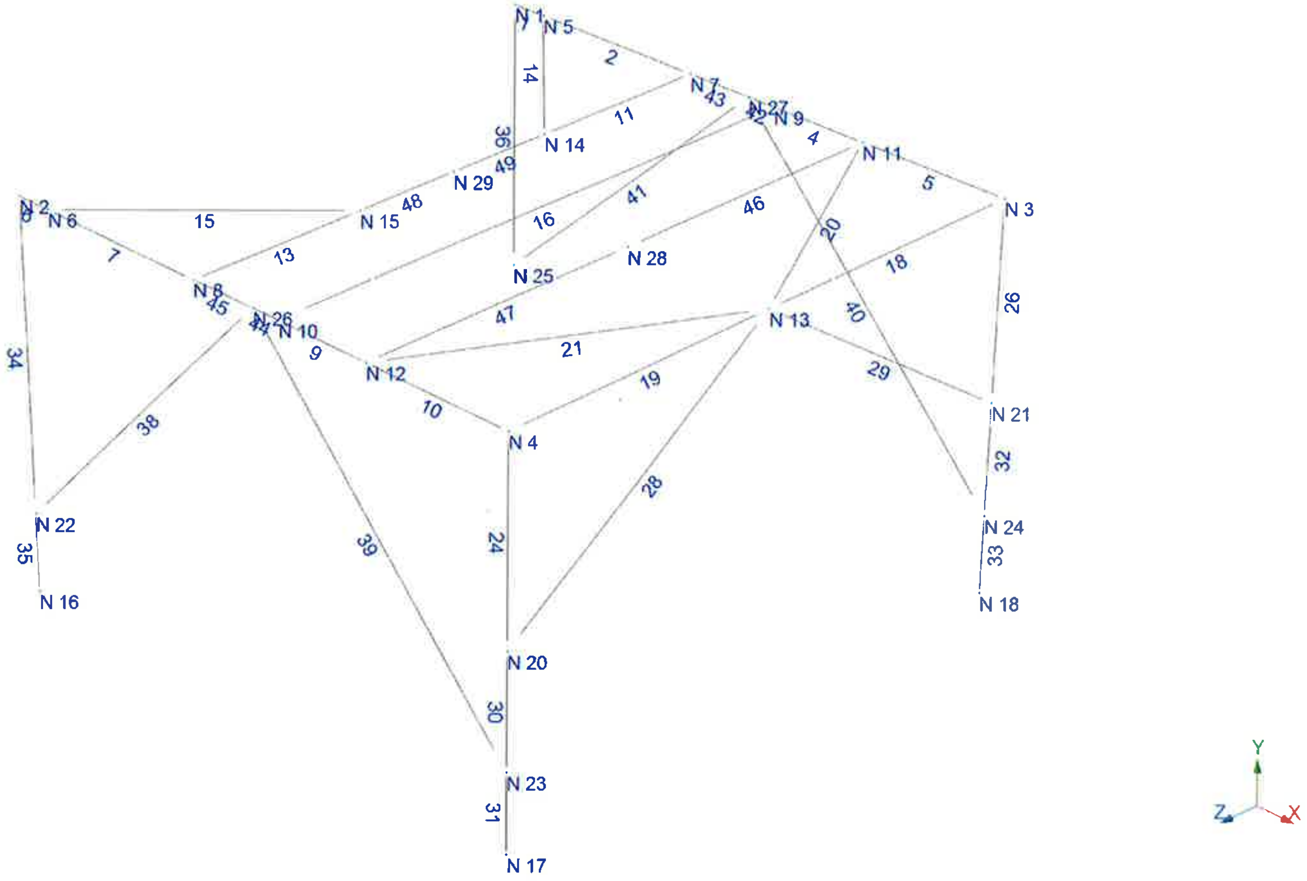
Design status

- ⬛ Not designed
- 🟥 Error on design
- 🟩 Design O.K.
- 🟨 With warnings



ALPHA FRAME
(WIND BLOWING WEST)

Current Date: 10/24/2014 9:11 AM
Units system: English
File name: R:\STRUCTURAL DEPT\Analysis Software\RAM Elements\RAM Projects\S2900 Alpha Frame (Wind West).etz\



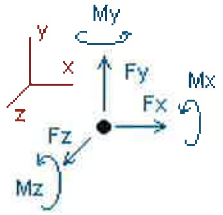
ALPHA FRAME
(WIND BLOWING WEST)

Bentley

Current Date: 11/4/2014 10:35 AM
Units system: English
File name: R:\STRUCTURAL DEPT\Analysis Software\RAM Elements\RAM Projects\S2900 Alpha Frame (Wind West).etz\

Analysis result

Reactions



Direction of positive forces and moments

	Forces [Kip]			Moments [Kip*ft]		
Node	**FX**	**FY**	**FZ**	**MX**	**MY**	**MZ**
Condition **D1=DL**						
16	0.96996	1.69055	-0.08918	-0.26148	0.18408	-1.67919
17	-0.99626	2.43495	-0.34626	-0.97172	-0.05452	1.72115
18	-1.08100	2.47963	0.31124	0.85638	0.06501	1.91449
25	1.10730	1.51442	0.12420	0.16583	-0.36455	0.20692
SUM	0.00000	8.11956	0.00000	-0.21099	-0.16998	2.16336
Condition **D2=DL+W**						
16	1.40199	2.82219	-0.28608	-0.86924	0.44245	-2.39815
17	-0.76518	1.32911	-0.17328	-0.44757	-0.37184	1.13611
18	-0.85348	1.31810	0.07872	0.13363	0.38290	1.35153
25	1.63226	2.65015	0.38063	0.46684	-0.91299	0.36832
SUM	1.41559	8.11956	0.00000	-0.71634	-0.45948	0.45781
Condition **D3=0.6DL+W**						
16	1.01400	2.14597	-0.25040	-0.76465	0.36882	-1.72647
17	-0.36668	0.35513	-0.03478	-0.05889	-0.35004	0.44765
18	-0.42108	0.32625	-0.04577	-0.20892	0.35689	0.58574
25	1.18934	2.04438	0.33095	0.40051	-0.76717	0.28555
SUM	1.41559	4.87173	0.00000	-0.63195	-0.39149	-0.40754

Current Date: 11/4/2014 10:34 AM
Units system: English
File name: R:\STRUCTURAL DEPT\Analysis Software\RAM Elements\RAM Projects\S2900 Alpha Frame (Wind West).etz\

Steel Code Check

Report: Summary - For all selected load conditions

Load conditions to be included in design :
D1=DL
D2=DL+W
D3=0.6DL+W

Description	Section	Member	Ctrl Eq.	Ratio	Status	Reference
	HSS_RECT 6X4X3_8	1	D1 at 0.00%	0.02	OK	
			D2 at 0.00%	**0.10**	**OK**	
			D3 at 0.00%	0.09	OK	
		2	D1 at 0.00%	0.02	OK	
			D2 at 100.00%	**0.12**	**OK**	Eq. H1-1b
			D3 at 100.00%	0.11	OK	Eq. H1-1b
		4	D1 at 100.00%	0.05	OK	Eq. H1-1b
			D2 at 0.00%	0.15	OK	
			D3 at 0.00%	**0.15**	**OK**	
		5	D1 at 100.00%	0.04	OK	Eq. H1-1b
			D2 at 100.00%	0.12	OK	Eq. H1-1b
			D3 at 100.00%	**0.13**	**OK**	Eq. H1-1b
		6	D1 at 0.00%	0.02	OK	
			D2 at 0.00%	**0.10**	**OK**	
			D3 at 0.00%	0.09	OK	
		7	D1 at 50.00%	0.02	OK	Eq. H1-1b
			D2 at 100.00%	**0.13**	**OK**	Eq. H1-1b
			D3 at 100.00%	0.12	OK	Eq. H1-1b
		9	D1 at 100.00%	0.04	OK	Eq. H1-1b
			D2 at 0.00%	0.15	OK	
			D3 at 100.00%	**0.16**	**OK**	Eq. H1-1b
		10	D1 at 100.00%	0.04	OK	Eq. H1-1b
			D2 at 100.00%	0.11	OK	Eq. H1-1b
			D3 at 100.00%	**0.12**	**OK**	Eq. H1-1b
		11	D1 at 100.00%	0.05	OK	Eq. H1-1b
			D2 at 0.00%	**0.25**	**OK**	Eq. H1-1b
			D3 at 0.00%	0.23	OK	Eq. H1-1b
		13	D1 at 100.00%	0.05	OK	Eq. H1-1b
			D2 at 0.00%	**0.25**	**OK**	Eq. H1-1b
			D3 at 0.00%	0.23	OK	Eq. H1-1b
		16	D1 at 50.00%	**0.04**	**OK**	Eq. H1-1b
			D2 at 56.25%	0.04	OK	Eq. H1-1b
			D3 at 56.25%	0.02	OK	Eq. H1-1b
		18	D1 at 50.00%	0.02	OK	Eq. H1-1b
			D2 at 0.00%	0.03	OK	Eq. H1-1b

	D3 at 0.00%	**0.04**	**OK**	Eq. H1-1b
19	D1 at 50.00%	0.02	OK	Eq. H1-1b
	D2 at 0.00%	0.03	OK	Eq. H1-1b
	D3 at 0.00%	**0.04**	**OK**	Eq. H1-1b
24	D1 at 0.00%	0.03	OK	Eq. H1-1b
	D2 at 0.00%	0.07	OK	Eq. H1-1b
	D3 at 0.00%	**0.08**	**OK**	Eq. H1-1b
26	D1 at 0.00%	0.03	OK	Eq. H1-1b
	D2 at 0.00%	0.07	OK	Eq. H1-1b
	D3 at 0.00%	**0.08**	**OK**	Eq. H1-1b
28	D1 at 0.00%	**0.03**	**OK**	Eq. H1-1b
	D2 at 50.00%	0.02	OK	Eq. H1-1b
	D3 at 37.50%	0.02	OK	Eq. H1-1b
29	D1 at 100.00%	**0.03**	**OK**	Eq. H1-1b
	D2 at 56.25%	0.02	OK	Eq. H1-1b
	D3 at 62.50%	0.02	OK	Eq. H1-1b
30	D1 at 0.00%	**0.06**	**OK**	Eq. H1-1b
	D2 at 100.00%	0.05	OK	Eq. H1-1b
	D3 at 100.00%	0.05	OK	Eq. H1-1b
31	D1 at 0.00%	**0.11**	**OK**	Eq. H1-1b
	D2 at 0.00%	0.06	OK	Eq. H1-1b
	D3 at 100.00%	0.02	OK	Eq. H1-1b
32	D1 at 0.00%	**0.06**	**OK**	Eq. H1-1b
	D2 at 100.00%	0.06	OK	Eq. H1-1b
	D3 at 100.00%	0.06	OK	Eq. H1-1b
33	D1 at 0.00%	**0.11**	**OK**	Eq. H1-1b
	D2 at 0.00%	0.06	OK	Eq. H1-1b
	D3 at 0.00%	0.03	OK	Eq. H1-1b
34	D1 at 0.00%	0.03	OK	Eq. H1-1b
	D2 at 0.00%	**0.15**	**OK**	Eq. H1-1b
	D3 at 0.00%	0.14	OK	Eq. H1-1b
35	D1 at 0.00%	0.07	OK	Eq. H1-1b
	D2 at 0.00%	**0.13**	**OK**	Eq. H1-1b
	D3 at 0.00%	0.10	OK	Eq. H1-1b
36	D1 at 0.00%	0.03	OK	Eq. H1-1b
	D2 at 0.00%	**0.16**	**OK**	Eq. H1-1b
	D3 at 0.00%	0.15	OK	Eq. H1-1b
38	D1 at 100.00%	0.03	OK	Eq. H1-1b
	D2 at 100.00%	**0.13**	**OK**	Eq. H1-1b
	D3 at 100.00%	0.11	OK	Eq. H1-1b
39	D1 at 100.00%	0.04	OK	Eq. H1-1b
	D2 at 0.00%	**0.12**	**OK**	Eq. H1-1b
	D3 at 0.00%	0.11	OK	Eq. H1-1b
40	D1 at 100.00%	0.04	OK	Eq. H1-1b
	D2 at 0.00%	**0.13**	**OK**	Eq. H1-1b
	D3 at 0.00%	0.11	OK	Eq. H1-1b
41	D1 at 0.00%	0.05	OK	Eq. H1-1b

		D2 at 0.00%	**0.13**	**OK**	Eq. H1-1b
		D3 at 0.00%	0.11	OK	Eq. H1-1b
	42	D1 at 100.00%	0.06	OK	Eq. H1-1b
		D2 at 0.00%	0.14	OK	
		D3 at 0.00%	**0.15**	**OK**	
	43	D1 at 100.00%	0.05	OK	Eq. H1-1b
		D2 at 0.00%	**0.24**	**OK**	
		D3 at 0.00%	0.23	OK	
	44	D1 at 100.00%	0.06	OK	Eq. H1-1b
		D2 at 0.00%	0.14	OK	
		D3 at 0.00%	**0.15**	**OK**	
	45	D1 at 100.00%	0.05	OK	Eq. H1-1b
		D2 at 0.00%	**0.24**	**OK**	
		D3 at 0.00%	0.23	OK	
	46	D1 at 100.00%	0.06	OK	Eq. H1-1b
		D2 at 0.00%	0.19	OK	Eq. H1-1b
		D3 at 100.00%	**0.22**	**OK**	Eq. H1-1b
	47	D1 at 100.00%	0.06	OK	Eq. H1-1b
		D2 at 100.00%	0.19	OK	Eq. H1-1b
		D3 at 100.00%	**0.22**	**OK**	Eq. H1-1b
	48	D1 at 100.00%	0.07	OK	Eq. H1-1b
		D2 at 100.00%	**0.36**	**OK**	Eq. H1-1b
		D3 at 100.00%	0.33	OK	Eq. H1-1b
	49	D1 at 93.75%	0.07	OK	Eq. H1-1b
		D2 at 100.00%	**0.36**	**OK**	Eq. H1-1b
		D3 at 100.00%	0.33	OK	Eq. H1-1b
L 4X4X3_8	**14**	D1 at 0.00%	0.11	OK	Eq. H1-1b
		D2 at 0.00%	**0.47**	**OK**	Eq. H1-1b
		D3 at 0.00%	0.43	OK	Eq. H1-1b
	15	D1 at 0.00%	0.10	OK	Eq. H1-1b
		D2 at 0.00%	**0.44**	**OK**	Eq. H1-1b
		D3 at 0.00%	0.40	OK	Eq. H1-1b
	20	D1 at 0.00%	0.12	OK	Eq. H1-1b
		D2 at 0.00%	0.48	OK	Eq. H1-1b
		D3 at 0.00%	**0.53**	**OK**	Eq. H1-1b
	21	D1 at 0.00%	0.12	OK	Eq. H1-1b
		D2 at 0.00%	0.49	OK	Eq. H1-1b
		D3 at 0.00%	**0.53**	**OK**	Eq. H1-1b

Date: 11-04-2014
Project Name: Stamford Harbor
Project Number: S2900
Designed By: GH Checked By: MSC

Hudson Design Group LLC

Wind Analysis → FRP Enclosure (ALPHA Sector)

Wind Blowing North - South

Reference Codes:

-IBC 2003 with 2005 Connecticut Supplement with 2009 Amendments

-Minimum Design Loads for Buildings and Other Structures (ASCE 7-05)

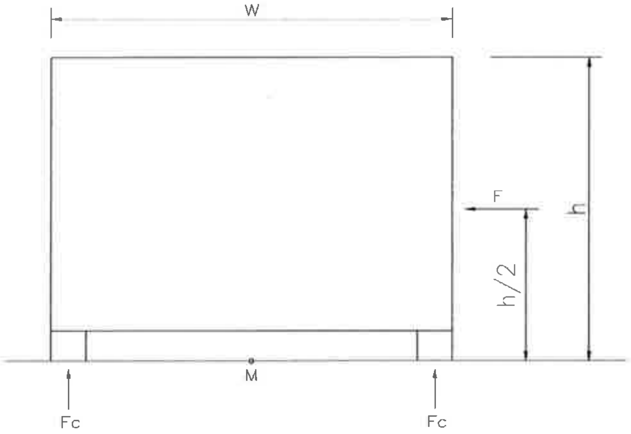
Structure Classification	II		(ASCE 7-05 Table 1-1)
Basic Wind Speed, V	105	mph	(Connecticut Supplement)
Importance Factor, I	1		(ASCE 7-05 Table 6-1)
Exposure Category	D		(ASCE 7-05 Section 6.5.6.3)
Height Above Ground Level, z	106.75	ft	(Top of Enclosure)
Exposure Coeficient, K_z	1.46		(ASCE 7-05 Table 6-3)
Wind Directionality Coef., K_d	0.90		(ASCE 7-05 Table 6-4)
Topographic Facto, K_{zt}	1.00		(ASCE 7-05 Section 6.5.7.2)
Velocity Pressure, q_z	$= 0.00256K_zK_{zt}K_dV^2I$ = **37.16** **psf**		(ASCE 7-05 Equation 6-15)
Gust Factor, G	0.85		(ASCE 7-05 Section 6.5.8)
Net Force Coeficient, C_f	1.31		(ASCE 7-05 Figure 6.21)
Projected Area Normal to Wind, A_f	74	ft^2	(7.67 ft. W x 9.5 ft. H)
Wind Force, F	$= q_zGC_fA_f$ = **3062.16** **lbs**		(ASCE 7-05 Equation 6-28)

Date: 11-04-2014
Project Name: Stamford Harbor
Project Number: S2900
Designed By: GH Checked By: MSC

Calculate Overturning Moment of Proposed FRP Enclosure (ALPHA)

Wind Blowing North - South

Dimensions (ft)	Wide, w	Depth, d	Height, h
	7.67	20.83	9.5



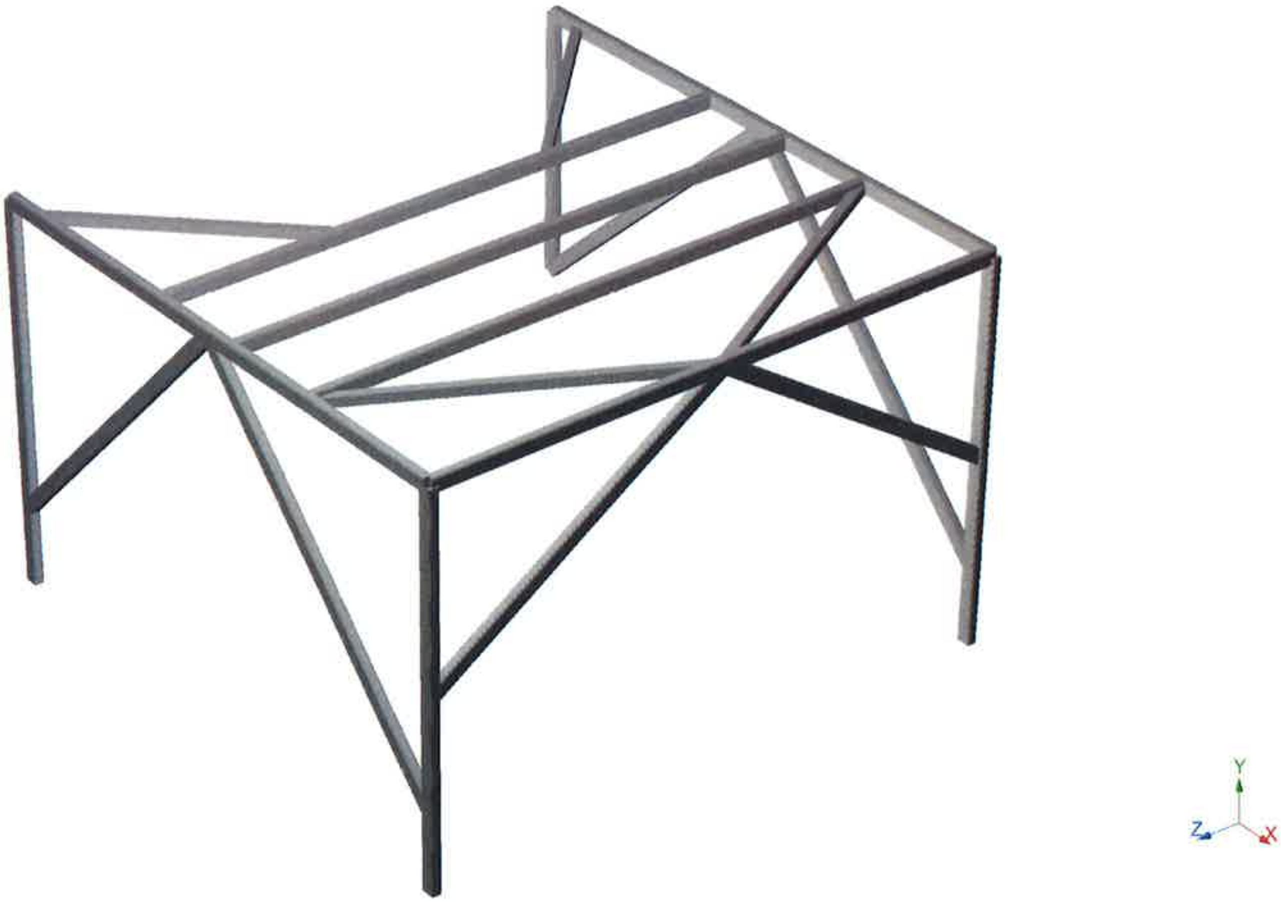
Moment, M = F x h/2
= **14545.24** **lb-ft**

Calculate Force Couple

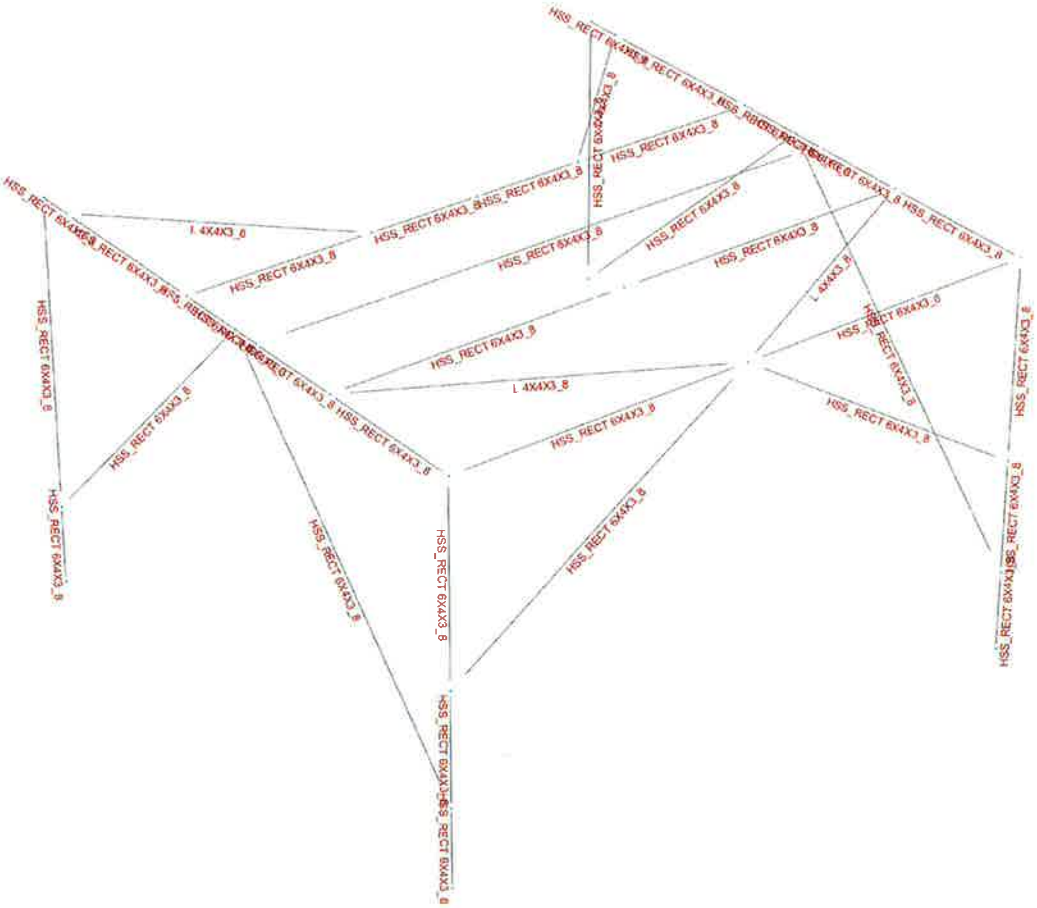
Force Couple, F_c = M / w
= **698.28** **lbs.**

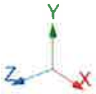
Length of Frame: **7.0** **ft.**

Loading = **99.75** **plf**



ALPHA FRAME
(WIND BLOWING NORTH)





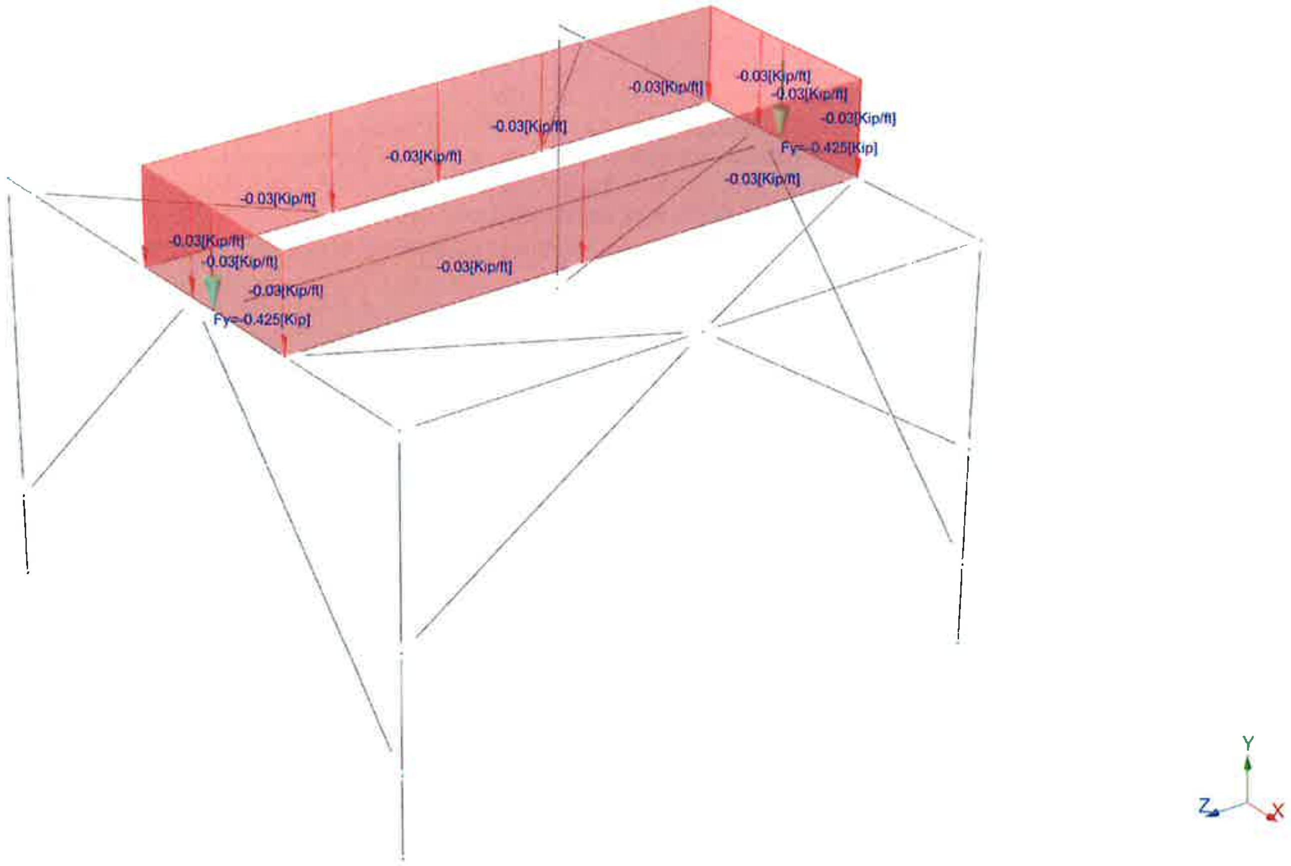
ALPHA FRAME
(WIND BLOWING NORTH)

Bentley

Current Date: 11/4/2014 10:58 AM
Units system: English
File name: R:\STRUCTURAL DEPT\Analysis Software\RAM Elements\RAM Projects\S2900 Alpha Frame (Wind North).etz\
Load condition: DL=Dead Load

Loads

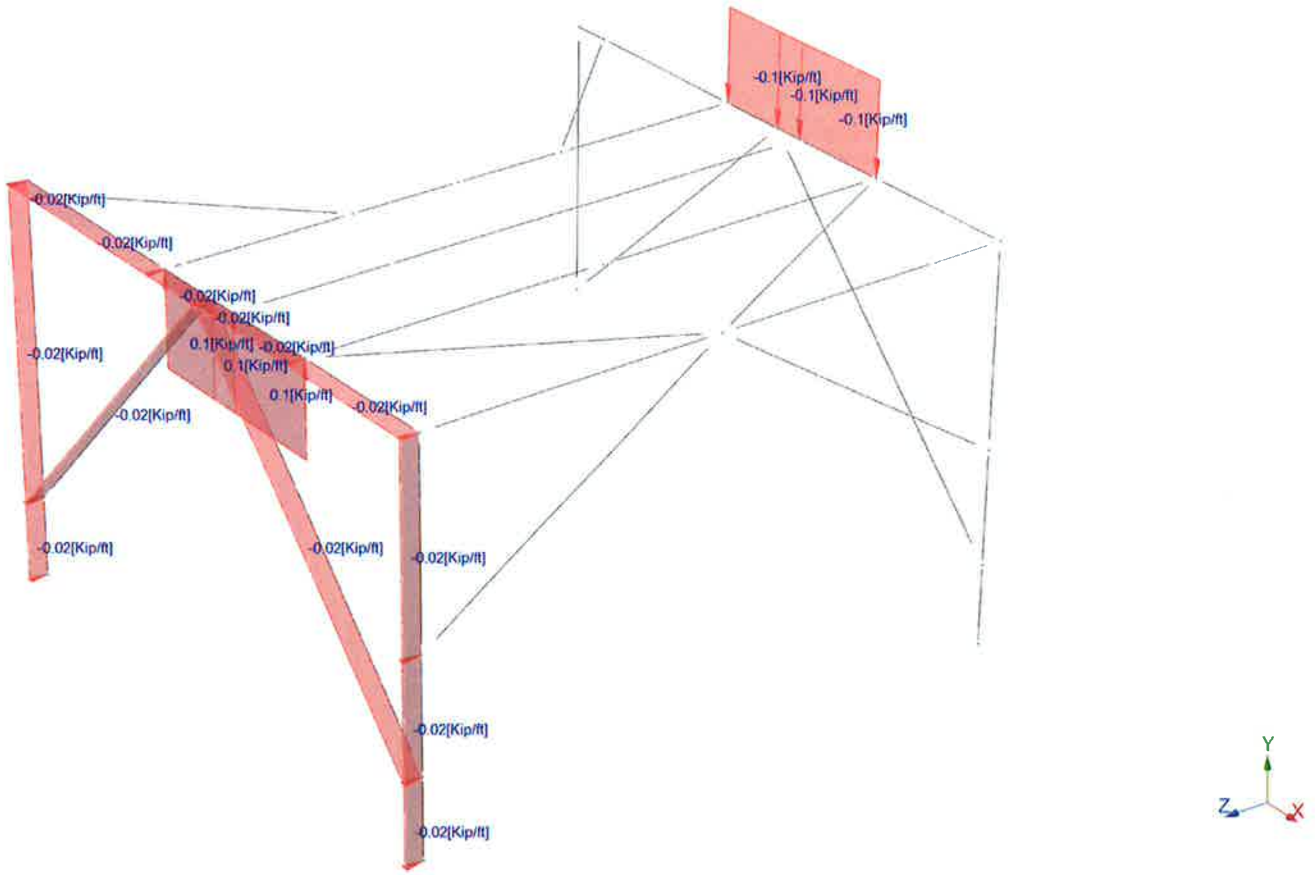
🟥 Global distributed - Members
🟩 Local distributed - Members
🟩 Concentrated - Nodes



Current Date: 11/4/2014 10:58 AM
Units system: English
File name: R:\STRUCTURAL DEPT\Analysis Software\RAM Elements\RAM Projects\S2900 Alpha Frame (Wind North).etz\
Load condition: W=Wind

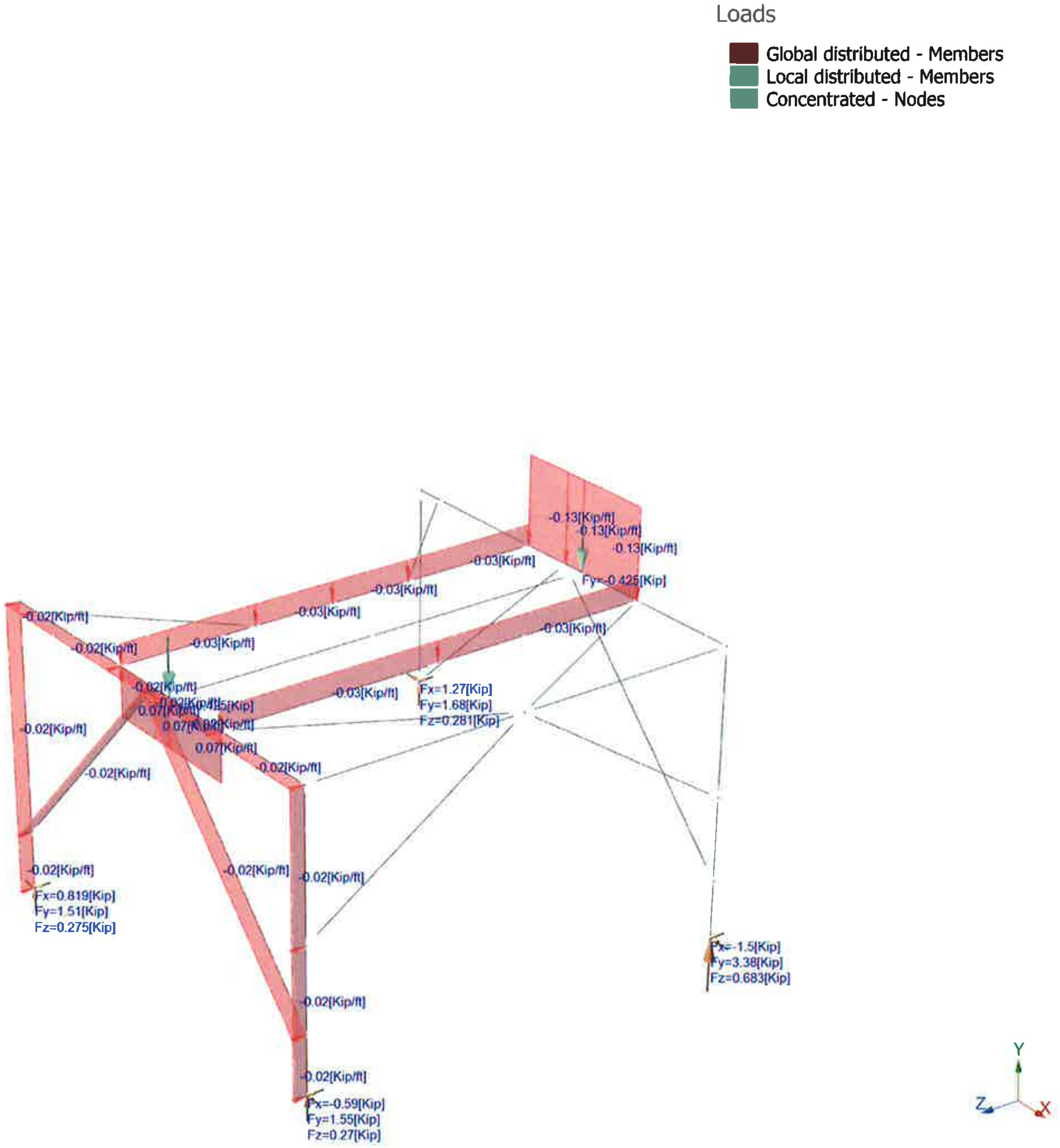
Loads

🟥 Global distributed - Members
🟩 Local distributed - Members



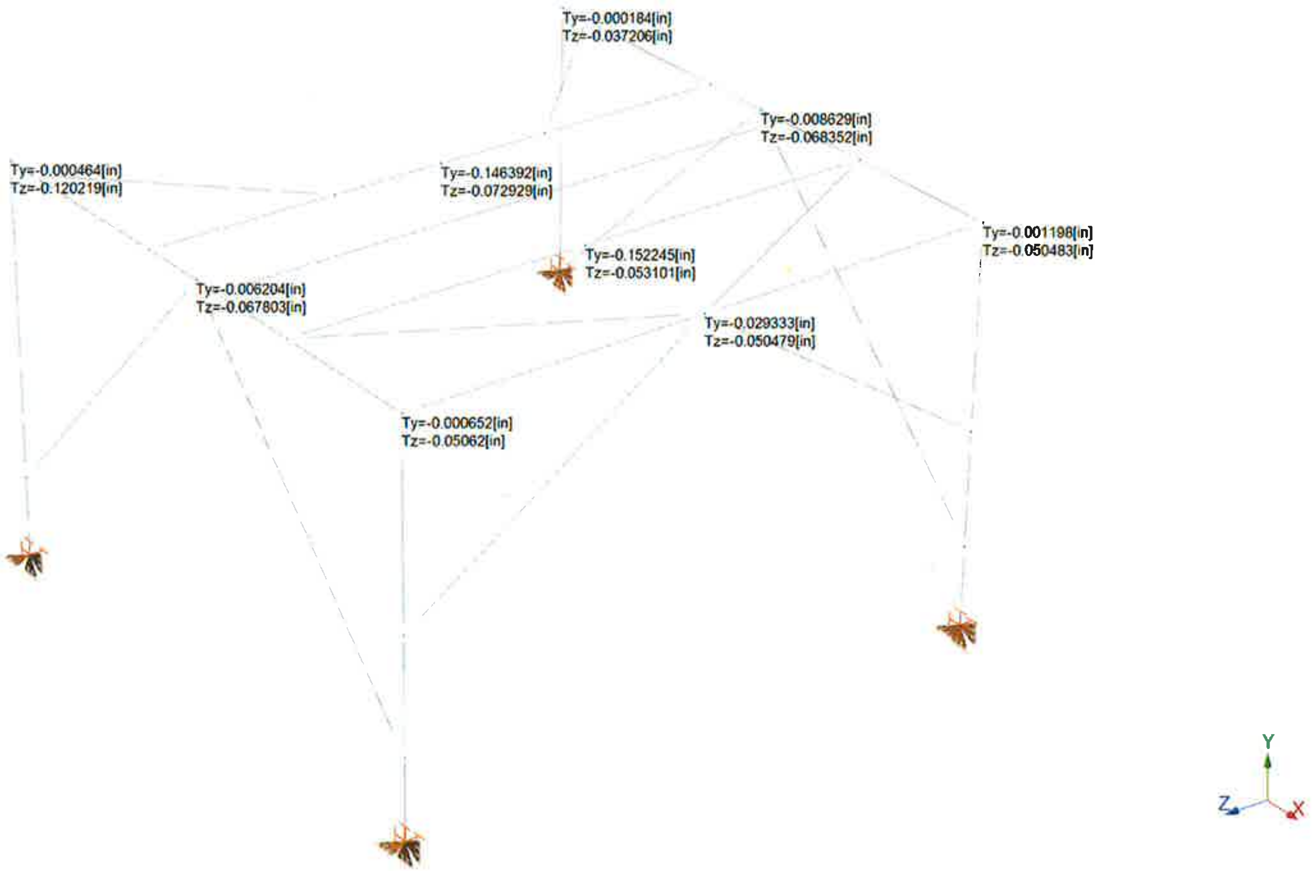
ALPHA FRAME
(WIND BLOWING NORTH)

Current Date: 11/4/2014 10:59 AM
Units system: English
File name: R:\STRUCTURAL DEPT\Analysis Software\RAM Elements\RAM Projects\S2900 Alpha Frame (Wind North).etz\
Load condition: D2=DL+W



ALPHA FRAME
(WIND BLOWING NORTH)

Current Date: 11/4/2014 11:00 AM
Units system: English
File name: R:\STRUCTURAL DEPT\Analysis Software\RAM Elements\RAM Projects\S2900 Alpha Frame (Wind North).etz\
Load condition: D2=DL+W

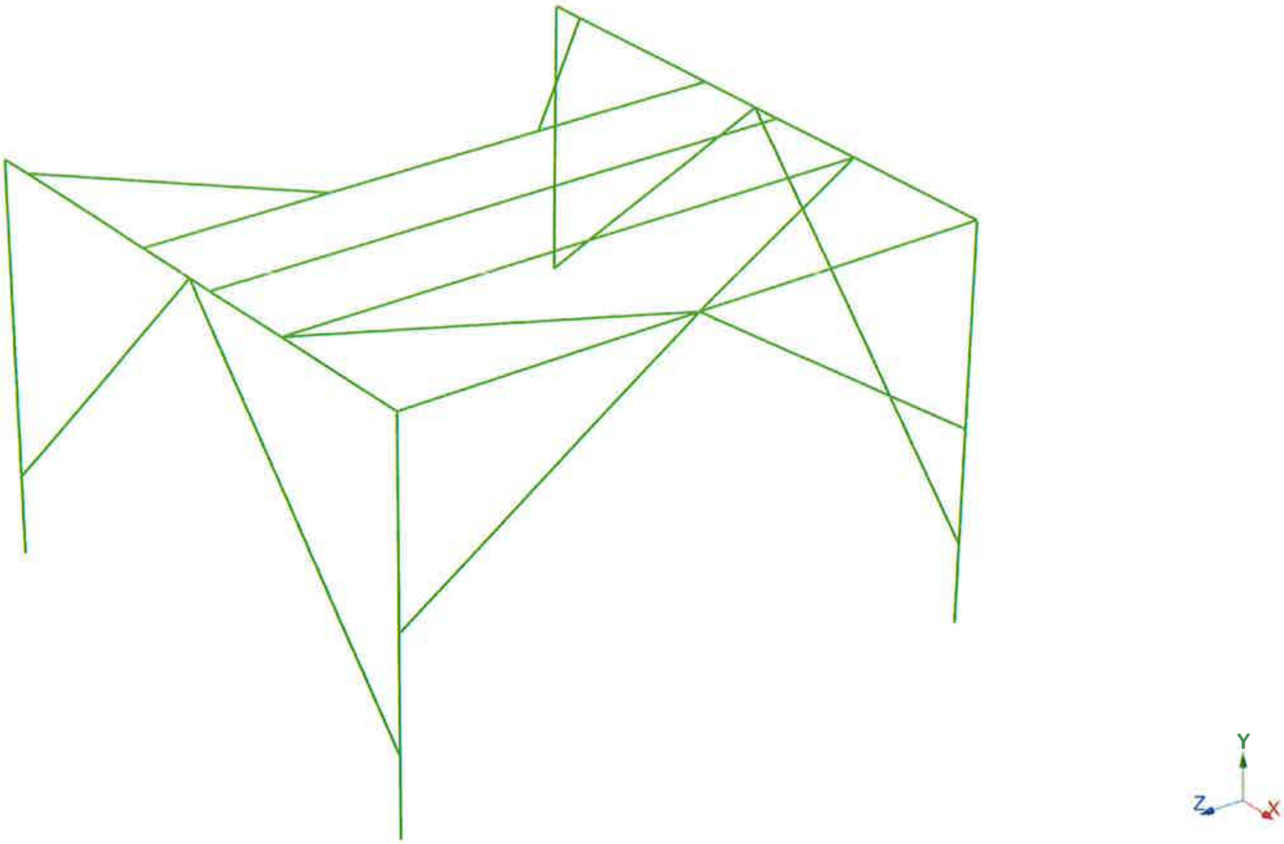


ALPHA FRAME
(WIND BLOWING NORTH)

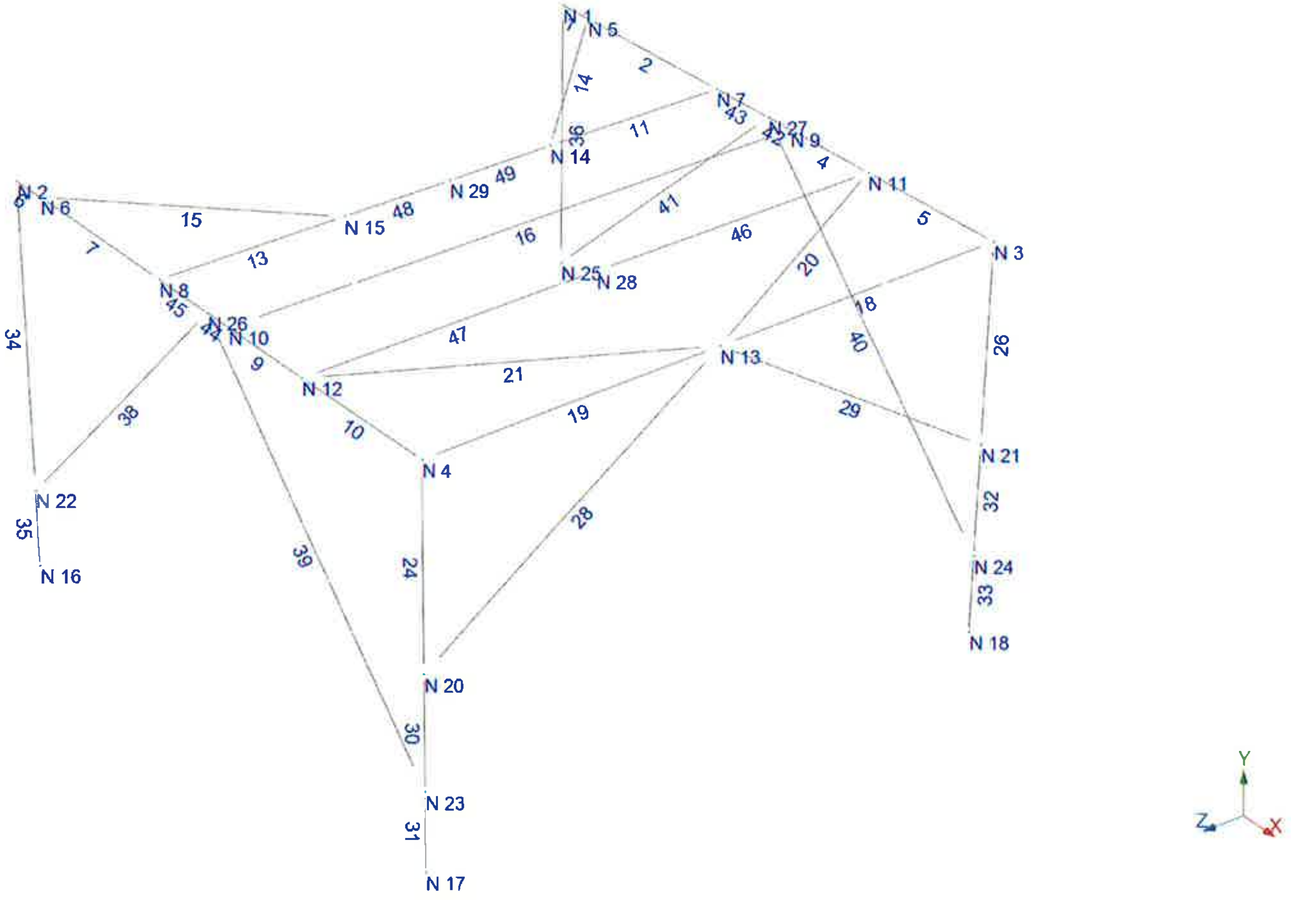
Current Date: 11/4/2014 11:00 AM
Units system: English
File name: R:\STRUCTURAL DEPT\Analysis Software\RAM Elements\RAM Projects\S2900 Alpha Frame (Wind North).etz\

Design status

- ■ Not designed
- 🟥 Error on design
- 🟩 Design O.K.
- 🟨 With warnings



ALPHA FRAME
(WIND BLOWING NORTH)

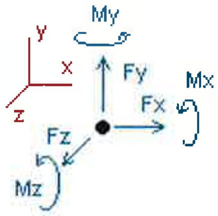


ALPHA FRAME
(WIND BLOWING NORTH)

Current Date: 11/4/2014 11:00 AM
Units system: English
File name: R:\STRUCTURAL DEPT\Analysis Software\RAM Elements\RAM Projects\S2900 Alpha Frame (Wind North).etz\

Analysis result

Reactions



Direction of positive forces and moments

	Forces [Kip]			Moments [Kip*ft]		
Node	**FX**	**FY**	**FZ**	**MX**	**MY**	**MZ**
Condition **D1=DL**						
16	0.96996	1.69055	-0.08918	-0.26148	0.18408	-1.67919
17	-0.99626	2.43495	-0.34626	-0.97172	-0.05452	1.72115
18	-1.08100	2.47963	0.31124	0.85638	0.06501	1.91449
25	1.10730	1.51442	0.12420	0.16583	-0.36455	0.20692
SUM	0.00000	8.11956	0.00000	-0.21099	-0.16998	2.16336
Condition **D2=DL+W**						
16	0.81918	1.51224	0.27464	1.09410	0.05173	-1.41607
17	-0.58976	1.55328	0.26998	0.87514	0.05924	0.98418
18	-1.50393	3.37814	0.68279	2.15925	0.03496	2.68482
25	1.27451	1.67589	0.28145	1.14595	-0.80579	0.24253
SUM	0.00000	8.11956	1.50887	5.27444	-0.65986	2.49546
Condition **D3=0.6DL+W**						
16	0.43120	0.83602	0.31031	1.19869	-0.02190	-0.74439
17	-0.19126	0.57930	0.40849	1.26383	0.08104	0.29572
18	-1.07153	2.38629	0.55830	1.81670	0.00896	1.91902
25	0.83159	1.07013	0.23177	1.07961	-0.65997	0.15977
SUM	0.00000	4.87173	1.50887	5.35884	-0.59187	1.63012

Bentley

Current Date: 11/4/2014 11:00 AM
Units system: English
File name: R:\STRUCTURAL DEPT\Analysis Software\RAM Elements\RAM Projects\S2900 Alpha Frame (Wind North).etz\

Steel Code Check

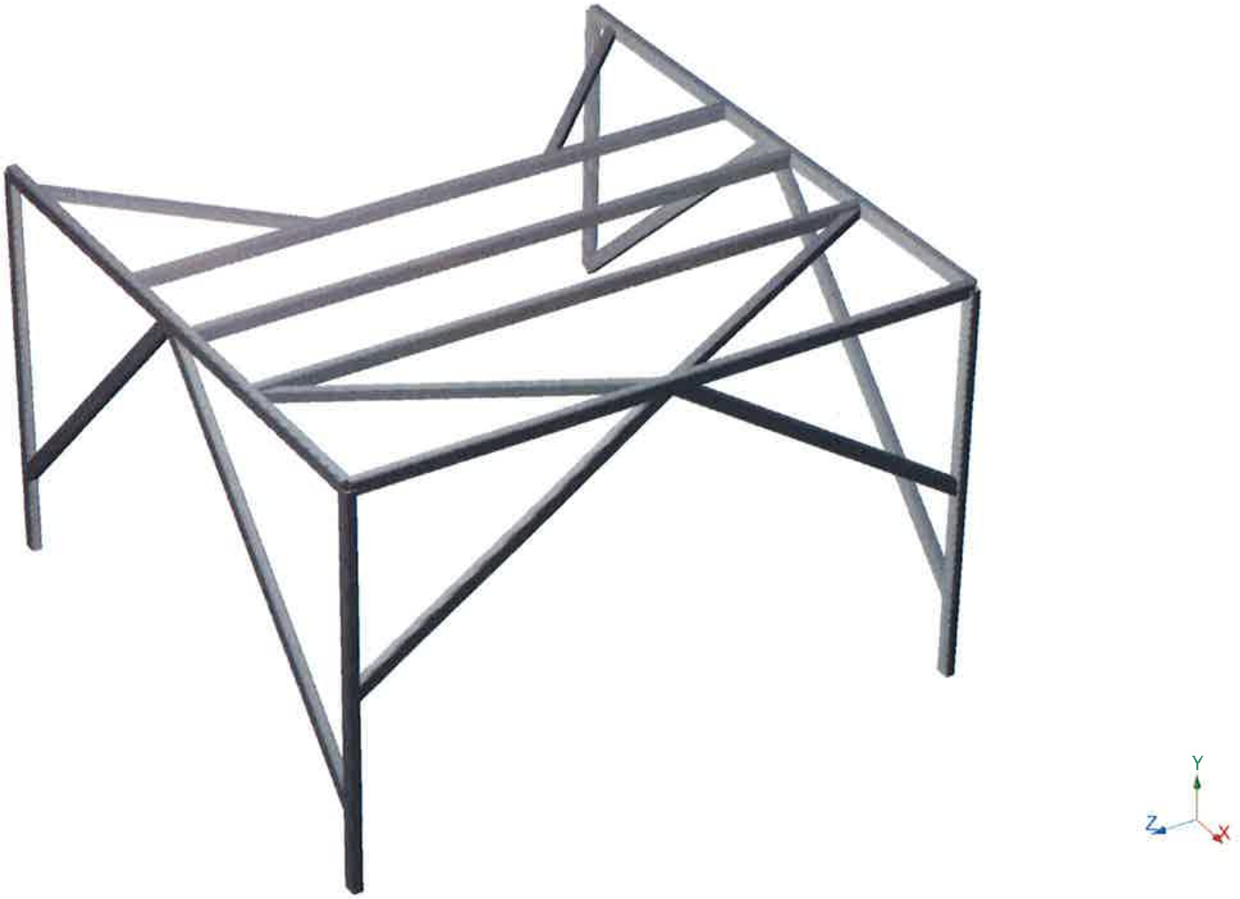
Report: Summary - For all selected load conditions

Load conditions to be included in design :
D1=DL
D2=DL+W
D3=0.6DL+W

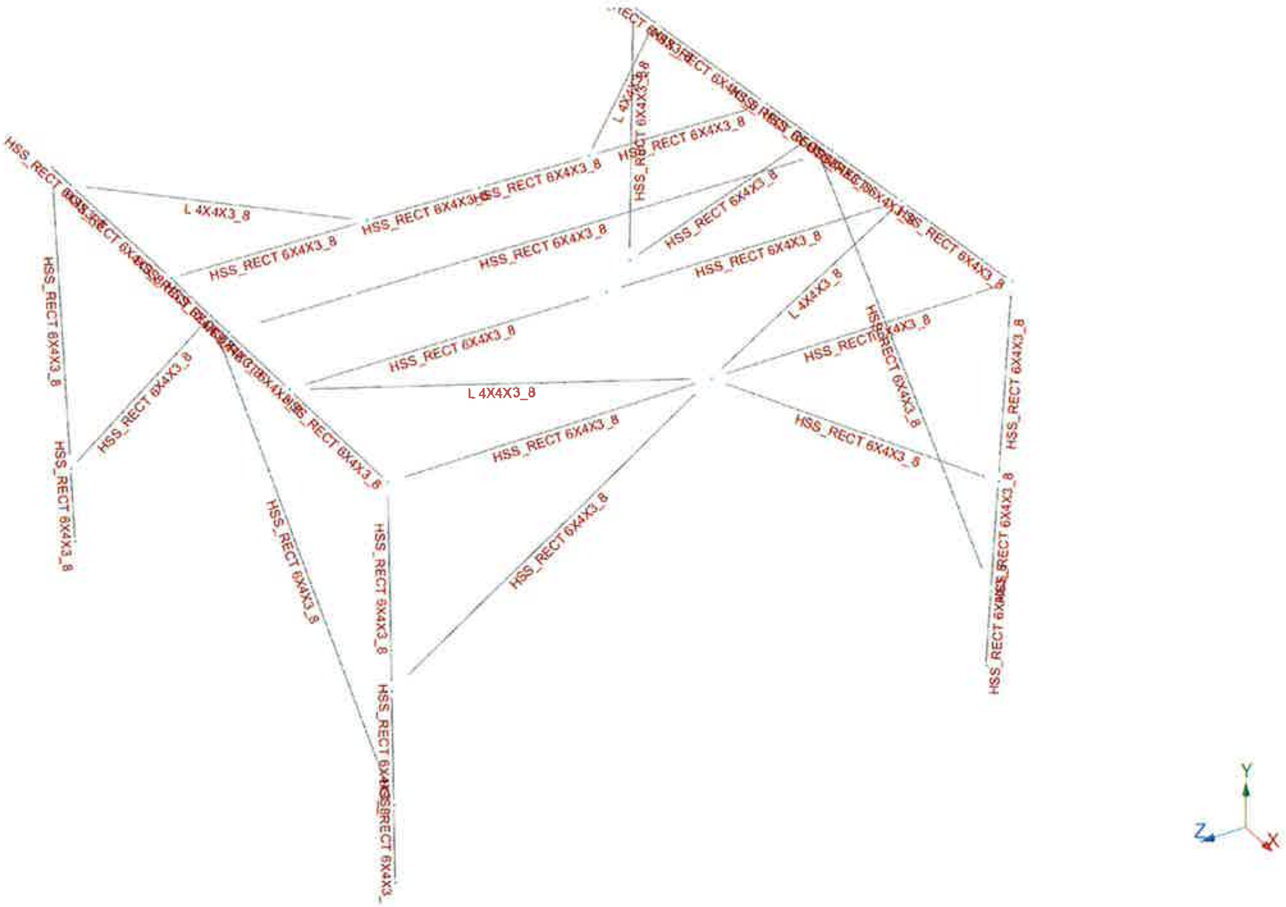
Description	Section	Member	Ctrl Eq.	Ratio	Status	Reference
	HSS_RECT 6X4X3_8	1	D1 at 0.00%	0.02	OK	
			D2 at 0.00%	**0.03**	**OK**	
			D3 at 0.00%	0.02	OK	
		2	D1 at 0.00%	0.02	OK	
			D2 at 100.00%	**0.03**	**OK**	Eq. H1-1b
			D3 at 100.00%	0.02	OK	Eq. H1-1b
		4	D1 at 100.00%	0.05	OK	Eq. H1-1b
			D2 at 100.00%	**0.07**	**OK**	Eq. H1-1b
			D3 at 100.00%	0.05	OK	Eq. H1-1b
		5	D1 at 100.00%	0.04	OK	Eq. H1-1b
			D2 at 100.00%	**0.06**	**OK**	Eq. H1-1b
			D3 at 100.00%	0.05	OK	Eq. H1-1b
		6	D1 at 0.00%	**0.02**	**OK**	
			D2 at 0.00%	0.01	OK	
			D3 at 0.00%	0.01	OK	Eq. H1-1b
		7	D1 at 50.00%	0.02	OK	Eq. H1-1b
			D2 at 100.00%	**0.02**	**OK**	Eq. H1-1b
			D3 at 100.00%	0.02	OK	Eq. H1-1b
		9	D1 at 100.00%	0.04	OK	Eq. H1-1b
			D2 at 100.00%	**0.06**	**OK**	Eq. H1-1b
			D3 at 100.00%	0.04	OK	Eq. H1-1b
		10	D1 at 100.00%	**0.04**	**OK**	Eq. H1-1b
			D2 at 100.00%	0.04	OK	Eq. H1-1b
			D3 at 100.00%	0.03	OK	Eq. H1-1b
		11	D1 at 100.00%	0.05	OK	Eq. H1-1b
			D2 at 0.00%	**0.06**	**OK**	Eq. H1-1b
			D3 at 0.00%	0.05	OK	Eq. H1-1b
		13	D1 at 100.00%	0.05	OK	Eq. H1-1b
			D2 at 100.00%	**0.07**	**OK**	Eq. H1-1b
			D3 at 100.00%	0.05	OK	Eq. H1-1b
		16	D1 at 50.00%	**0.04**	**OK**	Eq. H1-1b
			D2 at 56.25%	0.03	OK	Eq. H1-1b
			D3 at 62.50%	0.02	OK	Eq. H1-1b
		18	D1 at 50.00%	0.02	OK	Eq. H1-1b
			D2 at 25.00%	**0.02**	**OK**	Eq. H1-1b

	D3 at 12.50%	0.01	OK	Eq. H1-1b
19	D1 at 50.00%	**0.02**	**OK**	Eq. H1-1b
	D2 at 68.75%	0.01	OK	Eq. H1-1b
	D3 at 75.00%	0.01	OK	Eq. H1-1b
24	D1 at 0.00%	0.03	OK	Eq. H1-1b
	D2 at 0.00%	**0.04**	**OK**	Eq. H1-1b
	D3 at 0.00%	0.03	OK	Eq. H1-1b
26	D1 at 0.00%	0.03	OK	Eq. H1-1b
	D2 at 100.00%	**0.04**	**OK**	Eq. H1-1b
	D3 at 100.00%	0.04	OK	Eq. H1-1b
28	D1 at 0.00%	**0.03**	**OK**	Eq. H1-1b
	D2 at 68.75%	0.02	OK	Eq. H1-1b
	D3 at 43.75%	0.01	OK	Eq. H1-1b
29	D1 at 100.00%	0.03	OK	Eq. H1-1b
	D2 at 100.00%	**0.05**	**OK**	Eq. H1-1b
	D3 at 100.00%	0.04	OK	Eq. H1-1b
30	D1 at 0.00%	**0.06**	**OK**	Eq. H1-1b
	D2 at 0.00%	0.02	OK	Eq. H1-1b
	D3 at 0.00%	0.03	OK	Eq. H1-1b
31	D1 at 0.00%	**0.11**	**OK**	Eq. H1-1b
	D2 at 0.00%	0.08	OK	Eq. H1-1b
	D3 at 0.00%	0.07	OK	Eq. H1-1b
32	D1 at 0.00%	0.06	OK	Eq. H1-1b
	D2 at 0.00%	**0.11**	**OK**	Eq. H1-1b
	D3 at 0.00%	0.09	OK	Eq. H1-1b
33	D1 at 0.00%	0.11	OK	Eq. H1-1b
	D2 at 0.00%	**0.21**	**OK**	Eq. H1-1b
	D3 at 0.00%	0.17	OK	Eq. H1-1b
34	D1 at 0.00%	**0.03**	**OK**	Eq. H1-1b
	D2 at 100.00%	0.02	OK	Eq. H1-1b
	D3 at 100.00%	0.02	OK	Eq. H1-1b
35	D1 at 0.00%	0.07	OK	Eq. H1-1b
	D2 at 0.00%	**0.11**	**OK**	Eq. H1-1b
	D3 at 0.00%	0.09	OK	Eq. H1-1b
36	D1 at 0.00%	0.03	OK	Eq. H1-1b
	D2 at 0.00%	**0.04**	**OK**	Eq. H1-1b
	D3 at 100.00%	0.03	OK	Eq. H1-1b
38	D1 at 100.00%	0.03	OK	Eq. H1-1b
	D2 at 100.00%	**0.04**	**OK**	Eq. H1-1b
	D3 at 100.00%	0.03	OK	Eq. H1-1b
39	D1 at 100.00%	0.04	OK	Eq. H1-1b
	D2 at 0.00%	**0.04**	**OK**	Eq. H1-1b
	D3 at 0.00%	0.03	OK	Eq. H1-1b
40	D1 at 100.00%	0.04	OK	Eq. H1-1b
	D2 at 100.00%	**0.05**	**OK**	Eq. H1-1b
	D3 at 100.00%	0.03	OK	Eq. H1-1b
41	D1 at 0.00%	0.05	OK	Eq. H1-1b

		D2 at 0.00%	**0.07**	**OK**	Eq. H1-1b
		D3 at 0.00%	0.05	OK	Eq. H1-1b
	42	D1 at 100.00%	0.06	OK	Eq. H1-1b
		D2 at 100.00%	**0.10**	**OK**	Eq. H1-1b
		D3 at 100.00%	0.07	OK	Eq. H1-1b
	43	D1 at 100.00%	0.05	OK	Eq. H1-1b
		D2 at 100.00%	**0.07**	**OK**	Eq. H1-1b
		D3 at 100.00%	0.05	OK	Eq. H1-1b
	44	D1 at 100.00%	**0.06**	**OK**	Eq. H1-1b
		D2 at 100.00%	0.05	OK	Eq. H1-1b
		D3 at 100.00%	0.03	OK	Eq. H1-1b
	45	D1 at 100.00%	**0.05**	**OK**	Eq. H1-1b
		D2 at 0.00%	0.04	OK	Eq. H1-1b
		D3 at 0.00%	0.03	OK	Eq. H1-1b
	46	D1 at 100.00%	**0.06**	**OK**	Eq. H1-1b
		D2 at 93.75%	0.06	OK	Eq. H1-1b
		D3 at 93.75%	0.04	OK	Eq. H1-1b
	47	D1 at 100.00%	**0.06**	**OK**	Eq. H1-1b
		D2 at 100.00%	0.06	OK	Eq. H1-1b
		D3 at 100.00%	0.04	OK	Eq. H1-1b
	48	D1 at 100.00%	0.07	OK	Eq. H1-1b
		D2 at 75.00%	**0.08**	**OK**	Eq. H1-1b
		D3 at 50.00%	0.05	OK	Eq. H1-1b
	49	D1 at 93.75%	0.07	OK	Eq. H1-1b
		D2 at 100.00%	**0.08**	**OK**	Eq. H1-1b
		D3 at 100.00%	0.05	OK	Eq. H1-1b
L 4X4X3_8	**14**	D1 at 0.00%	0.11	OK	Eq. H1-1b
		D2 at 0.00%	**0.13**	**OK**	Eq. H1-1b
		D3 at 0.00%	0.09	OK	Eq. H1-1b
	15	D1 at 0.00%	**0.10**	**OK**	Eq. H1-1b
		D2 at 0.00%	0.07	OK	Eq. H1-1b
		D3 at 100.00%	0.04	OK	Eq. H1-1b
	20	D1 at 0.00%	**0.12**	**OK**	Eq. H1-1b
		D2 at 0.00%	0.11	OK	Eq. H1-1b
		D3 at 6.25%	0.06	OK	Eq. H1-1b
	21	D1 at 0.00%	0.12	OK	Eq. H1-1b
		D2 at 0.00%	**0.14**	**OK**	Eq. H1-1b
		D3 at 0.00%	0.10	OK	Eq. H1-1b



ALPHA FRAME
(WIND BLOWING SOUTH)

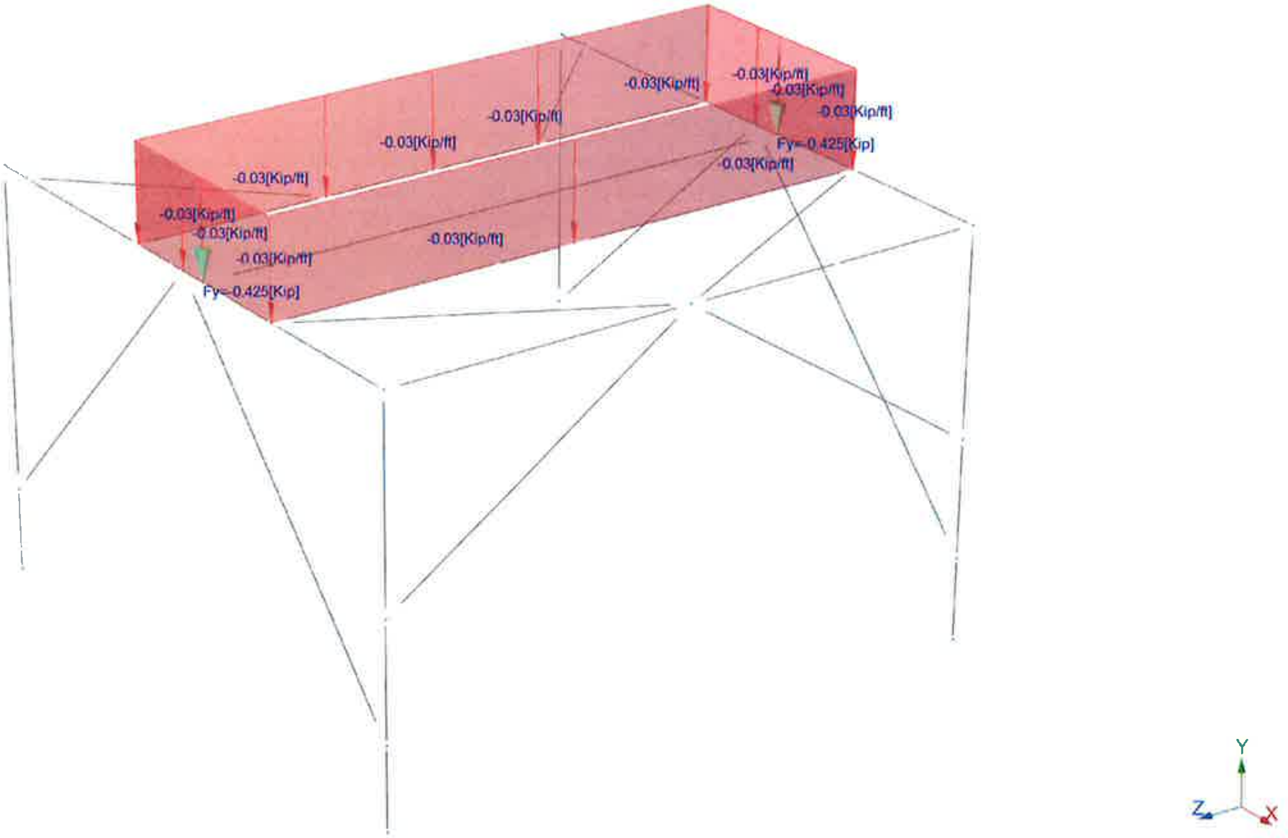


ALPHA FRAME
(WIND BLOWING SOUTH)

Current Date: 11/4/2014 11:23 AM
Units system: English
File name: R:\STRUCTURAL DEPT\Analysis Software\RAM Elements\RAM Projects\S2900 Alpha Frame (Wind South).etz\
Load condition: DL=Dead Load

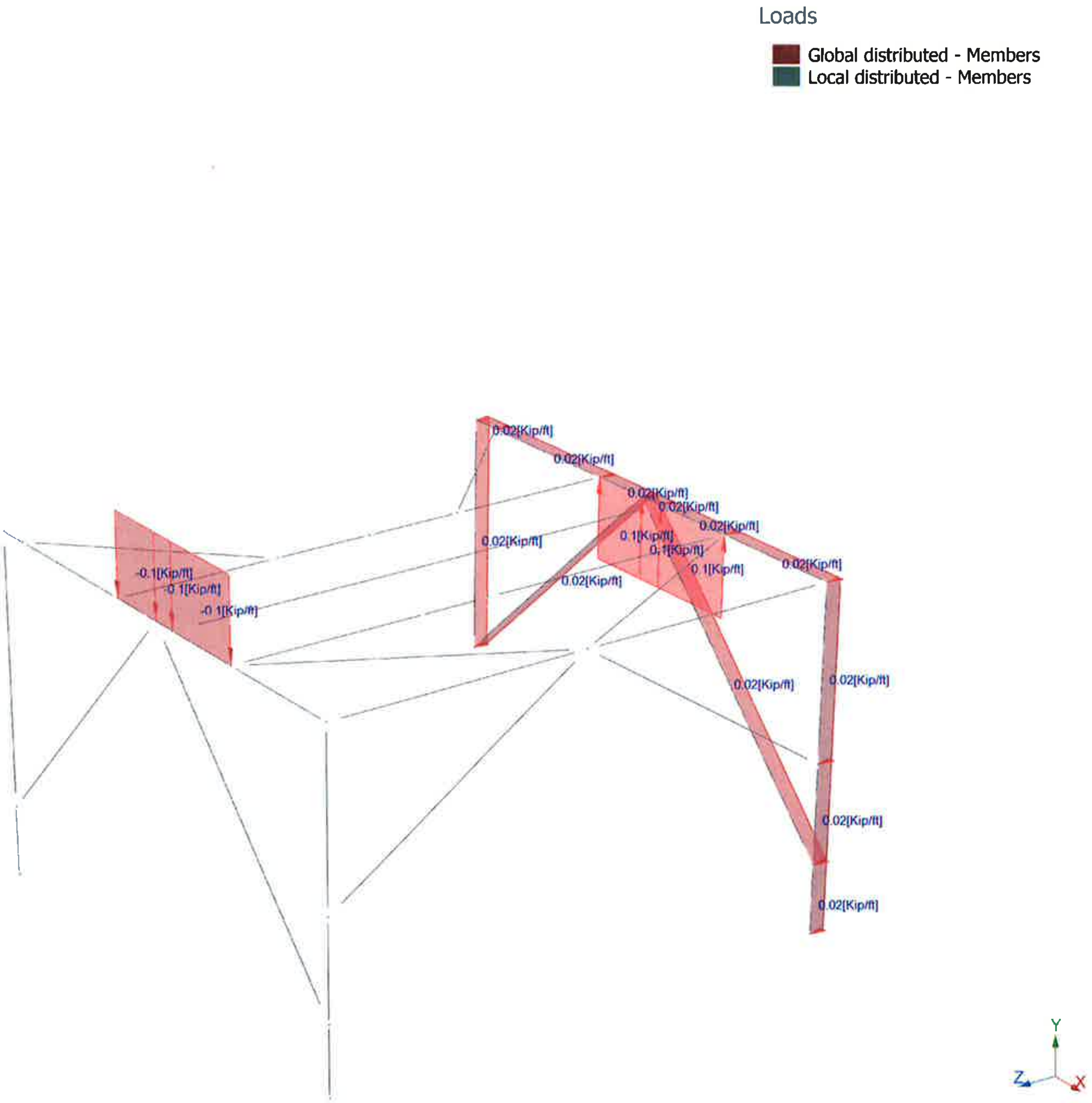
Loads

- 🟥 Global distributed - Members
- ■ Local distributed - Members
- 🟩 Concentrated - Nodes



ALPHA FRAME
(WIND BLOWING SOUTH)

Current Date: 11/4/2014 11:23 AM
Units system: English
File name: R:\STRUCTURAL DEPT\Analysis Software\RAM Elements\RAM Projects\S2900 Alpha Frame (Wind South).etz\
Load condition: W=Wind

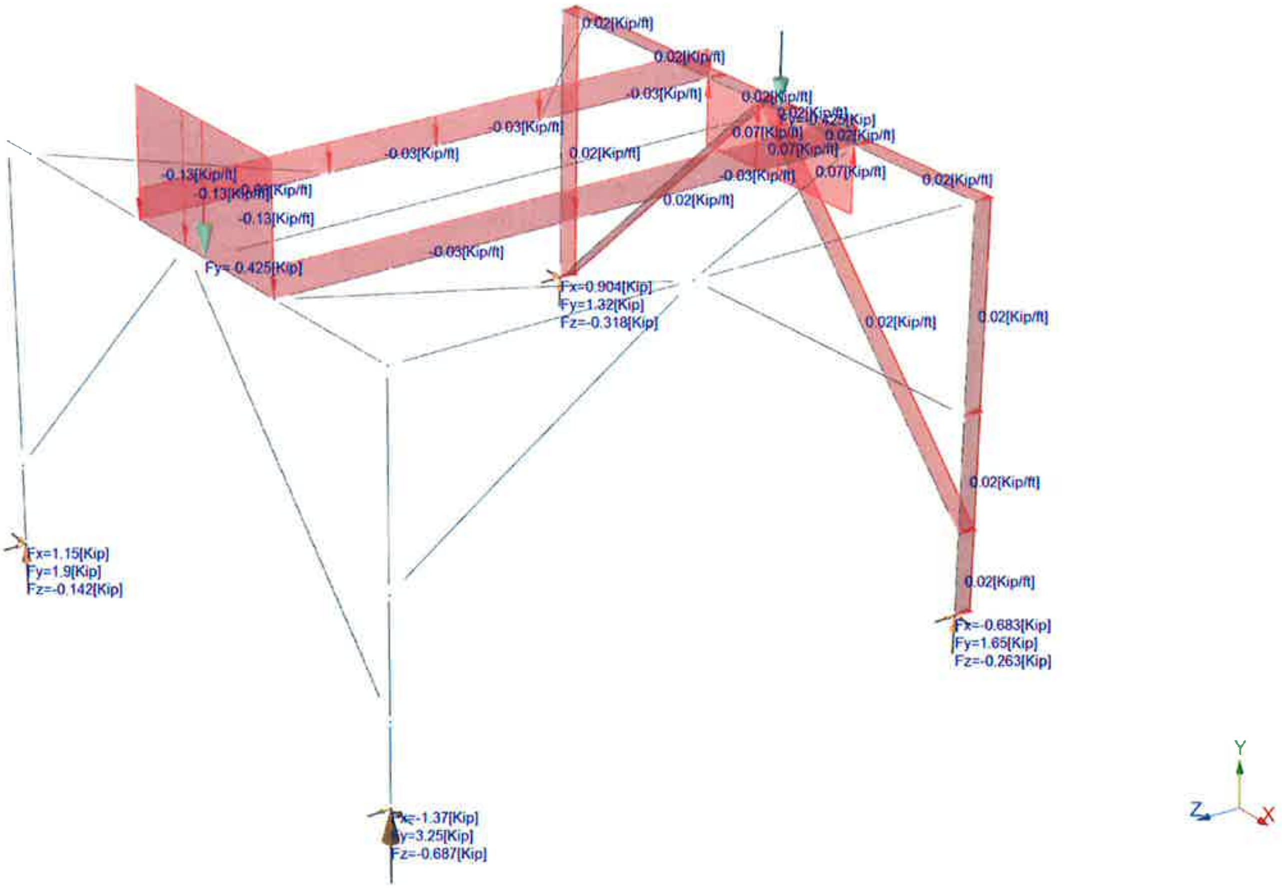


ALPHA FRAME
(WIND BLOWING SOUTH)

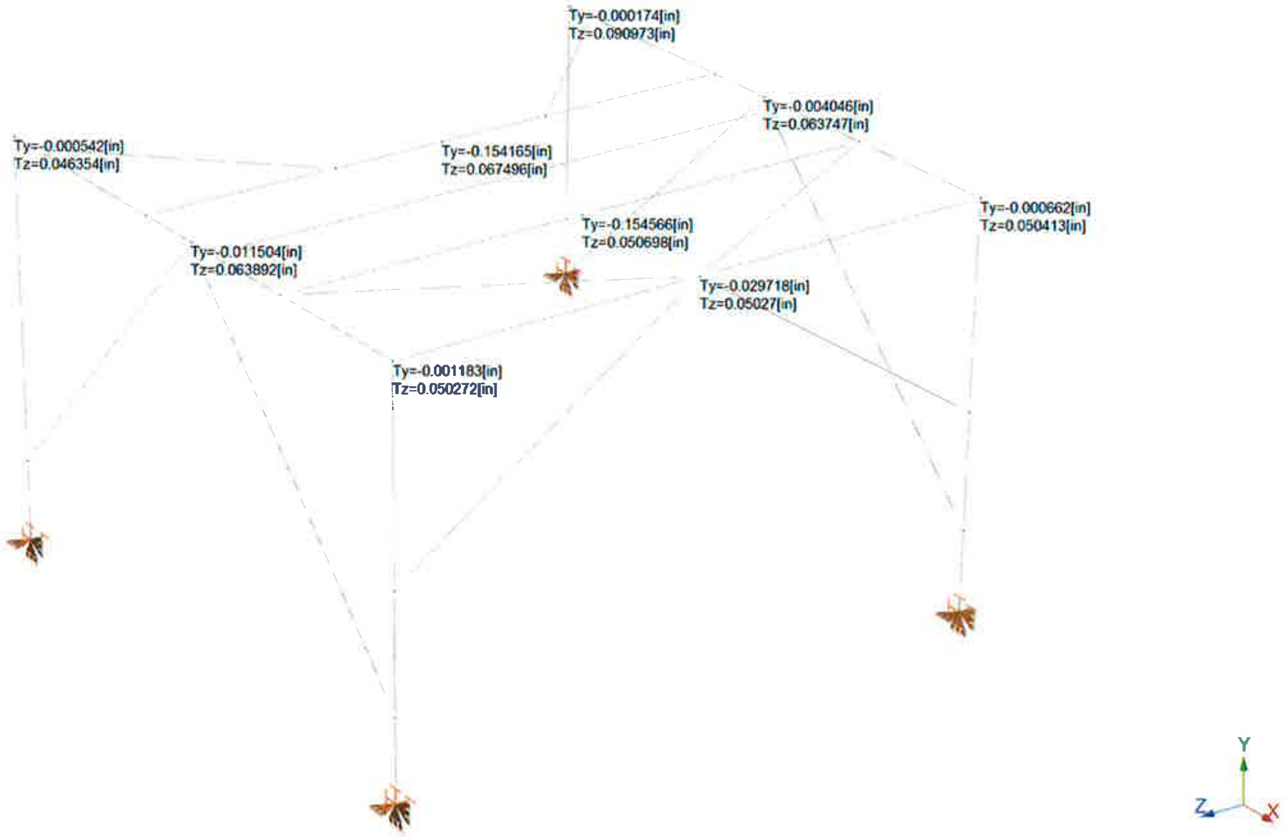
Current Date: 11/4/2014 11:24 AM
Units system: English
File name: R:\STRUCTURAL DEPT\Analysis Software\RAM Elements\RAM Projects\S2900 Alpha Frame (Wind South).etz\
Load condition: D2=DL+W

Loads

🟥 Global distributed - Members
🟩 Local distributed - Members
🟩 Concentrated - Nodes



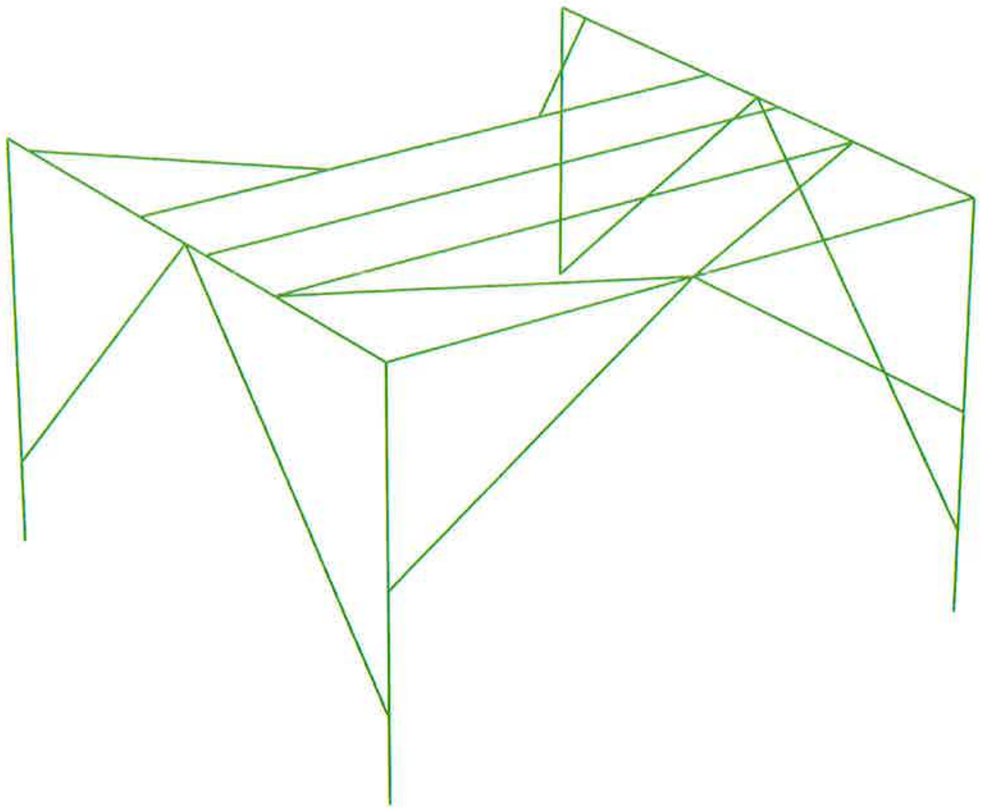
Current Date: 11/4/2014 11:24 AM
Units system: English
File name: R:\STRUCTURAL DEPT\Analysis Software\RAM Elements\RAM Projects\S2900 Alpha Frame (Wind South).etz\
Load condition: D2=DL+W

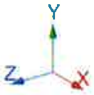


ALPHA FRAME
(WIND BLOWING SOUTH)

Design status

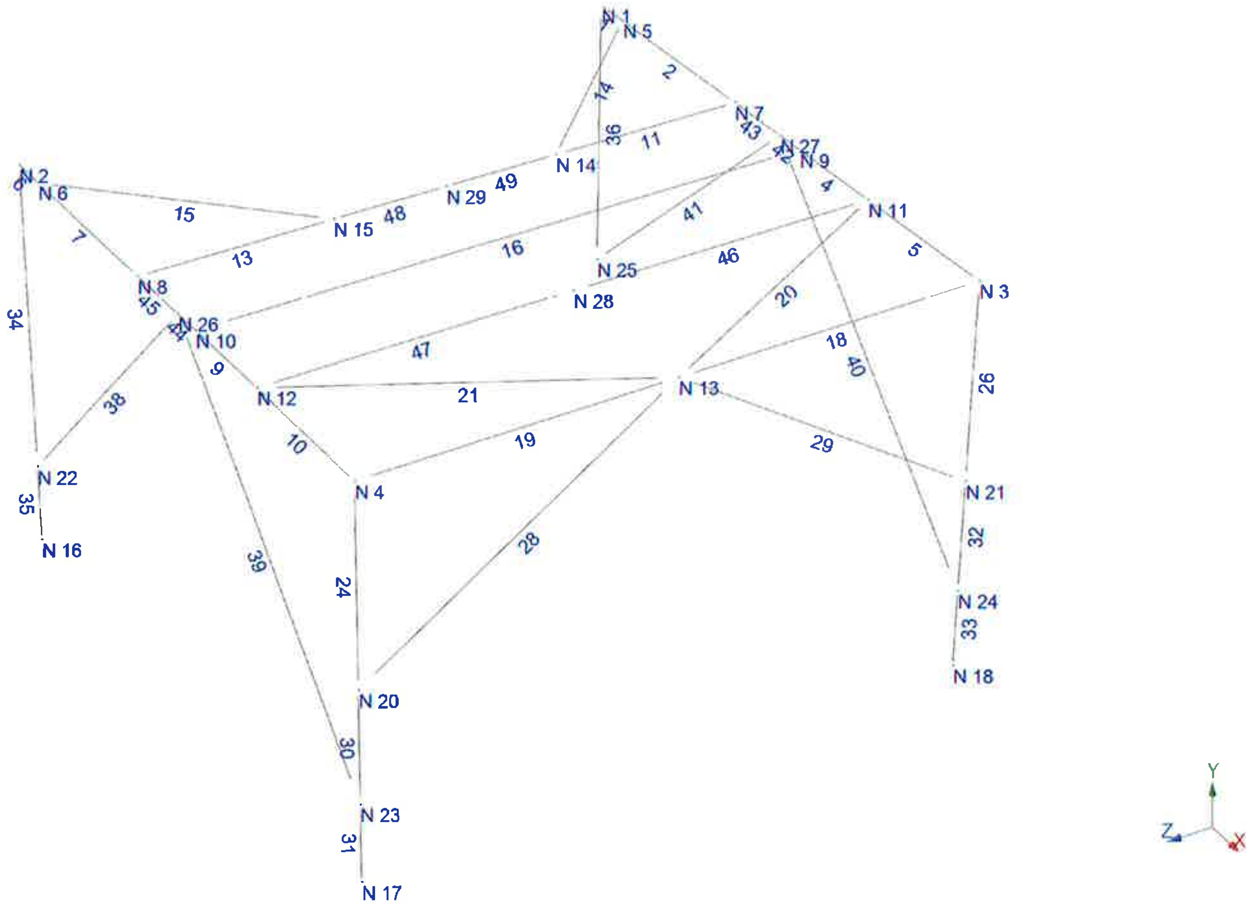
▨	Not designed
🟥	Error on design
🟩	Design O.K.
🟨	With warnings





ALPHA FRAME
(WIND BLOWING SOUTH)

Current Date: 10/24/2014 9:48 AM
Units system: English
File name: R:\STRUCTURAL DEPT\Analysis Software\RAM Elements\RAM Projects\S2900 Alpha Frame (Wind South).etz\

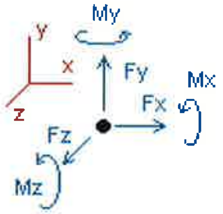


ALPHA FRAME
(WIND BLOWING SOUTH)

Current Date: 11/4/2014 11:25 AM
Units system: English
File name: R:\STRUCTURAL DEPT\Analysis Software\RAM Elements\RAM Projects\S2900 Alpha Frame (Wind South).etz\

Analysis result

Reactions



Direction of positive forces and moments

Node	Forces [Kip]			Moments [Kip*ft]		
	FX	FY	FZ	MX	MY	MZ
Condition **D1=DL**						
16	0.96996	1.69055	-0.08918	-0.26148	0.18408	-1.67919
17	-0.99626	2.43495	-0.34626	-0.97172	-0.05452	1.72115
18	-1.08100	2.47963	0.31124	0.85638	0.06501	1.91449
25	1.10730	1.51442	0.12420	0.16583	-0.36455	0.20692
SUM	0.00000	8.11956	0.00000	-0.21099	-0.16998	2.16336
Condition **D2=DL+W**						
16	1.15181	1.90496	-0.14200	-0.67600	0.27635	-2.00057
17	-1.37282	3.24772	-0.68750	-2.16746	-0.03636	2.40035
18	-0.68341	1.64598	-0.26288	-0.85468	-0.02865	1.18892
25	0.90442	1.32090	-0.31782	-1.39324	0.23330	0.18077
SUM	0.00000	8.11956	-1.41020	-5.09138	0.44464	1.76947
Condition **D3=0.6DL+W**						
16	0.76383	1.22874	-0.10633	-0.57141	0.20272	-1.32889
17	-0.97431	2.27374	-0.54899	-1.77877	-0.01455	1.71189
18	-0.25102	0.65413	-0.38738	-1.19723	-0.05465	0.42313
25	0.46150	0.71513	-0.36750	-1.45957	0.37912	0.09800
SUM	0.00000	4.87173	-1.41020	-5.00698	0.51263	0.90412

Current Date: 11/4/2014 11:25 AM
Units system: English
File name: R:\STRUCTURAL DEPT\Analysis Software\RAM Elements\RAM Projects\S2900 Alpha Frame (Wind South).etz\

Steel Code Check

Report: Summary - For all selected load conditions

Load conditions to be included in design :
D1=DL
D2=DL+W
D3=0.6DL+W

Description	Section	Member	Ctrl Eq.	Ratio	Status	Reference
	HSS_RECT 6X4X3_8	1	D1 at 0.00%	**0.02**	**OK**	
			D2 at 0.00%	0.01	OK	Eq. H1-1b
			D3 at 0.00%	0.01	OK	Eq. H1-1b
		2	D1 at 0.00%	0.02	OK	
			D2 at 100.00%	**0.02**	**OK**	Eq. H1-1b
			D3 at 100.00%	0.01	OK	Eq. H1-1b
		4	D1 at 100.00%	0.05	OK	Eq. H1-1b
			D2 at 100.00%	**0.06**	**OK**	Eq. H1-1b
			D3 at 100.00%	0.04	OK	Eq. H1-1b
		5	D1 at 100.00%	0.04	OK	Eq. H1-1b
			D2 at 100.00%	**0.04**	**OK**	Eq. H1-1b
			D3 at 100.00%	0.02	OK	Eq. H1-1b
		6	D1 at 0.00%	0.02	OK	
			D2 at 0.00%	**0.03**	**OK**	
			D3 at 0.00%	0.02	OK	
		7	D1 at 50.00%	0.02	OK	Eq. H1-1b
			D2 at 62.50%	**0.02**	**OK**	Eq. H1-1b
			D3 at 68.75%	0.02	OK	Eq. H1-1b
		9	D1 at 100.00%	0.04	OK	Eq. H1-1b
			D2 at 100.00%	**0.07**	**OK**	Eq. H1-1b
			D3 at 100.00%	0.05	OK	Eq. H1-1b
		10	D1 at 100.00%	0.04	OK	Eq. H1-1b
			D2 at 100.00%	**0.06**	**OK**	Eq. H1-1b
			D3 at 100.00%	0.05	OK	Eq. H1-1b
		11	D1 at 100.00%	0.05	OK	Eq. H1-1b
			D2 at 100.00%	**0.06**	**OK**	Eq. H1-1b
			D3 at 100.00%	0.04	OK	Eq. H1-1b
		13	D1 at 100.00%	**0.05**	**OK**	Eq. H1-1b
			D2 at 0.00%	0.05	OK	Eq. H1-1b
			D3 at 0.00%	0.04	OK	Eq. H1-1b
		16	D1 at 50.00%	**0.04**	**OK**	Eq. H1-1b
			D2 at 43.75%	0.04	OK	Eq. H1-1b
			D3 at 37.50%	0.02	OK	Eq. H1-1b
		18	D1 at 50.00%	**0.02**	**OK**	Eq. H1-1b
			D2 at 62.50%	0.02	OK	Eq. H1-1b

	D3 at 75.00%	0.01	OK	Eq. H1-1b
19	D1 at 50.00%	0.02	OK	Eq. H1-1b
	D2 at 31.25%	**0.02**	**OK**	Eq. H1-1b
	D3 at 12.50%	0.01	OK	Eq. H1-1b
24	D1 at 0.00%	0.03	OK	Eq. H1-1b
	D2 at 100.00%	**0.04**	**OK**	Eq. H1-1b
	D3 at 100.00%	0.04	OK	Eq. H1-1b
26	D1 at 0.00%	0.03	OK	Eq. H1-1b
	D2 at 0.00%	**0.04**	**OK**	Eq. H1-1b
	D3 at 0.00%	0.03	OK	Eq. H1-1b
28	D1 at 0.00%	0.03	OK	Eq. H1-1b
	D2 at 0.00%	**0.05**	**OK**	Eq. H1-1b
	D3 at 0.00%	0.04	OK	Eq. H1-1b
29	D1 at 100.00%	**0.03**	**OK**	Eq. H1-1b
	D2 at 31.25%	0.02	OK	Eq. H1-1b
	D3 at 56.25%	0.01	OK	Eq. H1-1b
30	D1 at 0.00%	0.06	OK	Eq. H1-1b
	D2 at 0.00%	**0.11**	**OK**	Eq. H1-1b
	D3 at 0.00%	0.09	OK	Eq. H1-1b
31	D1 at 0.00%	0.11	OK	Eq. H1-1b
	D2 at 0.00%	**0.20**	**OK**	Eq. H1-1b
	D3 at 0.00%	0.16	OK	Eq. H1-1b
32	D1 at 0.00%	**0.06**	**OK**	Eq. H1-1b
	D2 at 0.00%	0.02	OK	Eq. H1-1b
	D3 at 0.00%	0.03	OK	Eq. H1-1b
33	D1 at 0.00%	**0.11**	**OK**	Eq. H1-1b
	D2 at 0.00%	0.09	OK	Eq. H1-1b
	D3 at 0.00%	0.08	OK	Eq. H1-1b
34	D1 at 0.00%	0.03	OK	Eq. H1-1b
	D2 at 0.00%	**0.03**	**OK**	Eq. H1-1b
	D3 at 0.00%	0.02	OK	Eq. H1-1b
35	D1 at 0.00%	0.07	OK	Eq. H1-1b
	D2 at 0.00%	**0.11**	**OK**	Eq. H1-1b
	D3 at 0.00%	0.08	OK	Eq. H1-1b
36	D1 at 0.00%	0.03	OK	Eq. H1-1b
	D2 at 100.00%	0.05	OK	Eq. H1-1b
	D3 at 100.00%	**0.05**	**OK**	Eq. H1-1b
38	D1 at 100.00%	0.03	OK	Eq. H1-1b
	D2 at 100.00%	**0.05**	**OK**	Eq. H1-1b
	D3 at 100.00%	0.04	OK	Eq. H1-1b
39	D1 at 100.00%	0.04	OK	Eq. H1-1b
	D2 at 100.00%	**0.05**	**OK**	Eq. H1-1b
	D3 at 100.00%	0.03	OK	Eq. H1-1b
40	D1 at 100.00%	0.04	OK	Eq. H1-1b
	D2 at 0.00%	**0.05**	**OK**	Eq. H1-1b
	D3 at 0.00%	0.04	OK	Eq. H1-1b
41	D1 at 0.00%	**0.05**	**OK**	Eq. H1-1b

		D2 at 100.00%	0.04	OK	Eq. H1-1b
		D3 at 100.00%	0.04	OK	Eq. H1-1b
	42	D1 at 100.00%	0.06	OK	Eq. H1-1b
		D2 at 100.00%	**0.06**	**OK**	Eq. H1-1b
		D3 at 100.00%	0.04	OK	Eq. H1-1b
	43	D1 at 100.00%	**0.05**	**OK**	Eq. H1-1b
		D2 at 100.00%	0.03	OK	Eq. H1-1b
		D3 at 0.00%	0.02	OK	
	44	D1 at 100.00%	0.06	OK	Eq. H1-1b
		D2 at 100.00%	**0.09**	**OK**	Eq. H1-1b
		D3 at 100.00%	0.06	OK	Eq. H1-1b
	45	D1 at 100.00%	0.05	OK	Eq. H1-1b
		D2 at 100.00%	**0.06**	**OK**	Eq. H1-1b
		D3 at 100.00%	0.04	OK	Eq. H1-1b
	46	D1 at 100.00%	**0.06**	**OK**	Eq. H1-1b
		D2 at 100.00%	0.06	OK	Eq. H1-1b
		D3 at 100.00%	0.04	OK	Eq. H1-1b
	47	D1 at 100.00%	**0.06**	**OK**	Eq. H1-1b
		D2 at 93.75%	0.06	OK	Eq. H1-1b
		D3 at 93.75%	0.04	OK	Eq. H1-1b
	48	D1 at 100.00%	0.07	OK	Eq. H1-1b
		D2 at 100.00%	**0.08**	**OK**	Eq. H1-1b
		D3 at 100.00%	0.05	OK	Eq. H1-1b
	49	D1 at 93.75%	0.07	OK	Eq. H1-1b
		D2 at 81.25%	**0.08**	**OK**	Eq. H1-1b
		D3 at 68.75%	0.05	OK	Eq. H1-1b
L 4X4X3_8	**14**	D1 at 0.00%	**0.11**	**OK**	Eq. H1-1b
		D2 at 0.00%	0.07	OK	Eq. H1-1b
		D3 at 87.50%	0.04	OK	Eq. H1-1b
	15	D1 at 0.00%	0.10	OK	Eq. H1-1b
		D2 at 0.00%	**0.11**	**OK**	Eq. H1-1b
		D3 at 0.00%	0.08	OK	Eq. H1-1b
	20	D1 at 0.00%	0.12	OK	Eq. H1-1b
		D2 at 0.00%	**0.15**	**OK**	Eq. H1-1b
		D3 at 0.00%	0.10	OK	Eq. H1-1b
	21	D1 at 0.00%	**0.12**	**OK**	Eq. H1-1b
		D2 at 0.00%	0.11	OK	Eq. H1-1b
		D3 at 0.00%	0.06	OK	Eq. H1-1b

Hudson
Design Group LLC

Beta/Gamma Sector
Antenna Frame Calculations

Date: 11-04-2014

Project Name: Stamford Harbor

Project Number: S2900

Designed By: GH Checked By: MSC

Hudson Design Group LLC

Wind Analysis → FRP Enclosure (BETA/GAMMA Sector)

Wind Blowing East - West

Reference Codes:

-IBC 2003 with 2005 Connecticut Supplement with 2009 Amendments

-Minimum Design Loads for Buildings and Other Structures (ASCE 7-05)

Structure Classification		II		(ASCE 7-05 Table 1-1)
Basic Wind Speed, V		105	mph	(Connecticut Supplement)
Importance Factor, I		1		(ASCE 7-05 Table 6-1)
Exposure Category		D		(ASCE 7-05 Section 6.5.6.3)
Height Above Ground Level, z		106.75	ft	(Top of Enclosure)
Exposure Coeficient, K_z		1.46		(ASCE 7-05 Table 6-3)
Wind Directionality Coef., K_d		0.90		(ASCE 7-05 Table 6-4)
Topographic Facto, K_{zt}		1.00		(ASCE 7-05 Section 6.5.7.2)
Velocity Pressure, q_z	=	$0.00256K_zK_{zt}K_dV^2I$		(ASCE 7-05 Equation 6-15)
	=	**37.16**	**psf**	
Gust Factor, G		0.85		(ASCE 7-05 Section 6.5.8)
Net Force Coeficient, C_f		1.31		(ASCE 7-05 Figure 6.21)
Projected Area Normal to Wind, A_f		198	ft^2	(20.83 ft. W x 9.5 ft. H)
Wind Force, F	=	$q_zGC_fA_f$		(ASCE 7-05 Equation 6-28)
	=	**8193.34**	**lbs**	

Date: 11-04-2014

Project Name: Stamford Harbor

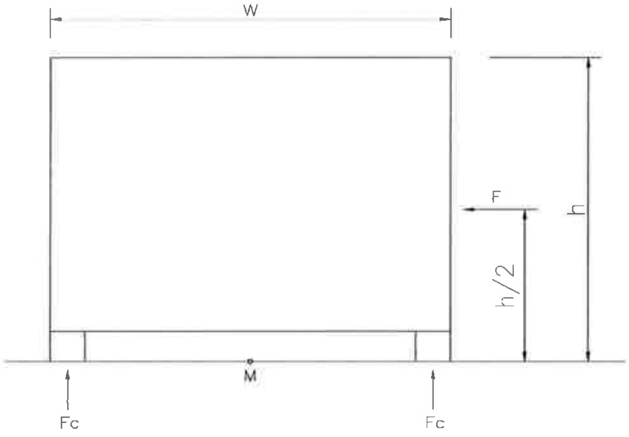
Project Number: S2900

Designed By: GH Checked By: MSC

Calculate Overturning Moment of Proposed FRP Enclosure (BETA/GAMMA)

Wind Blowing East - West

Dimensions (ft)	Wide, w	Depth, d	Height, h
	20.83	16.67	9.5



Moment, M = F x h/2

= **38918.35** **lb-ft**

Calculate Force Couple

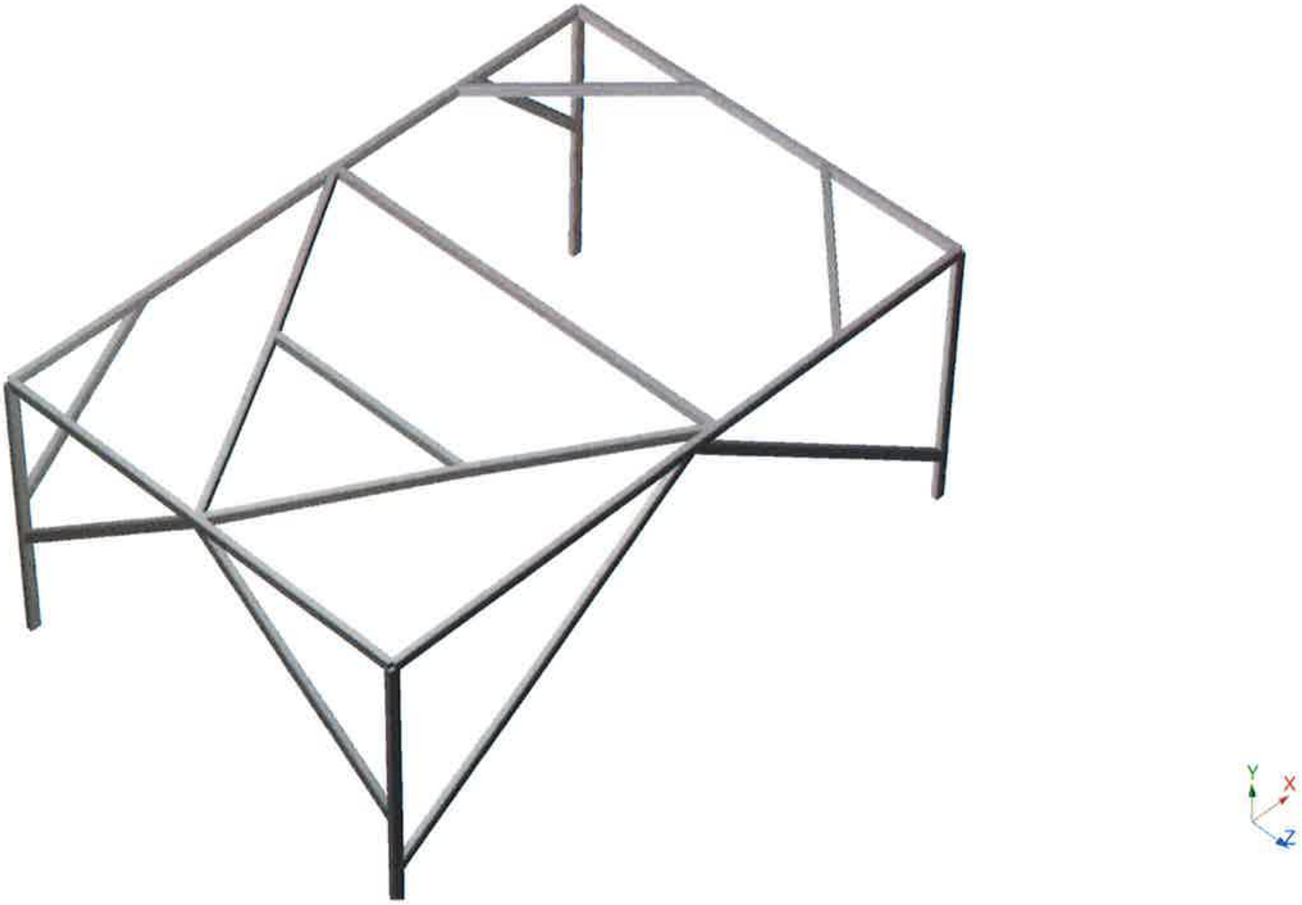
Force Couple, F_c = M / w

= **2334.63** **lbs.**

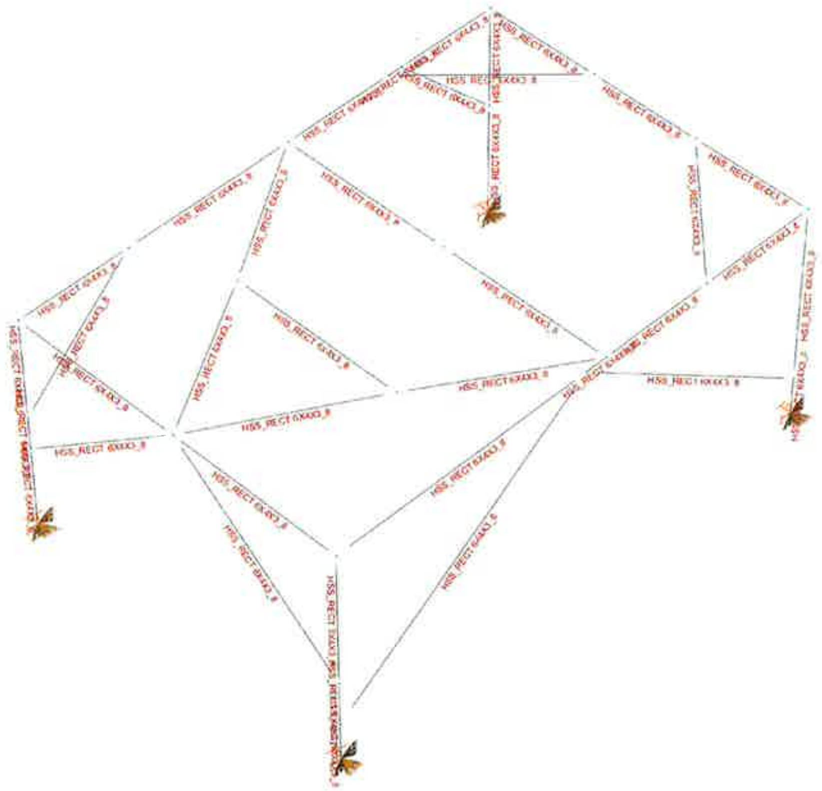
Length of Frame: **20.1667** **ft.**

Loading = **115.77** **plf**

Current Date: 10/23/2014 1:19 PM
Units system: English
File name: R:\STRUCTURAL DEPT\Analysis Software\RAM Elements\RAM Projects\S2900 Beta-Gamma Frame (Wind East).etz\



BETA/GAMMA FRAME
(WIND BLOWING EAST)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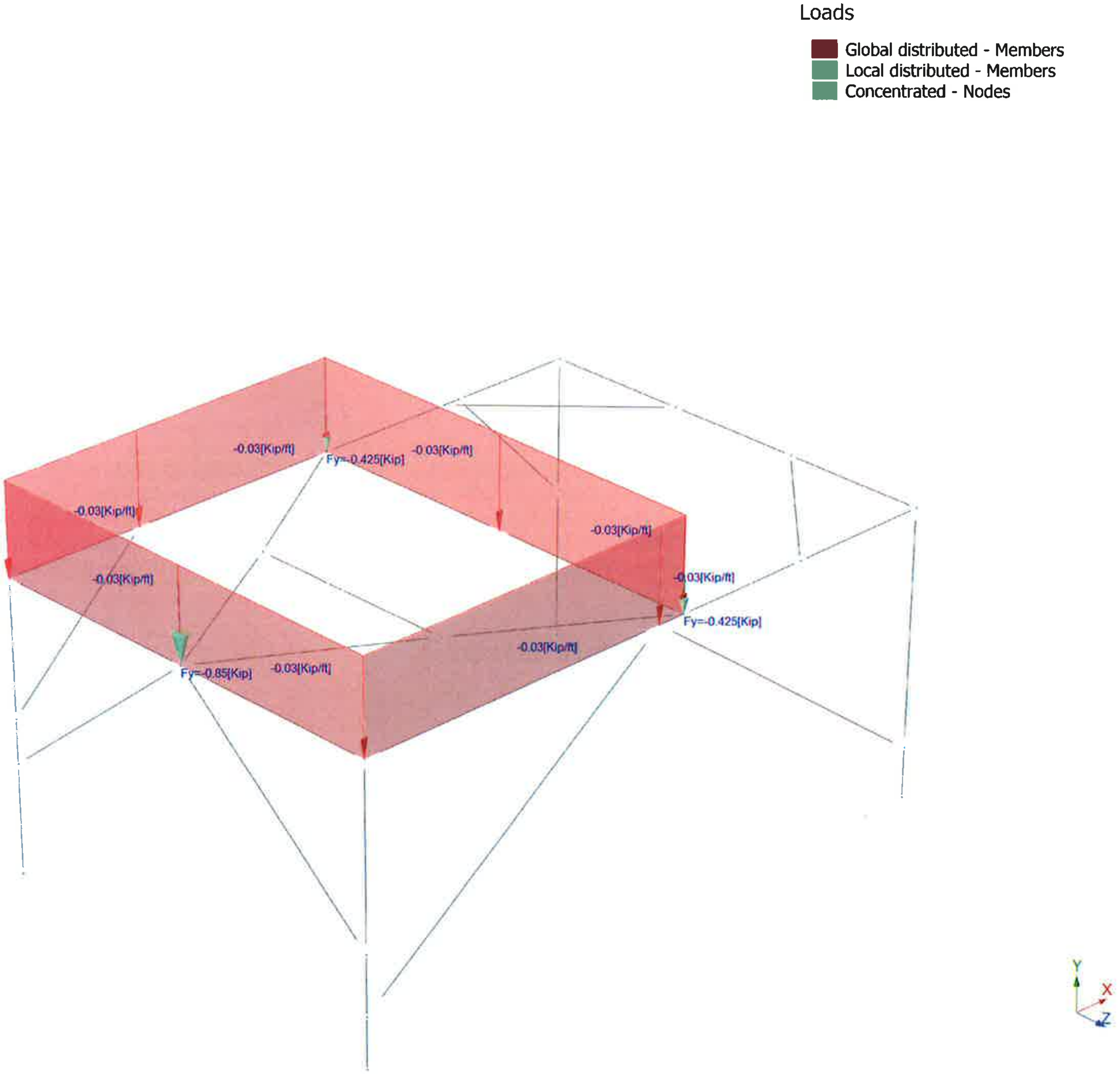
Y
X
Z

Current Date: 11/4/2014 11:44 AM
Units system: English
File name: R:\STRUCTURAL DEPT\Analysis Software\RAM Elements\RAM Projects\S2900 Beta-Gamma Frame (Wind East).etz\
Load condition: DL=Dead Load



BETA/GAMMA FRAME
(WIND BLOWING EAST)

Current Date: 11/4/2014 11:45 AM
Units system: English
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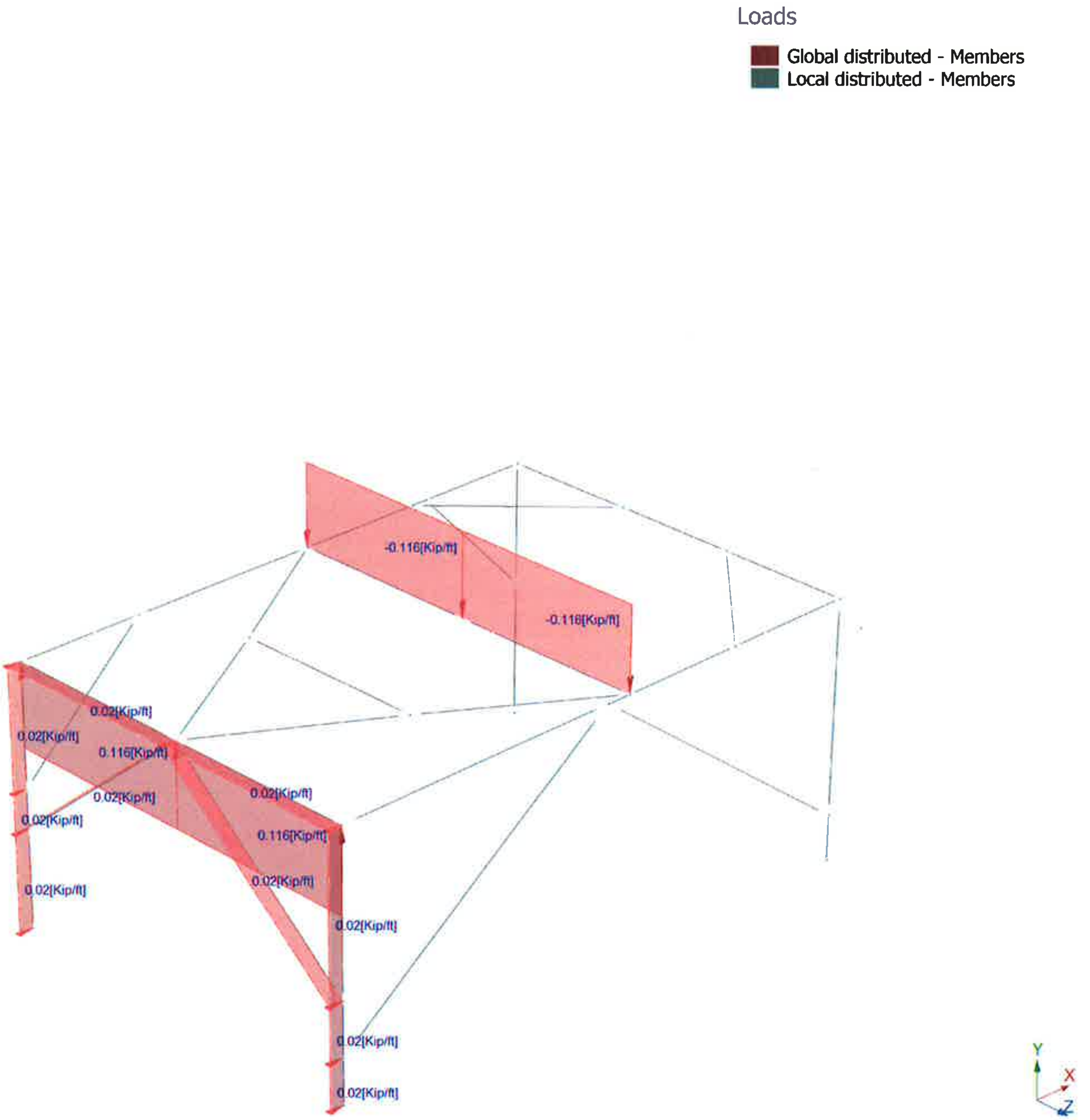
Load condition: W=Wind

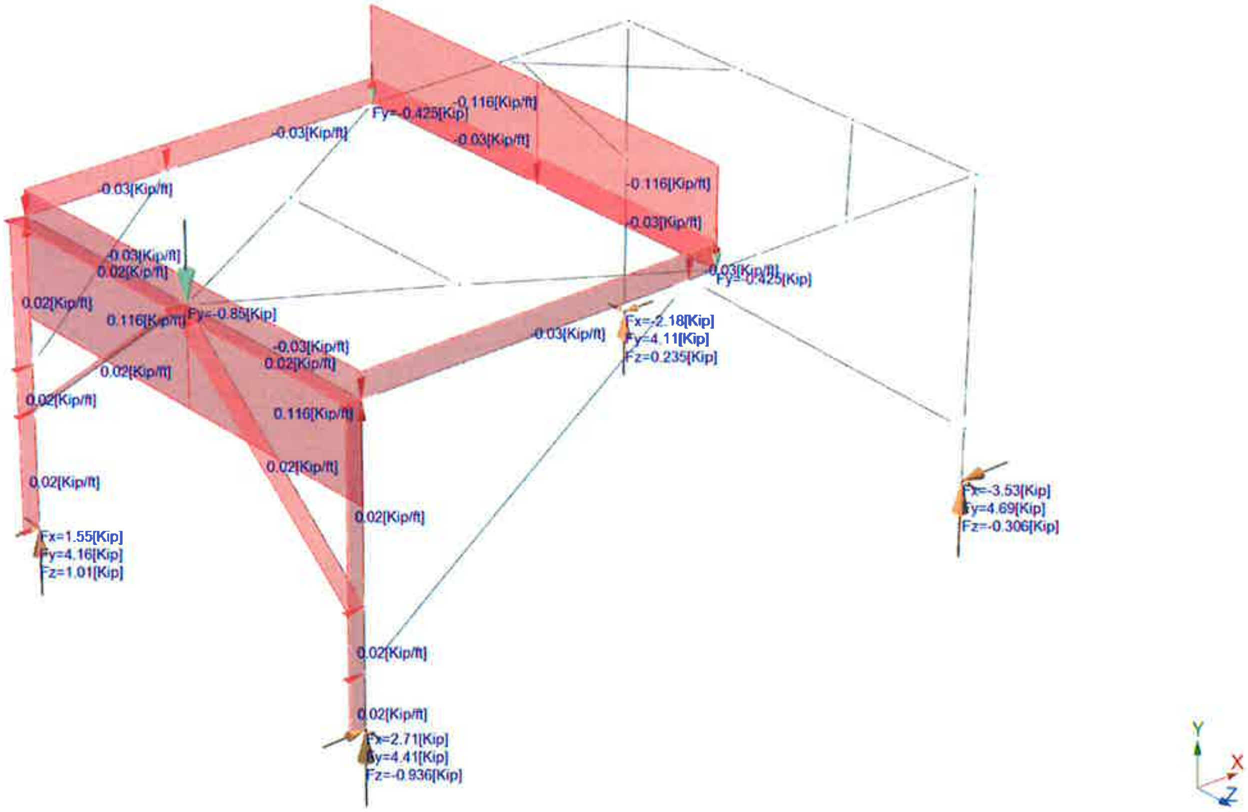


BETA/GAMMA FRAME
(WIND BLOWING EAST)

Current Date: 11/4/2014 11:45 AM
Units system: English
File name: R:\STRUCTURAL DEPT\Analysis Software\RAM Elements\RAM Projects\S2900 Beta-Gamma Frame (Wind East).etz\
Load condition: D2=DL+W

Loads

🟥 Global distributed - Members
🟩 Local distributed - Members
🟩 Concentrated - Nodes



BETA/GAMMA FRAME
(WIND BLOWING EAST)

Current Date: 11/4/2014 11:46 AM
Units system: English
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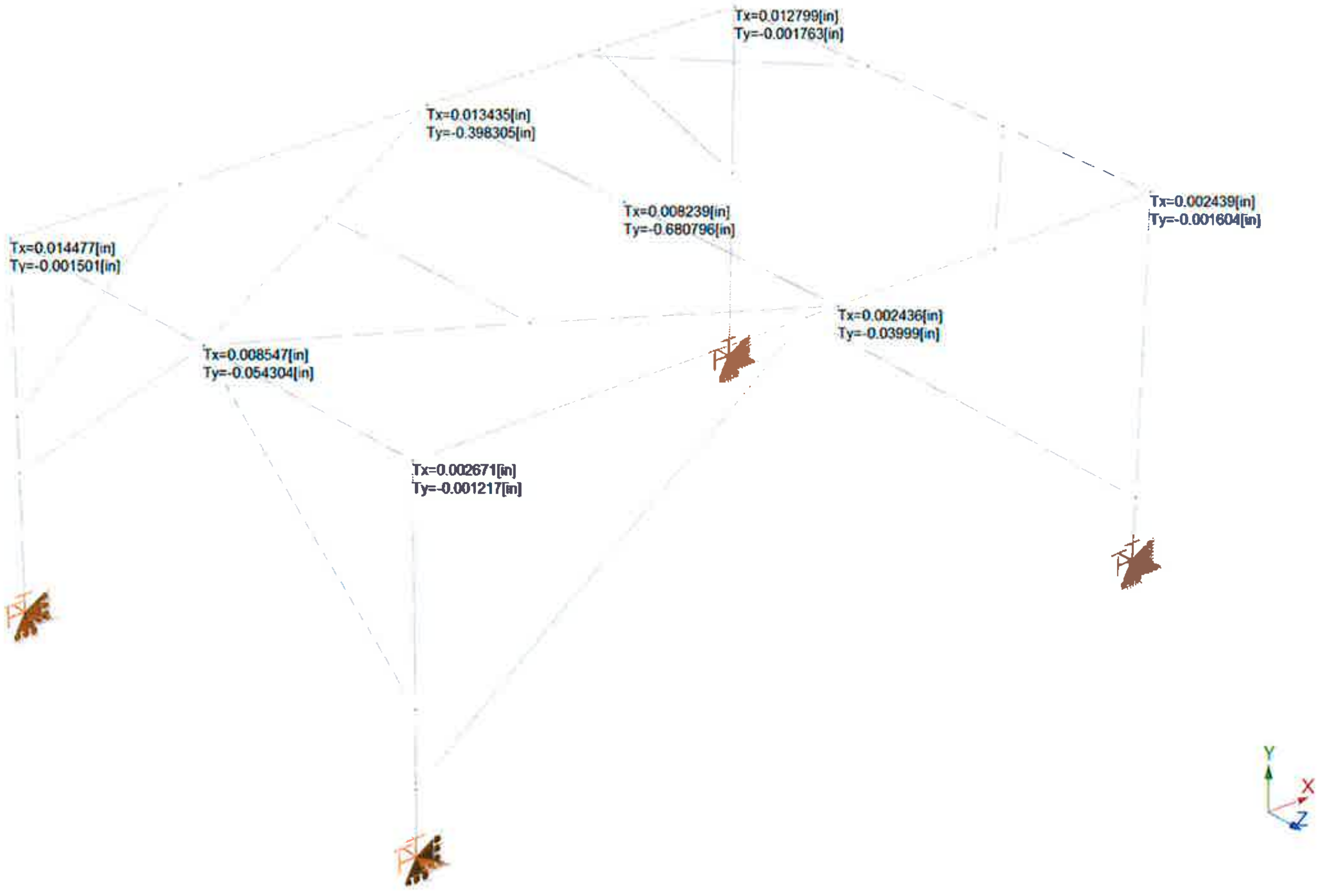
Load condition: D2=DL+W

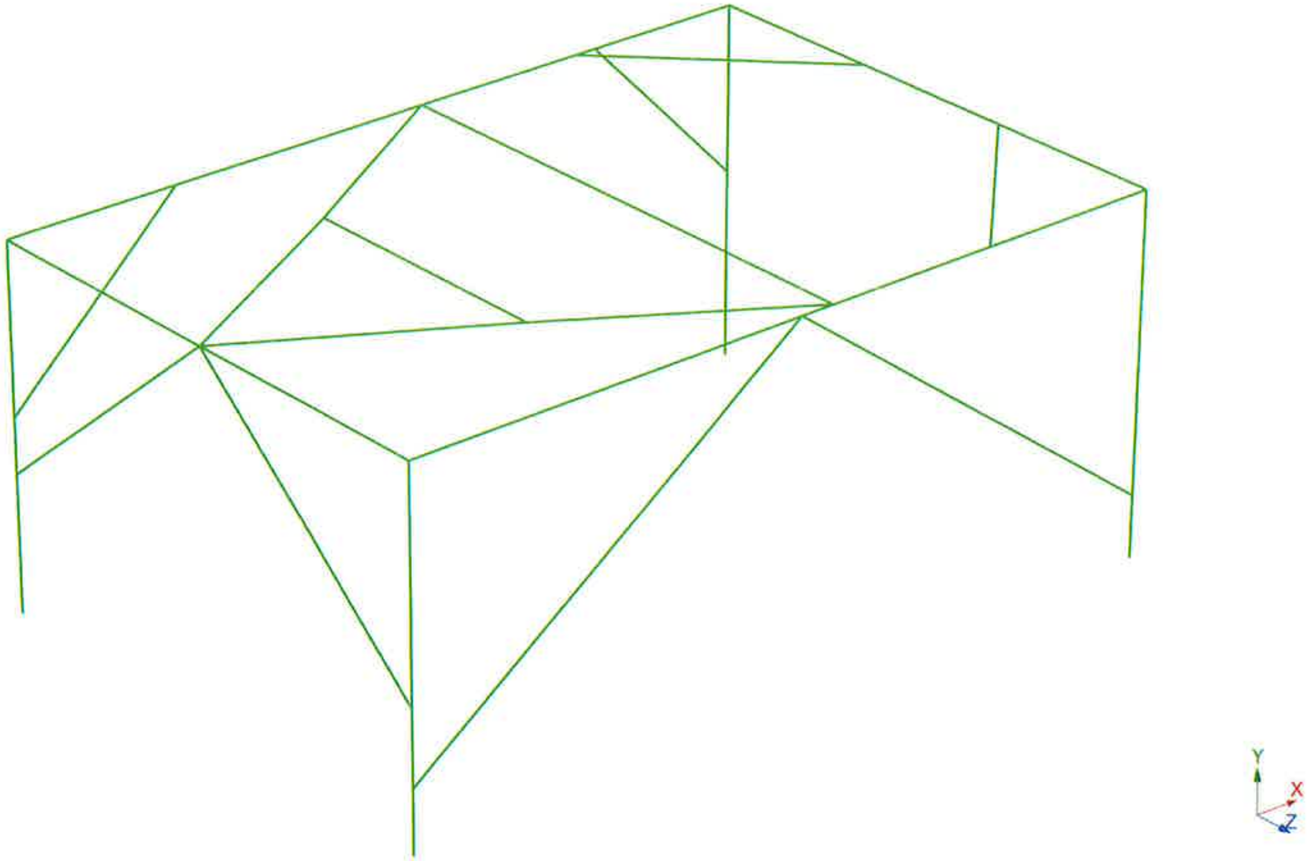


BETA/GAMMA FRAME
(WIND BLOWING EAST)

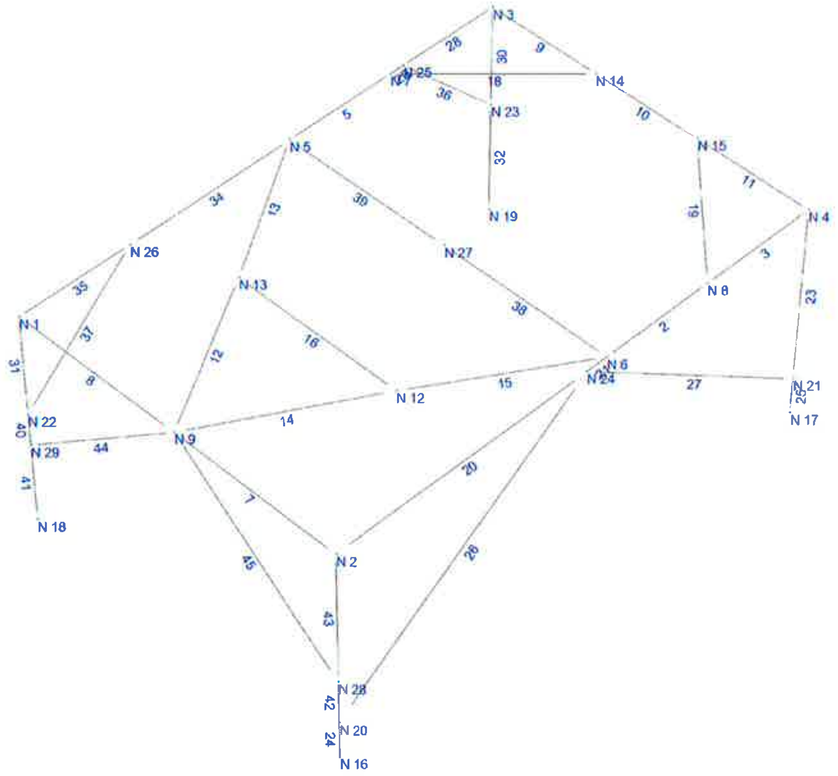
Current Date: 11/4/2014 11:45 AM
Units system: English
File name: R:\STRUCTURAL DEPT\Analysis Software\RAM Elements\RAM Projects\S2900 Beta-Gamma Frame (Wind East).etz\

Design status

🟪 Not designed
🟥 Error on design
🟩 Design O.K.
🟨 With warnings



BETA/GAMMA FRAME
(WIND BLOWING EAST)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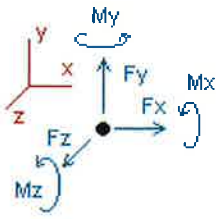
Current Date: 11/4/2014 11:47 AM
Units system: English
File name: R:\STRUCTURAL DEPT\Analysis Software\RAM Elements\RAM Projects\S2900 Beta-Gamma Frame (Wind East).etz\

Analysis result

Reactions



Direction of positive forces and moments

	Forces [Kip]			Moments [Kip*ft]		
Node	**FX**	**FY**	**FZ**	**MX**	**MY**	**MZ**
Condition **D1=DL**						
18	0.98578	3.14261	0.94492	2.43526	-0.03782	-3.28752
19	-0.99550	1.96182	0.11429	0.45151	0.02191	3.36538
17	-1.59159	2.16693	-0.11515	-0.35578	-0.17024	2.40516
16	1.60131	3.36837	-0.94406	-2.27779	-0.03579	-2.52658
SUM	0.00000	10.63973	0.00000	0.25320	-0.22193	-0.04356
Condition **D2=DL+W**						
18	1.55209	4.16137	1.00757	2.57059	-0.10105	-5.19103
19	-2.18418	4.10886	0.23492	0.84583	0.08259	7.54759
17	-3.52788	4.68978	-0.30605	-1.03055	-0.48686	5.35759
16	2.70877	4.41460	-0.93644	-2.15783	0.25695	-4.08080
SUM	-1.45120	17.37461	0.00000	0.22803	-0.24837	3.63335
Condition **D3=0.6DL+W**						
18	1.15778	2.90432	0.62960	1.59649	-0.08592	-3.87603
19	-1.78598	3.32414	0.18920	0.66522	0.07382	6.20144
17	-2.89124	3.82301	-0.25999	-0.88824	-0.41876	4.39553
16	2.06825	3.06725	-0.55881	-1.24672	0.27126	-3.07017
SUM	-1.45120	13.11872	0.00000	0.12675	-0.15960	3.65077

Bentley

Current Date: 11/4/2014 11:47 AM
Units system: English
File name: R:\STRUCTURAL DEPT\Analysis Software\RAM Elements\RAM Projects\S2900 Beta-Gamma Frame (Wind East).etz\

Steel Code Check

Report: Summary - For all selected load conditions

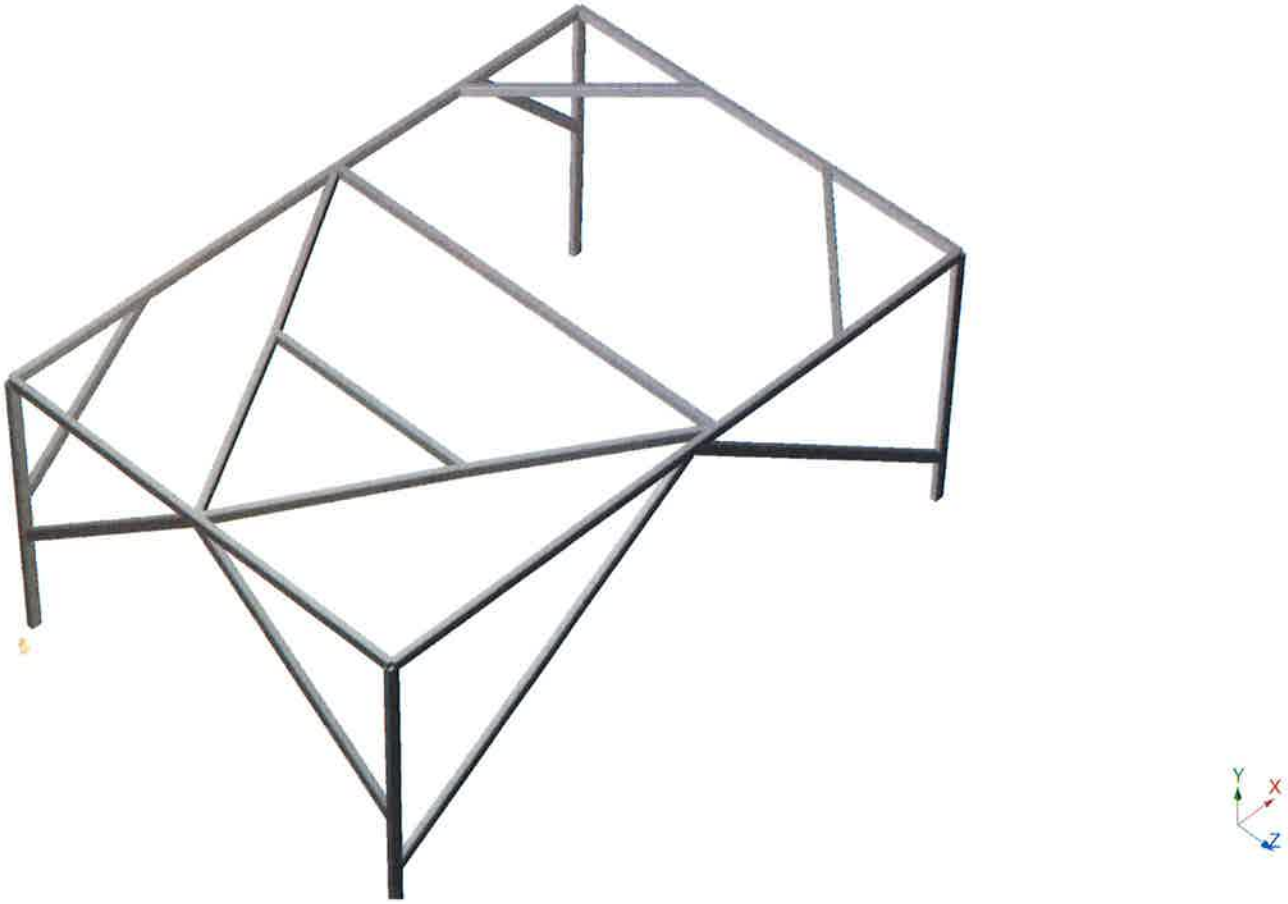
Load conditions to be included in design :
D1=DL
D2=DL+W
D3=0.6DL+W

Description	Section	Member	Ctrl Eq.	Ratio	Status	Reference
	HSS_RECT 6X4X3_8	**2**	D1 at 100.00%	0.02	OK	Eq. H1-1b
			D2 at 0.00%	**0.06**	**OK**	
			D3 at 0.00%	0.05	OK	
		3	D1 at 100.00%	0.02	OK	Eq. H1-1b
			D2 at 100.00%	**0.03**	**OK**	Eq. H1-1b
			D3 at 100.00%	0.03	OK	Eq. H1-1b
		5	D1 at 0.00%	0.14	OK	Eq. H1-1b
			D2 at 0.00%	**0.31**	**OK**	Eq. H1-1b
			D3 at 0.00%	0.26	OK	Eq. H1-1b
		7	D1 at 50.00%	0.02	OK	Eq. H1-1b
			D2 at 0.00%	**0.03**	**OK**	Eq. H1-1b
			D3 at 100.00%	0.03	OK	Eq. H1-1b
		8	D1 at 68.75%	0.03	OK	Eq. H1-1b
			D2 at 100.00%	**0.07**	**OK**	Eq. H1-1b
			D3 at 100.00%	0.07	OK	Eq. H1-1b
		9	D1 at 0.00%	0.02	OK	Eq. H1-1b
			D2 at 100.00%	**0.05**	**OK**	Eq. H1-1b
			D3 at 100.00%	0.04	OK	Eq. H1-1b
		10	D1 at 87.50%	0.04	OK	Eq. H1-1b
			D2 at 75.00%	**0.09**	**OK**	Eq. H1-1b
			D3 at 68.75%	0.07	OK	Eq. H1-1b
		11	D1 at 100.00%	0.04	OK	Eq. H1-1b
			D2 at 100.00%	**0.07**	**OK**	Eq. H1-1b
			D3 at 100.00%	0.06	OK	Eq. H1-1b
		12	D1 at 0.00%	0.05	OK	Eq. H1-1b
			D2 at 0.00%	**0.11**	**OK**	Eq. H1-1b
			D3 at 0.00%	0.09	OK	Eq. H1-1b
		13	D1 at 81.25%	0.05	OK	Eq. H1-1b
			D2 at 62.50%	**0.11**	**OK**	Eq. H1-1b
			D3 at 62.50%	0.09	OK	Eq. H1-1b
		14	D1 at 100.00%	0.04	OK	Eq. H1-1b
			D2 at 100.00%	**0.09**	**OK**	Eq. H1-1b
			D3 at 100.00%	0.07	OK	Eq. H1-1b
		15	D1 at 100.00%	0.05	OK	Eq. H1-1b
			D2 at 100.00%	**0.11**	**OK**	Eq. H1-1b

	D3 at 100.00%	0.09	OK	Eq. H1-1b
16	D1 at 56.25%	0.02	OK	Eq. H1-1b
	D2 at 62.50%	**0.05**	**OK**	Eq. H1-1b
	D3 at 62.50%	0.04	OK	Eq. H1-1b
18	D1 at 0.00%	0.03	OK	Eq. H1-1b
	D2 at 0.00%	**0.06**	**OK**	Eq. H1-1b
	D3 at 0.00%	0.05	OK	Eq. H1-1b
19	D1 at 43.75%	0.02	OK	Eq. H1-1b
	D2 at 31.25%	**0.04**	**OK**	Eq. H1-1b
	D3 at 25.00%	0.04	OK	Eq. H1-1b
20	D1 at 100.00%	0.05	OK	Eq. H1-1b
	D2 at 100.00%	**0.08**	**OK**	Eq. H1-1b
	D3 at 100.00%	0.06	OK	Eq. H1-1b
21	D1 at 100.00%	0.06	OK	Eq. H1-1b
	D2 at 0.00%	**0.15**	**OK**	
	D3 at 0.00%	0.13	OK	
23	D1 at 0.00%	0.05	OK	Eq. H1-1b
	D2 at 0.00%	**0.12**	**OK**	Eq. H1-1b
	D3 at 0.00%	0.10	OK	Eq. H1-1b
24	D1 at 0.00%	0.21	OK	Eq. H1-1b
	D2 at 0.00%	**0.27**	**OK**	Eq. H1-1b
	D3 at 0.00%	0.18	OK	Eq. H1-1b
25	D1 at 0.00%	0.11	OK	Eq. H1-1b
	D2 at 0.00%	**0.26**	**OK**	Eq. H1-1b
	D3 at 0.00%	0.20	OK	Eq. H1-1b
26	D1 at 0.00%	0.05	OK	Eq. H1-2
	D2 at 100.00%	**0.13**	**OK**	Eq. H1-1b
	D3 at 100.00%	0.12	OK	Eq. H1-1b
27	D1 at 100.00%	0.05	OK	Eq. H1-2
	D2 at 100.00%	**0.15**	**OK**	Eq. H1-1b
	D3 at 100.00%	0.12	OK	Eq. H1-1b
28	D1 at 100.00%	0.07	OK	Eq. H1-1b
	D2 at 100.00%	**0.16**	**OK**	Eq. H1-1b
	D3 at 100.00%	0.13	OK	Eq. H1-1b
29	D1 at 100.00%	0.08	OK	Eq. H1-1b
	D2 at 100.00%	**0.18**	**OK**	Eq. H1-1b
	D3 at 100.00%	0.15	OK	Eq. H1-1b
30	D1 at 100.00%	0.09	OK	Eq. H1-1b
	D2 at 100.00%	**0.20**	**OK**	Eq. H1-1b
	D3 at 100.00%	0.16	OK	Eq. H1-1b
31	D1 at 100.00%	0.09	OK	Eq. H1-1b
	D2 at 100.00%	**0.15**	**OK**	Eq. H1-1b
	D3 at 100.00%	0.11	OK	Eq. H1-1b
32	D1 at 100.00%	0.15	OK	Eq. H1-1b
	D2 at 100.00%	**0.32**	**OK**	Eq. H1-1b
	D3 at 100.00%	0.26	OK	Eq. H1-1b
34	D1 at 0.00%	0.12	OK	Eq. H1-1b

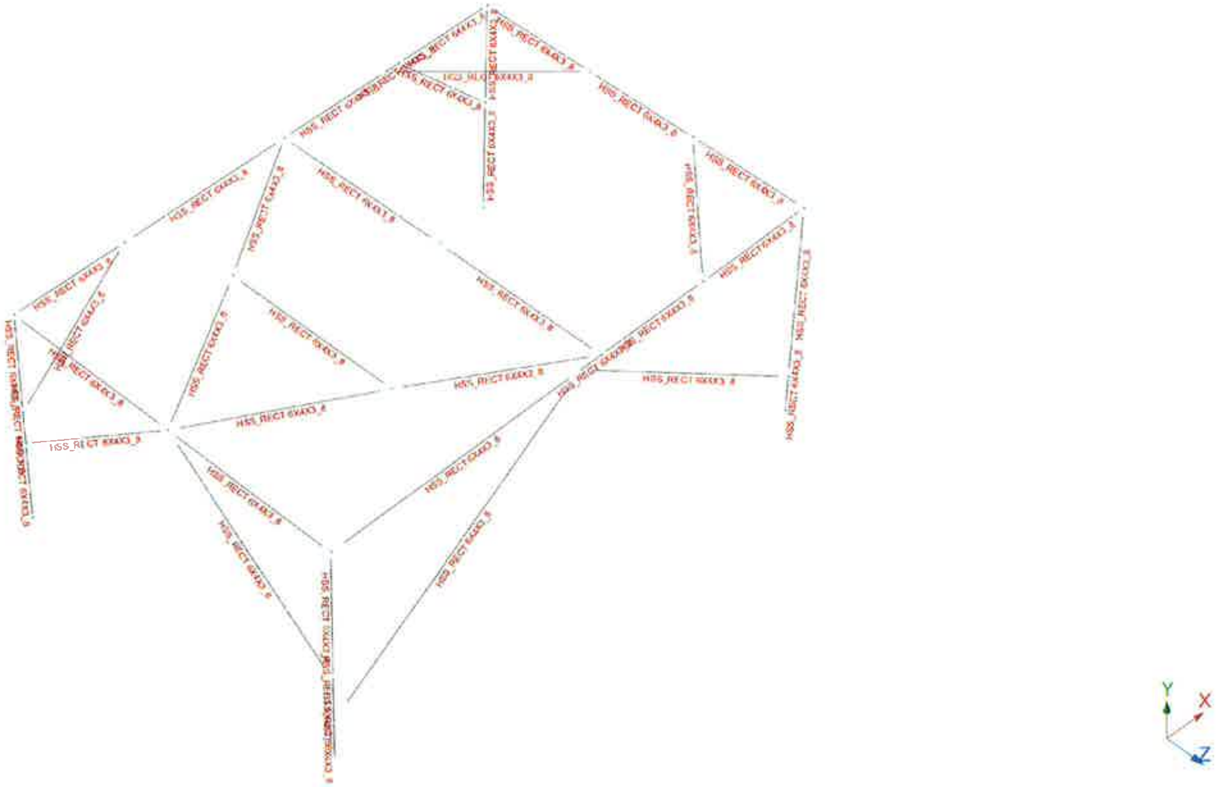
	D2 at 0.00%	**0.24**	**OK**	Eq. H1-1b
	D3 at 0.00%	0.20	OK	Eq. H1-1b
35	D1 at 100.00%	0.07	OK	Eq. H1-1b
	D2 at 100.00%	**0.13**	**OK**	Eq. H1-1b
	D3 at 100.00%	0.10	OK	Eq. H1-1b
36	D1 at 0.00%	0.06	OK	Eq. H1-1b
	D2 at 0.00%	**0.12**	**OK**	Eq. H1-1b
	D3 at 0.00%	0.10	OK	Eq. H1-1b
37	D1 at 100.00%	0.05	OK	Eq. H1-1b
	D2 at 100.00%	**0.08**	**OK**	Eq. H1-1b
	D3 at 100.00%	0.06	OK	Eq. H1-1b
38	D1 at 100.00%	0.06	OK	Eq. H1-1b
	D2 at 100.00%	**0.22**	**OK**	Eq. H1-1b
	D3 at 100.00%	0.19	OK	Eq. H1-1b
39	D1 at 93.75%	0.06	OK	Eq. H1-1b
	D2 at 93.75%	**0.22**	**OK**	Eq. H1-1b
	D3 at 93.75%	0.19	OK	Eq. H1-1b
40	D1 at 0.00%	0.14	OK	Eq. H1-1b
	D2 at 0.00%	**0.23**	**OK**	Eq. H1-1b
	D3 at 0.00%	0.17	OK	Eq. H1-1b
41	D1 at 0.00%	0.25	OK	Eq. H1-1b
	D2 at 0.00%	**0.33**	**OK**	Eq. H1-1b
	D3 at 0.00%	0.23	OK	Eq. H1-1b
42	D1 at 100.00%	0.12	OK	Eq. H1-1b
	D2 at 100.00%	**0.13**	**OK**	Eq. H1-1b
	D3 at 100.00%	0.08	OK	Eq. H1-1b
43	D1 at 100.00%	**0.04**	**OK**	Eq. H1-1b
	D2 at 100.00%	0.04	OK	Eq. H1-1b
	D3 at 0.00%	0.03	OK	Eq. H1-1b
44	D1 at 0.00%	0.08	OK	Eq. H1-1b
	D2 at 0.00%	**0.10**	**OK**	Eq. H1-1b
	D3 at 0.00%	0.07	OK	Eq. H1-1b
45	D1 at 100.00%	0.06	OK	Eq. H1-1b
	D2 at 0.00%	**0.09**	**OK**	Eq. H1-1b
	D3 at 0.00%	0.07	OK	Eq. H1-1b

Current Date: 10/23/2014 1:27 PM
Units system: English
File name: R:\STRUCTURAL DEPT\Analysis Software\RAM Elements\RAM Projects\S2900 Beta-Gamma Frame (Wind West).etz\



BETA/GAMMA FRAME
(WIND BLOWING WEST)

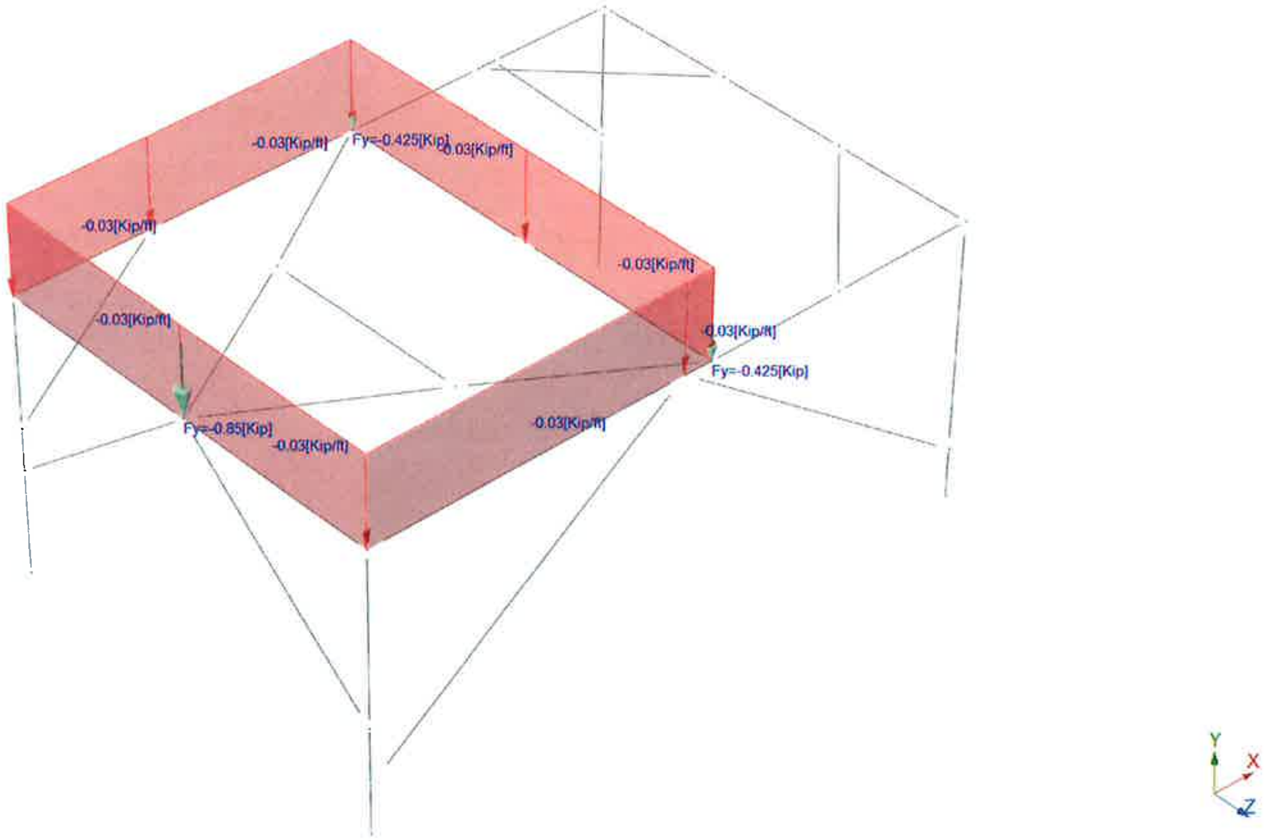
Current Date: 10/23/2014 1:28 PM
Units system: English
File name: R:\STRUCTURAL DEPT\Analysis Software\RAM Elements\RAM Projects\S2900 Beta-Gamma Frame (Wind West).etz\



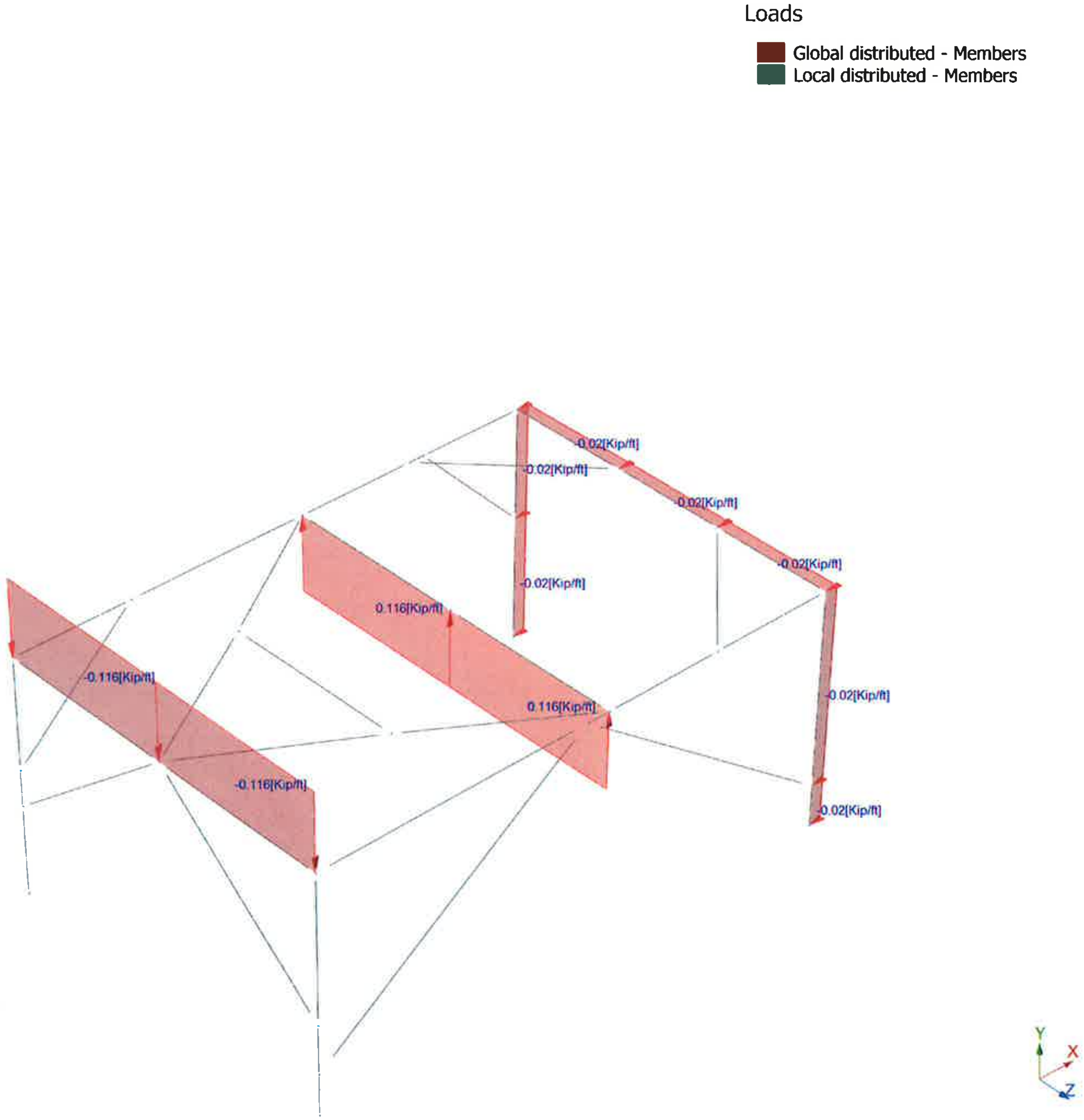
Current Date: 11/4/2014 11:55 AM
Units system: English
File name: R:\STRUCTURAL DEPT\Analysis Software\RAM Elements\RAM Projects\S2900 Beta-Gamma Frame (Wind West).etz\
Load condition: DL=Dead Load

Loads

🟥	Global distributed - Members
🟩	Local distributed - Members
🟩	Concentrated - Nodes

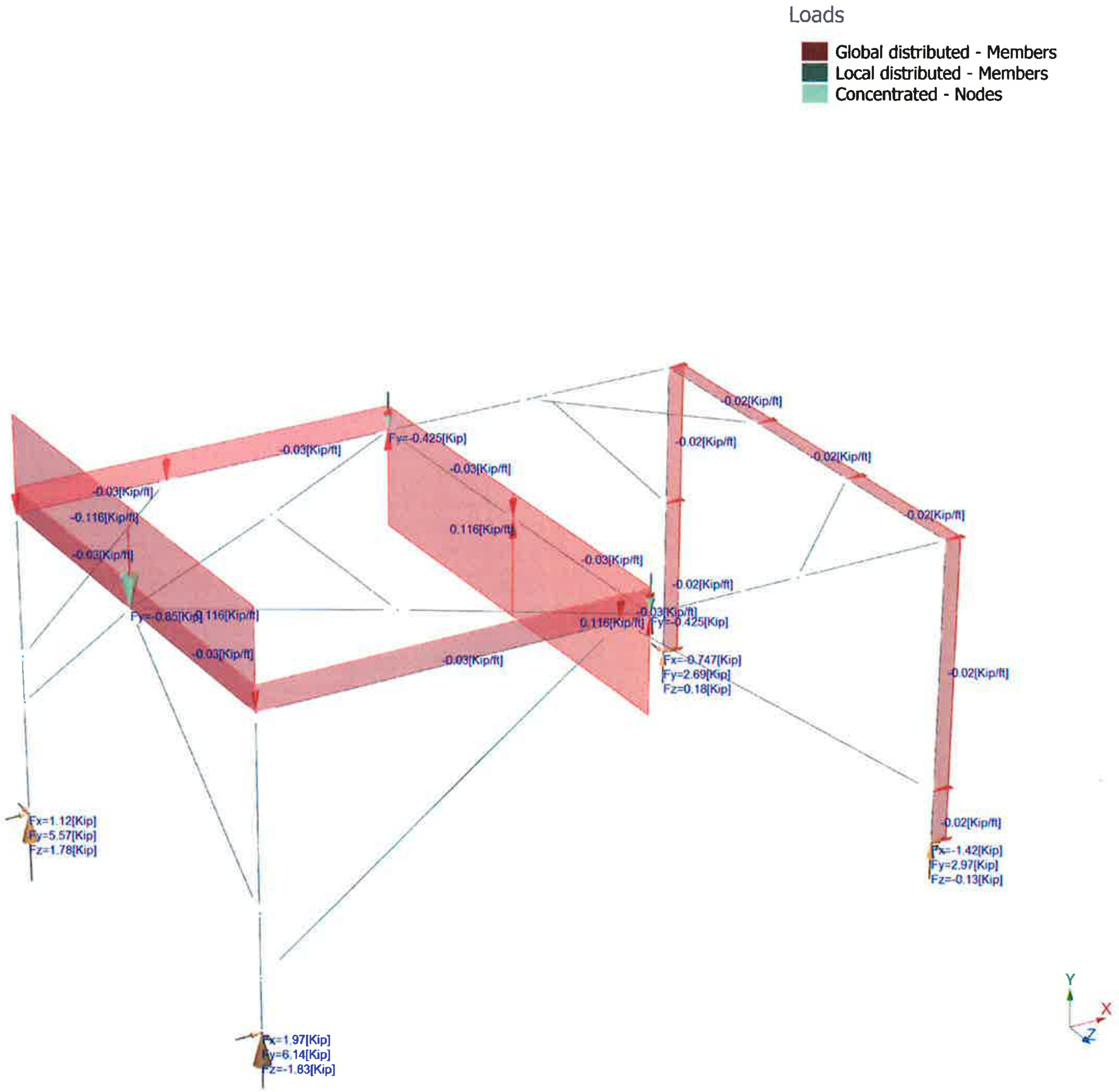


Current Date: 11/4/2014 11:55 AM
Units system: English
File name: R:\STRUCTURAL DEPT\Analysis Software\RAM Elements\RAM Projects\S2900 Beta-Gamma Frame (Wind West).etz\
Load condition: W=Wind



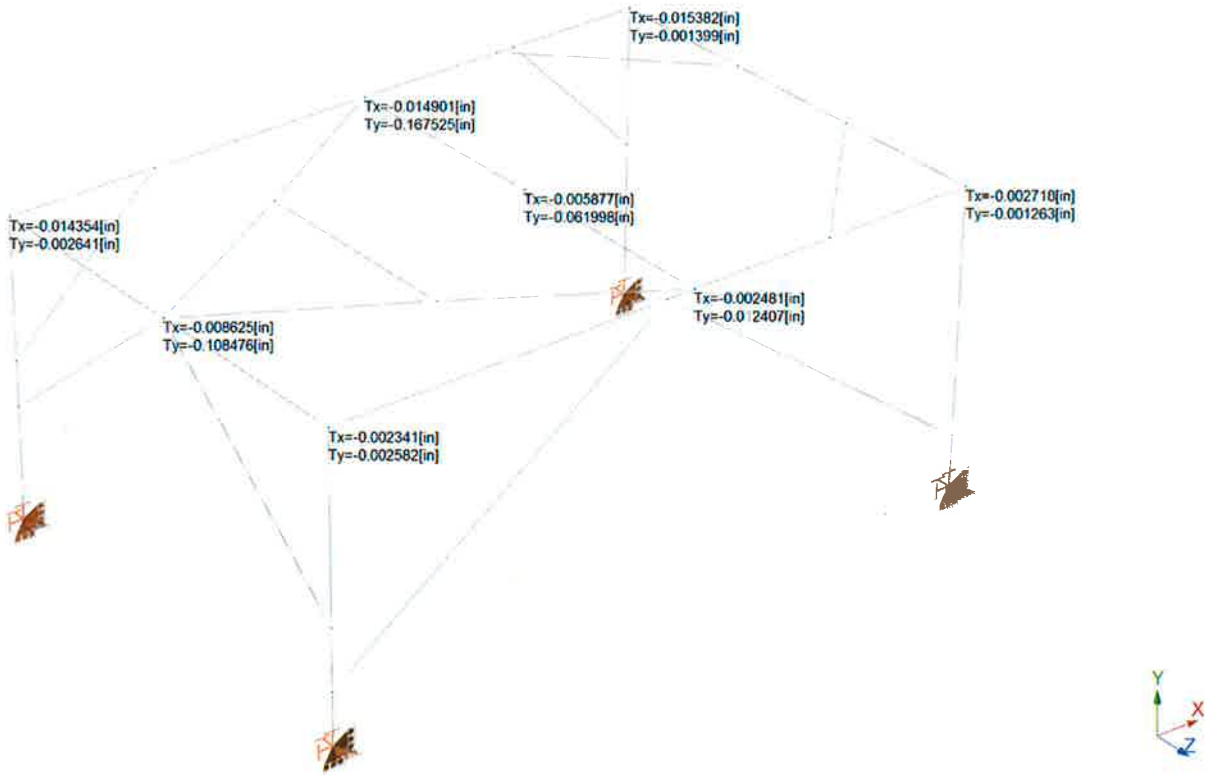
BETA/GAMMA FRAME
(WIND BLOWING WEST)

Current Date: 11/4/2014 11:55 AM
Units system: English
File name: R:\STRUCTURAL DEPT\Analysis Software\RAM Elements\RAM Projects\S2900 Beta-Gamma Frame (Wind West).etz\
Load condition: D2=DL+W



BETA/GAMMA FRAME
(WIND BLOWING WEST)

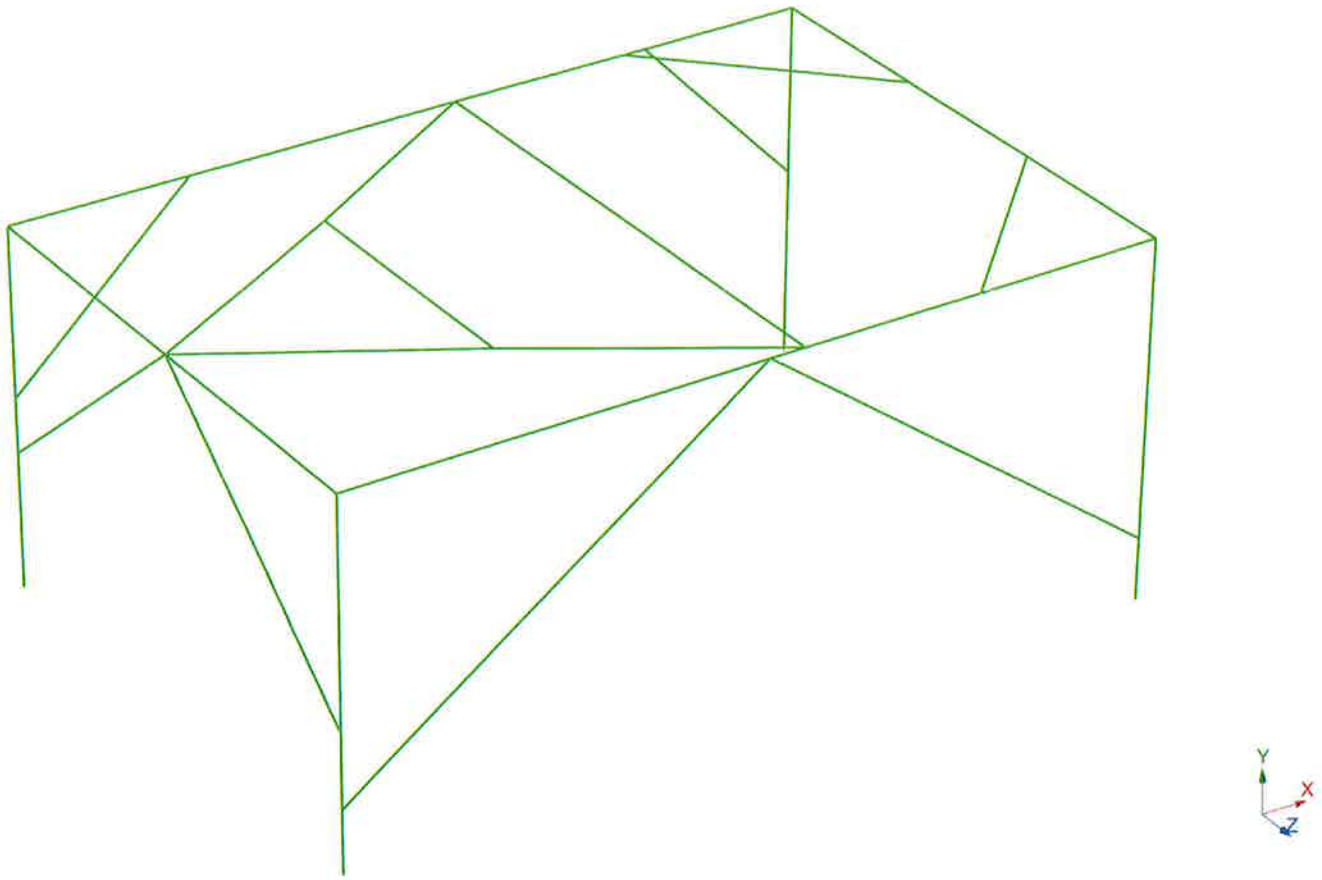
Current Date: 11/4/2014 11:56 AM
Units system: English
File name: R:\STRUCTURAL DEPT\Analysis Software\RAM Elements\RAM Projects\S2900 Beta-Gamma Frame (Wind West).etz\
Load condition: D2=DL+W



BETA/GAMMA FRAME
(WIND BLOWING WEST)

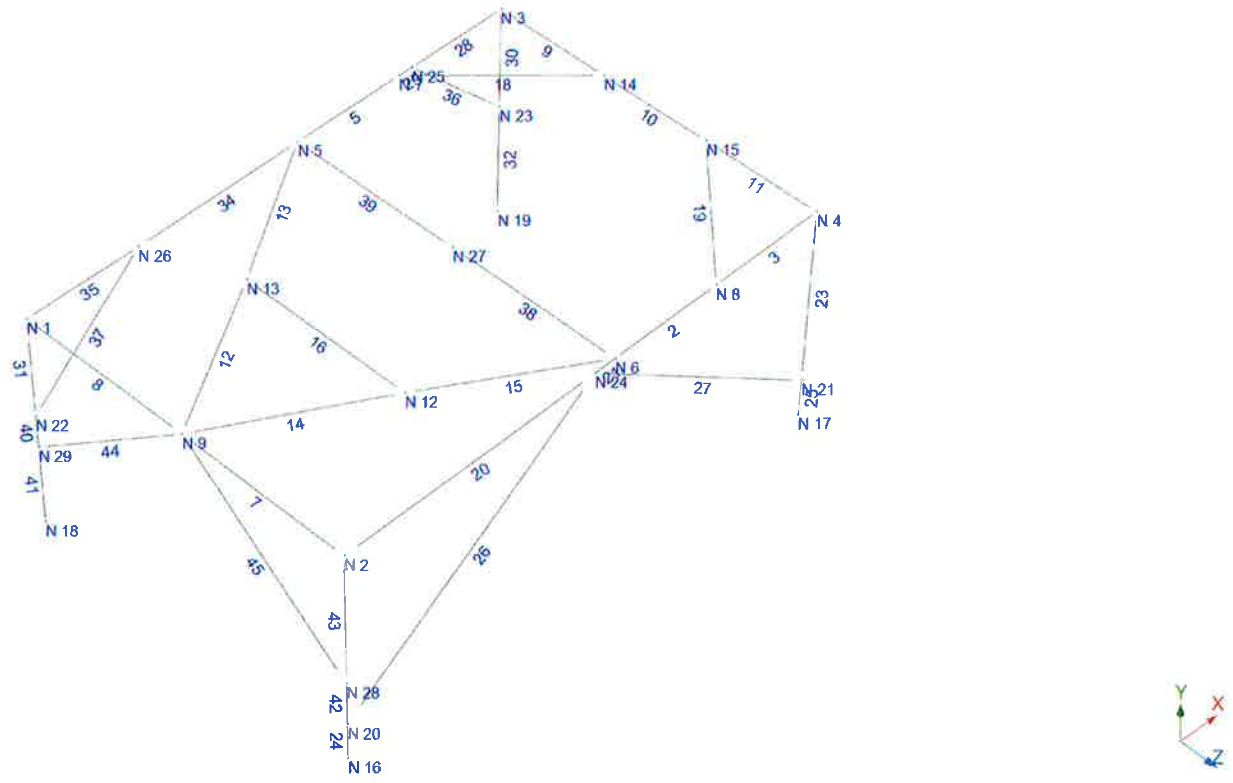
Design status

⬛ Not designed
🟥 Error on design
🟩 Design O.K.
🟨 With warnings



BETA/GAMMA FRAME
(WIND BLOWING WEST)

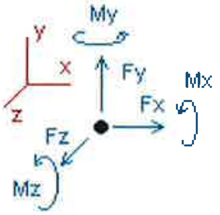
Current Date: 10/23/2014 1:27 PM
Units system: English
File name: R:\STRUCTURAL DEPT\Analysis Software\RAM Elements\RAM Projects\S2900 Beta-Gamma Frame (Wind West).etz\



Current Date: 11/4/2014 11:56 AM
Units system: English
File name: R:\STRUCTURAL DEPT\Analysis Software\RAM Elements\RAM Projects\S2900 Beta-Gamma Frame (Wind West).etz\

Analysis result

Reactions



Direction of positive forces and moments

	Forces [Kip]			Moments [Kip*ft]		
Node	**FX**	**FY**	**FZ**	**MX**	**MY**	**MZ**
Condition **D1=DL**						
16	1.60131	3.36837	-0.94406	-2.27779	-0.03579	-2.52658
17	-1.59159	2.16693	-0.11515	-0.35578	-0.17024	2.40516
18	0.98578	3.14261	0.94492	2.43526	-0.03782	-3.28752
19	-0.99550	1.96182	0.11429	0.45151	0.02191	3.36538
SUM	0.00000	10.63973	0.00000	0.25320	-0.22193	-0.04356
Condition **D2=DL+W**						
16	1.97488	6.13891	-1.83164	-4.48178	-0.30497	-2.92203
17	-1.41944	2.97464	-0.13024	-0.44456	-0.04594	1.93236
18	1.12264	5.57404	1.78237	4.59497	-0.01499	-3.78355
19	-0.74674	2.68703	0.17951	0.74432	0.03378	2.59183
SUM	0.93133	17.37461	0.00000	0.41295	-0.33212	-2.18139
Condition **D3=0.6DL+W**						
16	1.33436	4.79156	-1.45402	-3.57066	-0.29065	-1.91140
17	-0.78281	2.10787	-0.08418	-0.30224	0.02215	0.97029
18	0.72833	4.31699	1.40440	3.62086	0.00014	-2.46854
19	-0.34854	1.90230	0.13380	0.56372	0.02502	1.24568
SUM	0.93133	13.11872	0.00000	0.31167	-0.24335	-2.16397

Current Date: 11/4/2014 11:56 AM
Units system: English
File name: R:\STRUCTURAL DEPT\Analysis Software\RAM Elements\RAM Projects\S2900 Beta-Gamma Frame (Wind West).etz\

Steel Code Check

Report: Summary - For all selected load conditions

Load conditions to be included in design :
D1=DL
D2=DL+W
D3=0.6DL+W

Description	Section	Member	Ctrl Eq.	Ratio	Status	Reference
	HSS_RECT 6X4X3_8	2	D1 at 100.00%	0.02	OK	Eq. H1-1b
			D2 at 0.00%	**0.07**	**OK**	Eq. H1-1b
			D3 at 0.00%	0.07	OK	Eq. H1-1b
		3	D1 at 100.00%	0.02	OK	Eq. H1-1b
			D2 at 100.00%	**0.04**	**OK**	Eq. H1-1b
			D3 at 100.00%	0.03	OK	Eq. H1-1b
		5	D1 at 0.00%	**0.14**	**OK**	Eq. H1-1b
			D2 at 0.00%	0.07	OK	Eq. H1-1b
			D3 at 100.00%	0.04	OK	Eq. H1-1b
		7	D1 at 50.00%	0.02	OK	Eq. H1-1b
			D2 at 50.00%	**0.06**	**OK**	Eq. H1-1b
			D3 at 50.00%	0.05	OK	Eq. H1-1b
		8	D1 at 68.75%	0.03	OK	Eq. H1-1b
			D2 at 56.25%	**0.07**	**OK**	Eq. H1-1b
			D3 at 50.00%	0.06	OK	Eq. H1-1b
		9	D1 at 0.00%	0.02	OK	Eq. H1-1b
			D2 at 0.00%	**0.05**	**OK**	Eq. H1-1b
			D3 at 0.00%	0.04	OK	Eq. H1-1b
		10	D1 at 87.50%	0.04	OK	Eq. H1-1b
			D2 at 50.00%	**0.07**	**OK**	Eq. H1-1b
			D3 at 50.00%	0.05	OK	Eq. H1-1b
		11	D1 at 100.00%	0.04	OK	Eq. H1-1b
			D2 at 100.00%	**0.06**	**OK**	Eq. H1-1b
			D3 at 100.00%	0.05	OK	Eq. H1-1b
		12	D1 at 0.00%	0.05	OK	Eq. H1-1b
			D2 at 100.00%	**0.06**	**OK**	Eq. H1-1b
			D3 at 100.00%	0.04	OK	Eq. H1-1b
		13	D1 at 81.25%	0.05	OK	Eq. H1-1b
			D2 at 100.00%	0.06	OK	Eq. H1-1b
			D3 at 0.00%	**0.07**	**OK**	Eq. H1-1b
		14	D1 at 100.00%	0.04	OK	Eq. H1-1b
			D2 at 93.75%	**0.06**	**OK**	Eq. H1-1b
			D3 at 93.75%	0.04	OK	Eq. H1-1b
		15	D1 at 100.00%	0.05	OK	Eq. H1-1b
			D2 at 0.00%	**0.09**	**OK**	Eq. H1-1b

	D3 at 0.00%	0.08	OK	Eq. H1-1b
16	D1 at 56.25%	0.02	OK	Eq. H1-1b
	D2 at 50.00%	**0.02**	**OK**	Eq. H1-1b
	D3 at 50.00%	0.01	OK	Eq. H1-1b
18	D1 at 0.00%	0.03	OK	Eq. H1-1b
	D2 at 0.00%	**0.05**	**OK**	Eq. H1-1b
	D3 at 0.00%	0.04	OK	Eq. H1-1b
19	D1 at 43.75%	0.02	OK	Eq. H1-1b
	D2 at 56.25%	0.02	OK	Eq. H1-1b
	D3 at 0.00%	**0.02**	**OK**	Eq. H1-1b
20	D1 at 100.00%	0.05	OK	Eq. H1-1b
	D2 at 100.00%	**0.05**	**OK**	Eq. H1-1b
	D3 at 100.00%	0.03	OK	Eq. H1-1b
21	D1 at 100.00%	**0.06**	**OK**	Eq. H1-1b
	D2 at 100.00%	0.04	OK	Eq. H1-1b
	D3 at 0.00%	0.03	OK	Eq. H1-1b
23	D1 at 0.00%	0.05	OK	Eq. H1-1b
	D2 at 0.00%	**0.08**	**OK**	Eq. H1-1b
	D3 at 0.00%	0.06	OK	Eq. H1-1b
24	D1 at 0.00%	0.21	OK	Eq. H1-1b
	D2 at 0.00%	**0.34**	**OK**	Eq. H1-1b
	D3 at 0.00%	0.26	OK	Eq. H1-1b
25	D1 at 0.00%	**0.11**	**OK**	Eq. H1-1b
	D2 at 0.00%	0.09	OK	Eq. H1-1b
	D3 at 0.00%	0.05	OK	Eq. H1-1b
26	D1 at 0.00%	0.05	OK	Eq. H1-2
	D2 at 0.00%	**0.09**	**OK**	Eq. H1-1b
	D3 at 0.00%	0.07	OK	Eq. H1-1b
27	D1 at 100.00%	0.05	OK	Eq. H1-2
	D2 at 100.00%	**0.05**	**OK**	Eq. H1-1b
	D3 at 0.00%	0.04	OK	Eq. H1-1b
28	D1 at 100.00%	**0.07**	**OK**	Eq. H1-1b
	D2 at 100.00%	0.04	OK	Eq. H1-1b
	D3 at 100.00%	0.02	OK	Eq. H1-1b
29	D1 at 100.00%	**0.08**	**OK**	Eq. H1-1b
	D2 at 100.00%	0.05	OK	Eq. H1-1b
	D3 at 100.00%	0.02	OK	Eq. H1-1b
30	D1 at 100.00%	**0.09**	**OK**	Eq. H1-1b
	D2 at 0.00%	0.08	OK	Eq. H1-1b
	D3 at 0.00%	0.05	OK	Eq. H1-1b
31	D1 at 100.00%	0.09	OK	Eq. H1-1b
	D2 at 100.00%	**0.11**	**OK**	Eq. H1-1b
	D3 at 100.00%	0.07	OK	Eq. H1-1b
32	D1 at 100.00%	**0.15**	**OK**	Eq. H1-1b
	D2 at 100.00%	0.14	OK	Eq. H1-1b
	D3 at 100.00%	0.08	OK	Eq. H1-1b
34	D1 at 0.00%	**0.12**	**OK**	Eq. H1-1b

	D2 at 0.00%	0.11	OK	Eq. H1-1b
	D3 at 0.00%	0.06	OK	Eq. H1-1b
35	D1 at 100.00%	0.07	OK	Eq. H1-1b
	D2 at 100.00%	**0.08**	**OK**	Eq. H1-1b
	D3 at 100.00%	0.05	OK	Eq. H1-1b
36	D1 at 0.00%	0.06	OK	Eq. H1-1b
	D2 at 0.00%	**0.06**	**OK**	Eq. H1-1b
	D3 at 0.00%	0.04	OK	Eq. H1-1b
37	D1 at 100.00%	0.05	OK	Eq. H1-1b
	D2 at 100.00%	**0.07**	**OK**	Eq. H1-1b
	D3 at 100.00%	0.05	OK	Eq. H1-1b
38	D1 at 100.00%	0.06	OK	Eq. H1-1b
	D2 at 0.00%	0.05	OK	Eq. H1-1b
	D3 at 0.00%	**0.07**	**OK**	Eq. H1-1b
39	D1 at 93.75%	0.06	OK	Eq. H1-1b
	D2 at 0.00%	0.07	OK	Eq. H1-1b
	D3 at 0.00%	**0.07**	**OK**	Eq. H1-1b
40	D1 at 0.00%	0.14	OK	Eq. H1-1b
	D2 at 0.00%	**0.19**	**OK**	Eq. H1-1b
	D3 at 0.00%	0.12	OK	Eq. H1-1b
41	D1 at 0.00%	0.25	OK	Eq. H1-1b
	D2 at 0.00%	**0.38**	**OK**	Eq. H1-1b
	D3 at 0.00%	0.28	OK	Eq. H1-1b
42	D1 at 100.00%	0.12	OK	Eq. H1-1b
	D2 at 100.00%	**0.23**	**OK**	Eq. H1-1b
	D3 at 100.00%	0.18	OK	Eq. H1-1b
43	D1 at 100.00%	0.04	OK	Eq. H1-1b
	D2 at 100.00%	**0.06**	**OK**	Eq. H1-1b
	D3 at 0.00%	0.05	OK	Eq. H1-1b
44	D1 at 0.00%	0.08	OK	Eq. H1-1b
	D2 at 0.00%	**0.14**	**OK**	Eq. H1-1b
	D3 at 0.00%	0.11	OK	Eq. H1-1b
45	D1 at 100.00%	0.06	OK	Eq. H1-1b
	D2 at 100.00%	**0.13**	**OK**	Eq. H1-1b
	D3 at 100.00%	0.10	OK	Eq. H1-1b

Date: 11-04-2014
Project Name: Stamford Harbor
Project Number: S2900
Designed By: GH Checked By: MSC

Hudson Design Group LLC

Wind Analysis → FRP Enclosure (BETA/GAMMA Sector)

Wind Blowing North - South

Reference Codes:

-IBC 2003 with 2005 Connecticut Supplement with 2009 Amendments

-Minimum Design Loads for Buildings and Other Structures (ASCE 7-05)

Structure Classification	II		(ASCE 7-05 Table 1-1)
Basic Wind Speed, V	105	mph	(Connecticut Supplement)
Importance Factor, I	1		(ASCE 7-05 Table 6-1)
Exposure Category	D		(ASCE 7-05 Section 6.5.6.3)
Height Above Ground Level, z	106.75	ft	(Top of Enclosure)
Exposure Coeficient, K_z	1.46		(ASCE 7-05 Table 6-3)
Wind Directionality Coef., K_d	0.90		(ASCE 7-05 Table 6-4)
Topographic Facto, K_{zt}	1.00		(ASCE 7-05 Section 6.5.7.2)
Velocity Pressure, q_z	$= 0.00256 K_z K_{zt} K_d V^2 I$ = **37.16 psf**		(ASCE 7-05 Equation 6-15)
Gust Factor, G	0.85		(ASCE 7-05 Section 6.5.8)
Net Force Coeficient, C_f	1.31		(ASCE 7-05 Figure 6.21)
Projected Area Normal to Wind, A_f	159	ft^2	(16.67 ft. W x 9.5 ft. H)
Wind Force, F	$= q_z G C_f A_f$ = **6579.50 lbs**		(ASCE 7-05 Equation 6-28)

Date: 11-04-2014

Project Name: Stamford Harbor

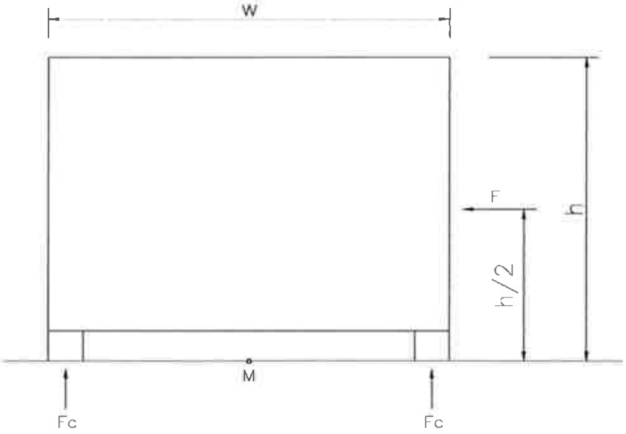
Project Number: S2900

Designed By: GH Checked By: MSC

Calculate Overturning Moment of Proposed FRP Enclosure (BETA/GAMMA)

Wind Blowing North - South

Dimensions (ft)	Wide, w	Depth, d	Height, h
	16.67	20.83	9.5



Moment, M = F x h/2

= **31252.61** **lb-ft**

Calculate Force Couple

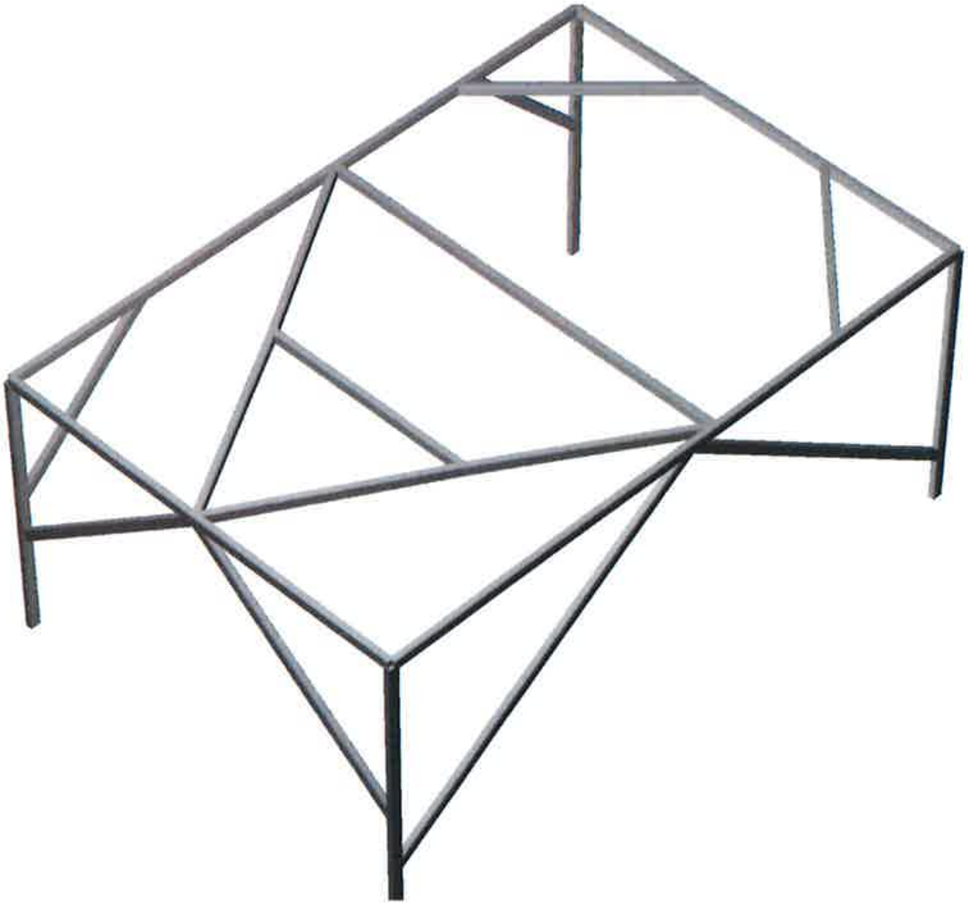
Force Couple, F_c = M / w

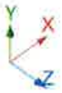
= **1500.37** **lbs.**

Length of Frame: **16** **ft.**

Loading = **93.77 plf**

Current Date: 10/23/2014 1:43 PM
Units system: English
File name: R:\STRUCTURAL DEPT\Analysis Software\RAM Elements\RAM Projects\S2900 Beta-Gamma Frame (Wind North).etz\





BETA/GAMMA FRAME
(WIND BLOWING NORTH)

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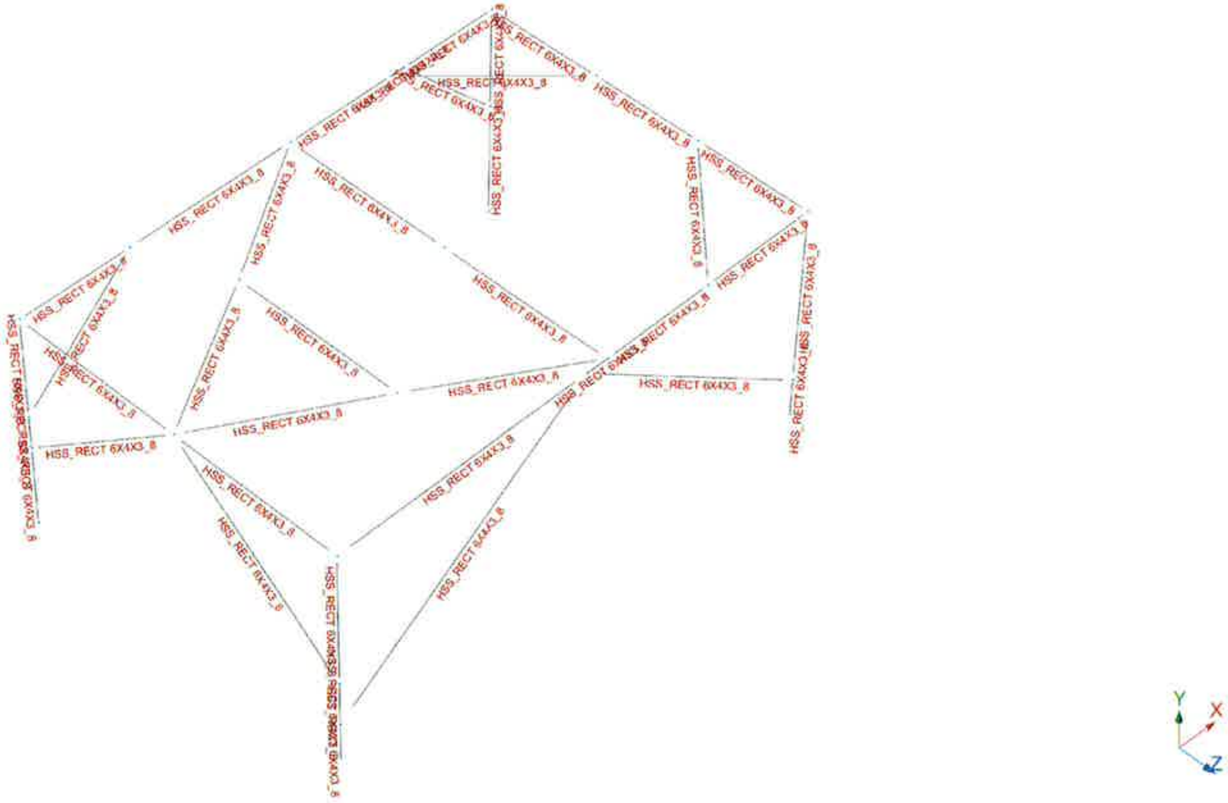
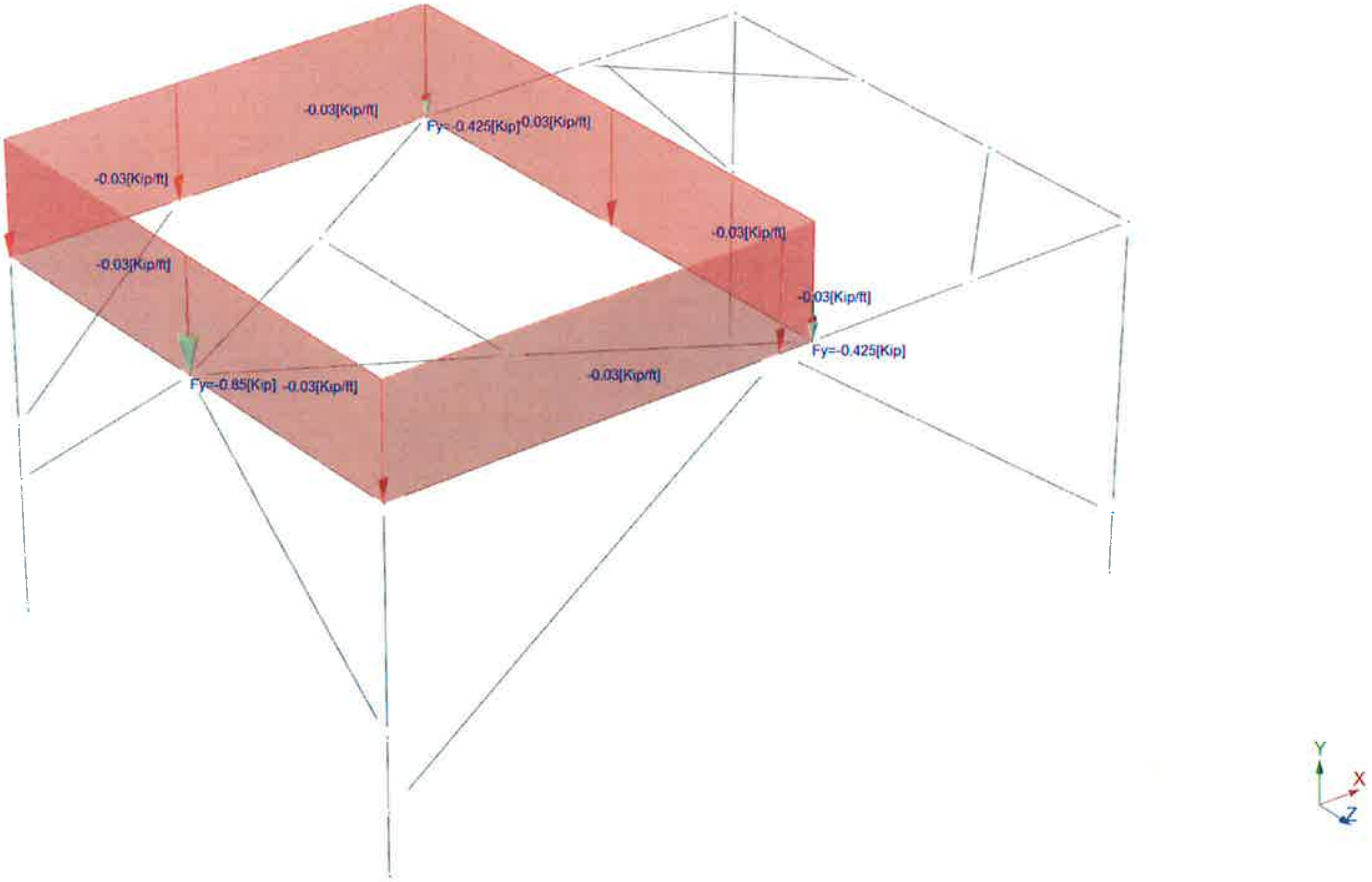


Bentley

Current Date: 11/4/2014 1:18 PM
Units system: English
File name: R:\STRUCTURAL DEPT\Analysis Software\RAM Elements\RAM Projects\S2900 Beta-Gamma Frame (Wind North).etz\
Load condition: DL=Dead Load

Loads

🟥 Global distributed - Members
🟩 Local distributed - Members
🟩 Concentrated - Nodes



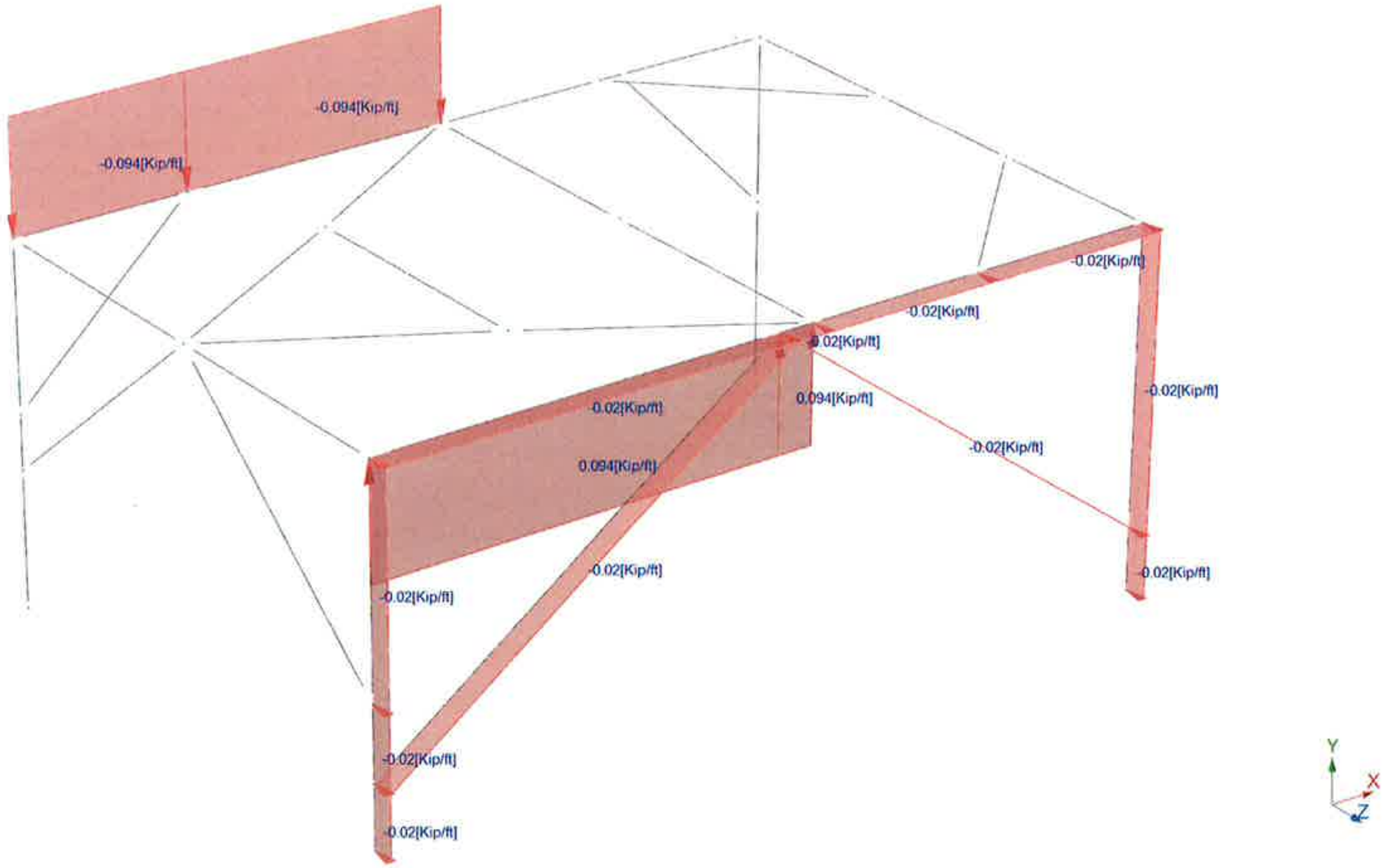
BETA/GAMMA FRAME
(WIND BLOWING NORTH)

Bentley

Current Date: 11/4/2014 1:19 PM
Units system: English
File name: R:\STRUCTURAL DEPT\Analysis Software\RAM Elements\RAM Projects\S2900 Beta-Gamma Frame (Wind North).etz\
Load condition: W=Wind

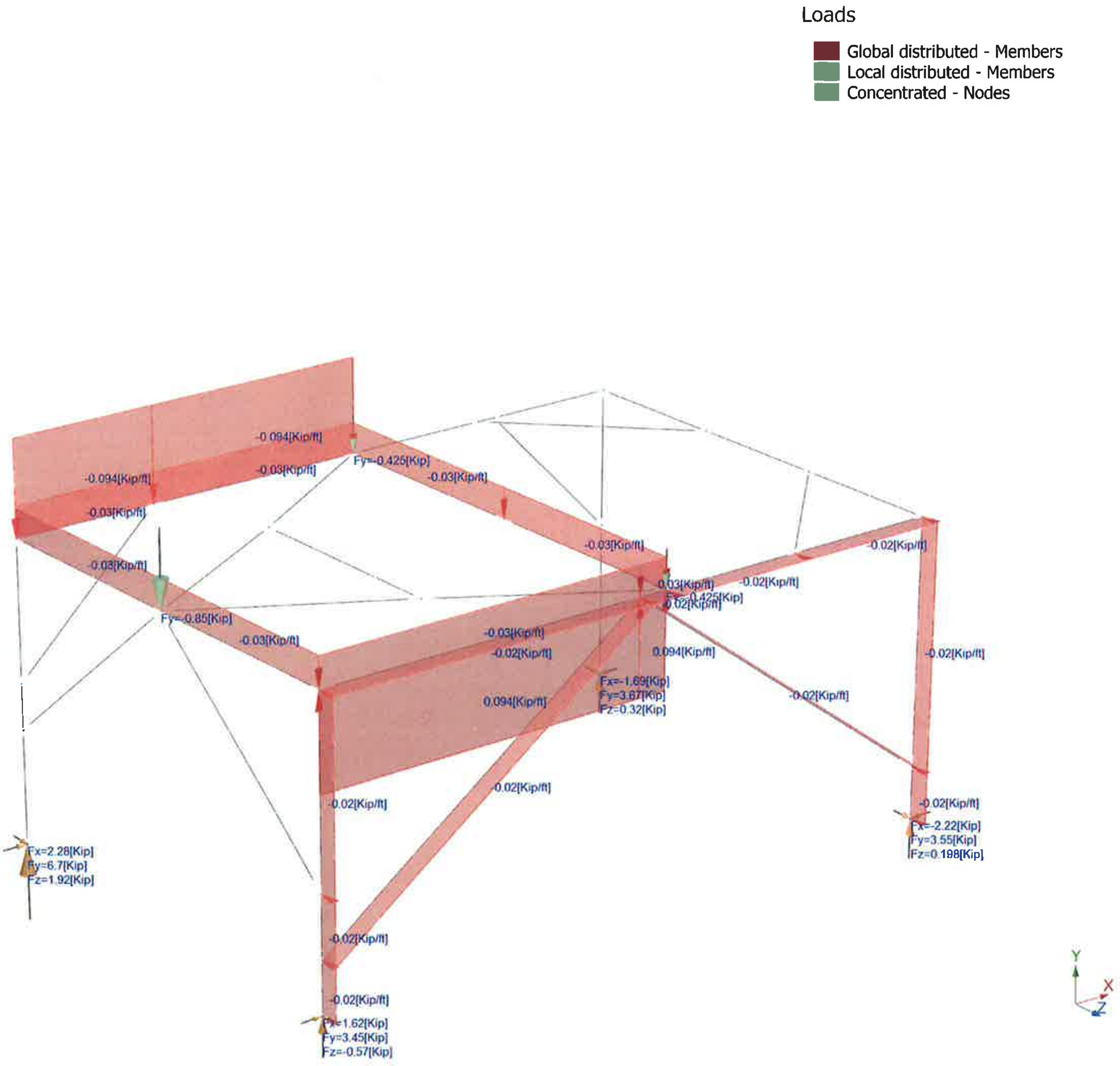
Loads

🟥 Global distributed - Members
🟩 Local distributed - Members



BETA/GAMMA FRAME
(WIND BLOWING NORTH)

Current Date: 11/4/2014 1:19 PM
Units system: English
File name: R:\STRUCTURAL DEPT\Analysis Software\RAM Elements\RAM Projects\S2900 Beta-Gamma Frame (Wind North).etz\
Load condition: D2=DL+W



BETA/GAMMA FRAME
(WIND BLOWING NORTH)

Bentley

Current Date: 11/4/2014 1:20 PM
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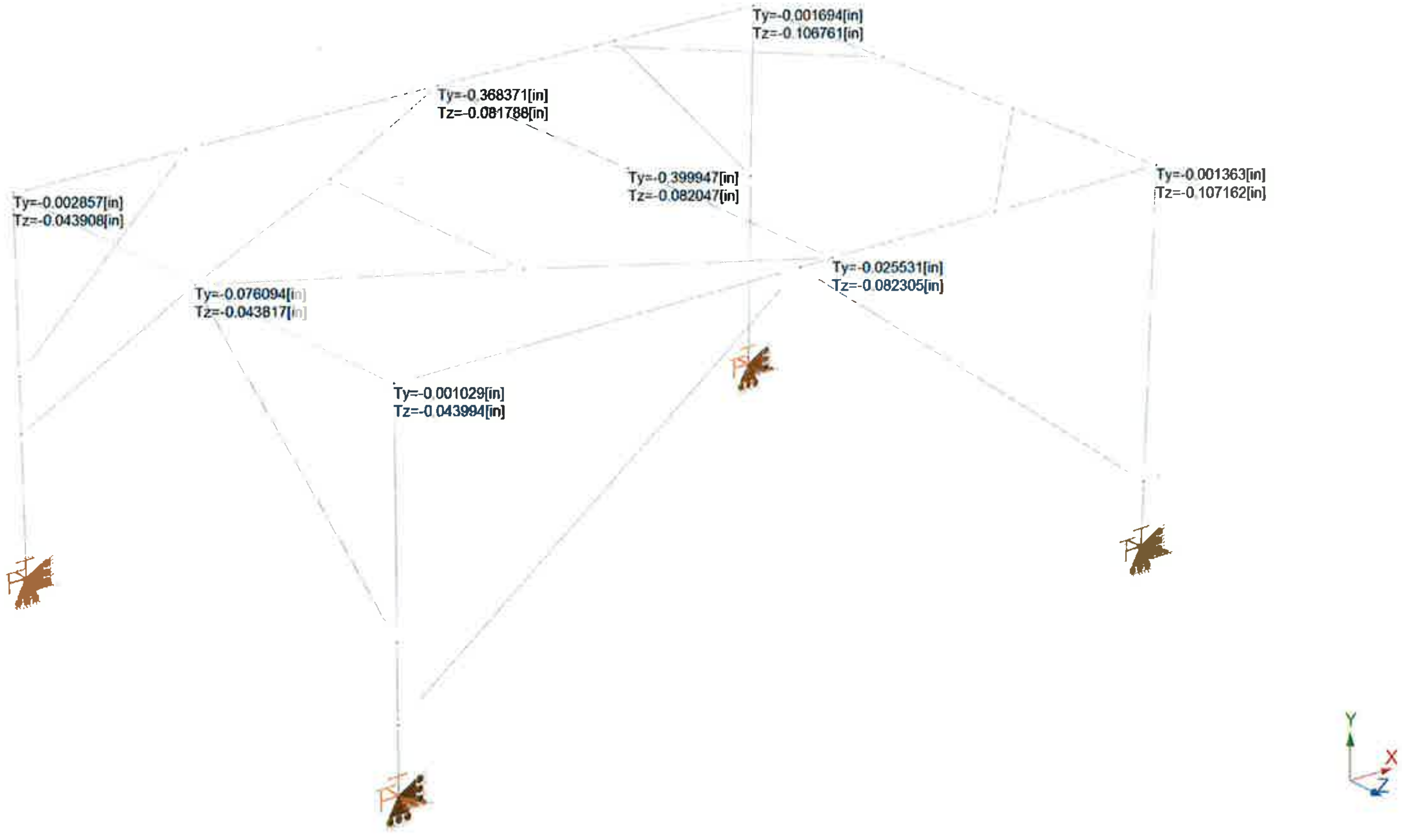
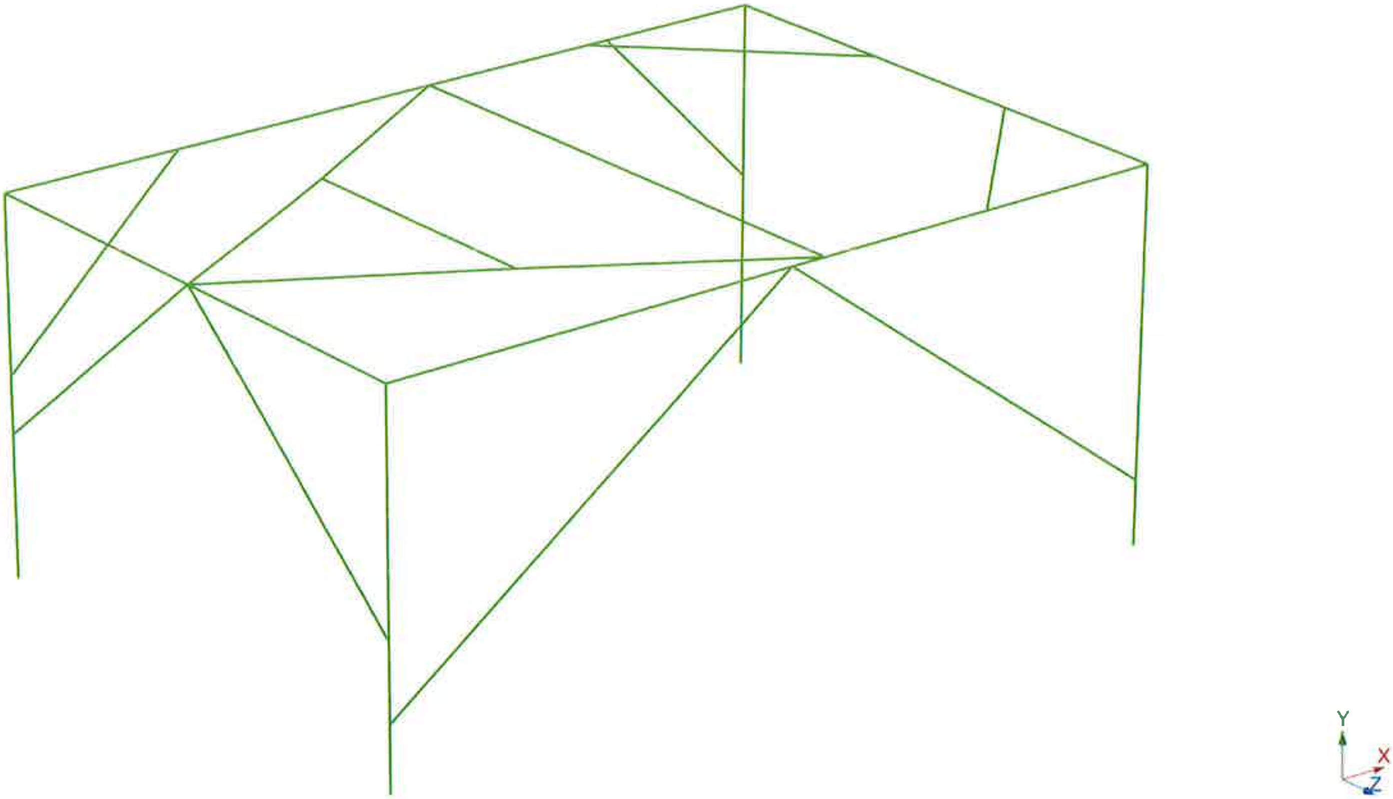
Load condition: D2=DL+W



BETA/GAMMA FRAME
(WIND BLOWING NORTH)

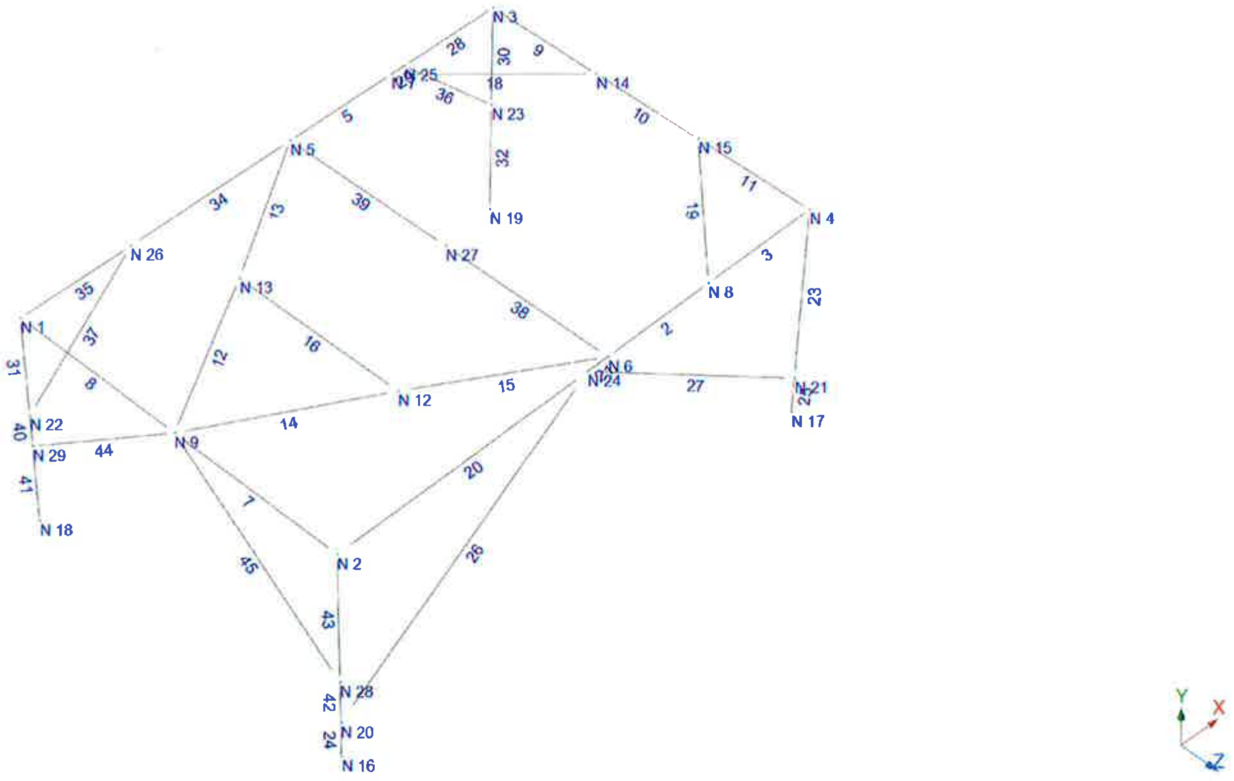
Design status

- ■ Not designed
- 🟥 Error on design
- 🟩 Design O.K.
- 🟨 With warnings



BETA/GAMMA FRAME
(WIND BLOWING NORTH)

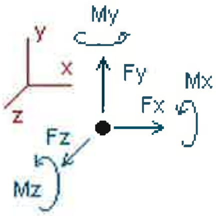
Current Date: 10/23/2014 1:43 PM
Units system: English
File name: R:\STRUCTURAL DEPT\Analysis Software\RAM Elements\RAM Projects\S2900 Beta-Gamma Frame (Wind North).etz\



Current Date: 11/4/2014 1:20 PM
Units system: English
File name: R:\STRUCTURAL DEPT\Analysis Software\RAM Elements\RAM Projects\S2900 Beta-Gamma Frame (Wind North).etz\

Analysis result

Reactions



Direction of positive forces and moments

	Forces [Kip]			Moments [Kip*ft]		
Node	**FX**	**FY**	**FZ**	**MX**	**MY**	**MZ**
Condition **D1=DL**						
18	0.98578	3.14261	0.94492	2.43526	-0.03782	-3.28752
19	-0.99550	1.96182	0.11429	0.45151	0.02191	3.36538
17	-1.59159	2.16693	-0.11515	-0.35578	-0.17024	2.40516
16	1.60131	3.36837	-0.94406	-2.27779	-0.03579	-2.52658
SUM	0.00000	10.63973	0.00000	0.25320	-0.22193	-0.04356
Condition **D2=DL+W**						
18	2.27775	6.70485	1.92107	5.13999	-0.15238	-7.78994
19	-1.68503	3.67158	0.32048	1.57445	0.00047	5.48044
17	-2.21551	3.54960	0.19823	0.78063	0.04066	3.22722
16	1.62278	3.44858	-0.57006	-1.15749	-0.45721	-2.28811
SUM	0.00000	17.37461	1.86972	6.33758	-0.56846	-1.37039
Condition **D3=0.6DL+W**						
18	1.88344	5.44781	1.54310	4.16588	-0.13725	-6.47493
19	-1.28683	2.88686	0.27477	1.39385	-0.00830	4.13429
17	-1.57887	2.68283	0.24428	0.92295	0.10876	2.26516
16	0.98226	2.10123	-0.19243	-0.24638	-0.44290	-1.27748
SUM	0.00000	13.11872	1.86972	6.23630	-0.47969	-1.35296

Bentley

Current Date: 11/4/2014 1:20 PM
Units system: English
File name: R:\STRUCTURAL DEPT\Analysis Software\RAM Elements\RAM Projects\S2900 Beta-Gamma Frame (Wind North).etz\

Steel Code Check

Report: Summary - For all selected load conditions

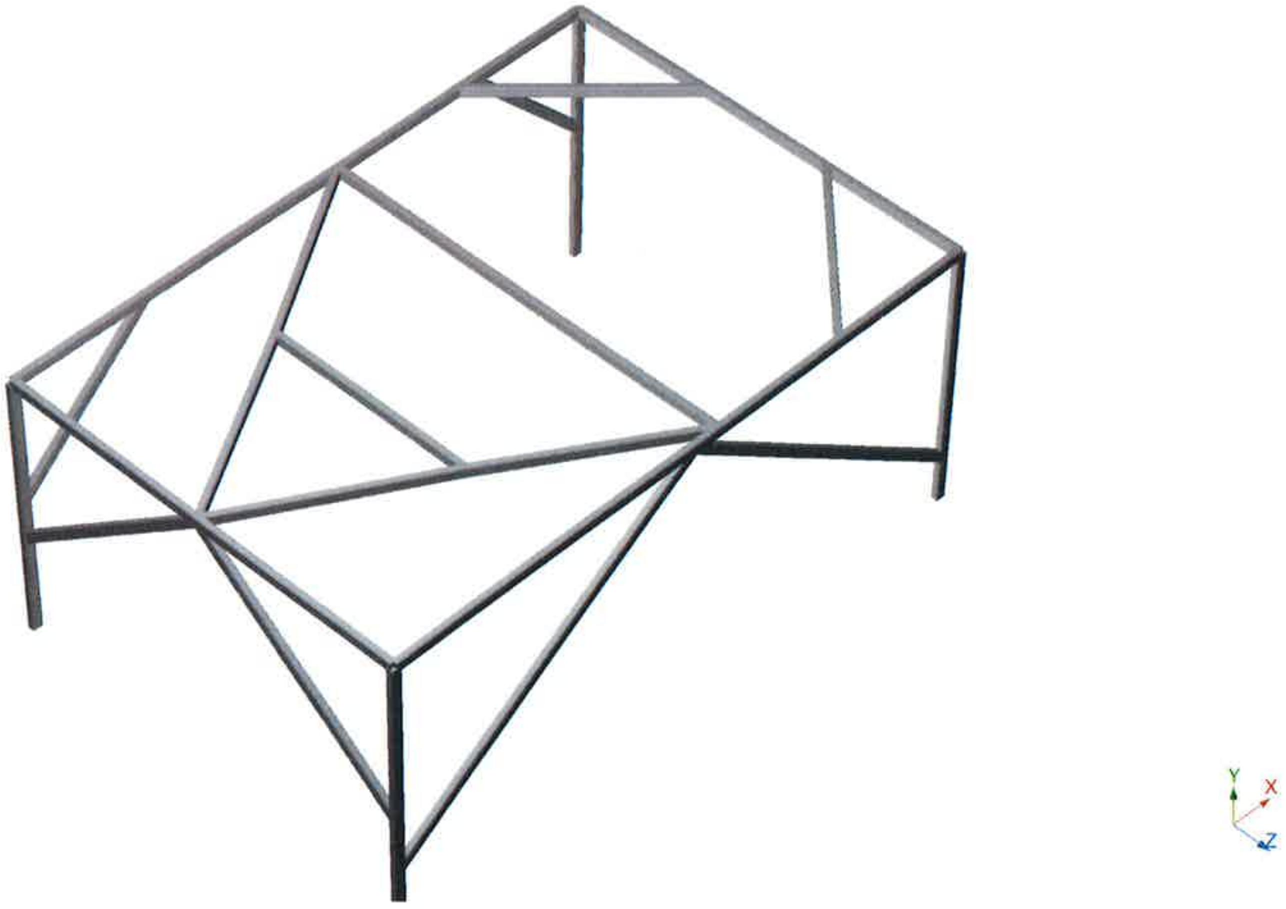
Load conditions to be included in design :

D1=DL
D2=DL+W
D3=0.6DL+W

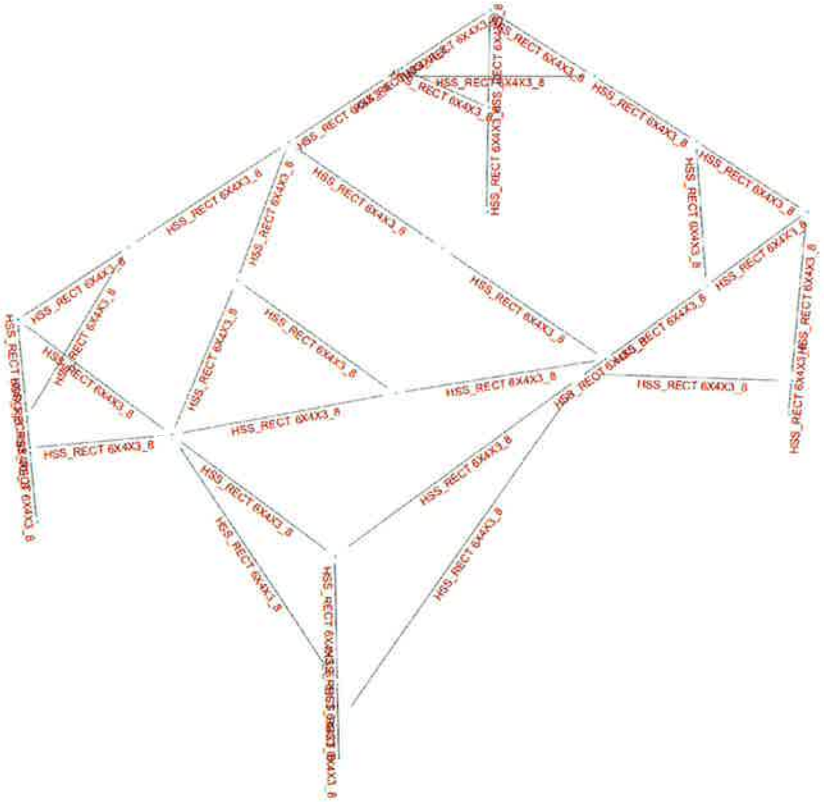
Description	Section	Member	Ctrl Eq.	Ratio	Status	Reference
	HSS_RECT 6X4X3_8	2	D1 at 100.00%	0.02	OK	Eq. H1-1b
			D2 at 100.00%	**0.05**	**OK**	Eq. H1-1b
			D3 at 100.00%	0.04	OK	Eq. H1-1b
		3	D1 at 100.00%	0.02	OK	Eq. H1-1b
			D2 at 100.00%	**0.04**	**OK**	Eq. H1-1b
			D3 at 100.00%	0.03	OK	Eq. H1-1b
		5	D1 at 0.00%	0.14	OK	Eq. H1-1b
			D2 at 0.00%	**0.23**	**OK**	Eq. H1-1b
			D3 at 0.00%	0.17	OK	Eq. H1-1b
		7	D1 at 50.00%	0.02	OK	Eq. H1-1b
			D2 at 37.50%	**0.03**	**OK**	Eq. H1-1b
			D3 at 0.00%	0.03	OK	Eq. H1-1b
		8	D1 at 68.75%	0.03	OK	Eq. H1-1b
			D2 at 62.50%	**0.04**	**OK**	Eq. H1-1b
			D3 at 62.50%	0.03	OK	Eq. H1-1b
		9	D1 at 0.00%	0.02	OK	Eq. H1-1b
			D2 at 0.00%	**0.07**	**OK**	Eq. H1-1b
			D3 at 0.00%	0.06	OK	Eq. H1-1b
		10	D1 at 87.50%	0.04	OK	Eq. H1-1b
			D2 at 100.00%	**0.08**	**OK**	Eq. H1-1b
			D3 at 100.00%	0.06	OK	Eq. H1-1b
		11	D1 at 100.00%	0.04	OK	Eq. H1-1b
			D2 at 100.00%	**0.06**	**OK**	Eq. H1-1b
			D3 at 100.00%	0.05	OK	Eq. H1-1b
		12	D1 at 0.00%	0.05	OK	Eq. H1-1b
			D2 at 0.00%	**0.09**	**OK**	Eq. H1-1b
			D3 at 0.00%	0.07	OK	Eq. H1-1b
		13	D1 at 81.25%	0.05	OK	Eq. H1-1b
			D2 at 93.75%	**0.09**	**OK**	Eq. H1-1b
			D3 at 100.00%	0.07	OK	Eq. H1-1b
		14	D1 at 100.00%	0.04	OK	Eq. H1-1b
			D2 at 100.00%	**0.07**	**OK**	Eq. H1-1b
			D3 at 100.00%	0.06	OK	Eq. H1-1b
		15	D1 at 100.00%	0.05	OK	Eq. H1-1b
			D2 at 100.00%	**0.09**	**OK**	Eq. H1-1b

	D3 at 100.00%	0.07	OK	Eq. H1-1b
16	D1 at 56.25%	0.02	OK	Eq. H1-1b
	D2 at 62.50%	**0.03**	**OK**	Eq. H1-1b
	D3 at 62.50%	0.03	OK	Eq. H1-1b
18	D1 at 0.00%	0.03	OK	Eq. H1-1b
	D2 at 0.00%	**0.07**	**OK**	Eq. H1-1b
	D3 at 0.00%	0.05	OK	Eq. H1-1b
19	D1 at 43.75%	0.02	OK	Eq. H1-1b
	D2 at 43.75%	**0.03**	**OK**	Eq. H1-1b
	D3 at 43.75%	0.03	OK	Eq. H1-1b
20	D1 at 100.00%	0.05	OK	Eq. H1-1b
	D2 at 0.00%	0.04	OK	Eq. H1-1b
	D3 at 0.00%	**0.05**	**OK**	Eq. H1-1b
21	D1 at 100.00%	0.06	OK	Eq. H1-1b
	D2 at 0.00%	**0.10**	**OK**	
	D3 at 0.00%	0.08	OK	Eq. H1-1b
23	D1 at 0.00%	0.05	OK	Eq. H1-1b
	D2 at 0.00%	**0.08**	**OK**	Eq. H1-1b
	D3 at 0.00%	0.06	OK	Eq. H1-1b
24	D1 at 0.00%	**0.21**	**OK**	Eq. H1-1b
	D2 at 0.00%	0.15	OK	Eq. H1-1b
	D3 at 0.00%	0.06	OK	Eq. H1-1b
25	D1 at 0.00%	0.11	OK	Eq. H1-1b
	D2 at 0.00%	**0.16**	**OK**	Eq. H1-1b
	D3 at 0.00%	0.13	OK	Eq. H1-1b
26	D1 at 0.00%	0.05	OK	Eq. H1-2
	D2 at 100.00%	**0.10**	**OK**	Eq. H1-1b
	D3 at 100.00%	0.09	OK	Eq. H1-1b
27	D1 at 100.00%	0.05	OK	Eq. H1-2
	D2 at 100.00%	**0.11**	**OK**	Eq. H1-1b
	D3 at 100.00%	0.09	OK	Eq. H1-1b
28	D1 at 100.00%	0.07	OK	Eq. H1-1b
	D2 at 100.00%	**0.12**	**OK**	Eq. H1-1b
	D3 at 100.00%	0.09	OK	Eq. H1-1b
29	D1 at 100.00%	0.08	OK	Eq. H1-1b
	D2 at 100.00%	**0.13**	**OK**	Eq. H1-1b
	D3 at 100.00%	0.09	OK	Eq. H1-1b
30	D1 at 100.00%	0.09	OK	Eq. H1-1b
	D2 at 100.00%	**0.15**	**OK**	Eq. H1-1b
	D3 at 0.00%	0.12	OK	Eq. H1-1b
31	D1 at 100.00%	0.09	OK	Eq. H1-1b
	D2 at 100.00%	**0.20**	**OK**	Eq. H1-1b
	D3 at 100.00%	0.17	OK	Eq. H1-1b
32	D1 at 100.00%	0.15	OK	Eq. H1-1b
	D2 at 0.00%	**0.29**	**OK**	Eq. H1-1b
	D3 at 0.00%	0.23	OK	Eq. H1-1b
34	D1 at 0.00%	0.12	OK	Eq. H1-1b

	D2 at 0.00%	**0.20**	**OK**	Eq. H1-1b
	D3 at 0.00%	0.16	OK	Eq. H1-1b
35	D1 at 100.00%	0.07	OK	Eq. H1-1b
	D2 at 100.00%	**0.15**	**OK**	Eq. H1-1b
	D3 at 100.00%	0.12	OK	Eq. H1-1b
36	D1 at 0.00%	0.06	OK	Eq. H1-1b
	D2 at 0.00%	**0.10**	**OK**	Eq. H1-1b
	D3 at 0.00%	0.08	OK	Eq. H1-1b
37	D1 at 100.00%	0.05	OK	Eq. H1-1b
	D2 at 100.00%	**0.12**	**OK**	Eq. H1-1b
	D3 at 100.00%	0.10	OK	Eq. H1-1b
38	D1 at 100.00%	0.06	OK	Eq. H1-1b
	D2 at 100.00%	**0.09**	**OK**	Eq. H1-1b
	D3 at 100.00%	0.07	OK	Eq. H1-1b
39	D1 at 93.75%	0.06	OK	Eq. H1-1b
	D2 at 93.75%	**0.09**	**OK**	Eq. H1-1b
	D3 at 93.75%	0.07	OK	Eq. H1-1b
40	D1 at 0.00%	0.14	OK	Eq. H1-1b
	D2 at 0.00%	**0.33**	**OK**	Eq. H1-1b
	D3 at 0.00%	0.27	OK	Eq. H1-1b
41	D1 at 0.00%	0.25	OK	Eq. H1-1b
	D2 at 0.00%	**0.56**	**OK**	Eq. H1-1b
	D3 at 0.00%	0.46	OK	Eq. H1-1b
42	D1 at 100.00%	**0.12**	**OK**	Eq. H1-1b
	D2 at 100.00%	0.11	OK	Eq. H1-1b
	D3 at 100.00%	0.06	OK	Eq. H1-1b
43	D1 at 100.00%	**0.04**	**OK**	Eq. H1-1b
	D2 at 0.00%	0.03	OK	Eq. H1-1b
	D3 at 0.00%	0.04	OK	Eq. H1-1b
44	D1 at 0.00%	0.08	OK	Eq. H1-1b
	D2 at 0.00%	**0.16**	**OK**	Eq. H1-1b
	D3 at 0.00%	0.12	OK	Eq. H1-1b
45	D1 at 100.00%	0.06	OK	Eq. H1-1b
	D2 at 0.00%	**0.07**	**OK**	Eq. H1-1b
	D3 at 0.00%	0.05	OK	Eq. H1-1b



BETA/GAMMA FRAME
(WIND BLOWING SOUTH)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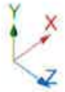
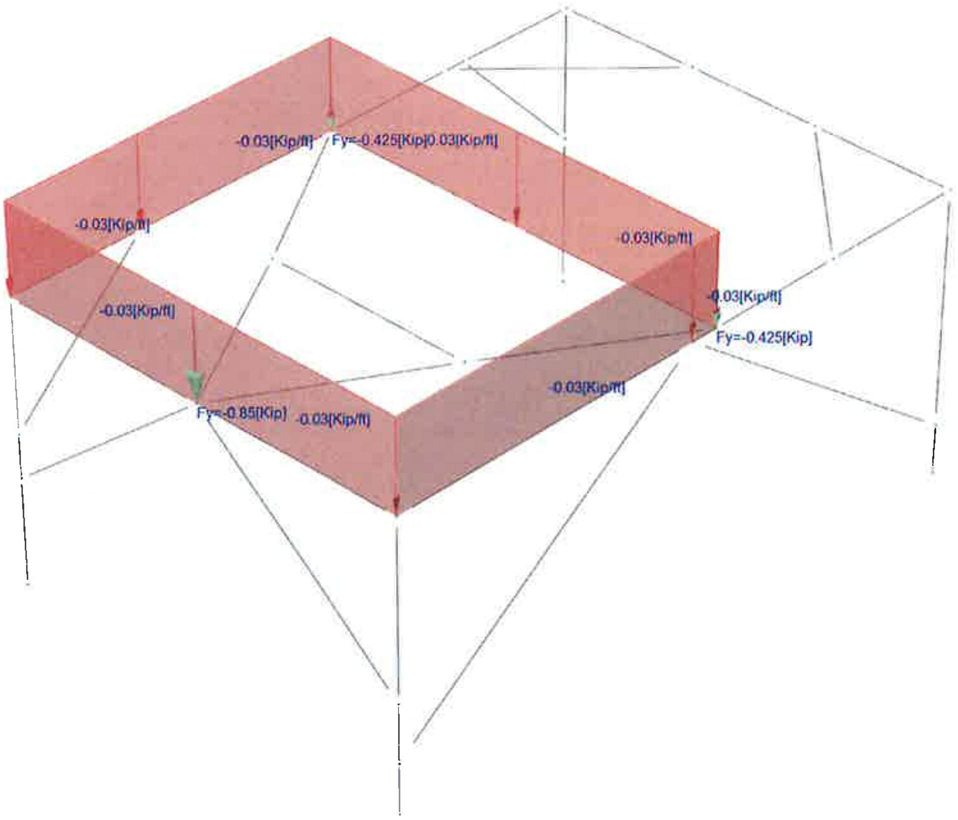
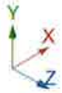

Y
X
Z

Current Date: 11/4/2014 1:30 PM
Units system: English
File name: R:\STRUCTURAL DEPT\Analysis Software\RAM Elements\RAM Projects\S2900 Beta-Gamma Frame (Wind South).etz\
Load condition: DL=Dead Load

Loads

🟥	Global distributed - Members
🟩	Local distributed - Members
🟩	Concentrated - Nodes



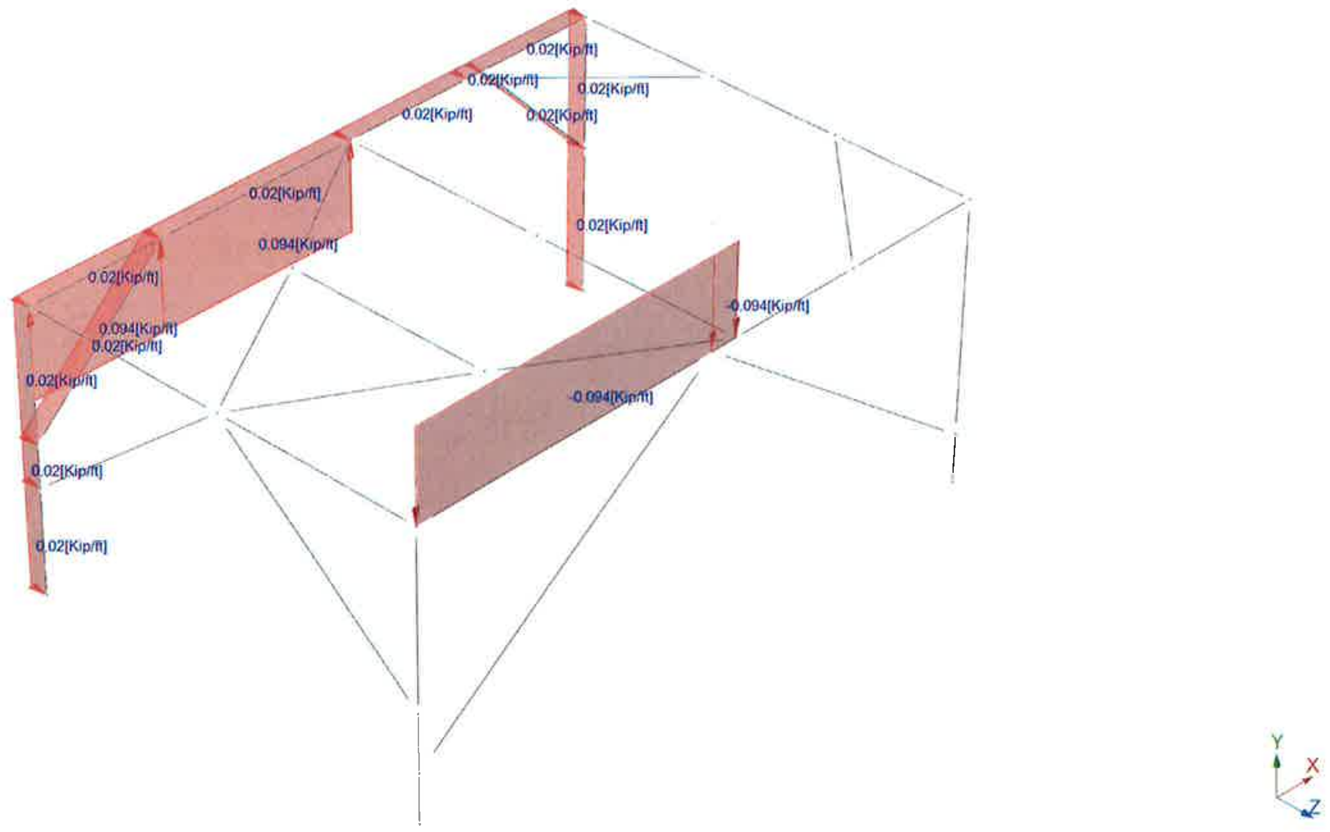


Bentley

Current Date: 11/4/2014 1:30 PM
Units system: English
File name: R:\STRUCTURAL DEPT\Analysis Software\RAM Elements\RAM Projects\S2900 Beta-Gamma Frame (Wind South).etz\
Load condition: W=Wind

Loads

🟥 Global distributed - Members
🟩 Local distributed - Members

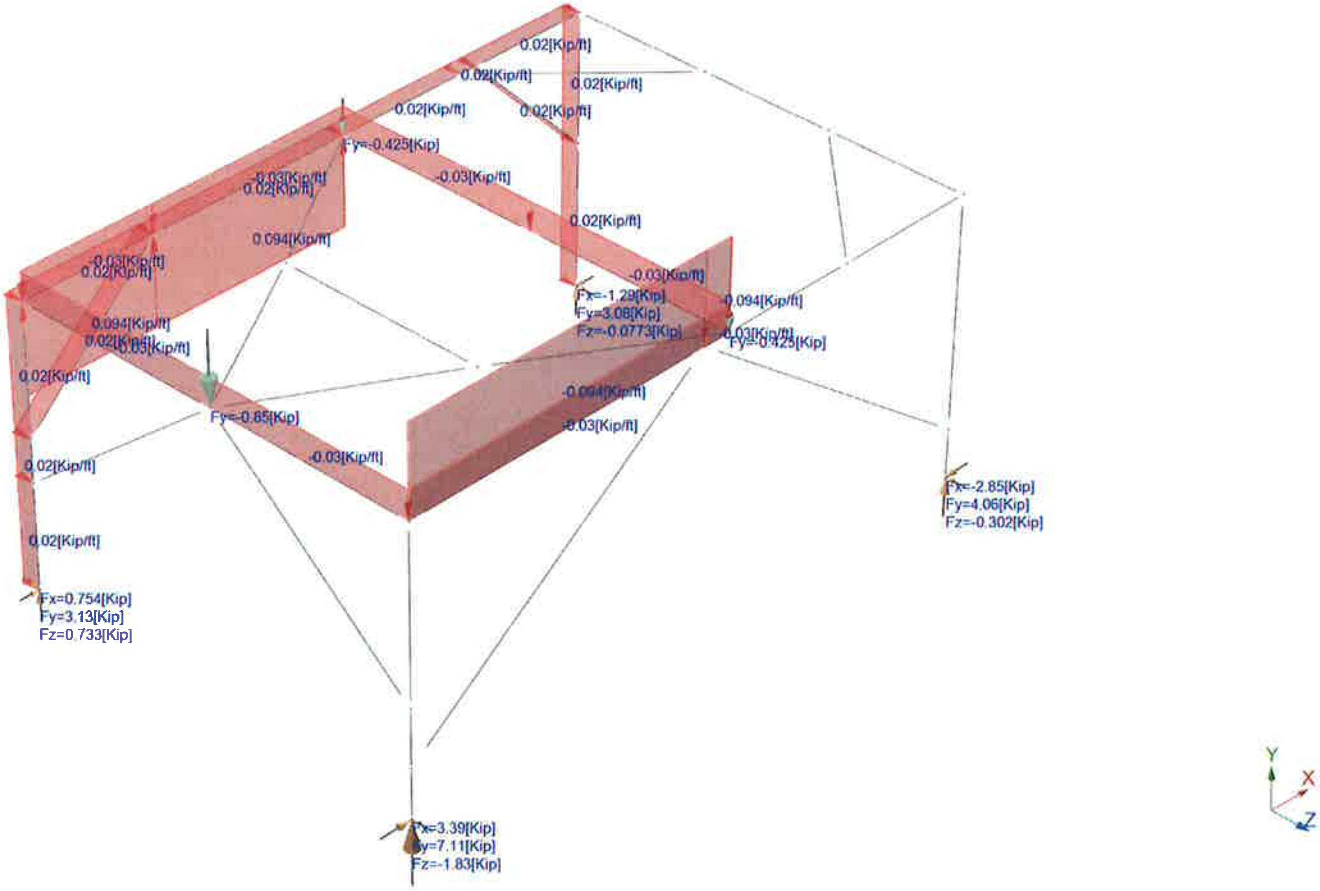


BETA/GAMMA FRAME
(WIND BLOWING SOUTH)

Current Date: 11/4/2014 1:30 PM
Units system: English
File name: R:\STRUCTURAL DEPT\Analysis Software\RAM Elements\RAM Projects\S2900 Beta-Gamma Frame (Wind South).etz\
Load condition: D2=DL+W

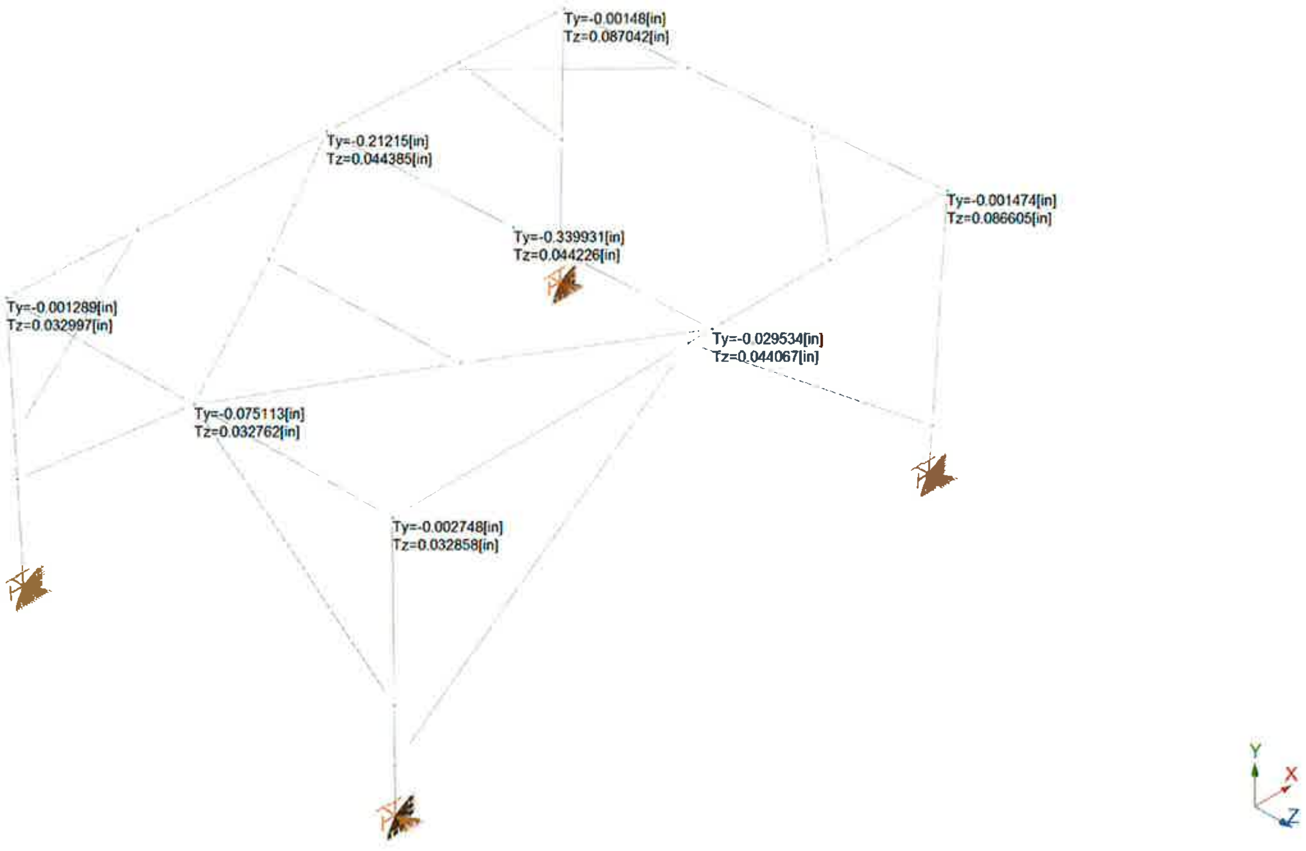
Loads

- 🟥 Global distributed - Members
- 🟩 Local distributed - Members
- 🟩 Concentrated - Nodes



BETA/GAMMA FRAME
(WIND BLOWING SOUTH)

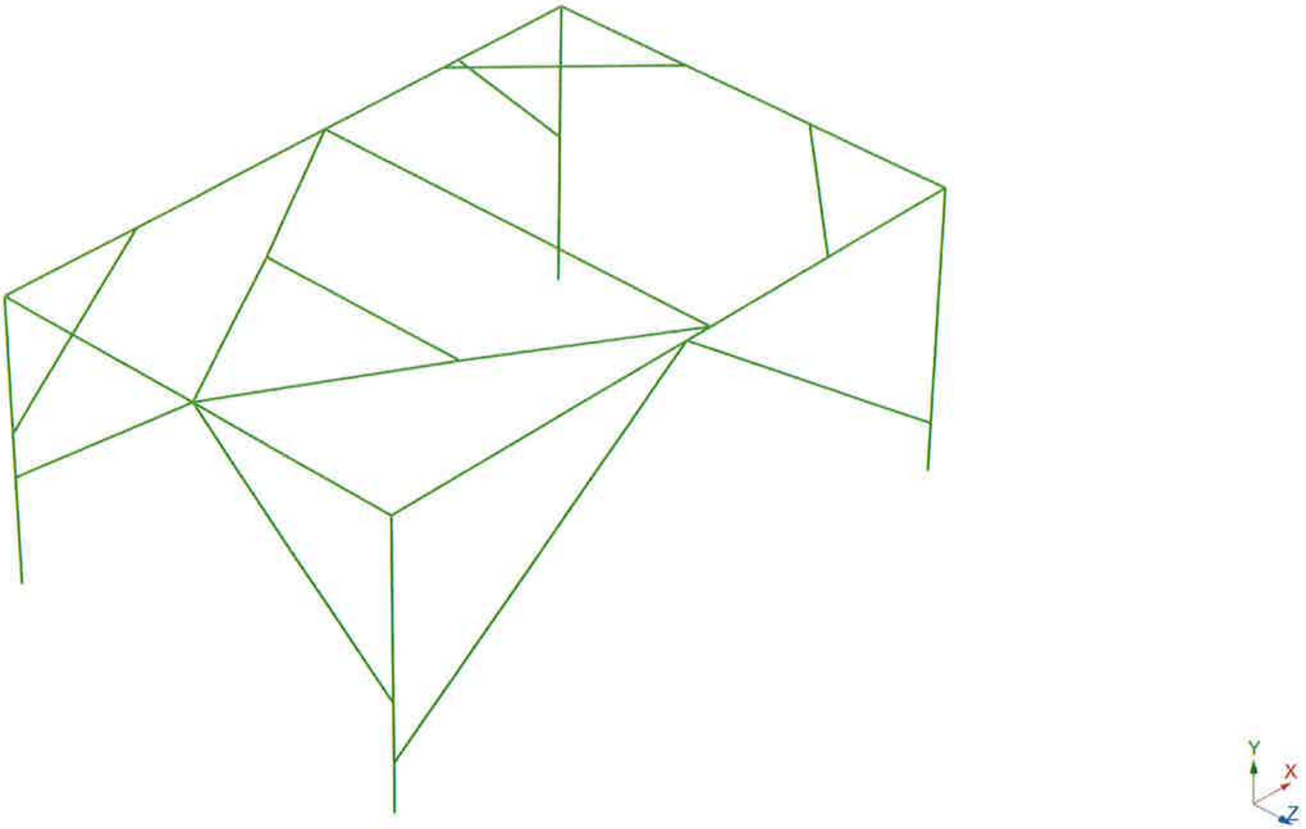
Current Date: 11/4/2014 1:31 PM
Units system: English
File name: R:\STRUCTURAL DEPT\Analysis Software\RAM Elements\RAM Projects\S2900 Beta-Gamma Frame (Wind South).etz\
Load condition: D2=DL+W



BETA/GAMMA FRAME
(WIND BLOWING SOUTH)

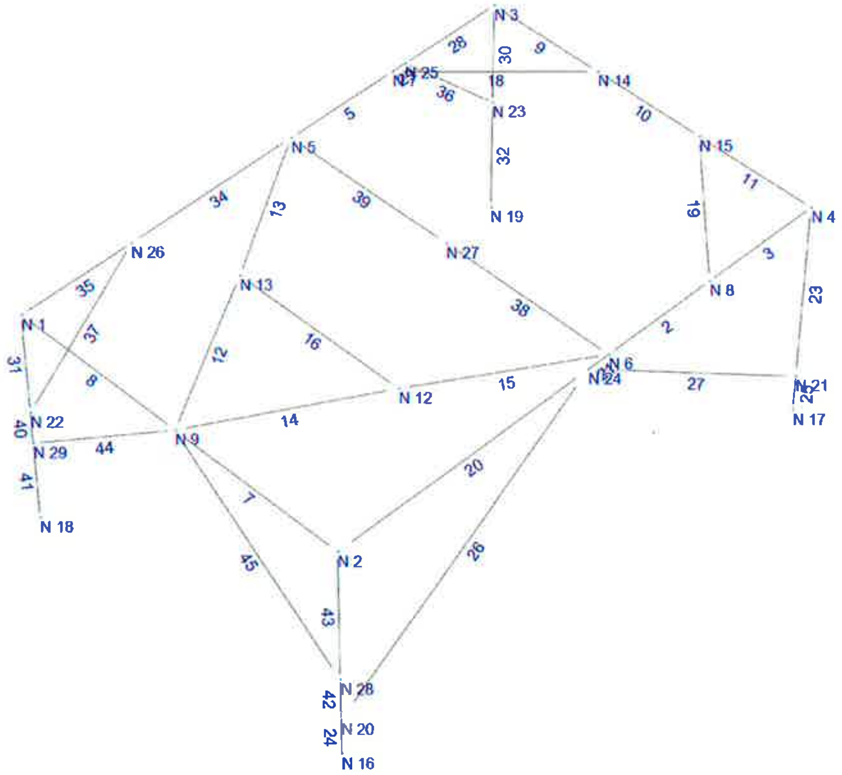
Design status

- ■ Not designed
- 🟥 Error on design
- 🟩 Design O.K.
- 🟨 With warnings



BETA/GAMMA FRAME
(WIND BLOWING SOUTH)

Current Date: 10/23/2014 1:53 PM
Units system: English
File name: R:\STRUCTURAL DEPT\Analysis Software\RAM Elements\RAM Projects\S2900 Beta-Gamma Frame (Wind South).etz\

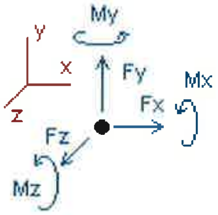


Bentley

Current Date: 11/4/2014 1:31 PM
Units system: English
File name: R:\STRUCTURAL DEPT\Analysis Software\RAM Elements\RAM Projects\S2900 Beta-Gamma Frame (Wind South).etz\

Analysis result

Reactions



Direction of positive forces and moments

	Forces [Kip]			Moments [Kip*ft]		
Node	**FX**	**FY**	**FZ**	**MX**	**MY**	**MZ**
Condition **D1=DL**						
17	-1.59159	2.16693	-0.11515	-0.35578	-0.17024	2.40516
19	-0.99550	1.96182	0.11429	0.45151	0.02191	3.36538
16	1.60131	3.36837	-0.94406	-2.27779	-0.03579	-2.52658
18	0.98578	3.14261	0.94492	2.43526	-0.03782	-3.28752
SUM	0.00000	10.63973	0.00000	0.25320	-0.22193	-0.04356
Condition **D2=DL+W**						
17	-2.84607	4.06298	-0.30187	-1.33916	-0.22883	4.31226
19	-1.29436	3.07989	-0.07729	-0.34899	0.01886	4.46776
16	3.38683	7.10543	-1.83488	-4.61618	-0.04080	-5.40197
18	0.75360	3.12631	0.73265	1.75154	0.14490	-2.39911
SUM	0.00000	17.37461	-1.48138	-4.55279	-0.10587	0.97894
Condition **D3=0.6DL+W**						
17	-2.20944	3.19621	-0.25581	-1.19684	-0.16073	3.35020
19	-0.89616	2.29517	-0.12300	-0.52959	0.01010	3.12161
16	2.74630	5.75808	-1.45726	-3.70507	-0.02649	-4.39134
18	0.35929	1.86926	0.35468	0.77743	0.16002	-1.08410
SUM	0.00000	13.11872	-1.48138	-4.65406	-0.01710	0.99636

Current Date: 11/4/2014 1:31 PM
Units system: English
File name: R:\STRUCTURAL DEPT\Analysis Software\RAM Elements\RAM Projects\S2900 Beta-Gamma Frame (Wind South).etz\

Steel Code Check

Report: Summary - For all selected load conditions

Load conditions to be included in design :

D1=DL
D2=DL+W
D3=0.6DL+W

Description	Section	Member	Ctrl Eq.	Ratio	Status	Reference
	HSS_RECT 6X4X3_8	**2**	D1 at 100.00%	0.02	OK	Eq. H1-1b
			D2 at 0.00%	**0.06**	**OK**	Eq. H1-1b
			D3 at 0.00%	0.05	OK	Eq. H1-1b
		3	D1 at 100.00%	0.02	OK	Eq. H1-1b
			D2 at 100.00%	**0.04**	**OK**	Eq. H1-1b
			D3 at 100.00%	0.03	OK	Eq. H1-1b
		5	D1 at 0.00%	0.14	OK	Eq. H1-1b
			D2 at 0.00%	**0.19**	**OK**	Eq. H1-1b
			D3 at 0.00%	0.14	OK	Eq. H1-1b
		7	D1 at 50.00%	0.02	OK	Eq. H1-1b
			D2 at 50.00%	**0.03**	**OK**	Eq. H1-1b
			D3 at 43.75%	0.02	OK	Eq. H1-1b
		8	D1 at 68.75%	0.03	OK	Eq. H1-1b
			D2 at 56.25%	**0.04**	**OK**	Eq. H1-1b
			D3 at 0.00%	0.04	OK	Eq. H1-1b
		9	D1 at 0.00%	0.02	OK	Eq. H1-1b
			D2 at 100.00%	**0.06**	**OK**	Eq. H1-1b
			D3 at 100.00%	0.05	OK	Eq. H1-1b
		10	D1 at 87.50%	0.04	OK	Eq. H1-1b
			D2 at 81.25%	**0.08**	**OK**	Eq. H1-1b
			D3 at 81.25%	0.06	OK	Eq. H1-1b
		11	D1 at 100.00%	0.04	OK	Eq. H1-1b
			D2 at 100.00%	**0.07**	**OK**	Eq. H1-1b
			D3 at 0.00%	0.06	OK	Eq. H1-1b
		12	D1 at 0.00%	0.05	OK	Eq. H1-1b
			D2 at 100.00%	**0.07**	**OK**	Eq. H1-1b
			D3 at 100.00%	0.06	OK	Eq. H1-1b
		13	D1 at 81.25%	0.05	OK	Eq. H1-1b
			D2 at 100.00%	**0.08**	**OK**	Eq. H1-1b
			D3 at 100.00%	0.06	OK	Eq. H1-1b
		14	D1 at 100.00%	0.04	OK	Eq. H1-1b
			D2 at 100.00%	**0.08**	**OK**	Eq. H1-1b
			D3 at 100.00%	0.06	OK	Eq. H1-1b
		15	D1 at 100.00%	0.05	OK	Eq. H1-1b
			D2 at 100.00%	**0.08**	**OK**	Eq. H1-1b

	D3 at 100.00%	0.07	OK	Eq. H1-1b
16	D1 at 56.25%	0.02	OK	Eq. H1-1b
	D2 at 56.25%	**0.04**	**OK**	Eq. H1-1b
	D3 at 50.00%	0.03	OK	Eq. H1-1b
18	D1 at 0.00%	0.03	OK	Eq. H1-1b
	D2 at 0.00%	**0.05**	**OK**	Eq. H1-1b
	D3 at 0.00%	0.04	OK	Eq. H1-1b
19	D1 at 43.75%	0.02	OK	Eq. H1-1b
	D2 at 43.75%	**0.03**	**OK**	Eq. H1-1b
	D3 at 50.00%	0.02	OK	Eq. H1-1b
20	D1 at 100.00%	0.05	OK	Eq. H1-1b
	D2 at 100.00%	**0.13**	**OK**	Eq. H1-1b
	D3 at 100.00%	0.11	OK	Eq. H1-1b
21	D1 at 100.00%	0.06	OK	Eq. H1-1b
	D2 at 100.00%	**0.11**	**OK**	Eq. H1-1b
	D3 at 100.00%	0.09	OK	Eq. H1-1b
23	D1 at 0.00%	0.05	OK	Eq. H1-1b
	D2 at 0.00%	**0.11**	**OK**	Eq. H1-1b
	D3 at 0.00%	0.09	OK	Eq. H1-1b
24	D1 at 0.00%	0.21	OK	Eq. H1-1b
	D2 at 0.00%	**0.44**	**OK**	Eq. H1-1b
	D3 at 0.00%	0.36	OK	Eq. H1-1b
25	D1 at 0.00%	0.11	OK	Eq. H1-1b
	D2 at 0.00%	**0.24**	**OK**	Eq. H1-1b
	D3 at 0.00%	0.19	OK	Eq. H1-1b
26	D1 at 0.00%	0.05	OK	Eq. H1-2
	D2 at 0.00%	**0.11**	**OK**	Eq. H1-1b
	D3 at 0.00%	0.09	OK	Eq. H1-1b
27	D1 at 100.00%	0.05	OK	Eq. H1-2
	D2 at 100.00%	**0.09**	**OK**	Eq. H1-2
	D3 at 100.00%	0.07	OK	Eq. H1-2
28	D1 at 100.00%	0.07	OK	Eq. H1-1b
	D2 at 100.00%	**0.10**	**OK**	Eq. H1-1b
	D3 at 100.00%	0.07	OK	Eq. H1-1b
29	D1 at 100.00%	0.08	OK	Eq. H1-1b
	D2 at 100.00%	**0.10**	**OK**	Eq. H1-1b
	D3 at 100.00%	0.07	OK	Eq. H1-1b
30	D1 at 100.00%	0.09	OK	Eq. H1-1b
	D2 at 100.00%	**0.10**	**OK**	Eq. H1-1b
	D3 at 100.00%	0.07	OK	Eq. H1-1b
31	D1 at 100.00%	**0.09**	**OK**	Eq. H1-1b
	D2 at 100.00%	0.06	OK	Eq. H1-1b
	D3 at 0.00%	0.04	OK	Eq. H1-1b
32	D1 at 100.00%	0.15	OK	Eq. H1-1b
	D2 at 100.00%	**0.18**	**OK**	Eq. H1-1b
	D3 at 0.00%	0.14	OK	Eq. H1-1b
34	D1 at 0.00%	0.12	OK	Eq. H1-1b

	D2 at 0.00%	**0.19**	**OK**	Eq. H1-1b
	D3 at 0.00%	0.15	OK	Eq. H1-1b
35	D1 at 100.00%	0.07	OK	Eq. H1-1b
	D2 at 100.00%	**0.08**	**OK**	Eq. H1-1b
	D3 at 100.00%	0.05	OK	Eq. H1-1b
36	D1 at 0.00%	0.06	OK	Eq. H1-1b
	D2 at 0.00%	**0.08**	**OK**	Eq. H1-1b
	D3 at 0.00%	0.05	OK	Eq. H1-1b
37	D1 at 100.00%	**0.05**	**OK**	Eq. H1-1b
	D2 at 100.00%	0.04	OK	Eq. H1-1b
	D3 at 0.00%	0.03	OK	Eq. H1-1b
38	D1 at 100.00%	0.06	OK	Eq. H1-1b
	D2 at 100.00%	**0.10**	**OK**	Eq. H1-1b
	D3 at 100.00%	0.07	OK	Eq. H1-1b
39	D1 at 93.75%	0.06	OK	Eq. H1-1b
	D2 at 93.75%	**0.10**	**OK**	Eq. H1-1b
	D3 at 93.75%	0.07	OK	Eq. H1-1b
40	D1 at 0.00%	**0.14**	**OK**	Eq. H1-1b
	D2 at 0.00%	0.10	OK	Eq. H1-1b
	D3 at 0.00%	0.05	OK	Eq. H1-1b
41	D1 at 0.00%	**0.25**	**OK**	Eq. H1-1b
	D2 at 0.00%	0.18	OK	Eq. H1-1b
	D3 at 100.00%	0.09	OK	Eq. H1-1b
42	D1 at 100.00%	0.12	OK	Eq. H1-1b
	D2 at 100.00%	**0.24**	**OK**	Eq. H1-1b
	D3 at 100.00%	0.19	OK	Eq. H1-1b
43	D1 at 100.00%	0.04	OK	Eq. H1-1b
	D2 at 100.00%	**0.08**	**OK**	Eq. H1-1b
	D3 at 0.00%	0.07	OK	Eq. H1-1b
44	D1 at 0.00%	**0.08**	**OK**	Eq. H1-1b
	D2 at 0.00%	0.07	OK	Eq. H1-1b
	D3 at 100.00%	0.05	OK	Eq. H1-1b
45	D1 at 100.00%	0.06	OK	Eq. H1-1b
	D2 at 100.00%	**0.12**	**OK**	Eq. H1-1b
	D3 at 100.00%	0.09	OK	Eq. H1-1b

Hudson
Design Group LLC

Equipment Platform Calculations

Date: 11-25-2014
Project Name: Stamford Harbor
Project Number: S2900
Designed By: GH Checked By: MSC

Hudson Design Group LLC

Steel Frame Design Calculations

Live Loads:

Service Load	25 psf
Snow Load	38.5 psf
Wind Load	33 psf

Dead Loads:

Shelter + Equipment	30000 lbs.
Generator Load	2812 lbs.
Grating	15 psf
Handrail	10 plf

Load Breakdown

- **Beam A (0 ft - 15.5 ft)**

Live Load

→ Service 25 psf x 5.75 ft. (Half Shelter Width)
= **143.75 plf**

→ Snow 38.5 psf x 5.75 ft. (Half Shelter Width)
= **221.38 plf**

→ Wind 33 psf x 10.5 ft. (Shelter Height)
= **346.50 plf**

Dead Load

→ Shelter 30000 lbs / 2 beams / 15.5 ft (Shelter Length)
= **967.74 plf**

Date: 11-25-2014
Project Name: Stamford Harbor
Project Number: S2900
Designed By: GH Checked By: MSC

Hudson
Design Group LLC

Load Breakdown (Cont.)

- **Beam A (15.5 ft - 30 ft)**

Live Load

→ Service 25 psf x 1.5 ft. (Tributary Width)
= **37.50 plf**

→ Wind 33 psf x 1.33 ft. (Beam Height)
= **43.89 plf**

Dead Load

→ Grating 15 psf x 1.5 ft. (Tributary Width)
= **22.50 plf**

→ Handrail **10 plf**

- **Beam B**

Live Load

→ Service 25 psf x 6.7 ft. (Tributary Width)
= **167.50 plf**

→ Snow 38.5 psf x 5.75 ft. (Half Shelter Width)
= **221.38 plf**

Dead Load

→ Shelter 30000 lbs / 2 beams / 15.5 ft (Shelter Length)
= **967.74 plf**

→ Grating 15 psf x 1.21 ft. (Tributary Width)
= **18.15 plf**

Load Breakdown (Cont.)

- **Beam C**

Live Load

→ Service 25 psf x 1.21 ft. (Tributary Width)
= **30.25 plf**

→ Snow 38.5 psf x 1.71 ft. (Half Generator Width)
= **65.84 plf**

Dead Load

→ Generator 2812 lbs / 2 beams / 7.75 ft (Generator Length)
= **181.42 plf**

→ Grating 15 psf x 1.21 ft. (Tributary Width)
= **18.15 plf**

- **Beam D**

Live Load

→ Service 25 psf x 1.25 ft. (Tributary Width)
= **31.25 plf**

→ Snow 38.5 psf x 1.71 ft. (Half Generator Width)
= **65.84 plf**

Dead Load

→ Generator 2812 lbs / 2 beams / 7.75 ft (Generator Length)
= **181.42 plf**

→ Grating 15 psf x 1.25 ft. (Tributary Width)
= **18.75 plf**

Load Breakdown (Cont.)

- **Beam E**

Live Load

→ Service 25 psf x 1.25 ft. (Tributary Width)

= **31.25 plf**

Dead Load

→ Grating 15 psf x 1.25 ft. (Tributary Width)

= **18.75 plf**

- **Beam F**

Live Load

→ Service 25 psf x 2.6 ft. (Tributary Width)

= **65.00 plf**

Dead Load

→ Grating 15 psf x 2.6 ft. (Tributary Width)

= **39.00 plf**

- **Beam G**

Live Load

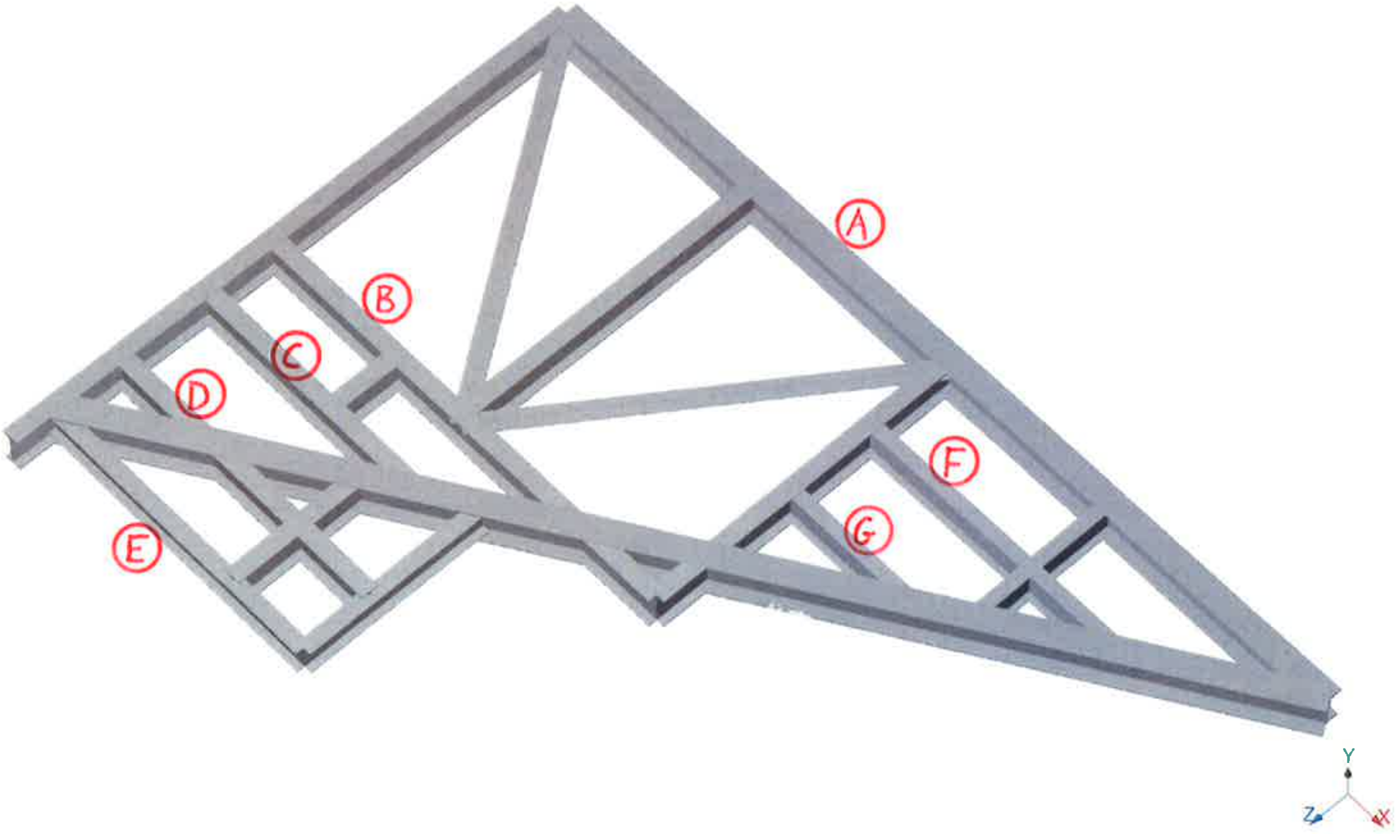
→ Service 25 psf x 3.5 ft. (Tributary Width)

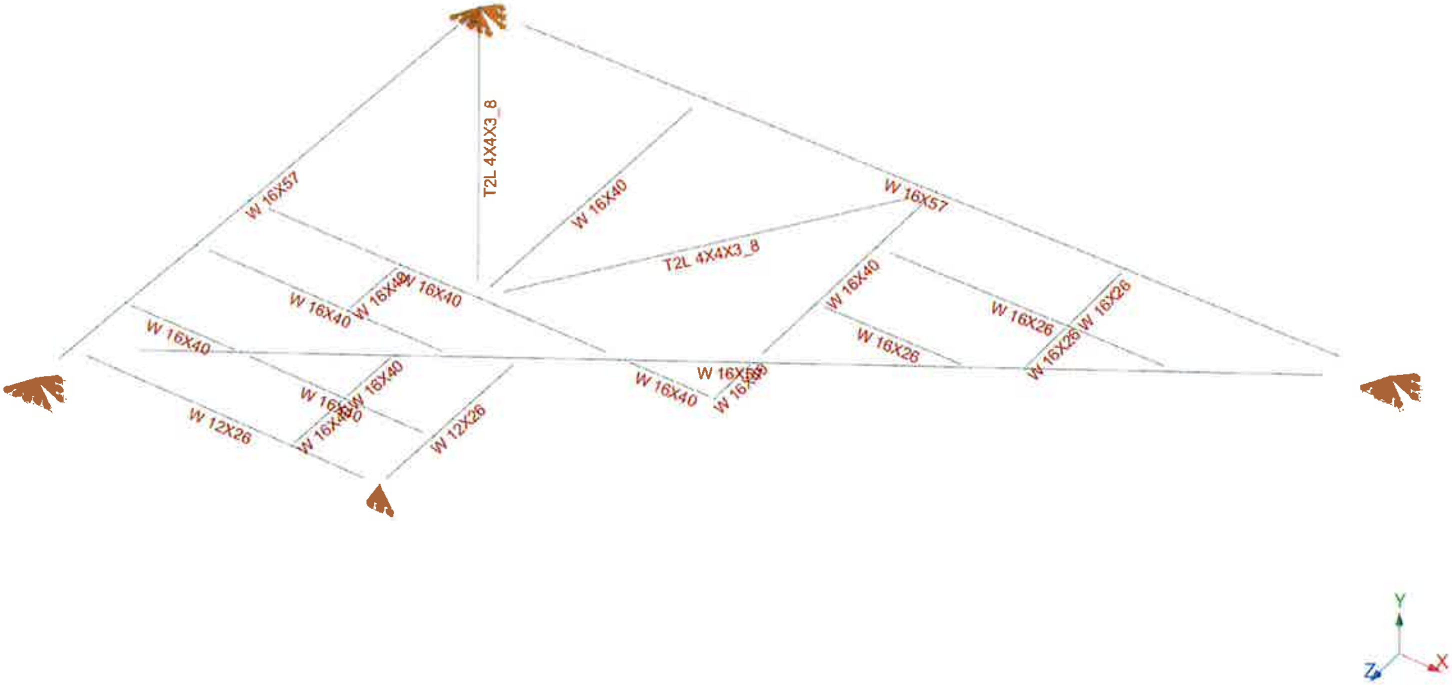
= **87.50 plf**

Dead Load

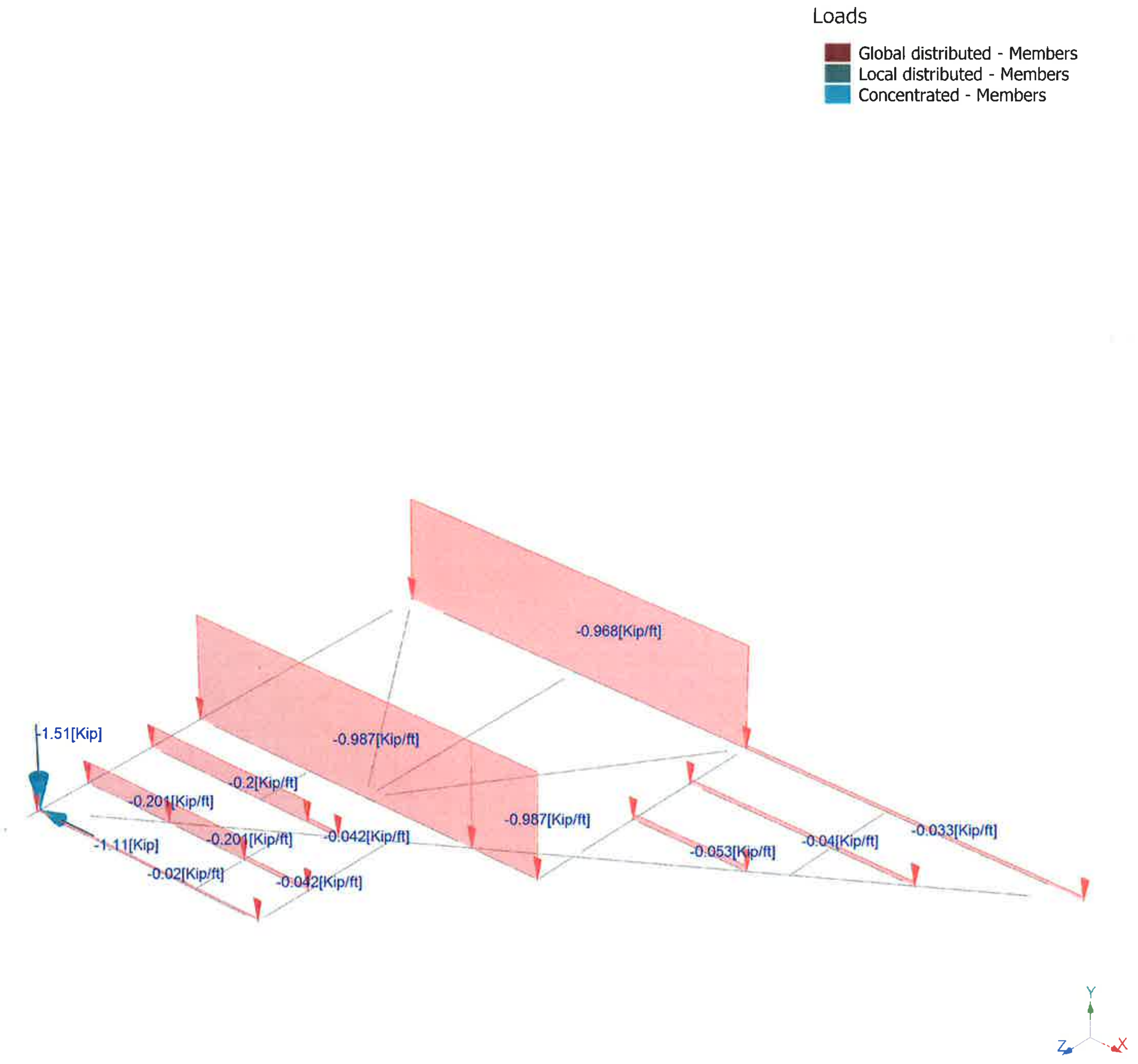
→ Grating 15 psf x 3.5 ft. (Tributary Width)

= **52.50 plf**


A
B
C
D
E
F
G
Y
Z
X


T2L 4X4X3_8
W 16X57
W 16X40
W 16X57
T2L 4X4X3_8
W 16X40
W 16X40
W 16X40
W 16X40
W 16X40
W 16X26
W 16X26
W 16X26
W 16X26
W 16X40
W 16X55
W 16X40
W 16X40
W 16X40
W 16X40
W 12X26
W 12X26
W 16X40
Y
Z
X

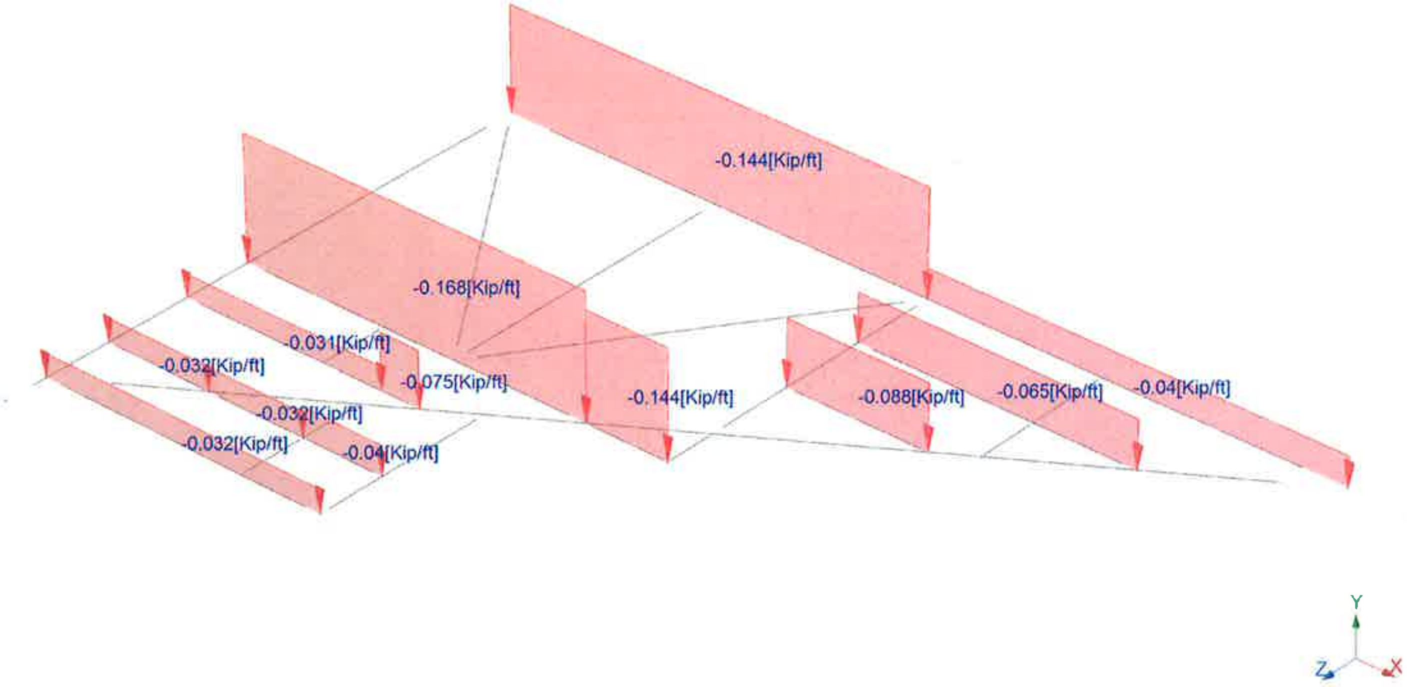
Current Date: 11/25/2014 9:42 AM
Units system: English
File name: C:\Users\ghaggstrom\Desktop\S2900 (Shelter Frame).etz\
Load condition: DL=Dead Load



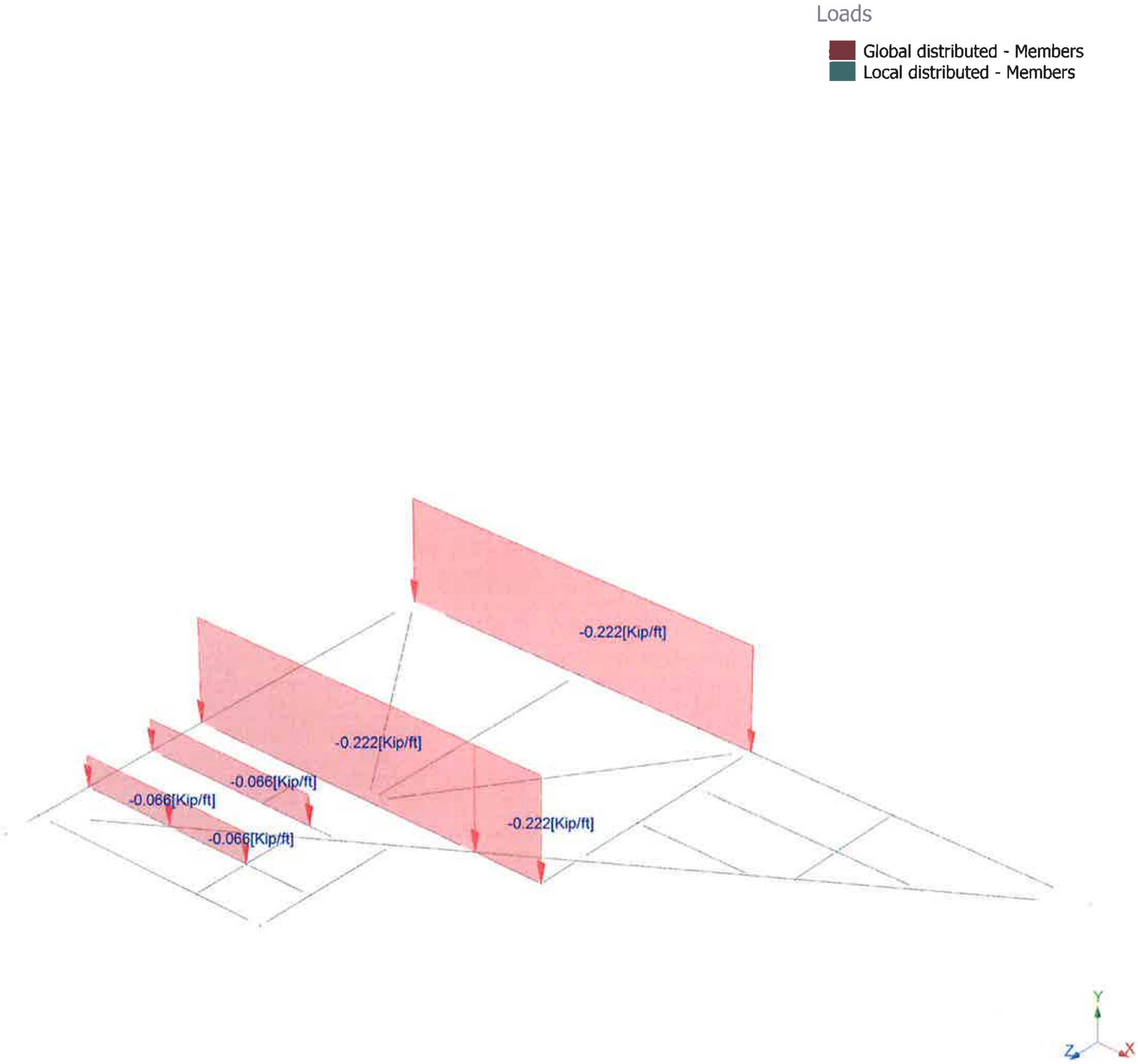
Current Date: 11/25/2014 9:42 AM
Units system: English
File name: C:\Users\ghaggstrom\Desktop\S2900 (Shelter Frame).etz\
Load condition: LL=Service

Loads

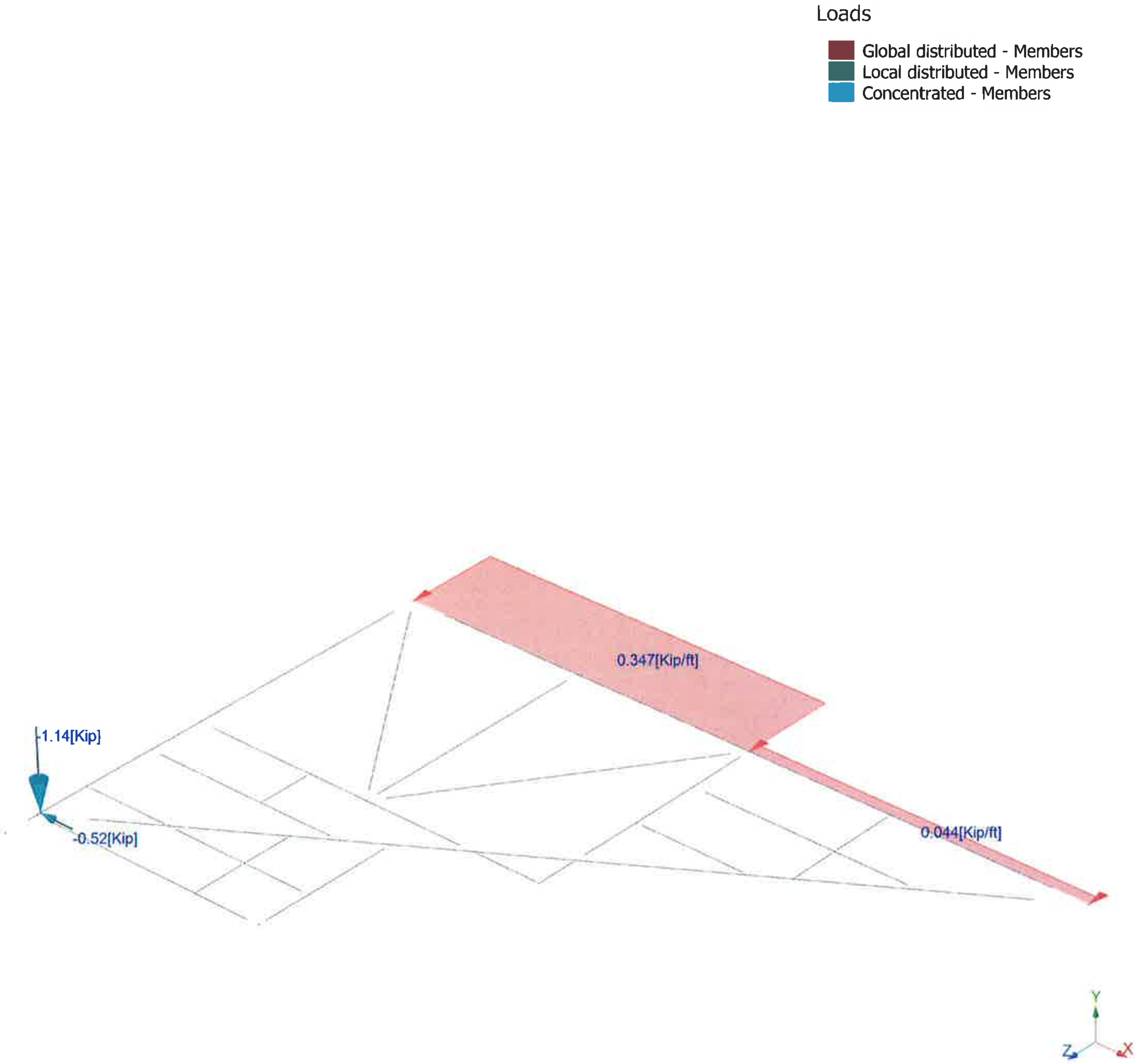
🟥 Global distributed - Members
🟦 Local distributed - Members



Current Date: 11/25/2014 9:42 AM
Units system: English
File name: C:\Users\ghaggstrom\Desktop\S2900 (Shelter Frame).etz\
Load condition: S=Snow



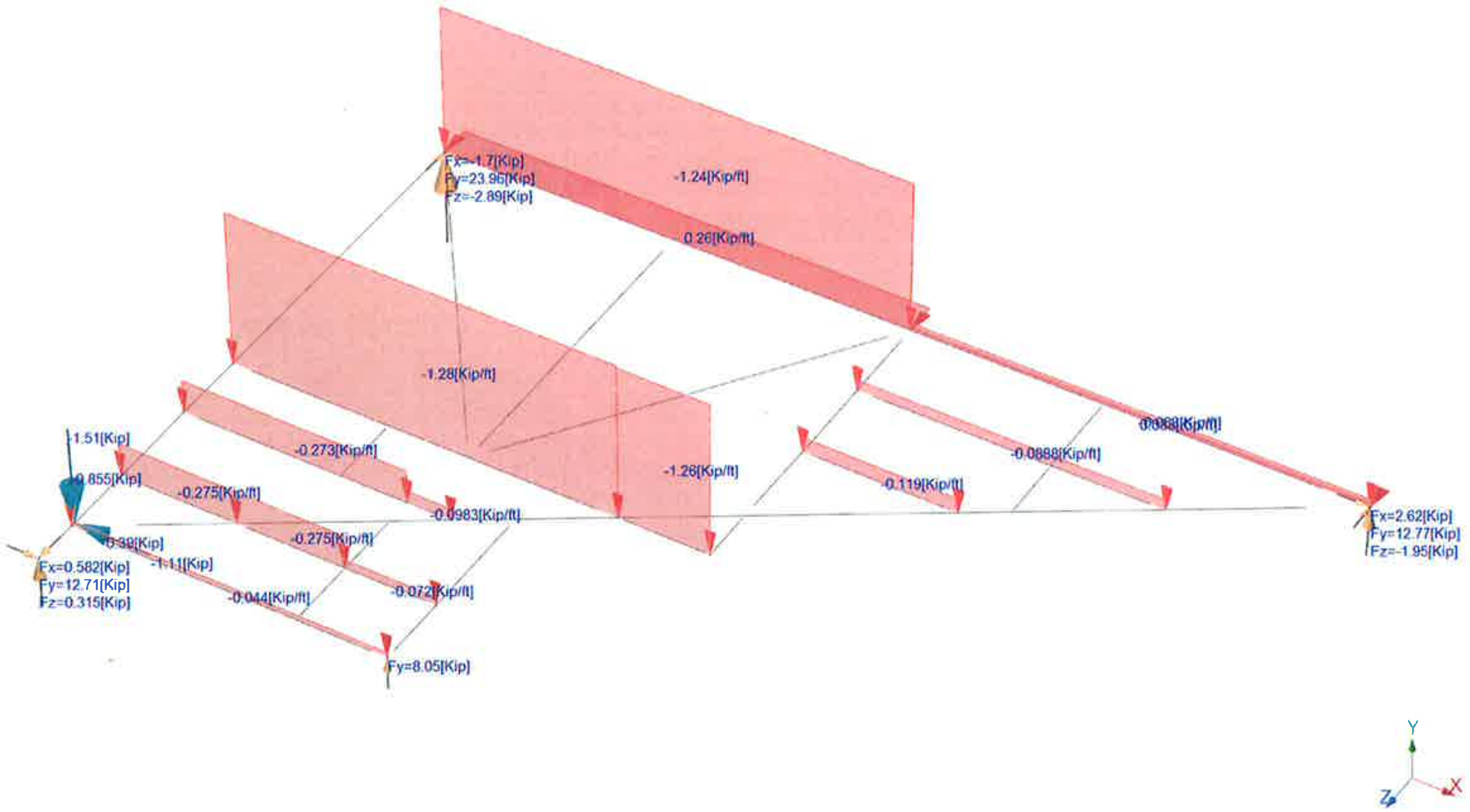
Current Date: 11/25/2014 9:42 AM
Units system: English
File name: C:\Users\ghaggstrom\Desktop\S2900 (Shelter Frame).etz\
Load condition: W=Wind



Current Date: 11/25/2014 10:32 AM
Units system: English
File name: C:\Users\ghaggstrom\Desktop\S2900 (Shelter Frame).etz\
Load condition: D10=DL+0.75LL+0.75S+0.75W

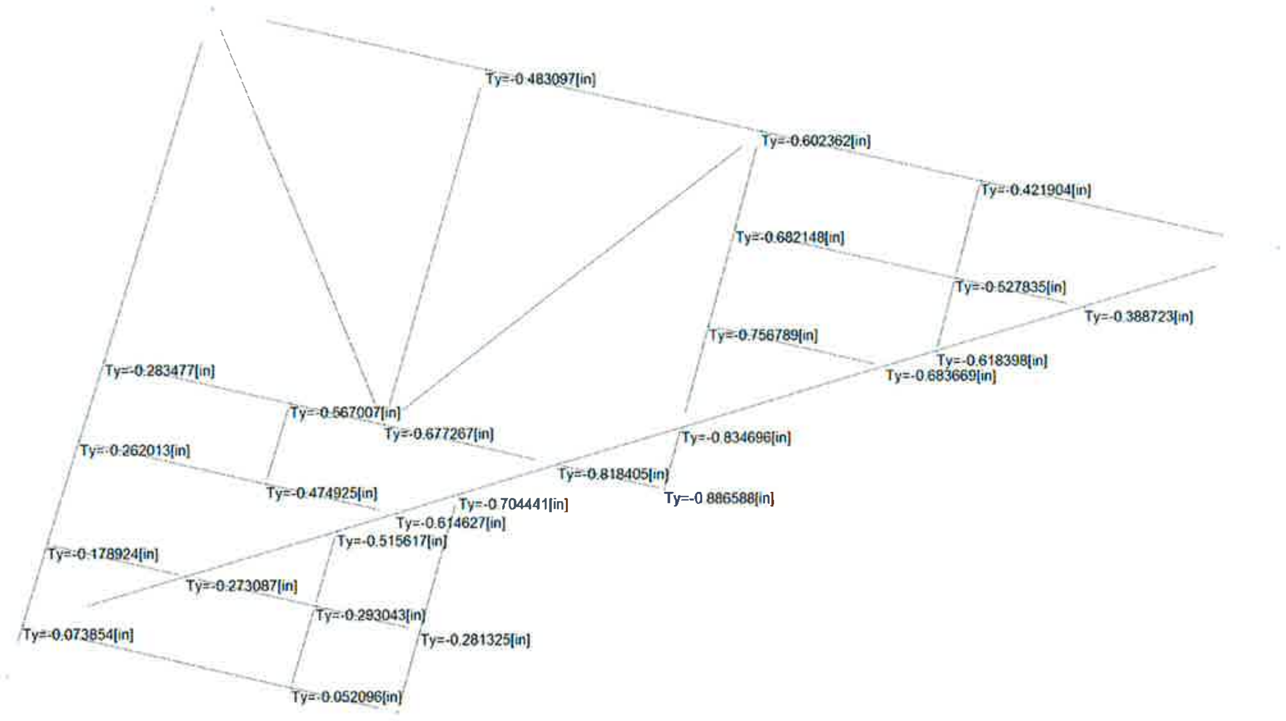
Loads

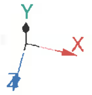
🟥	Global distributed - Members
🟦	Local distributed - Members
🟦	Concentrated - Members



WORST CASE LOADING

Current Date: 11/25/2014 10:32 AM
Units system: English
File name: C:\Users\ghaggstrom\Desktop\S2900 (Shelter Frame).etz\
Load condition: D10=DL+0.75LL+0.75S+0.75W



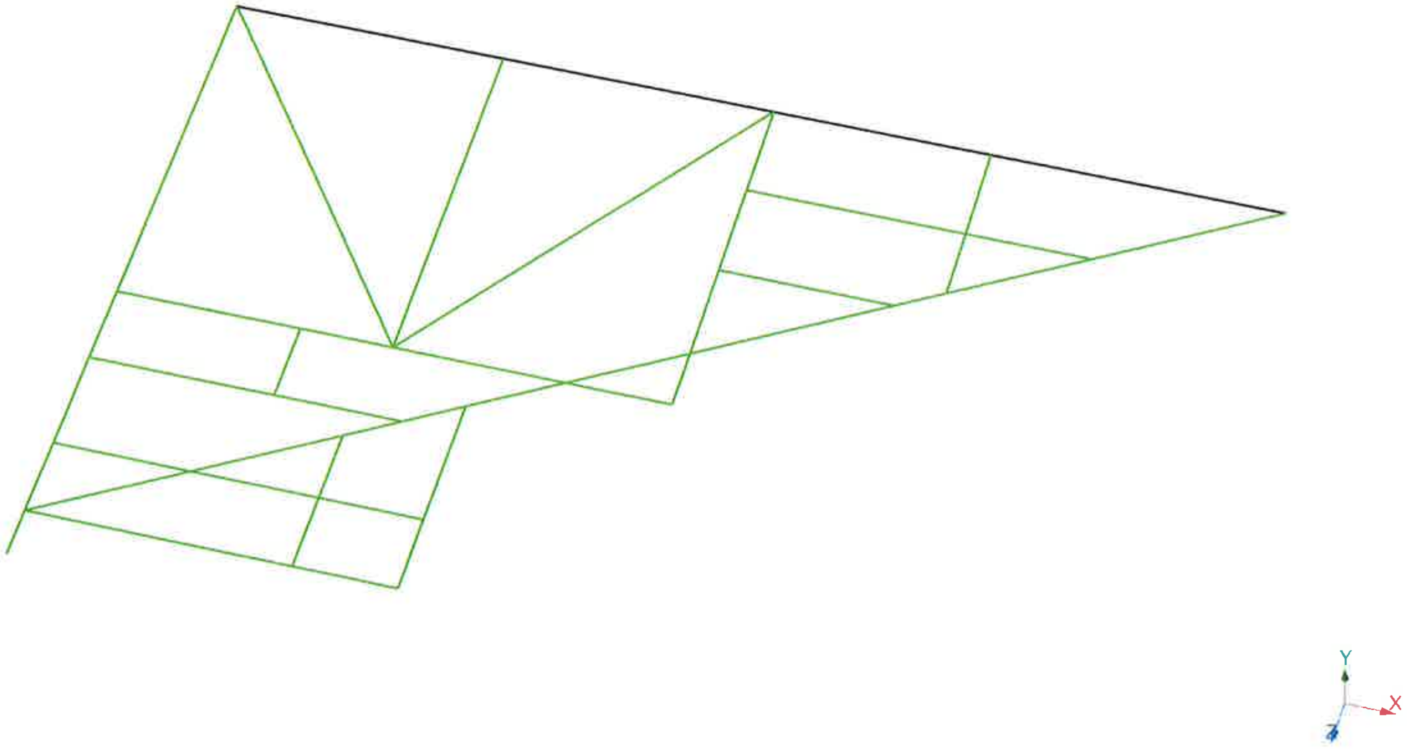


WORST CASE LOADING

Current Date: 11/25/2014 10:33 AM
Units system: English
File name: C:\Users\ghaggstrom\Desktop\S2900 (Shelter Frame).etz\

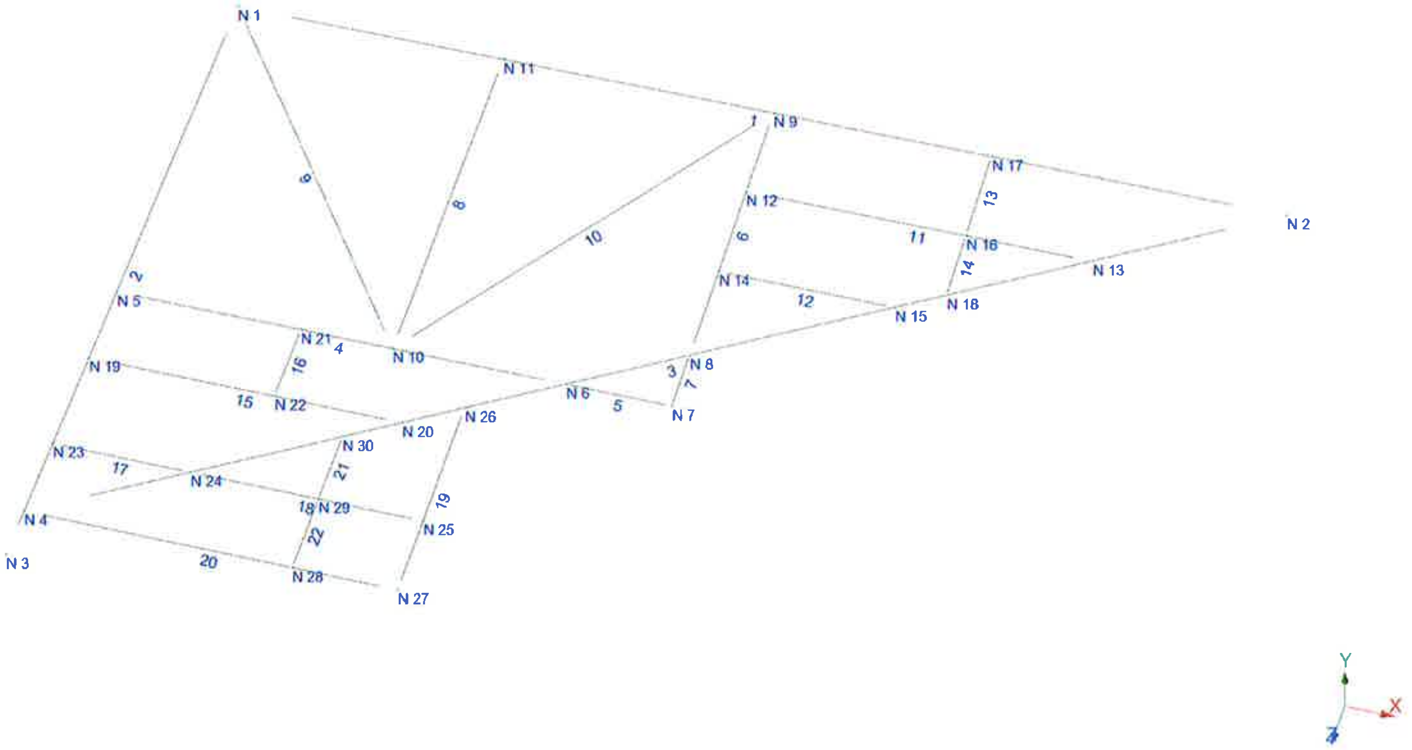
Design status

- ◼ Not designed
- 🟥 Error on design
- 🟩 Design O.K.
- 🟨 With warnings



WORST CASE LOADING

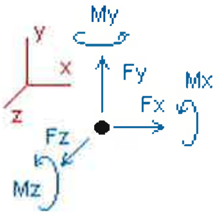
Current Date: 11/25/2014 10:33 AM
Units system: English
File name: C:\Users\ghaggstrom\Desktop\S2900 (Shelter Frame).etz\



Current Date: 11/25/2014 10:33 AM
Units system: English
File name: C:\Users\ghaggstrom\Desktop\S2900 (Shelter Frame).etz\

Analysis result

Reactions



Direction of positive forces and moments

	Forces [Kip]			Moments [Kip*ft]		
Node	**FX**	**FY**	**FZ**	**MX**	**MY**	**MZ**
Condition **D2=DL+LL**						
1	0.02412	21.83791	0.07832	0.00000	0.00000	0.00000
2	0.83859	12.14218	-0.52306	0.00000	0.00000	0.00000
3	0.24730	11.05156	0.44474	0.00000	0.00000	0.00000
27	0.00000	7.57423	0.00000	0.00000	0.00000	0.00000
SUM	1.11000	52.60589	0.00000	0.00000	0.00000	0.00000
Condition **D3=DL+S**						
1	0.02412	22.67990	0.07832	0.00000	0.00000	0.00000
2	0.83859	11.57226	-0.52306	0.00000	0.00000	0.00000
3	0.24730	11.36423	0.44474	0.00000	0.00000	0.00000
27	0.00000	7.42048	0.00000	0.00000	0.00000	0.00000
SUM	1.11000	53.03687	0.00000	0.00000	0.00000	0.00000
Condition **D6=DL+0.75LL+0.75S**						
1	0.02412	23.88914	0.07832	0.00000	0.00000	0.00000
2	0.83859	12.76993	-0.52306	0.00000	0.00000	0.00000
3	0.24730	11.91963	0.44474	0.00000	0.00000	0.00000
27	0.00000	8.06486	0.00000	0.00000	0.00000	0.00000
SUM	1.11000	56.64356	0.00000	0.00000	0.00000	0.00000
Condition **D7=DL+W**						
1	-2.27428	19.08820	-3.87355	0.00000	0.00000	0.00000
2	3.21064	10.03651	-2.42083	0.00000	0.00000	0.00000
3	0.69365	10.84379	0.27115	0.00000	0.00000	0.00000
27	0.00000	6.34852	0.00000	0.00000	0.00000	0.00000
SUM	1.63000	46.31702	-6.02323	0.00000	0.00000	0.00000

Condition **D10=DL+0.75LL+0.75S+0.75W**

1	-1.69968	23.95646	-2.88558	0.00000	0.00000	0.00000
2	2.61762	12.77347	-1.94638	0.00000	0.00000	0.00000
3	0.58206	12.71415	0.31455	0.00000	0.00000	0.00000
27	0.00000	8.05449	0.00000	0.00000	0.00000	0.00000
SUM	1.50000	57.49856	-4.51742	0.00000	0.00000	0.00000

Current Date: 11/25/2014 10:33 AM
Units system: English
File name: C:\Users\ghaggstrom\Desktop\S2900 (Shelter Frame).etz\

Steel Code Check

Report: Summary - For all selected load conditions

Load conditions to be included in design :

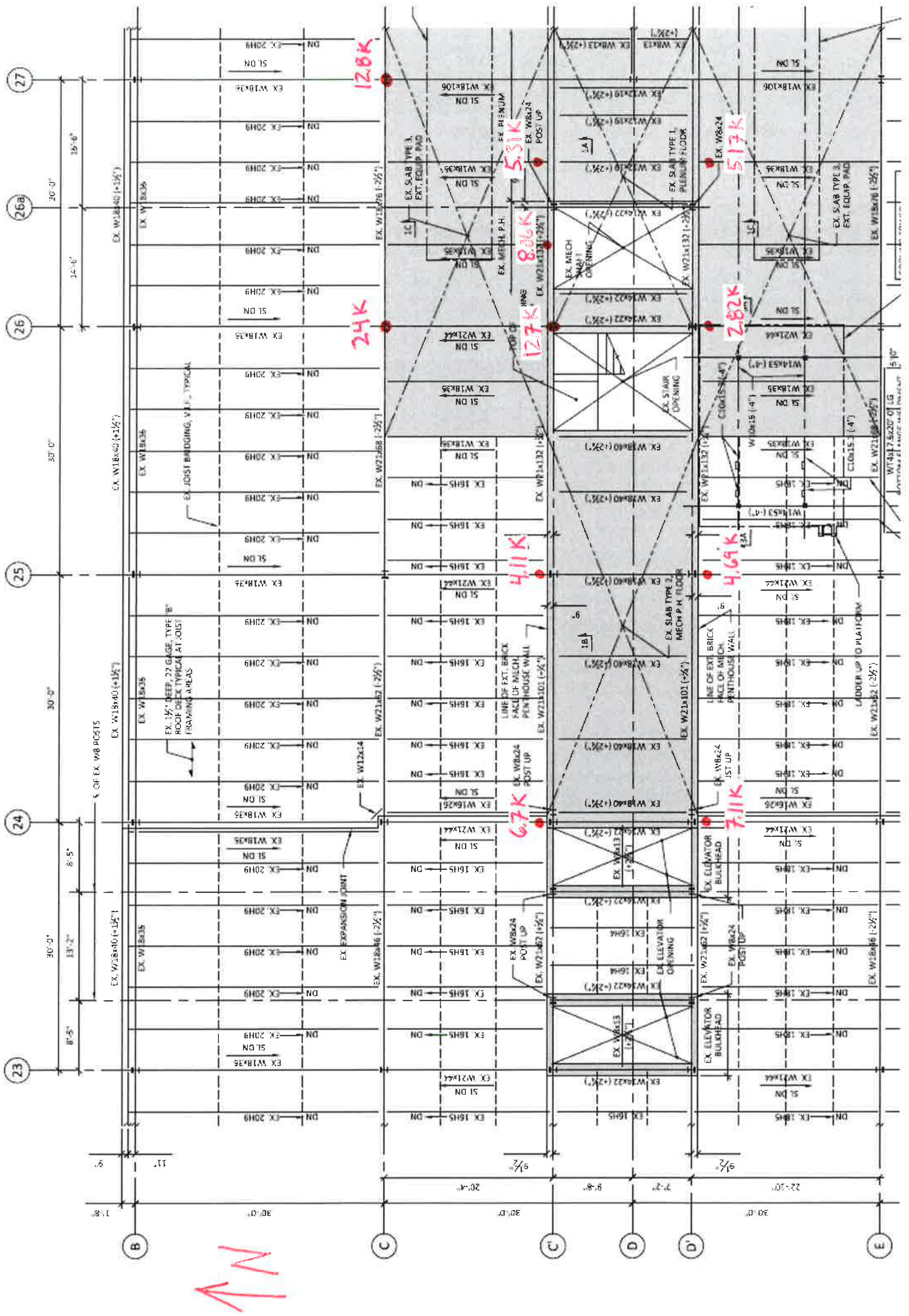
D2=DL+LL
D3=DL+S
D6=DL+0.75LL+0.75S
D7=DL+W
D10=DL+0.75LL+0.75S+0.75W

Description	Section	Member	Ctrl Eq.	Ratio	Status	Reference
	T2L 4X4X3_8	**9**	D10 at 68.75%	**0.08**	**OK**	Eq. H1-1b
			D2 at 62.50%	0.06	OK	Eq. H1-1b
			D3 at 62.50%	0.06	OK	Eq. H1-1b
			D6 at 62.50%	0.06	OK	Eq. H1-1b
			D7 at 62.50%	0.08	OK	Eq. H1-1b
		10	D10 at 68.75%	**0.08**	**OK**	Eq. H1-1b
			D2 at 68.75%	0.06	OK	Eq. H1-1b
			D3 at 68.75%	0.06	OK	Eq. H1-1b
			D6 at 68.75%	0.07	OK	Eq. H1-1b
			D7 at 68.75%	0.07	OK	Eq. H1-1b
	W 12X26	**19**	D10 at 62.50%	**0.15**	**OK**	Eq. H1-1b
			D2 at 62.50%	0.14	OK	Eq. H1-1b
			D3 at 62.50%	0.14	OK	Eq. H1-1b
			D6 at 62.50%	0.15	OK	Eq. H1-1b
			D7 at 62.50%	0.12	OK	Eq. H1-1b
		20	D10 at 0.00%	**0.26**	**OK**	Eq. H1-1b
			D2 at 0.00%	0.24	OK	Eq. H1-1b
			D3 at 0.00%	0.24	OK	Eq. H1-1b
			D6 at 0.00%	0.25	OK	Eq. H1-1b
			D7 at 0.00%	0.21	OK	Eq. H1-1b
	W 16X26	**11**	D10 at 62.50%	**0.18**	**OK**	Eq. H1-1b
			D2 at 62.50%	0.16	OK	Eq. H1-1b
			D3 at 62.50%	0.16	OK	Eq. H1-1b
			D6 at 62.50%	0.17	OK	Eq. H1-1b
			D7 at 62.50%	0.15	OK	Eq. H1-1b
		12	D10 at 96.88%	0.01	OK	Eq. H1-1b
			D2 at 0.00%	0.01	OK	Sec. G2.1(a)
			D3 at 68.75%	0.00	OK	Eq. H1-1b
			D6 at 59.38%	0.01	OK	Eq. H1-1b
			D7 at 96.88%	**0.01**	**OK**	Eq. H1-1b
		13	D10 at 0.00%	**0.10**	**OK**	Eq. H1-1b
			D2 at 0.00%	0.08	OK	Eq. H1-1b
			D3 at 0.00%	0.08	OK	Eq. H1-1b
			D6 at 0.00%	0.09	OK	Eq. H1-1b
			D7 at 0.00%	0.08	OK	Eq. H1-1b
		14	D10 at 0.00%	**0.09**	**OK**	Eq. H1-1b
			D2 at 0.00%	0.08	OK	Eq. H1-1b

		D3 at 0.00%	0.08	OK	Eq. H1-1b
		D6 at 0.00%	0.09	OK	Eq. H1-1b
		D7 at 0.00%	0.07	OK	Eq. H1-1b
W 16X40	**4**	D10 at 62.50%	**0.23**	**OK**	Eq. H1-1b
		D2 at 56.25%	0.19	OK	Eq. H1-1b
		D3 at 54.69%	0.20	OK	Eq. H1-1b
		D6 at 54.69%	0.21	OK	Eq. H1-1b
		D7 at 62.50%	0.19	OK	Eq. H1-1b
	5	D10 at 0.00%	**0.06**	**OK**	Eq. H1-1b
		D2 at 100.00%	0.04	OK	Sec. G2.1(a)
		D3 at 100.00%	0.04	OK	Sec. G2.1(a)
		D6 at 100.00%	0.05	OK	Sec. G2.1(a)
		D7 at 0.00%	0.05	OK	Eq. H1-1b
	6	D10 at 1.56%	**0.06**	**OK**	Eq. H1-1b
		D2 at 0.00%	0.04	OK	Sec. G2.1(a)
		D3 at 0.00%	0.05	OK	Sec. G2.1(a)
		D6 at 0.00%	0.05	OK	Sec. G2.1(a)
		D7 at 1.56%	0.05	OK	Eq. H1-1b
	7	D10 at 100.00%	**0.05**	**OK**	Eq. H1-1b
		D2 at 100.00%	0.04	OK	Sec. G2.1(a)
		D3 at 100.00%	0.05	OK	Sec. G2.1(a)
		D6 at 100.00%	0.05	OK	Sec. G2.1(a)
		D7 at 100.00%	0.05	OK	Eq. H1-1b
	8	D10 at 43.75%	0.01	OK	Eq. H1-2
		D2 at 43.75%	0.01	OK	Eq. H1-1b
		D3 at 43.75%	0.01	OK	Eq. H1-1b
		D6 at 43.75%	0.01	OK	Eq. H1-1b
		D7 at 0.00%	**0.01**	**OK**	Sec. E1
	15	D10 at 100.00%	**0.06**	**OK**	Eq. H1-1b
		D2 at 100.00%	0.06	OK	Eq. H1-1b
		D3 at 100.00%	0.06	OK	Eq. H1-1b
		D6 at 100.00%	0.06	OK	Eq. H1-1b
		D7 at 100.00%	0.05	OK	Eq. H1-1b
	16	D10 at 0.00%	0.01	OK	Eq. H1-1b
		D2 at 0.00%	0.00	OK	Eq. H1-1b
		D3 at 0.00%	0.00	OK	Eq. H1-1b
		D6 at 0.00%	0.00	OK	Eq. H1-1b
		D7 at 0.00%	**0.01**	**OK**	Eq. H1-1b
	17	D10 at 100.00%	**0.26**	**OK**	Eq. H1-1b
		D2 at 100.00%	0.24	OK	Eq. H1-1b
		D3 at 100.00%	0.24	OK	Eq. H1-1b
		D6 at 100.00%	0.26	OK	Eq. H1-1b
		D7 at 100.00%	0.21	OK	Eq. H1-1b
	18	D10 at 0.00%	**0.26**	**OK**	Eq. H1-1b
		D2 at 0.00%	0.24	OK	Eq. H1-1b
		D3 at 0.00%	0.24	OK	Eq. H1-1b
		D6 at 0.00%	0.26	OK	Eq. H1-1b
		D7 at 0.00%	0.21	OK	Eq. H1-1b
	21	D10 at 0.00%	**0.01**	**OK**	Eq. H1-1b
		D2 at 0.00%	0.01	OK	Sec. G2.1(a)
		D3 at 0.00%	0.01	OK	Sec. G2.1(a)
		D6 at 0.00%	0.01	OK	Sec. G2.1(a)
		D7 at 0.00%	0.01	OK	Eq. H1-1b

	22	D10 at 100.00%	**0.01**	**OK**	Eq. H1-1b
		D2 at 100.00%	0.01	OK	Eq. H1-1b
		D3 at 100.00%	0.01	OK	Eq. H1-1b
		D6 at 100.00%	0.01	OK	Eq. H1-1b
		D7 at 100.00%	0.01	OK	Eq. H1-1b
W 16X57	**1**	D10 at 39.06%	**0.87**	**With warnings**	Eq. H1-1b
		D2 at 39.06%	0.79	With warnings	Eq. H1-1b
		D3 at 39.06%	0.80	With warnings	Eq. H1-1b
		D6 at 39.06%	0.86	With warnings	Eq. H1-1b
		D7 at 39.06%	0.70	With warnings	Eq. H1-1b
	2	D10 at 53.75%	**0.52**	**OK**	Eq. H1-1b
		D2 at 53.75%	0.47	OK	Eq. H1-1b
		D3 at 53.75%	0.49	OK	Eq. H1-1b
		D6 at 53.75%	0.51	OK	Eq. H1-1b
		D7 at 53.75%	0.42	OK	Eq. H1-1b
	3	D10 at 51.56%	0.84	OK	Eq. H1-1b
		D2 at 51.56%	0.78	OK	Eq. H1-1b
		D3 at 51.56%	0.78	OK	Eq. H1-1b
		D6 at 51.56%	**0.84**	**OK**	Eq. H1-1b
		D7 at 51.56%	0.66	OK	Eq. H1-1b

Roof Beam Calculations



ROOF FRAMING PLAN
N.T.S.

1
SK

Date: 10-30-2014
Project Name: Stamford Harbor
Project Number: S2900
Designed By: GH Checked By: MSC

Roof Loading Calculations

Live Loads:

Snow Load	30 psf	
Penthouse Floor	150 psf	
Drift Load	100 plf	(Max Drift Intensity = 30 psf)

Dead Loads:

Roof (Type 0)	5 psf
Roof (Type 1)	46 psf
Roof (Type 2)	85 psf
Roof (Type 3)	95 psf
Penthouse Wall	50 psf
Penthouse Roof	10 psf

Load Breakdown:

- **Beam 24-C-C' & 24-D'-E**

Live Load

→ Snow 30 psf x 5 ft. (Tributary Width)
= **150.00 plf**

→ Drift 30 psf x 5 ft. (Tributary Width)
= **150.00 plf**

Dead Load

→ Roof (0) 5 psf x 5 ft. (Tributary Width)
= **25.00 plf**

- **Beam 25-C-C' & 25-D'-E**

Live Load

→ Snow 30 psf x 5 ft. (Tributary Width)
= **150.00 plf**

→ Drift 30 psf x 5 ft. (Tributary Width)
= **150.00 plf**

Dead Load

→ Roof (0) 5 psf x 5 ft. (Tributary Width)
= **25.00 plf**

Date: 10-30-2014
Project Name: Stamford Harbor
Project Number: S2900
Designed By: GH Checked By: MSC

Load Breakdown (Cont.):

- **Beam 26-D'-E**

Live Load

→ Snow 30 psf x 8.5 ft. (Tributary Width)
= **255.00 plf**

→ Drift 30 psf x 8.5 ft. (Tributary Width)
= **255.00 plf**

Dead Load

→ Roof (3) 95 psf x 8.5 ft. (Tributary Width)
= **807.50 plf**

- **Beam 26a-C-C' & 26a-D'-E**

Live Load

→ Snow 30 psf x 10 ft. (Tributary Width)
= **300.00 plf**

→ Drift 30 psf x 10 ft. (Tributary Width)
= **300.00 plf**

Dead Load

→ Roof (3) 95 psf x 10 ft. (Tributary Width)
= **950.00 plf**

- **Beam C'-26-27 & D'-26-27**

Live Load

→ Snow 30 psf x 18.6 ft. (Tributary Width)
= **558.00 plf**

→ Drift **100 plf**

→ Penthouse 150 psf x 8.42 ft. (Half Penthouse Floor Width)
= **1263.00 plf**

Dead Load

→ Roof (1) 46 psf x 8.42 ft. (Half Penthouse Floor Width)
= **387.32 plf**

→ Roof (3) 95 psf x 10.67 ft. (Width of slab acting on beam)
= **1013.65 plf**

→ Pent. Wall 50 psf x 11.5 ft. (Penthouse Height)
= **575.00 plf**

→ Pent. Roof 10 psf x 8.42 ft. (Half Penthouse Roof Width)
= 84.20 plf + W10x26 = **100 plf**

Date: 10-30-2014
Project Name: Stamford Harbor
Project Number: S2900
Designed By: GH Checked By: MSC

Hudson Design Group LLC

Load Breakdown (Cont.):

- **Beam 27-C-D (0 ft - 10.17 ft)**

Live Load

→ Snow 30 psf x 10 ft. (Tributary Width)
= **300.00 plf**

Dead Load

→ Roof (3) 95 psf x 10 ft. (Tributary Width)
= **950.00 plf**

- **Beam 27-C-D (10.17 ft - 20.33 ft)**

Live Load

→ Snow 30 psf x 5 ft. (Tributary Width)
= **150.00 plf**

→ Drift 30 psf x 5 ft. (Tributary Width)
= **150.00 plf**

Dead Load

→ Roof (3) 95 psf x 5 ft. (Tributary Width)
= **475.00 plf**

- **Beam 27-C-D (20.33 ft - 30.0 ft)**

Live Load

→ Snow 30 psf x 5 ft. (Tributary Width)
= **150.00 plf**

→ Penthouse 150 psf x 5 ft. (Tributary Width)
= **750.00 plf**

Dead Load

→ Roof (1) 46 psf x 5 ft. (Tributary Width)
= **230.00 plf**

→ Pent. Roof 10 psf x 5 ft. (Tributary Width)
= **50.00 plf**

Date: 10-30-2014
Project Name: Stamford Harbor
Project Number: S2900
Designed By: GH Checked By: MSC

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Load Breakdown (Cont.):

- **Beam 27-D-E (0 ft - 7.17 ft)**

Live Load

→ Snow 30 psf x 5 ft. (Tributary Width)
= **150.00 plf**

→ Penthouse 150 psf x 5 ft. (Tributary Width)
= **750.00 plf**

Dead Load

→ Roof (1) 46 psf x 5 ft. (Tributary Width)
= **230.00 plf**

→ Pent. Roof 10 psf x 5 ft. (Tributary Width)
= **50.00 plf**

- **Beam 27-D-E (7.17 ft - 18.58 ft)**

Live Load

→ Snow 30 psf x 5 ft. (Tributary Width)
= **150.00 plf**

→ Drift 30 psf x 5 ft. (Tributary Width)
= **150.00 plf**

Dead Load

→ Roof (3) 95 psf x 5 ft. (Tributary Width)
= **475.00 plf**

- **Beam 27-D-E (18.58 ft - 30.0 ft)**

Live Load

→ Snow 30 psf x 10 ft. (Tributary Width)
= **300.00 plf**

Dead Load

→ Roof (3) 95 psf x 10 ft. (Tributary Width)
= **950.00 plf**

Project: S2900 - Stamford Harbor

Location: Beam 24-C-C'
Multi-Loaded Multi-Span Beam
[2003 International Building Code(AISC 13th Ed ASD)]
A992-50 W21x44 x 20.33 FT
Section Adequate By: 1203.6%
Controlling Factor: Moment

DEFLECTIONS	Center	
Live Load	0.03	IN L/9557
Dead Load	0.03	in
Total Load	0.06	IN L/4303

Live Load Deflection Criteria: L/360   Total Load Deflection Criteria: L/240

REACTIONS	A		B	
Live Load	1580	lb	1971	lb
Dead Load	1248	lb	6854	lb
Total Load	2828	lb	8825	lb
Bearing Length	0.95	in	0.95	in

BEAM DATA	Center	
Span Length	20.33	ft
Unbraced Length-Top	0	ft
Unbraced Length-Bottom	20.33	ft

STEEL PROPERTIES
W21x44 - A992-50

Properties:			
Yield Stress:	Fy =	50	ksi
Modulus of Elasticity:	E =	29000	ksi
Depth:	d =	20.7	in
Web Thickness:	tw =	0.35	in
Flange Width:	bf =	6.5	in
Flange Thickness:	tf =	0.45	in
Distance to Web Toe of Fillet:	k =	0.95	in
Moment of Inertia About X-X Axis:	Ix =	843	in4
Section Modulus About X-X Axis:	Sx =	81.6	in3
Plastic Section Modulus About X-X Axis:	Zx =	95.4	in3
Design Properties per AISC 13th Edition Steel Manual:			
Flange Buckling Ratio:	FBR =	7.22	
Allowable Flange Buckling Ratio:	AFBR =	9.15	
Web Buckling Ratio:	WBR =	53.71	
Allowable Web Buckling Ratio:	AWBR =	90.55	
Controlling Unbraced Length:	Lb =	0	ft
Limiting Unbraced Length - for lateral-torsional buckling:	Lp =	4.45	ft
Nominal Flexural Strength w/ safety factor:	Mn =	238024	ft-lb
Controlling Equation:	F2-1		
Web height to thickness ratio:	h/tw =	53.71	
Limiting height to thickness ratio for eqn. G2-2:	h/tw-limit =	53.95	
Cv Factor:	Cv =	1	
Controlling Equation:	G2-2		
Nominal Shear Strength w/ safety factor:	Vn =	144900	lb

Controlling Moment: 18259 ft-lb
13.01 Ft from left support of span 2 (Center Span)
Created by combining all dead loads and live loads on span(s) 2
Controlling Shear: -8825 lb
20.0 Ft from left support of span 2 (Center Span)
Created by combining all dead loads and live loads on span(s

Comparisons with required sections:	Req'd	Provided
Moment of Inertia (deflection):	47.02 in4	843 in4
Moment:	18259 ft-lb	238024 ft-lb
Shear:	-8825 lb	144900 lb

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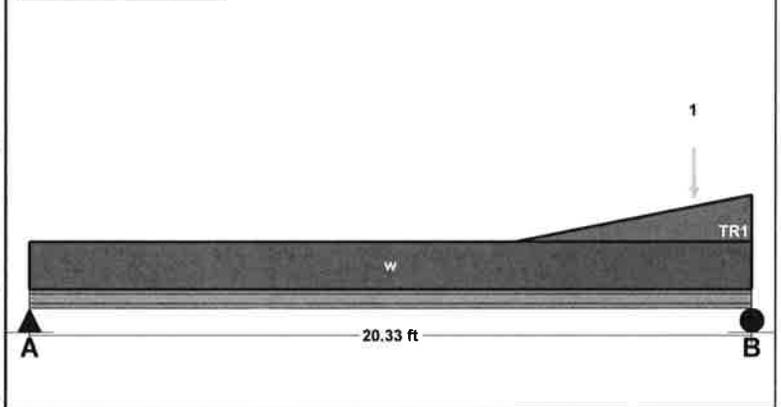

UNIFORM LOADS	Center	
Uniform Live Load	150	plf
Uniform Dead Load	25	plf
Beam Self Weight	44	plf
Total Uniform Load	219	plf

POINT LOADS - CENTER SPAN	
Load Number	One
Live Load	0 lb
Dead Load	6700 lb
Location	18.67 ft

TRAPEZOIDAL LOADS - CENTER SPAN	
Load Number	One
Left Live Load	0 plf
Left Dead Load	0 plf
Right Live Load	150 plf
Right Dead Load	0 plf
Load Start	13.65 ft
Load End	20.33 ft
Load Length	6.68 ft

Project: S2900 - Stamford Harbor

Location: Beam 24-D'-E
Multi-Loaded Multi-Span Beam
[2003 International Building Code(AISC 13th Ed ASD)]
A572-50 W21x44 x 22.83 FT
Section Adequate By: 1007.0%
Controlling Factor: Moment

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DEFLECTIONS	Center	
Live Load	0.04	IN L/6853
Dead Load	0.04	in
Total Load	0.08	IN L/3238

Live Load Deflection Criteria: L/360 Total Load Deflection Criteria: L/240

REACTIONS	A		B	
Live Load	2164	lb	1761	lb
Dead Load	7378	lb	1308	lb
Total Load	9542	lb	3069	lb
Bearing Length	0.95	in	0.95	in

BEAM DATA	Center	
Span Length	22.83	ft
Unbraced Length-Top	0	ft
Unbraced Length-Bottom	22.83	ft

STEEL PROPERTIES
W21x44 - A572-50

Properties:

Yield Stress:	Fy =	50	ksi
Modulus of Elasticity:	E =	29000	ksi
Depth:	d =	20.7	in
Web Thickness:	tw =	0.35	in
Flange Width:	bf =	6.5	in
Flange Thickness:	tf =	0.45	in
Distance to Web Toe of Fillet:	k =	0.95	in
Moment of Inertia About X-X Axis:	Ix =	843	in4
Section Modulus About X-X Axis:	Sx =	81.6	in3
Plastic Section Modulus About X-X Axis:	Zx =	95.4	in3
Design Properties per AISC 13th Edition Steel Manual:			
Flange Buckling Ratio:	FBR =	7.22	
Allowable Flange Buckling Ratio:	AFBR =	9.15	
Web Buckling Ratio:	WBR =	53.71	
Allowable Web Buckling Ratio:	AWBR =	90.55	
Controlling Unbraced Length:	Lb =	0	ft
Limiting Unbraced Length - for lateral-torsional buckling:	Lp =	4.45	ft
Nominal Flexural Strength w/ safety factor:	Mn =	238024	ft-lb
Controlling Equation:	F2-1		
Web height to thickness ratio:	h/tw =	53.71	
Limiting height to thickness ratio for eqn. G2-2:	h/tw-limit =	53.95	
Cv Factor:	Cv =	1	
Controlling Equation:	G2-2		
Nominal Shear Strength w/ safety factor:	Vn =	144900	lb

Controlling Moment: 21501 ft-lb
8.9 Ft from left support of span 2 (Center Span)
Created by combining all dead loads and live loads on span(s) 2
Controlling Shear: 9542 lb
At left support of span 2 (Center Span)
Created by combining all dead loads and live loads on span(s

Comparisons with required sections:	Req'd	Provided
Moment of Inertia (deflection):	62.48 in4	843 in4
Moment:	21501 ft-lb	238024 ft-lb
Shear:	9542 lb	144900 lb

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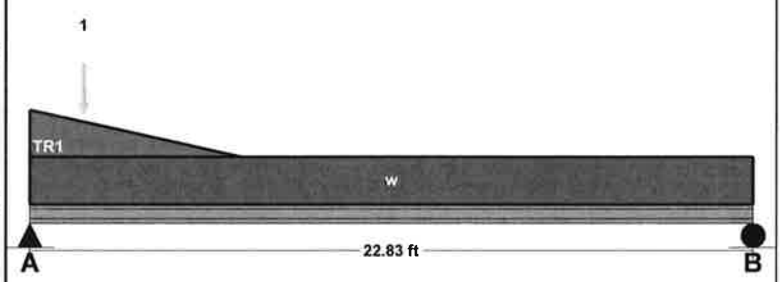

UNIFORM LOADS	Center	
Uniform Live Load	150	plf
Uniform Dead Load	25	plf
Beam Self Weight	44	plf
Total Uniform Load	219	plf

POINT LOADS - CENTER SPAN	
Load Number	One
Live Load	0 lb
Dead Load	7110 lb
Location	1.67 ft

TRAPEZOIDAL LOADS - CENTER SPAN	
Load Number	One
Left Live Load	150 plf
Left Dead Load	0 plf
Right Live Load	0 plf
Right Dead Load	0 plf
Load Start	0 ft
Load End	6.68 ft
Load Length	6.68 ft

Project: S2900 - Stamford Harbor

Location: Beam 25-C-C'
Multi-Loaded Multi-Span Beam
[2003 International Building Code(AISC 13th Ed ASD)]
A572-50 W21x44 x 20.33 FT
Section Adequate By: 1422.7%
Controlling Factor: Moment

DEFLECTIONS	Center	
Live Load	0.03	IN L/9557
Dead Load	0.02	in
Total Load	0.05	IN L/4998

Live Load Deflection Criteria: L/360 Total Load Deflection Criteria: L/240

REACTIONS	A		B	
Live Load	1580	lb	1971	lb
Dead Load	1037	lb	4476	lb
Total Load	2617	lb	6447	lb
Bearing Length	0.95	in	0.95	in

BEAM DATA	Center	
Span Length	20.33	ft
Unbraced Length-Top	0	ft
Unbraced Length-Bottom	20.33	ft

STEEL PROPERTIES
W21x44 - A572-50

Properties:

Yield Stress:	Fy =	50	ksi
Modulus of Elasticity:	E =	29000	ksi
Depth:	d =	20.7	in
Web Thickness:	tw =	0.35	in
Flange Width:	bf =	6.5	in
Flange Thickness:	tf =	0.45	in
Distance to Web Toe of Fillet:	k =	0.95	in
Moment of Inertia About X-X Axis:	Ix =	843	in4
Section Modulus About X-X Axis:	Sx =	81.6	in3
Plastic Section Modulus About X-X Axis:	Zx =	95.4	in3
Design Properties per AISC 13th Edition Steel Manual:			
Flange Buckling Ratio:	FBR =	7.22	
Allowable Flange Buckling Ratio:	AFBR =	9.15	
Web Buckling Ratio:	WBR =	53.71	
Allowable Web Buckling Ratio:	AWBR =	90.55	
Controlling Unbraced Length:	Lb =	0	ft
Limiting Unbraced Length - for lateral-torsional buckling:	Lp =	4.45	ft
Nominal Flexural Strength w/ safety factor:	Mn =	238024	ft-lb
Controlling Equation:	F2-1		
Web height to thickness ratio:	h/tw =	53.71	
Limiting height to thickness ratio for eqn. G2-2:	h/tw-limit =	53.95	
Cv Factor:	Cv =	1	
Controlling Equation:	G2-2		
Nominal Shear Strength w/ safety factor:	Vn =	144900	lb

Controlling Moment: 15631 ft-lb
11.99 Ft from left support of span 2 (Center Span)
Created by combining all dead loads and live loads on span(s) 2
Controlling Shear: -6447 lb
20.0 Ft from left support of span 2 (Center Span)
Created by combining all dead loads and live loads on span(s

Comparisons with required sections:	Req'd	Provided
Moment of Inertia (deflection):	40.48 in4	843 in4
Moment:	15631 ft-lb	238024 ft-lb
Shear:	-6447 lb	144900 lb

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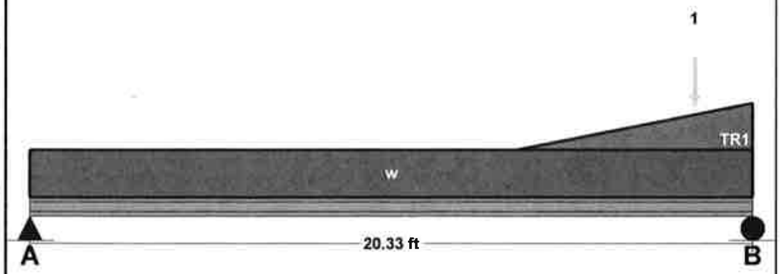

UNIFORM LOADS	Center	
Uniform Live Load	150	plf
Uniform Dead Load	25	plf
Beam Self Weight	44	plf
Total Uniform Load	219	plf

POINT LOADS - CENTER SPAN

Load Number	One
Live Load	0 lb
Dead Load	4110 lb
Location	18.67 ft

TRAPEZOIDAL LOADS - CENTER SPAN

Load Number	One
Left Live Load	0 plf
Left Dead Load	0 plf
Right Live Load	150 plf
Right Dead Load	0 plf
Load Start	13.65 ft
Load End	20.33 ft
Load Length	6.68 ft

Project: S2900 - Stamford Harbor

Location: Beam 25-D'-E
Multi-Loaded Multi-Span Beam
[2003 International Building Code(AISC 13th Ed ASD)]
A572-50 W21x44 x 22.83 FT
Section Adequate By: 1146.7%
Controlling Factor: Moment

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DEFLECTIONS	Center	
Live Load	0.04	IN L/6853
Dead Load	0.04	in
Total Load	0.08	IN L/3640

Live Load Deflection Criteria: L/360 Total Load Deflection Criteria: L/240

REACTIONS	A		B	
Live Load	2164	lb	1761	lb
Dead Load	5135	lb	1131	lb
Total Load	7299	lb	2892	lb
Bearing Length	0.95	in	0.95	in

BEAM DATA	Center	
Span Length	22.83	ft
Unbraced Length-Top	0	ft
Unbraced Length-Bottom	22.83	ft

STEEL PROPERTIES

W21x44 - A572-50

Properties:

Yield Stress:	Fy =	50	ksi
Modulus of Elasticity:	E =	29000	ksi
Depth:	d =	20.7	in
Web Thickness:	tw =	0.35	in
Flange Width:	bf =	6.5	in
Flange Thickness:	tf =	0.45	in
Distance to Web Toe of Fillet:	k =	0.95	in
Moment of Inertia About X-X Axis:	Ix =	843	in4
Section Modulus About X-X Axis:	Sx =	81.6	in3
Plastic Section Modulus About X-X Axis:	Zx =	95.4	in3

Design Properties per AISC 13th Edition Steel Manual:

Flange Buckling Ratio:	FBR =	7.22	
Allowable Flange Buckling Ratio:	AFBR =	9.15	
Web Buckling Ratio:	WBR =	53.71	
Allowable Web Buckling Ratio:	AWBR =	90.55	
Controlling Unbraced Length:	Lb =	0	ft
Limiting Unbraced Length - for lateral-torsional buckling:	Lp =	4.45	ft
Nominal Flexural Strength w/ safety factor:	Mn =	238024	ft-lb
Controlling Equation:	F2-1		
Web height to thickness ratio:	h/tw =	53.71	
Limiting height to thickness ratio for eqn. G2-2:	h/tw-limit =	53.95	
Cv Factor:	Cv =	1	
Controlling Equation:	G2-2		
Nominal Shear Strength w/ safety factor:	Vn =	144900	lb

Controlling Moment: 19093 ft-lb
9.59 Ft from left support of span 2 (Center Span)
Created by combining all dead loads and live loads on span(s) 2
Controlling Shear: 7299 lb
At left support of span 2 (Center Span)
Created by combining all dead loads and live loads on span(s

Comparisons with required sections:	Req'd	Provided
Moment of Inertia (deflection):	55.58 in4	843 in4
Moment:	19093 ft-lb	238024 ft-lb
Shear:	7299 lb	144900 lb

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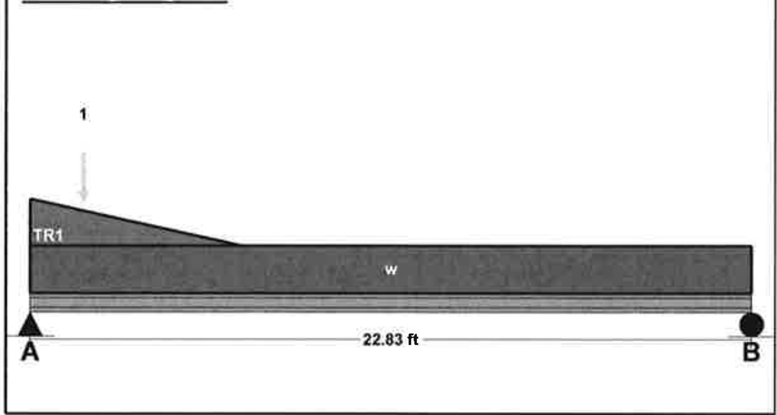

UNIFORM LOADS	Center	
Uniform Live Load	150	plf
Uniform Dead Load	25	plf
Beam Self Weight	44	plf
Total Uniform Load	219	plf

POINT LOADS - CENTER SPAN	
Load Number	One
Live Load	0 lb
Dead Load	4690 lb
Location	1.67 ft

TRAPEZOIDAL LOADS - CENTER SPAN	
Load Number	One
Left Live Load	150 plf
Left Dead Load	0 plf
Right Live Load	0 plf
Right Dead Load	0 plf
Load Start	0 ft
Load End	6.68 ft
Load Length	6.68 ft

Project: S2900 - Stamford Harbor

Location: Beam 26-D'-E
Multi-Loaded Multi-Span Beam
[2003 International Building Code(AISC 13th Ed ASD)]
A572-50 W21x44 x 22.83 FT
Section Adequate By: 215.4%
Controlling Factor: Moment

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DEFLECTIONS	Center	
Live Load	0.07	IN L/4031
Dead Load	0.22	in
Total Load	0.29	IN L/939

Live Load Deflection Criteria: L/360 Total Load Deflection Criteria: L/240

REACTIONS	A		B	
Live Load	3679	lb	2994	lb
Dead Load	12339	lb	9932	lb
Total Load	16019	lb	12926	lb
Bearing Length	0.95	in	0.95	in

BEAM DATA	Center	
Span Length	22.83	ft
Unbraced Length-Top	0	ft
Unbraced Length-Bottom	22.83	ft

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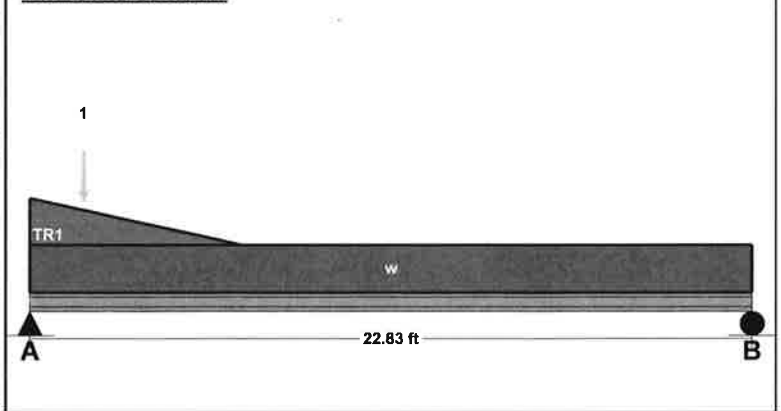

UNIFORM LOADS	Center	
Uniform Live Load	255	plf
Uniform Dead Load	808	plf
Beam Self Weight	44	plf
Total Uniform Load	1107	plf

POINT LOADS - CENTER SPAN	
Load Number	One
Live Load	0 lb
Dead Load	2820 lb
Location	1.67 ft

TRAPEZOIDAL LOADS - CENTER SPAN	
Load Number	One
Left Live Load	255 plf
Left Dead Load	0 plf
Right Live Load	0 plf
Right Dead Load	0 plf
Load Start	0 ft
Load End	6.68 ft
Load Length	6.68 ft

STEEL PROPERTIES
W21x44 - A572-50

Properties:			
Yield Stress:	Fy =	50	ksi
Modulus of Elasticity:	E =	29000	ksi
Depth:	d =	20.7	in
Web Thickness:	tw =	0.35	in
Flange Width:	bf =	6.5	in
Flange Thickness:	tf =	0.45	in
Distance to Web Toe of Fillet:	k =	0.95	in
Moment of Inertia About X-X Axis:	Ix =	843	in4
Section Modulus About X-X Axis:	Sx =	81.6	in3
Plastic Section Modulus About X-X Axis:	Zx =	95.4	in3
Design Properties per AISC 13th Edition Steel Manual:			
Flange Buckling Ratio:	FBR =	7.22	
Allowable Flange Buckling Ratio:	AFBR =	9.15	
Web Buckling Ratio:	WBR =	53.71	
Allowable Web Buckling Ratio:	AWBR =	90.55	
Controlling Unbraced Length:	Lb =	0	ft
Limiting Unbraced Length - for lateral-torsional buckling:	Lp =	4.45	ft
Nominal Flexural Strength w/ safety factor:	Mn =	238024	ft-lb
Controlling Equation:	F2-1		
Web height to thickness ratio:	h/tw =	53.71	
Limiting height to thickness ratio for eqn. G2-2:	h/tw-limit =	53.95	
Cv Factor:	Cv =	1	
Controlling Equation:	G2-2		
Nominal Shear Strength w/ safety factor:	Vn =	144900	lb

Controlling Moment: 75462 ft-lb
11.19 Ft from left support of span 2 (Center Span)
Created by combining all dead loads and live loads on span(s) 2
Controlling Shear: 16019 lb
At left support of span 2 (Center Span)
Created by combining all dead loads and live loads on span(s

Comparisons with required sections:	Req'd	Provided
Moment of Inertia (deflection):	215.43 in4	843 in4
Moment:	75462 ft-lb	238024 ft-lb
Shear:	16019 lb	144900 lb

Project: S2900 - Stamford Harbor

Location: Beam 26a-C-C'
Multi-Loaded Multi-Span Beam
[2003 International Building Code(AISC 13th Ed ASD)]
A572-50 W18x35 x 20.33 FT
Section Adequate By: 130.4%
Controlling Factor: Moment

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DEFLECTIONS	Center	
Live Load	0.08	IN L/2891
Dead Load	0.28	in
Total Load	0.37	IN L/665

Live Load Deflection Criteria: L/360 Total Load Deflection Criteria: L/240

REACTIONS	A		B	
Live Load	3159	lb	3942	lb
Dead Load	10446	lb	14889	lb
Total Load	13605	lb	18831	lb
Bearing Length	0.83	in	0.83	in

BEAM DATA	Center	
Span Length	20.33	ft
Unbraced Length-Top	0	ft
Unbraced Length-Bottom	20.33	ft

STEEL PROPERTIES
W18x35 - A572-50

Properties:
Yield Stress: Fy = 50 ksi
Modulus of Elasticity: E = 29000 ksi
Depth: d = 17.7 in
Web Thickness: tw = 0.3 in
Flange Width: bf = 6 in
Flange Thickness: tf = 0.43 in
Distance to Web Toe of Fillet: k = 0.83 in
Moment of Inertia About X-X Axis: Ix = 510 in4
Section Modulus About X-X Axis: Sx = 57.6 in3
Plastic Section Modulus About X-X Axis: Zx = 66.5 in3

Design Properties per AISC 13th Edition Steel Manual:
Flange Buckling Ratio: FBR = 7.06
Allowable Flange Buckling Ratio: AFBR = 9.15
Web Buckling Ratio: WBR = 53.49
Allowable Web Buckling Ratio: AWBR = 90.55
Controlling Unbraced Length: Lb = 0 ft
Limiting Unbraced Length -
for lateral-torsional buckling: Lp = 4.31 ft
Nominal Flexural Strength w/ safety factor: Mn = 165918 ft-lb
Controlling Equation: F2-1
Web height to thickness ratio: h/tw = 53.49
Limiting height to thickness ratio for eqn. G2-2: h/tw-limit = 53.95
Cv Factor: Cv = 1
Controlling Equation: G2-2
Nominal Shear Strength w/ safety factor: Vn = 106200 lb

Controlling Moment: 72025 ft-lb
10.57 Ft from left support of span 2 (Center Span)
Created by combining all dead loads and live loads on span(s) 2
Controlling Shear: -18831 lb
20.0 Ft from left support of span 2 (Center Span)
Created by combining all dead loads and live loads on span(s

Comparisons with required sections:	Req'd	Provided
Moment of Inertia (deflection):	184 in4	510 in4
Moment:	72025 ft-lb	165918 ft-lb
Shear:	-18831 lb	106200 lb

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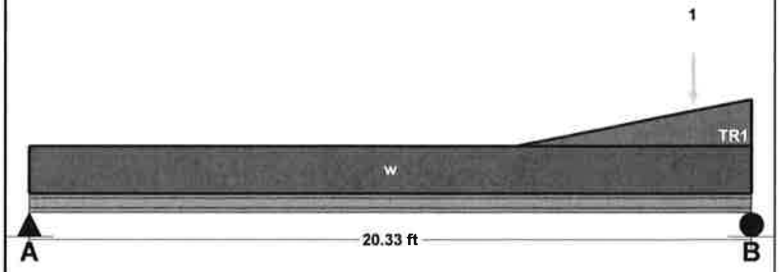

UNIFORM LOADS	Center	
Uniform Live Load	300	plf
Uniform Dead Load	950	plf
Beam Self Weight	35	plf
Total Uniform Load	1285	plf

POINT LOADS - CENTER SPAN

Load Number	One
Live Load	0 lb
Dead Load	5310 lb
Location	18.67 ft

TRAPEZOIDAL LOADS - CENTER SPAN

Load Number	One
Left Live Load	0 plf
Left Dead Load	0 plf
Right Live Load	300 plf
Right Dead Load	0 plf
Load Start	13.65 ft
Load End	20.33 ft
Load Length	6.68 ft

Project: S2900 - Stamford Harbor

Location: Beam 26a-D'-E
Multi-Loaded Multi-Span Beam
[2003 International Building Code(AISC 13th Ed ASD)]
A572-50 W18x35 x 22.83 FT
Section Adequate By: 85.9%
Controlling Factor: Moment

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DEFLECTIONS	Center	
Live Load	0.13	IN L/2073
Dead Load	0.44	in
Total Load	0.57	IN L/479

Live Load Deflection Criteria: L/360 Total Load Deflection Criteria: L/240

REACTIONS	A		B	
Live Load	4329	lb	3522	lb
Dead Load	16036	lb	11622	lb
Total Load	20364	lb	15144	lb
Bearing Length	0.83	in	0.83	in

BEAM DATA	Center	
Span Length	22.83	ft
Unbraced Length-Top	0	ft
Unbraced Length-Bottom	22.83	ft

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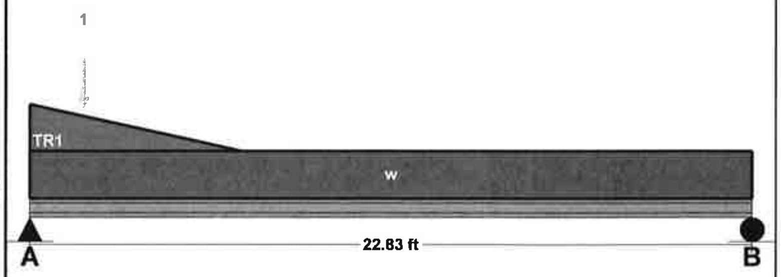

UNIFORM LOADS	Center	
Uniform Live Load	300	plf
Uniform Dead Load	950	plf
Beam Self Weight	35	plf
Total Uniform Load	1285	plf

POINT LOADS - CENTER SPAN	
Load Number	One
Live Load	0 lb
Dead Load	5170 lb
Location	1.67 ft

TRAPEZOIDAL LOADS - CENTER SPAN	
Load Number	One
Left Live Load	300 plf
Left Dead Load	0 plf
Right Live Load	0 plf
Right Dead Load	0 plf
Load Start	0 ft
Load End	6.68 ft
Load Length	6.68 ft

STEEL PROPERTIES

W18x35 - A572-50

Properties:			
Yield Stress:	Fy =	50	ksi
Modulus of Elasticity:	E =	29000	ksi
Depth:	d =	17.7	in
Web Thickness:	tw =	0.3	in
Flange Width:	bf =	6	in
Flange Thickness:	tf =	0.43	in
Distance to Web Toe of Fillet:	k =	0.83	in
Moment of Inertia About X-X Axis:	Ix =	510	in4
Section Modulus About X-X Axis:	Sx =	57.6	in3
Plastic Section Modulus About X-X Axis:	Zx =	66.5	in3
Design Properties per AISC 13th Edition Steel Manual:			
Flange Buckling Ratio:	FBR =	7.06	
Allowable Flange Buckling Ratio:	AFBR =	9.15	
Web Buckling Ratio:	WBR =	53.49	
Allowable Web Buckling Ratio:	AWBR =	90.55	
Controlling Unbraced Length:	Lb =	0	ft
Limiting Unbraced Length - for lateral-torsional buckling:	Lp =	4.31	ft
Nominal Flexural Strength w/ safety factor:	Mn =	165918	ft-lb
Controlling Equation:	F2-1		
Web height to thickness ratio:	h/tw =	53.49	
Limiting height to thickness ratio for eqn. G2-2:	h/tw-limit =	53.95	
Cv Factor:	Cv =	1	
Controlling Equation:	G2-2		
Nominal Shear Strength w/ safety factor:	Vn =	106200	lb

Controlling Moment: 89235 ft-lb
10.96 Ft from left support of span 2 (Center Span)
Created by combining all dead loads and live loads on span(s) 2
Controlling Shear: 20364 lb
At left support of span 2 (Center Span)
Created by combining all dead loads and live loads on span(s

Comparisons with required sections:	Req'd	Provided
Moment of Inertia (deflection):	255.47 in4	510 in4
Moment:	89235 ft-lb	165918 ft-lb
Shear:	20364 lb	106200 lb

Project: S2900 - Stamford Harbor

Location: Beam C'-26-27
Multi-Loaded Multi-Span Beam
[2003 International Building Code(AISC 13th Ed ASD)]
A572-50 W21x132 x 30.0 FT
Section Adequate By: 81.4%
Controlling Factor: Moment

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DEFLECTIONS	Center	
Live Load	0.27	IN L/1311
Dead Load	0.52	in
Total Load	0.79	IN L/453

Live Load Deflection Criteria: L/360 Total Load Deflection Criteria: L/240

REACTIONS	A		B	
Live Load	20716	lb	24915	lb
Dead Load	37732	lb	38227	lb
Total Load	58448	lb	63143	lb
Bearing Length	1.54	in	1.54	in

BEAM DATA	Center	
Span Length	30	ft
Unbraced Length-Top	0	ft
Unbraced Length-Bottom	30	ft

STEEL PROPERTIES
W21x132 - A572-50

Properties:

Yield Stress:	Fy =	50	ksi
Modulus of Elasticity:	E =	29000	ksi
Depth:	d =	21.8	in
Web Thickness:	tw =	0.65	in
Flange Width:	bf =	12.4	in
Flange Thickness:	tf =	1.04	in
Distance to Web Toe of Fillet:	k =	1.54	in
Moment of Inertia About X-X Axis:	Ix =	3220	in4
Section Modulus About X-X Axis:	Sx =	295	in3
Plastic Section Modulus About X-X Axis:	Zx =	333	in3

Design Properties per AISC 13th Edition Steel Manual:

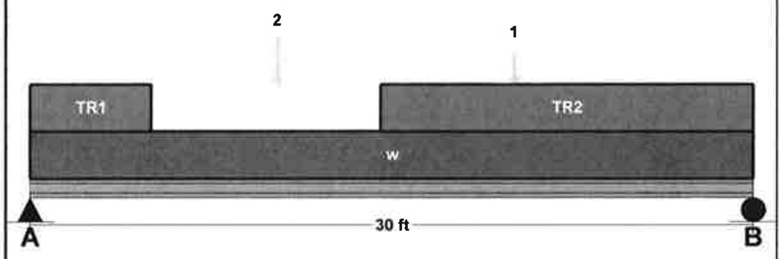
Flange Buckling Ratio:	FBR =	5.96	
Allowable Flange Buckling Ratio:	AFBR =	9.15	
Web Buckling Ratio:	WBR =	28.8	
Allowable Web Buckling Ratio:	AWBR =	90.55	
Controlling Unbraced Length:	Lb =	0	ft
Limiting Unbraced Length - for lateral-torsional buckling:	Lp =	10.35	ft
Nominal Flexural Strength w/ safety factor:	Mn =	830838	ft-lb
Controlling Equation:	F2-1		
Web height to thickness ratio:	h/tw =	28.8	
Limiting height to thickness ratio for eqn. G2-2:	h/tw-limit =	53.95	
Cv Factor:	Cv =	1	
Controlling Equation:	G2-2		
Nominal Shear Strength w/ safety factor:	Vn =	283400	lb

Controlling Moment: 457965 ft-lb
15.9 Ft from left support of span 2 (Center Span)
Created by combining all dead loads and live loads on span(s) 2

Controlling Shear: -63143 lb
At right support of span 2 (Center Span)
Created by combining all dead loads and live loads on span(s

Comparisons with required sections:	Req'd	Provided
Moment of Inertia (deflection):	1704.66 in4	3220 in4
Moment:	457965 ft-lb	830838 ft-lb
Shear:	-63143 lb	283400 lb

LOADING DIAGRAM



UNIFORM LOADS	Center	
Uniform Live Load	658	plf
Uniform Dead Load	1689	plf
Beam Self Weight	132	plf
Total Uniform Load	2479	plf

POINT LOADS - CENTER SPAN

Load Number	One	Two
Live Load	0 lb	0 lb
Dead Load	5310 lb	8065 lb
Location	20 ft	10.23 ft

TRAPEZOIDAL LOADS - CENTER SPAN

Load Number	One	Two
Left Live Load	1263 plf	1263 plf
Left Dead Load	388 plf	388 plf
Right Live Load	1263 plf	1263 plf
Right Dead Load	388 plf	388 plf
Load Start	0 ft	14.5 ft
Load End	5 ft	30 ft
Load Length	5 ft	15.5 ft

Project: S2900 - Stamford Harbor

Location: Beam D'-26-27
Multi-Loaded Multi-Span Beam
[2003 International Building Code(AISC 13th Ed ASD)]
A572-50 W21x132 x 30.0 FT
Section Adequate By: 98.0%
Controlling Factor: Moment

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DEFLECTIONS	Center	
Live Load	0.27	IN L/1311
Dead Load	0.45	in
Total Load	0.72	IN L/500

Live Load Deflection Criteria: L/360 Total Load Deflection Criteria: L/240

REACTIONS	A		B	
Live Load	20716	lb	24915	lb
Dead Load	32370	lb	35384	lb
Total Load	53086	lb	60299	lb
Bearing Length	1.54	in	1.54	in

BEAM DATA	Center	
Span Length	30	ft
Unbraced Length-Top	0	ft
Unbraced Length-Bottom	30	ft

STEEL PROPERTIES

W21x132 - A572-50

Properties:

Yield Stress:	Fy =	50	ksi
Modulus of Elasticity:	E =	29000	ksi
Depth:	d =	21.8	in
Web Thickness:	tw =	0.65	in
Flange Width:	bf =	12.4	in
Flange Thickness:	tf =	1.04	in
Distance to Web Toe of Fillet:	k =	1.54	in
Moment of Inertia About X-X Axis:	Ix =	3220	in4
Section Modulus About X-X Axis:	Sx =	295	in3
Plastic Section Modulus About X-X Axis:	Zx =	333	in3
Design Properties per AISC 13th Edition Steel Manual:			
Flange Buckling Ratio:	FBR =	5.96	
Allowable Flange Buckling Ratio:	AFBR =	9.15	
Web Buckling Ratio:	WBR =	28.8	
Allowable Web Buckling Ratio:	AWBR =	90.55	
Controlling Unbraced Length:	Lb =	0	ft
Limiting Unbraced Length - for lateral-torsional buckling:	Lp =	10.35	ft
Nominal Flexural Strength w/ safety factor:	Mn =	830838	ft-lb
Controlling Equation:	F2-1		
Web height to thickness ratio:	h/tw =	28.8	
Limiting height to thickness ratio for eqn. G2-2:	h/tw-limit =	53.95	
Cv Factor:	Cv =	1	
Controlling Equation:	G2-2		
Nominal Shear Strength w/ safety factor:	Vn =	283400	lb

Controlling Moment: 419567 ft-lb
16.8 Ft from left support of span 2 (Center Span)
Created by combining all dead loads and live loads on span(s) 2
Controlling Shear: -60299 lb
At right support of span 2 (Center Span)
Created by combining all dead loads and live loads on span(s

Comparisons with required sections:	Req'd	Provided
Moment of Inertia (deflection):	1546.96 in4	3220 in4
Moment:	419567 ft-lb	830838 ft-lb
Shear:	-60299 lb	283400 lb

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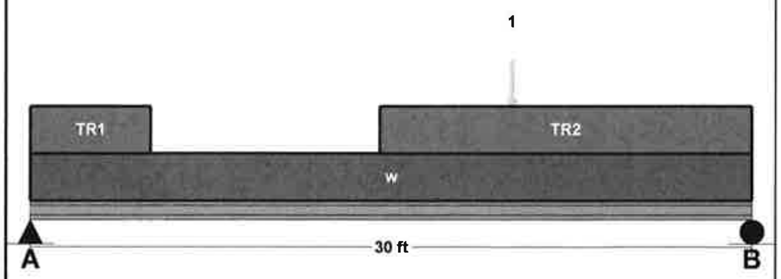

UNIFORM LOADS	Center	
Uniform Live Load	658	plf
Uniform Dead Load	1689	plf
Beam Self Weight	132	plf
Total Uniform Load	2479	plf

POINT LOADS - CENTER SPAN	
Load Number	One
Live Load	0 lb
Dead Load	5170 lb
Location	20 ft

TRAPEZOIDAL LOADS - CENTER SPAN		
Load Number	One	Two
Left Live Load	1263 plf	1263 plf
Left Dead Load	388 plf	388 plf
Right Live Load	1263 plf	1263 plf
Right Dead Load	388 plf	388 plf
Load Start	0 ft	14.5 ft
Load End	5 ft	30 ft
Load Length	5 ft	15.5 ft

Project: S2900 - Stamford Harbor

Location: Beam 27-C-D
Multi-Loaded Multi-Span Beam
[2003 International Building Code(AISC 13th Ed ASD)
A572-50 W18x106 x 30.0 FT
Section Adequate By: 9.0%
Controlling Factor: Moment

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DEFLECTIONS	Center	
Live Load	0.50	IN L/727
Dead Load	0.81	in
Total Load	1.30	IN L/276

Live Load Deflection Criteria: L/360 Total Load Deflection Criteria: L/240

REACTIONS	A		B	
Live Load	12915	lb	25779	lb
Dead Load	25390	lb	35213	lb
Total Load	38305	lb	60991	lb
Bearing Length	1.34	in	1.34	in

BEAM DATA	Center	
Span Length	30	ft
Unbraced Length-Top	0	ft
Unbraced Length-Bottom	30	ft

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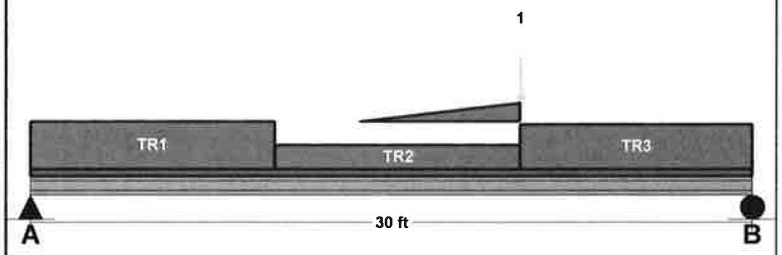

UNIFORM LOADS	Center	
Uniform Live Load	0	plf
Uniform Dead Load	0	plf
Beam Self Weight	106	plf
Total Uniform Load	106	plf

POINT LOADS - CENTER SPAN

Load Number	One	Two
Live Load	24915 lb	0 lb
Dead Load	38227 lb	2000 lb
Location	20.33 ft	20.33 ft

TRAPEZOIDAL LOADS - CENTER SPAN

Load Number	One	Two	Three	Four
Left Live Load	300 plf	150 plf	900 plf	0 plf
Left Dead Load	950 plf	475 plf	280 plf	0 plf
Right Live Load	300 plf	150 plf	900 plf	150 plf
Right Dead Load	950 plf	475 plf	280 plf	0 plf
Load Start	0 ft	10.17 ft	20.33 ft	13.65 ft
Load End	10.17 ft	20.33 ft	30 ft	20.33 ft
Load Length	10.17 ft	10.16 ft	9.67 ft	6.68 ft

STEEL PROPERTIES

W18x106 - A572-50

Properties:

Yield Stress:	Fy =	50	ksi
Modulus of Elasticity:	E =	29000	ksi
Depth:	d =	18.7	in
Web Thickness:	tw =	0.59	in
Flange Width:	bf =	11.2	in
Flange Thickness:	tf =	0.94	in
Distance to Web Toe of Fillet:	k =	1.34	in
Moment of Inertia About X-X Axis:	Ix =	1910	in4
Section Modulus About X-X Axis:	Sx =	204	in3
Plastic Section Modulus About X-X Axis:	Zx =	230	in3
Design Properties per AISC 13th Edition Steel Manual:			
Flange Buckling Ratio:	FBR =	5.96	
Allowable Flange Buckling Ratio:	AFBR =	9.15	
Web Buckling Ratio:	WBR =	27.15	
Allowable Web Buckling Ratio:	AWBR =	90.55	
Controlling Unbraced Length:	Lb =	0	ft
Limiting Unbraced Length - for lateral-torsional buckling:	Lp =	9.4	ft
Nominal Flexural Strength w/ safety factor:	Mn =	573852	ft-lb
Controlling Equation:	F2-1		
Web height to thickness ratio:	h/tw =	27.15	
Limiting height to thickness ratio for eqn. G2-2:	h/tw-limit =	53.95	
Cv Factor:	Cv =	1	
Controlling Equation:	G2-2		
Nominal Shear Strength w/ safety factor:	Vn =	220660	lb

Controlling Moment: 526253 ft-lb
20.4 Ft from left support of span 2 (Center Span)
Created by combining all dead loads and live loads on span(s) 2
Controlling Shear: -60991 lb
At right support of span 2 (Center Span)
Created by combining all dead loads and live loads on span(s

Comparisons with required sections:	Req'd	Provided
Moment of Inertia (deflection):	1658.92 in4	1910 in4
Moment:	526253 ft-lb	573852 ft-lb
Shear:	-60991 lb	220660 lb

NOTES

Point Load 1: Reaction from Beam C'-26-27

Point Load 2: Penthouse Wall (8 ft tall section) (8 ft * 50 psf * 5 ft = 2000 lbs)

Project: S2900 - Stamford Harbor

Location: Beam 27-D-E
Multi-Loaded Multi-Span Beam
[2003 International Building Code(AISC 13th Ed ASD)]
A572-50 W18x106 x 30.0 FT
Section Adequate By: 35.8%
Controlling Factor: Moment

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DEFLECTIONS	Center	
Live Load	0.40	IN L/904
Dead Load	0.67	in
Total Load	1.07	IN L/337

Live Load Deflection Criteria: L/360 Total Load Deflection Criteria: L/240

REACTIONS	A		B	
Live Load	26615	lb	10391	lb
Dead Load	36966	lb	21875	lb
Total Load	63581	lb	32266	lb
Bearing Length	1.34	in	1.34	in

BEAM DATA	Center	
Span Length	30	ft
Unbraced Length-Top	0	ft
Unbraced Length-Bottom	30	ft

STEEL PROPERTIES
W18x106 - A572-50

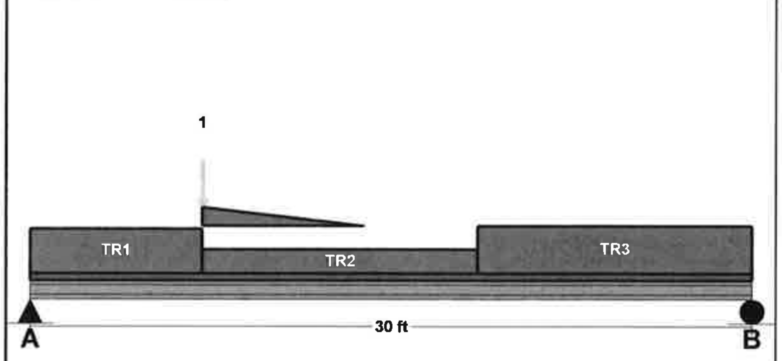
Properties:

Yield Stress:	Fy =	50	ksi
Modulus of Elasticity:	E =	29000	ksi
Depth:	d =	18.7	in
Web Thickness:	tw =	0.59	in
Flange Width:	bf =	11.2	in
Flange Thickness:	tf =	0.94	in
Distance to Web Toe of Fillet:	k =	1.34	in
Moment of Inertia About X-X Axis:	Ix =	1910	in4
Section Modulus About X-X Axis:	Sx =	204	in3
Plastic Section Modulus About X-X Axis:	Zx =	230	in3
Design Properties per AISC 13th Edition Steel Manual:			
Flange Buckling Ratio:	FBR =	5.96	
Allowable Flange Buckling Ratio:	AFBR =	9.15	
Web Buckling Ratio:	WBR =	27.15	
Allowable Web Buckling Ratio:	AWBR =	90.55	
Controlling Unbraced Length:	Lb =	0	ft
Limiting Unbraced Length - for lateral-torsional buckling:	Lp =	9.4	ft
Nominal Flexural Strength w/ safety factor:	Mn =	573852	ft-lb
Controlling Equation:	F2-1		
Web height to thickness ratio:	h/tw =	27.15	
Limiting height to thickness ratio for eqn. G2-2:	h/tw-limit =	53.95	
Cv Factor:	Cv =	1	
Controlling Equation:	G2-2		
Nominal Shear Strength w/ safety factor:	Vn =	220660	lb

Controlling Moment: 422580 ft-lb
7.2 Ft from left support of span 2 (Center Span)
Created by combining all dead loads and live loads on span(s) 2
Controlling Shear: 63581 lb
At left support of span 2 (Center Span)
Created by combining all dead loads and live loads on span(s

Comparisons with required sections:	Req'd	Provided
Moment of Inertia (deflection):	1360.1 in4	1910 in4
Moment:	422580 ft-lb	573852 ft-lb
Shear:	63581 lb	220660 lb

LOADING DIAGRAM



UNIFORM LOADS	Center	
Uniform Live Load	0	plf
Uniform Dead Load	0	plf
Beam Self Weight	106	plf
Total Uniform Load	106	plf

POINT LOADS - CENTER SPAN

Load Number	One	Two
Live Load	24915 lb	0 lb
Dead Load	35384 lb	2000 lb
Location	7.17 ft	7.17 ft

TRAPEZOIDAL LOADS - CENTER SPAN

Load Number	One	Two	Three	Four
Left Live Load	900 plf	150 plf	300 plf	150 plf
Left Dead Load	280 plf	475 plf	950 plf	0 plf
Right Live Load	900 plf	150 plf	300 plf	0 plf
Right Dead Load	280 plf	475 plf	950 plf	0 plf
Load Start	0 ft	7.17 ft	18.58 ft	7.17 ft
Load End	7.17 ft	18.58 ft	30 ft	13.85 ft
Load Length	7.17 ft	11.41 ft	11.42 ft	6.68 ft

NOTES

Point Load 1: Reaction from Beam D'-26-27

Point Load 2: Penthouse Wall (8 ft tall section)(8 ft * 50 psf * 5 ft = 2000 lbs)

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Column Calculations

Date: 11-25-14
Project Name: Stamford Harbor
Project Number: S2900
Designed By: GH Checked By: MSC

Hudson Design Group LLC

COLUMN ANALYSIS

Column C'24 (W12x72):

Tributary Area = (30'/2 + 30'/2) * (20.33'/2 + 16.83'/2) = 557.4 ft^2

Live Loads:

Snow =	30 psf	x	557.4 ft^2	=	16722 lbs
Penthouse Floor =	150 psf	x	127 ft^2	=	19050 lbs
				Total =	**35772 lbs**

Dead Loads:

Roof (Type 0) =	5 psf	x	430.4 ft^2	=	2152 lbs
Roof (Type 2) =	85 psf	x	127 ft^2	=	10795 lbs
Penthouse Roof =	10 psf	x	127 ft^2	=	1270 lbs
Penthouse Walls =	575 plf	x	23.4 ft	=	13455 lbs
Misc. =	5 psf	x	557.4 ft^2	=	2787 lbs
Reaction From Proposed Antennas Frame =					6700 lbs
				Total =	**37159 lbs**

Column D'24 (W12x72):

Tributary Area = (30'/2 + 30'/2) * (22.83'/2 + 16.83'/2) = 594.9 ft^2

Live Loads:

Snow =	30 psf	x	594.9 ft^2	=	17847 lbs
Penthouse Floor =	150 psf	x	127 ft^2	=	19050 lbs
				Total =	**36897 lbs**

Dead Loads:

Roof (Type 0) =	5 psf	x	467.9 ft^2	=	2339.5 lbs
Roof (Type 2) =	85 psf	x	127 ft^2	=	10795 lbs
Penthouse Roof =	10 psf	x	127 ft^2	=	1270 lbs
Penthouse Walls =	575 plf	x	23.4 ft	=	13455 lbs
Misc. =	5 psf	x	594.9 ft^2	=	2974.5 lbs
Reaction From Proposed Antennas Frame =					7110 lbs
				Total =	**37944 lbs**

Date: 11-25-14
Project Name: Stamford Harbor
Project Number: S2900
Designed By: GH Checked By: MSC

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COLUMN ANALYSIS (Cont.)

Column C'25 (W12x65):

Tributary Area = (30'/2 + 30'/2) * (20.33'/2 + 16.83'/2) = 557.4 ft^2

Live Loads:					
Snow =	30 psf	x	557.4 ft^2	=	16722 lbs
Penthouse Floor =	150 psf	x	252.5 ft^2	=	37875 lbs
			Total =		**54597 lbs**
Dead Loads:					
Roof (Type 0) =	5 psf	x	304.9 ft^2	=	1524.5 lbs
Roof (Type 2) =	85 psf	x	252.5 ft^2	=	21462.5 lbs
Penthouse Roof =	10 psf	x	252.5 ft^2	=	2525 lbs
Penthouse Walls =	575 plf	x	30 ft	=	17250 lbs
Misc. =	5 psf	x	557.4 ft^2	=	2787 lbs
Reaction From Proposed Antennas Frame =					4110 lbs
			Total =		**49659 lbs**

Column D'25 (W12x65):

Tributary Area = (30'/2 + 30'/2) * (22.83'/2 + 16.83'/2) = 594.9 ft^2

Live Loads:					
Snow =	30 psf	x	594.9 ft^2	=	17847 lbs
Penthouse Floor =	150 psf	x	252.5 ft^2	=	37875 lbs
			Total =		**55722 lbs**
Dead Loads:					
Roof (Type 0) =	5 psf	x	342.4 ft^2	=	1712 lbs
Roof (Type 2) =	85 psf	x	252.5 ft^2	=	21462.5 lbs
Penthouse Roof =	10 psf	x	252.5 ft^2	=	2525 lbs
Penthouse Walls =	575 plf	x	30 ft	=	17250 lbs
Misc. =	5 psf	x	594.9 ft^2	=	2974.5 lbs
Reaction From Proposed Cooling Tower =					5050 lbs
Reaction From Proposed Antennas Frame =					4690 lbs
			Total =		**55664 lbs**

Date: 11-25-14
Project Name: Stamford Harbor
Project Number: S2900
Designed By: GH Checked By: MSC

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COLUMN ANALYSIS (Cont.)

Column C'26 (W10x60):

Tributary Area = (30'/2 + 30'/2) * (20.33'/2 + 16.83'/2) = 557.4 ft^2

Live Loads:					
Snow =	30 psf	x	557.4 ft^2	=	16722 lbs
Penthouse Floor =	150 psf	x	252.5 ft^2	=	37875 lbs
			Total =		**54597 lbs**
Dead Loads:					
Roof (Type 3) =	95 psf	x	304.9 ft^2	=	28965.5 lbs
Roof (Type 1) =	46 psf	x	252.5 ft^2	=	11615 lbs
Penthouse Roof =	10 psf	x	252.5 ft^2	=	2525 lbs
Penthouse Walls =	575 plf	x	30 ft	=	17250 lbs
Misc. =	5 psf	x	557.4 ft^2	=	2787 lbs
Reaction From Proposed Equipment Frame =					12714 lbs
Reaction From Proposed Equipment Frame =					8060 lbs
			Total =		**83917 lbs**

Column D'26 (W10x60):

Tributary Area = (30'/2 + 30'/2) * (22.83'/2 + 16.83'/2) = 594.9 ft^2

Live Loads:					
Snow =	30 psf	x	594.9 ft^2	=	17847 lbs
Penthouse Floor =	150 psf	x	252.5 ft^2	=	37875 lbs
			Total =		**55722 lbs**
Dead Loads:					
Roof (Type 3) =	95 psf	x	342.4 ft^2	=	32528 lbs
Roof (Type 1) =	46 psf	x	252.5 ft^2	=	11615 lbs
Penthouse Roof =	10 psf	x	252.5 ft^2	=	2525 lbs
Penthouse Walls =	575 plf	x	30 ft	=	17250 lbs
Misc. =	5 psf	x	594.9 ft^2	=	2974.5 lbs
Reaction From Proposed Cooling Tower =					5050 lbs
Reaction From Proposed Antennas Frame =					2820 lbs
			Total =		**74763 lbs**

Date: 11-25-14
Project Name: Stamford Harbor
Project Number: S2900
Designed By: GH Checked By: MSC

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COLUMN ANALYSIS (Cont.)

Column C26 (W12x79):

Tributary Area = (30'/2 + 30'/2) * (20.33'/2 + 30'/2) = 755 ft^2

Live Loads:

Snow =	30 psf	x	755 ft^2	=	22650 lbs
			Total =		**22650 lbs**

Dead Loads:

Roof (Type 3) =	95 psf	x	305 ft^2	=	28975 lbs
Roof (Type 0) =	46 psf	x	450 ft^2	=	20700 lbs
Misc. =	5 psf	x	755 ft^2	=	3775 lbs
Reaction From Proposed Equipment Frame =					24000 lbs
			Total =		**77450 lbs**

Column C27 (W12x96):

Tributary Area = (30'/2 + 30'/2) * (20.33'/2 + 30'/2) = 900 ft^2

Live Loads:

Snow =	30 psf	x	900 ft^2	=	27000 lbs
			Total =		**27000 lbs**

Dead Loads:

Roof (Type 3) =	95 psf	x	450 ft^2	=	42750 lbs
Roof (Type 0) =	46 psf	x	450 ft^2	=	20700 lbs
Misc. =	5 psf	x	900 ft^2	=	4500 lbs
Reaction From Proposed Equipment Frame =					12800 lbs
			Total =		**80750 lbs**

Date: 11-04-14
Project Name: Stamford Harbor
Project Number: S2900
Designed By: GH Checked By: MSC

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COLUMN ANALYSIS (Cont.)

Column D27 (W10x68):

Tributary Area = (30'/2 + 30'/2) * (20.33'/2 + 16.83'/2) = 900 ft^2

Live Loads:

Snow =	30 psf	x	900 ft^2	=	27000 lbs
Penthouse Floor =	150 psf	x	505 ft^2	=	75750 lbs
				Total =	**102750 lbs**

Dead Loads:

Roof (Type 1) =	46 psf	x	505 ft^2	=	23230 lbs
Roof (Type 3) =	95 psf	x	395 ft^2	=	37525 lbs
Penthouse Roof =	10 psf	x	505 ft^2	=	5050 lbs
Penthouse Walls =	575 plf	x	60 ft	=	34500 lbs
Misc. =	5 psf	x	900 ft^2	=	4500 lbs
Reaction From Proposed Antenna Frame =	5310 lb + 5170 lb			=	10480 lbs
				Total =	**115285 lbs**

Project: S2900 - Stamford Harbor

Location: Column C'24
Column
[2003 International Building Code(AISC 13th Ed ASD)]
A572-50 W12x72 x 12.1 FT
Section Adequate By: 77.2%

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VERTICAL REACTIONS

Live Load:	Vert-LL-Rxn =	35772	lb
Dead Load:	Vert-DL-Rxn =	38030	lb
Total Load:	Vert-TL-Rxn =	73802	lb

COLUMN DATA

Total Column Length:	12.1	ft
Unbraced Length (X-Axis) Lx:	12.1	ft
Unbraced Length (Y-Axis) Ly:	12.1	ft
Column End Condtion-K (e):	2	
Column Bending Coefficient	1	

COLUMN PROPERTIES

W12x72 - W Shapes

Yield Stress:	Fy =	50 ksi		
Modulus of Elasticity:	E =	29 ksi		
Depth:	d =	12.3 in		
Web Thickness:	tw =	0.43 in		
Flange Width:	bf =	12 in		
Flange Thickness:	tf =	0.67 in		
Distance to Web Toe of Fillet:	k =	1.27 in		
Moment of Inertia (deflection):	Ix =	597 in4	Iy =	195 in4
Section Modulus:	Sx =	97.4 in3	Sy =	32.4 in3
Plastic Section Modulus:	Zx =	108 in3	Zy =	49.2 in3
Rad. of Gyration:	rx =	5.31 in	ry =	3.04 in

Column Compression Calculations:

KL/r Ratio: KLx/rx = 54.69 KLy/ry = 95.53

Controlling Direction for Compr. Calcs: (Y-Y Axis)

Flexural Buckling Stress: Fcr = 25.66 ksi

Controlling Equation F2-2

Nominal Compressive Strength: Pc = 324 kip

Combined Stress Calculations:

H1-1a Controls : 0.23

Controlling Combined Stress Factor: 0.23

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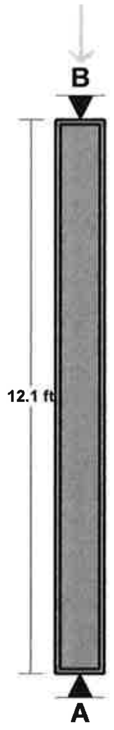

AXIAL LOADING

Live Load:	PL =	35772 lb
Dead Load:	PD =	37159 lb
Column Self Weight:	CSW =	871 lb
Total Load:	PT =	73802 lb

Project: S2900 - Stamford Harbor

Location: Column D'24
Column
[2003 International Building Code(AISC 13th Ed ASD)]
A572-50 W12x65 x 12.1 FT
Section Adequate By: 74.0%

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VERTICAL REACTIONS

Live Load:	Vert-LL-Rxn =	36897	lb
Dead Load:	Vert-DL-Rxn =	38731	lb
Total Load:	Vert-TL-Rxn =	75628	lb

COLUMN DATA

Total Column Length:	12.1	ft
Unbraced Length (X-Axis) Lx:	12.1	ft
Unbraced Length (Y-Axis) Ly:	12.1	ft
Column End Condtion-K (e):	2	
Column Bending Coefficient	1	

COLUMN PROPERTIES

W12x65 - W Shapes

Yield Stress:	Fy =	50 ksi		
Modulus of Elasticity:	E =	29 ksi		
Depth:	d =	12.1 in		
Web Thickness:	tw =	0.39 in		
Flange Width:	bf =	12 in		
Flange Thickness:	tf =	0.61 in		
Distance to Web Toe of Fillet:	k =	1.2 in		
Moment of Inertia (deflection):	Ix =	533 in4	Iy =	174 in4
Section Modulus:	Sx =	87.9 in3	Sy =	29.1 in3
Plastic Section Modulus:	Zx =	96.8 in3	Zy =	44.1 in3
Rad. of Gyration:	rx =	5.28 in	ry =	3.02 in

Column Compression Calculations:

KL/r Ratio: KLx/rx = 55 KLy/ry = 96.16
Controlling Direction for Compr. Calcs: (Y-Y Axis)
Flexural Buckling Stress: Fcr = 25.43 ksi
Controlling Equation F2-2
Nominal Compressive Strength: Pc = 291 kip

Combined Stress Calculations:

H1-1a Controls : 0.26

Controlling Combined Stress Factor: 0.26

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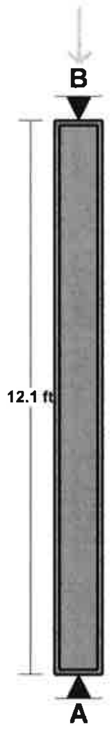

AXIAL LOADING

Live Load:	PL =	36897	lb
Dead Load:	PD =	37944	lb
Column Self Weight:	CSW =	787	lb
Total Load:	PT =	75628	lb

Project: S2900 - Stamford Harbor

Location: Column C'25
Column
[2003 International Building Code(AISC 13th Ed ASD)]
A572-50 W12x65 x 12.1 FT
Section Adequate By: 63.9%

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VERTICAL REACTIONS

Live Load:	Vert-LL-Rxn =	54597	lb
Dead Load:	Vert-DL-Rxn =	50446	lb
Total Load:	Vert-TL-Rxn =	105043	lb

COLUMN DATA

Total Column Length:	12.1	ft
Unbraced Length (X-Axis) Lx:	12.1	ft
Unbraced Length (Y-Axis) Ly:	12.1	ft
Column End Condtion-K (e):	2	
Column Bending Coefficient	1	

COLUMN PROPERTIES

W12x65 - W Shapes

Yield Stress:	Fy =	50 ksi		
Modulus of Elasticity:	E =	29 ksi		
Depth:	d =	12.1 in		
Web Thickness:	tw =	0.39 in		
Flange Width:	bf =	12 in		
Flange Thickness:	tf =	0.61 in		
Distance to Web Toe of Fillet:	k =	1.2 in		
Moment of Inertia (deflection):	Ix =	533 in4	Iy =	174 in4
Section Modulus:	Sx =	87.9 in3	Sy =	29.1 in3
Plastic Section Modulus:	Zx =	96.8 in3	Zy =	44.1 in3
Rad. of Gyration:	rx =	5.28 in	ry =	3.02 in

Column Compression Calculations:

KL/r Ratio: KLx/rx = 55 KLy/ry = 96.16

Controlling Direction for Compr. Calcs: (Y-Y Axis)

Flexural Buckling Stress: Fcr = 25.43 ksi

Controlling Equation F2-2

Nominal Compressive Strength: Pc = 291 kip

Combined Stress Calculations:

H1-1a Controls : 0.36

Controlling Combined Stress Factor: 0.36

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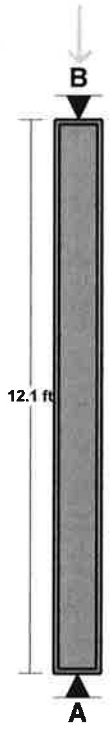

AXIAL LOADING

Live Load:	PL =	54597	lb
Dead Load:	PD =	49659	lb
Column Self Weight:	CSW =	787	lb
Total Load:	PT =	105043	lb

Project: S2900 - Stamford Harbor

Location: Column D'25
Column
[2003 International Building Code(AISC 13th Ed ASD)]
A572-50 W12x65 x 12.1 FT
Section Adequate By: 61.4%

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VERTICAL REACTIONS

Live Load:	Vert-LL-Rxn =	55722	lb
Dead Load:	Vert-DL-Rxn =	56451	lb
Total Load:	Vert-TL-Rxn =	112173	lb

COLUMN DATA

Total Column Length:	12.1	ft
Unbraced Length (X-Axis) Lx:	12.1	ft
Unbraced Length (Y-Axis) Ly:	12.1	ft
Column End Condtion-K (e):	2	
Column Bending Coefficient	1	

COLUMN PROPERTIES

W12x65 - W Shapes

Yield Stress:	Fy =	50	ksi			
Modulus of Elasticity:	E =	29	ksi			
Depth:	d =	12.1	in			
Web Thickness:	tw =	0.39	in			
Flange Width:	bf =	12	in			
Flange Thickness:	tf =	0.61	in			
Distance to Web Toe of Fillet:	k =	1.2	in			
Moment of Inertia (deflection):	Ix =	533	in4	Iy =	174	in4
Section Modulus:	Sx =	87.9	in3	Sy =	29.1	in3
Plastic Section Modulus:	Zx =	96.8	in3	Zy =	44.1	in3
Rad. of Gyration:	rx =	5.28	in	ry =	3.02	in

Column Compression Calculations:

KL/r Ratio: KLx/rx = 55 KLy/ry = 96.16

Controlling Direction for Compr. Calcs: (Y-Y Axis)

Flexural Buckling Stress: Fcr = 25.43 ksi

Controlling Equation F2-2

Nominal Compressive Strength: Pc = 291 kip

Combined Stress Calculations:

H1-1a Controls : 0.39

Controlling Combined Stress Factor: 0.39

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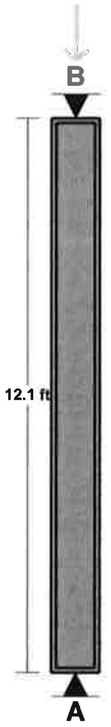

AXIAL LOADING

Live Load:	PL =	55722	lb
Dead Load:	PD =	55664	lb
Column Self Weight:	CSW =	787	lb
Total Load:	PT =	112173	lb

Project: S2900 - Stamford Harbor

Location: Column C'26
Column
[2003 International Building Code(AISC 13th Ed ASD)]
A572-50 W10x60 x 12.1 FT
Section Adequate By: 32.8%

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VERTICAL REACTIONS

Live Load:	Vert-LL-Rxn =	54597	lb
Dead Load:	Vert-DL-Rxn =	84643	lb
Total Load:	Vert-TL-Rxn =	139240	lb

COLUMN DATA

Total Column Length:	12.1	ft
Unbraced Length (X-Axis) Lx:	12.1	ft
Unbraced Length (Y-Axis) Ly:	12.1	ft
Column End Condtion-K (e):	2	
Column Bending Coefficient	1	

COLUMN PROPERTIES

W10x60 - W Shapes

Yield Stress:	Fy =	50	ksi			
Modulus of Elasticity:	E =	29	ksi			
Depth:	d =	10.2	in			
Web Thickness:	tw =	0.42	in			
Flange Width:	bf =	10.1	in			
Flange Thickness:	tf =	0.68	in			
Distance to Web Toe of Fillet:	k =	1.18	in			
Moment of Inertia (deflection):	Ix =	341	in4	Iy =	116	in4
Section Modulus:	Sx =	66.7	in3	Sy =	23	in3
Plastic Section Modulus:	Zx =	74.6	in3	Zy =	35	in3
Rad. of Gyration:	rx =	4.39	in	ry =	2.57	in

Column Compression Calculations:

KL/r Ratio: KLx/rx = 66.15 KLy/ry = 113

Controlling Direction for Compr. Calcs: (Y-Y Axis)

Flexural Buckling Stress: Fcr = 19.66 ksi

Controlling Equation F2-2

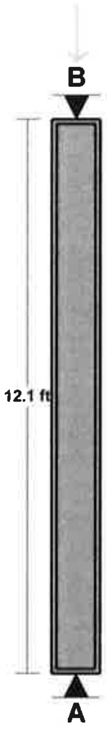
Nominal Compressive Strength: Pc = 207 kip

Combined Stress Calculations:

H1-1a Controls : 0.67

Controlling Combined Stress Factor: 0.67

LOADING DIAGRAM



AXIAL LOADING

Live Load:	PL =	54597	lb
Dead Load:	PD =	83917	lb
Column Self Weight:	CSW =	726	lb
Total Load:	PT =	139240	lb

Project: S2900 - Stamford Harbor

Location: Column D'26
Column
[2003 International Building Code(AISC 13th Ed ASD)]
A572-50 W10x60 x 12.1 FT
Section Adequate By: 36.7%

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VERTICAL REACTIONS

Live Load:	Vert-LL-Rxn =	55722	lb
Dead Load:	Vert-DL-Rxn =	75489	lb
Total Load:	Vert-TL-Rxn =	131211	lb

COLUMN DATA

Total Column Length:	12.1	ft
Unbraced Length (X-Axis) Lx:	12.1	ft
Unbraced Length (Y-Axis) Ly:	12.1	ft
Column End Condtion-K (e):	2	
Column Bending Coefficient	1	

COLUMN PROPERTIES

W10x60 - W Shapes

Yield Stress:	Fy =	50 ksi		
Modulus of Elasticity:	E =	29 ksi		
Depth:	d =	10.2 in		
Web Thickness:	tw =	0.42 in		
Flange Width:	bf =	10.1 in		
Flange Thickness:	tf =	0.68 in		
Distance to Web Toe of Fillet:	k =	1.18 in		
Moment of Inertia (deflection):	Ix =	341 in4	Iy =	116 in4
Section Modulus:	Sx =	66.7 in3	Sy =	23 in3
Plastic Section Modulus:	Zx =	74.6 in3	Zy =	35 in3
Rad. of Gyration:	rx =	4.39 in	ry =	2.57 in

Column Compression Calculations:

KL/r Ratio: KLx/rx = 66.15 KLy/ry = 113

Controlling Direction for Compr. Calcs: (Y-Y Axis)

Flexural Buckling Stress: Fcr = 19.66 ksi

Controlling Equation F2-2

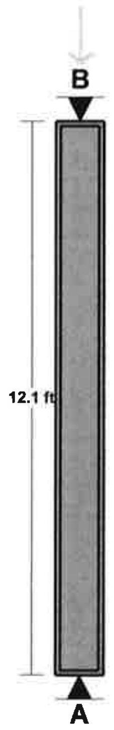
Nominal Compressive Strength: Pc = 207 kip

Combined Stress Calculations:

H1-1a Controls : 0.63

Controlling Combined Stress Factor: 0.63

LOADING DIAGRAM



AXIAL LOADING

Live Load:	PL =	55722	lb
Dead Load:	PD =	74763	lb
Column Self Weight:	CSW =	726	lb
Total Load:	PT =	131211	lb

Project: S2900 - Stamford Harbor

Location: Column C26
Column
[2003 International Building Code(AISC 13th Ed ASD)]
A572-50 W12x79 x 12.1 FT
Section Adequate By: 71.8%

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VERTICAL REACTIONS

Live Load:	Vert-LL-Rxn =	22650	lb
Dead Load:	Vert-DL-Rxn =	78406	lb
Total Load:	Vert-TL-Rxn =	101056	lb

COLUMN DATA

Total Column Length:	12.1	ft
Unbraced Length (X-Axis) Lx:	12.1	ft
Unbraced Length (Y-Axis) Ly:	12.1	ft
Column End Condtion-K (e):	2	
Column Bending Coefficient	1	

COLUMN PROPERTIES

W12x79 - W Shapes

Yield Stress:	Fy =	50	ksi			
Modulus of Elasticity:	E =	29	ksi			
Depth:	d =	12.4	in			
Web Thickness:	tw =	0.47	in			
Flange Width:	bf =	12.1	in			
Flange Thickness:	tf =	0.74	in			
Distance to Web Toe of Fillet:	k =	1.33	in			
Moment of Inertia (deflection):	Ix =	662	in4	Iy =	216	in4
Section Modulus:	Sx =	107	in3	Sy =	35.8	in3
Plastic Section Modulus:	Zx =	119	in3	Zy =	54.3	in3
Rad. of Gyration:	rx =	5.34	in	ry =	3.05	in

Column Compression Calculations:

KL/r Ratio: KLx/rx = 54.38 KLy/ry = 95.21

Controlling Direction for Compr. Calcs: (Y-Y Axis)

Flexural Buckling Stress: Fcr = 25.77 ksi

Controlling Equation F2-2

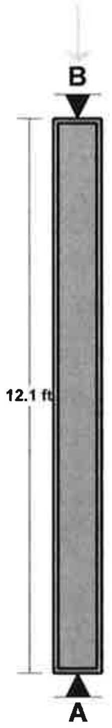
Nominal Compressive Strength: Pc = 358 kip

Combined Stress Calculations:

H1-1a Controls : 0.28

Controlling Combined Stress Factor: 0.28

LOADING DIAGRAM



AXIAL LOADING

Live Load:	PL =	22650	lb
Dead Load:	PD =	77450	lb
Column Self Weight:	CSW =	956	lb
Total Load:	PT =	101056	lb

Project: S2900 - Stamford Harbor

Location: Column C27
Column
[2003 International Building Code(AISC 13th Ed ASD)]
A572-50 W12x96 x 12.1 FT
Section Adequate By: 75.4%

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VERTICAL REACTIONS

Live Load:	Vert-LL-Rxn =	27000	lb
Dead Load:	Vert-DL-Rxn =	81912	lb
Total Load:	Vert-TL-Rxn =	108912	lb

COLUMN DATA

Total Column Length:	12.1	ft
Unbraced Length (X-Axis) Lx:	12.1	ft
Unbraced Length (Y-Axis) Ly:	12.1	ft
Column End Condtion-K (e):	2	
Column Bending Coefficient	1	

COLUMN PROPERTIES

W12x96 - W Shapes

Yield Stress:	Fy =	50 ksi		
Modulus of Elasticity:	E =	29 ksi		
Depth:	d =	12.7 in		
Web Thickness:	tw =	0.55 in		
Flange Width:	bf =	12.2 in		
Flange Thickness:	tf =	0.9 in		
Distance to Web Toe of Fillet:	k =	1.5 in		
Moment of Inertia (deflection):	Ix =	833 in4	Iy =	270 in4
Section Modulus:	Sx =	131 in3	Sy =	44.4 in3
Plastic Section Modulus:	Zx =	147 in3	Zy =	67.5 in3
Rad. of Gyration:	rx =	5.44 in	ry =	3.09 in

Column Compression Calculations:

KL/r Ratio: KLx/rx = 53.38 KLy/ry = 93.98

Controlling Direction for Compr. Calcs: (Y-Y Axis)

Flexural Buckling Stress: Fcr = 26.21 ksi

Controlling Equation F2-2

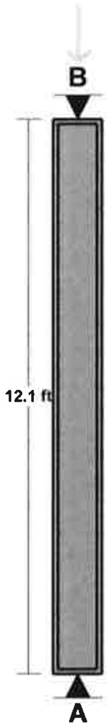
Nominal Compressive Strength: Pc = 443 kip

Combined Stress Calculations:

H1-1a Controls : 0.25

Controlling Combined Stress Factor: 0.25

LOADING DIAGRAM



AXIAL LOADING

Live Load:	PL =	27000 lb
Dead Load:	PD =	80750 lb
Column Self Weight:	CSW =	1162 lb
Total Load:	PT =	108912 lb

Project: S2900 - Stamford Harbor

Location: Column D27
Column
[2003 International Building Code(AISC 13th Ed ASD)]
A572-50 W10x68 x 12.1 FT
Section Adequate By: 8.4%

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VERTICAL REACTIONS

Live Load:	Vert-LL-Rxn =	102750	lb
Dead Load:	Vert-DL-Rxn =	116108	lb
Total Load:	Vert-TL-Rxn =	218858	lb

COLUMN DATA

Total Column Length:	12.1	ft
Unbraced Length (X-Axis) Lx:	12.1	ft
Unbraced Length (Y-Axis) Ly:	12.1	ft
Column End Condtion-K (e):	2	
Column Bending Coefficient	1	

COLUMN PROPERTIES

W10x68 - W Shapes

Yield Stress:	Fy =	50 ksi		
Modulus of Elasticity:	E =	29 ksi		
Depth:	d =	10.4 in		
Web Thickness:	tw =	0.47 in		
Flange Width:	bf =	10.1 in		
Flange Thickness:	tf =	0.77 in		
Distance to Web Toe of Fillet:	k =	1.27 in		
Moment of Inertia (deflection):	Ix =	394 in4	Iy =	134 in4
Section Modulus:	Sx =	75.7 in3	Sy =	26.4 in3
Plastic Section Modulus:	Zx =	85.3 in3	Zy =	40.1 in3
Rad. of Gyration:	rx =	4.44 in	ry =	2.59 in

Column Compression Calculations:

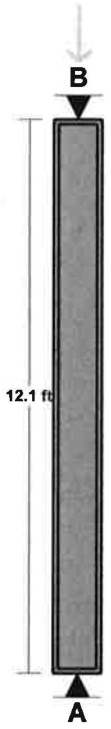
KL/r Ratio: KLx/rx = 65.41 KLy/ry = 112.12
Controlling Direction for Compr. Calcs: (Y-Y Axis)
Flexural Buckling Stress: Fcr = 19.94 ksi
Controlling Equation F2-2
Nominal Compressive Strength: Pc = 239 kip

Combined Stress Calculations:

H1-1a Controls : 0.92

Controlling Combined Stress Factor: 0.92

LOADING DIAGRAM



AXIAL LOADING

Live Load:	PL =	102750 lb
Dead Load:	PD =	115285 lb
Column Self Weight:	CSW =	823 lb
Total Load:	PT =	218858 lb

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Miscellaneous Calculations

Date: 10-22-14
Project Name: Stamford Harbor
Project Number: S2900
Designed By: GH Checked By: MSC

Hudson Design Group LLC

Determine the Weight of the Proposed Equipment (Per Sector)

Antennas:	4	x	68 lbs	=	272 lbs
RRUS-11:	3	x	50 lbs	=	150 lbs
RRUS-12:	2	x	58 lbs	=	116 lbs
RRUS-E2:	1	x	58 lbs	=	58 lbs
RRUS-32:	1	x	77 lbs	=	77 lbs
A2 Mod.:	2	x	22 lbs	=	44 lbs
Pipes:	4	x	30 lbs	=	120 lbs
TOTAL =					**837 lbs**

Determine the Weight of the New Cooling Tower & Supporting Frame:

W10x12:	57	ft	x	12 plf	=	684 lbs
W14x34:	16.2	ft	x	34 plf	=	550.8 lbs
W14x61:	28	ft	x	61 plf	=	1708 lbs
W12x26:	16.2	ft	x	26 plf	=	421.2 lbs
C10x20:	81	ft	x	20 plf	=	1620 lbs
Grating	6.1	psf	x	302 sqft	=	1842 lbs
Cooling Tower Weight =						12940 lbs
Misc. =						400 lbs
TOTAL =						**20166 lbs**

Date: 10-30-14
Project Name: Stamford Harbor
Project Number: S2900
Designed By: GH Checked By: MSC

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Determine the Surcharge Load Due to Drift

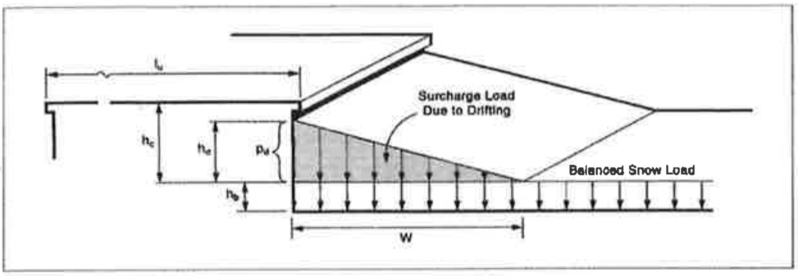
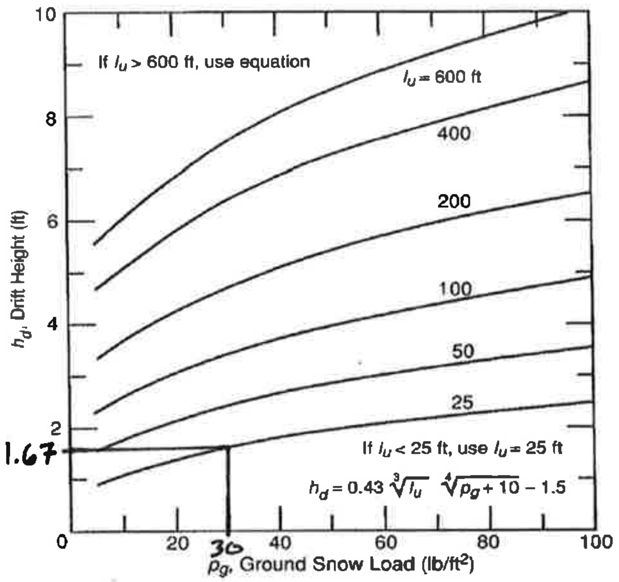


FIGURE 7-8 CONFIGURATION OF SNOW DRIFTS ON LOWER ROOFS

l_u = 18.42 ft
h_c = 11.5 ft
P_g = 30 psf



To convert lb/ft² to kN/m², multiply by 0.0479.
To convert ft to m, multiply by 0.3048.

FIGURE 7-9 GRAPH AND EQUATION FOR DETERMINING DRIFT HEIGHT, h_d

From Figure 7-9: h_d = 1.67 ft

W = 6.68 ft (4 * h_d)

Snow Density (**γ**) = 0.13 * P_g + 14 = 17.9 pcf

Maximum Intensity of Surcharge Load (**P_d**) = h_d * γ = 29.9 psf

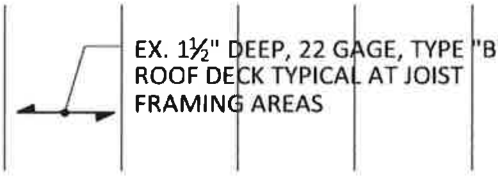
Distributed Load Caused by Drift = (hd * W/2) * γ = **99.8 plf**

Date: 10-22-14
Project Name: Stamford Harbor
Project Number: S2900
Designed By: GH Checked By: MSC

Hudson Design Group LLC

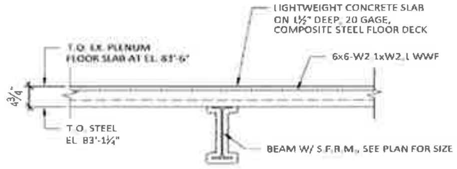
Determine the Weight of the Existing Roof

TYPE 0:


EX. 1½" DEEP, 22 GAGE, TYPE "B" ROOF DECK TYPICAL AT JOIST FRAMING AREAS

Deck Weight =	2 psf
Misc. =	3 psf
Total =	5 psf

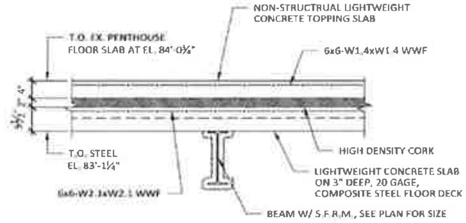
TYPE 1:


LIGHTWEIGHT CONCRETE SLAB ON 1½" DEEP, 20 GAGE, COMPOSITE STEEL FLOOR DECK
T.O. EX. PLENUM FLOOR SLAB AT EL. 83'-6"
6x6-W2.1xW2.1 WWF
4¾"
T.O. STEEL EL. 83'-1¼"
BEAM W/ S.F.R.M., SEE PLAN FOR SIZE

EXISTING PLENUM FLOOR SLAB TYPE 1 SECTION 1A
¼"=1'-0"

Composite Deck Weight =	43 psf
Misc. =	3 psf
Total =	46 psf

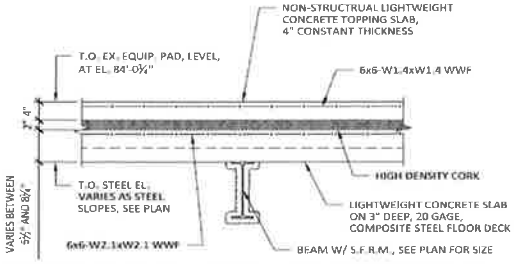
TYPE 2:


NON-STRUCTRUAL LIGHTWEIGHT CONCRETE TOPPING SLAB
T.O. EX. PENTHOUSE FLOOR SLAB AT EL. 84'-0¾"
6x6-W1.4xW1.4 WWF
4"
3"
3½"
T.O. STEEL EL. 83'-1¼"
HIGH DENSITY CORK
LIGHTWEIGHT CONCRETE SLAB ON 3" DEEP, 20 GAGE, COMPOSITE STEEL FLOOR DECK
6x6-W2.1xW2.1 WWF
BEAM W/ S.F.R.M., SEE PLAN FOR SIZE

EXISTING MECHANICAL PENTHOUSE FLOOR SLAB TYPE 2 SECTION 1B
¾"=1'-0"

Composite Deck Weight =	43 psf
Upper Slab Weight =	37 psf
Misc. =	5 psf
Total =	85 psf

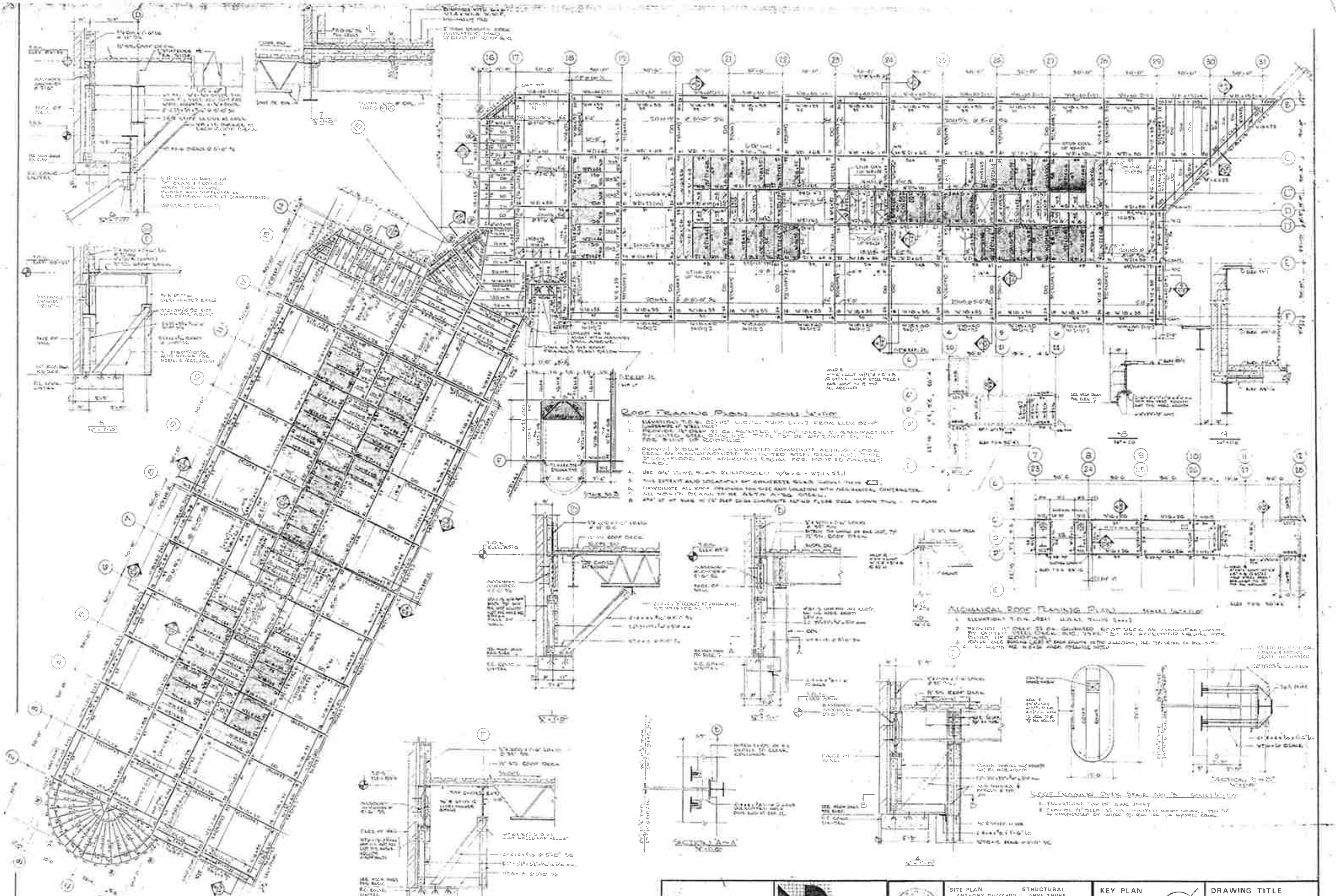
TYPE 3:


NON-STRUCTRUAL LIGHTWEIGHT CONCRETE TOPPING SLAB, 4" CONSTANT THICKNESS
T.O. EX. EQUIP. PAD, LEVEL, AT EL. 84'-0¾"
6x6-W1.4xW1.4 WWF
4"
3"
VARIES BETWEEN 5½" AND 8¼"
T.O. STEEL EL. VARIES AS STEEL SLOPES, SEE PLAN
HIGH DENSITY CORK
LIGHTWEIGHT CONCRETE SLAB ON 3" DEEP, 20 GAGE, COMPOSITE STEEL FLOOR DECK
6x6-W2.1xW2.1 WWF
BEAM W/ S.F.R.M., SEE PLAN FOR SIZE

EXISTING EXTERIOR EQUIPMENT PAD/SLAB TYPE 3 SECTION 1C
¾"=1'-0"

Avg. Composite Deck Weight =	53 psf
Upper Slab Weight =	37 psf
Misc. =	5 psf
Total =	95 psf

Referenced Documents



ROOF FRAMING PLAN   SCALE 1/16"=1'-0"

1. ELEVATIONS T.O.S. 82'-10½" U.O.N. THUS [ ] FROM ELEV. 82'-10½" (UNDERSIDE OF STEEL DECK)
2. PROVIDE 1½" DEEP 22 GA. PAINTED ROOF DECK AS MANUFACTURED BY UNITED STEEL DECK, INC. TYPE "B" OR APPROVED EQUAL FOR BUILT UP ROOFING.
3. PROVIDE 3" DEEP 20 GA. GALVANIZED COMPOSITE ACTING FLOOR DECK AS MANUFACTURED BY UNITED STEEL DECK, INC. TYPE 3" LOK-FLOOR, OR APPROVED EQUAL FOR POURED CONCRETE SLAB.
4. USE 6¼" LT. WT. SLAB REINFORCED W/6×6 - W2.1×W2.1
5. THE EXTENT AND LOCATION OF CONCRETE SLAB SHOWN THUS [illegible].
6. COORDINATE ALL ROOF OPENINGS FOR SIZE AND LOCATION WITH MECHANICAL CONTRACTOR.
7. ALL W&M(?) BEAMS TO BE ASTM A-36 STEEL.
8. [illegible] SHOWN THUS [illegible] IN PLAN

MECHANICAL ROOF FRAMING PLAN   SCALE 1/8"=1'-0"

1. ELEVATIONS T.O.S. [illegible] U.O.N. THUS [illegible]
2. PROVIDE 1½" DEEP 22 GA. GALVANIZED ROOF DECK AS MANUFACTURED BY UNITED STEEL DECK, INC. TYPE "B" OR APPROVED EQUAL FOR BUILT UP ROOFING.
3. PROVIDE ONE BRACING [illegible] AT EACH COLUMN IN TWO DIRECTIONS, SEE TYP. DETAIL ON DWG. S-4
4. ALL COLUMNS ARE [illegible]

ROOF FRAMING OVER STAIR NO. 3   SCALE: 1/4"=1'-0"

1. ELEVATIONS TOP OF BAR JOIST
2. PROVIDE 1½" DEEP 22 GA. PAINTED ROOF DECK, TYPE "B" AS MANUFACTURED BY UNITED ST. DECK INC. OR APPROVED EQUAL.

SECTION "B-B"

SECTION "A-A"

HARBOR PLAZA

COLLINS DEVELOPMENT CORPORATION
1445 EAST PUTNAM AVE.
OLD GREENWICH CT. 06870

YANKEE PLANING
ARCHITECT
DO H. CHUNG A.I.A.
1445 EAST PUTNAM AVE
OLD GREENWICH CT 06870

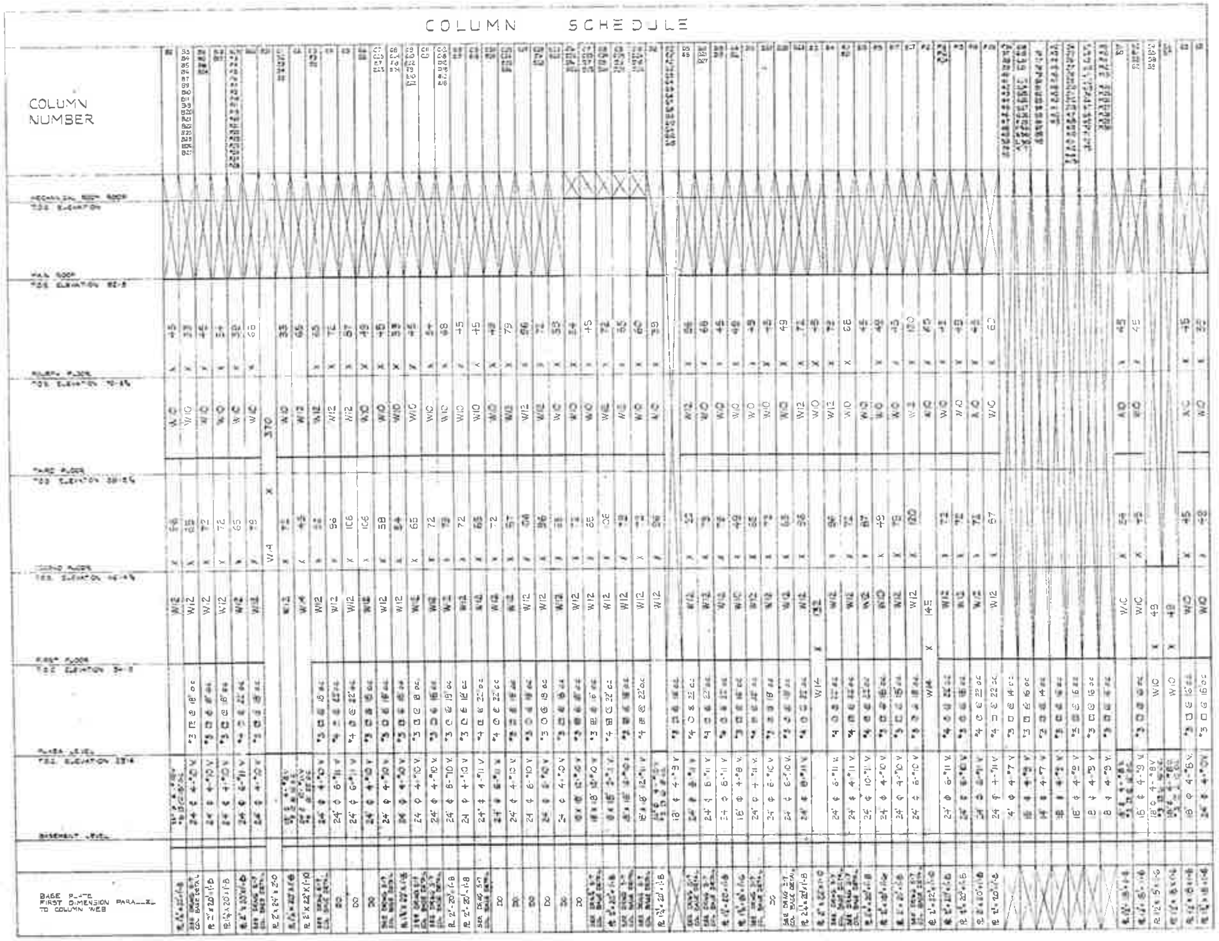
SITE PLAN
ANTHONY GUZZARDO
SITE ENGINEER
WILLIAM URBAN
LANDSCAPING
JOHNSON & DEE

STRUCTURAL
ANNE THUNE
HVAC, PLUMBING & ELECTRICAL
NIKO LILLIOS

KEY PLAN
NORTH

DRAWING TITLE
ROOF FRAMING PLAN
SCALE : 1/16 = 1'-0
DATE 6-25-79
REV. 12-26-79
DWG. NO. S5

COLUMN SCHEDULE


COLUMN NUMBER

MECHANICAL ROOF ROOF
T.O.S. ELEVATION

MAIN ROOF
T.O.S. ELEVATION 82-8

FOURTH FLOOR
T.O.S. ELEVATION 70-4½

THIRD FLOOR
T.O.S. ELEVATION 58-5½

SECOND FLOOR
T.O.S. ELEVATION 46-4½

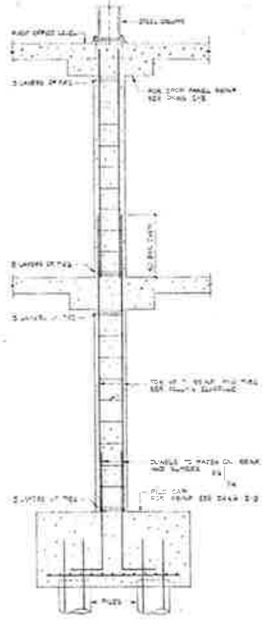
FIRST FLOOR
T.O.C. ELEVATION 34-0

PLAZA LEVEL
T.O.C. ELEVATION 23-4

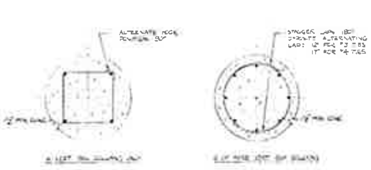
BASEMENT LEVEL

BASE PLATE
FIRST DIMENSION PARALLEL
TO COLUMN WEB

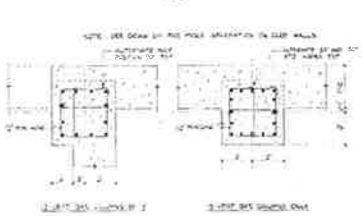
ALL LOADS ARE IN KIPS (1000 LBS)
TOS IS TOP OF STEEL
TOC IS TOP OF CONCRETE
ALL CONCRETE COLUMNS f'_c = 5000 PSI
ALL VERTICAL REINF F_y = 60 KSI
ALL TIES F_y = 40 KSI



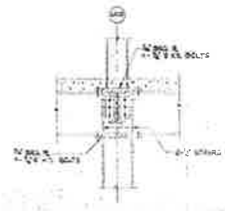
TYPICAL CONCRETE COLUMN DETAIL
½" = 1'-0



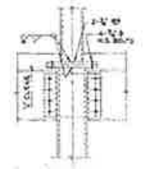
ROUND COLUMNS



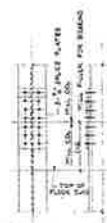
SQUARE COLUMNS



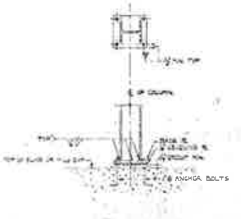
TYPICAL DETAIL OF INTERRUPTED COLUMN
NO SCALE



COLUMN SPLICE TUBE COLUMN
NO SCALE



COLUMN SPLICE WIDE FLANGE
NO SCALE



TYPICAL STEEL COLUMN BASE PLATE

HARBOR PLAZA

COLLINS
DEVELOPMENT
CORPORATION

YANKEE PLANING
ARCHITECT
DO H. CHUNG A.I.A

SITE PLAN
ANTHONY GUZZARDO

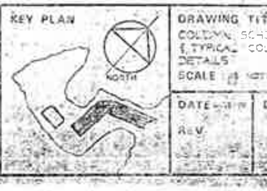
STRUCTURAL
ARNE THUNE

SITE ENGINEER
WILLIAM URBAN

HVAC, PLUMBING & ELECTRICAL
KING ANTLOS

LANDSCAPING
JOHNSON & DEE

KEY PLAN

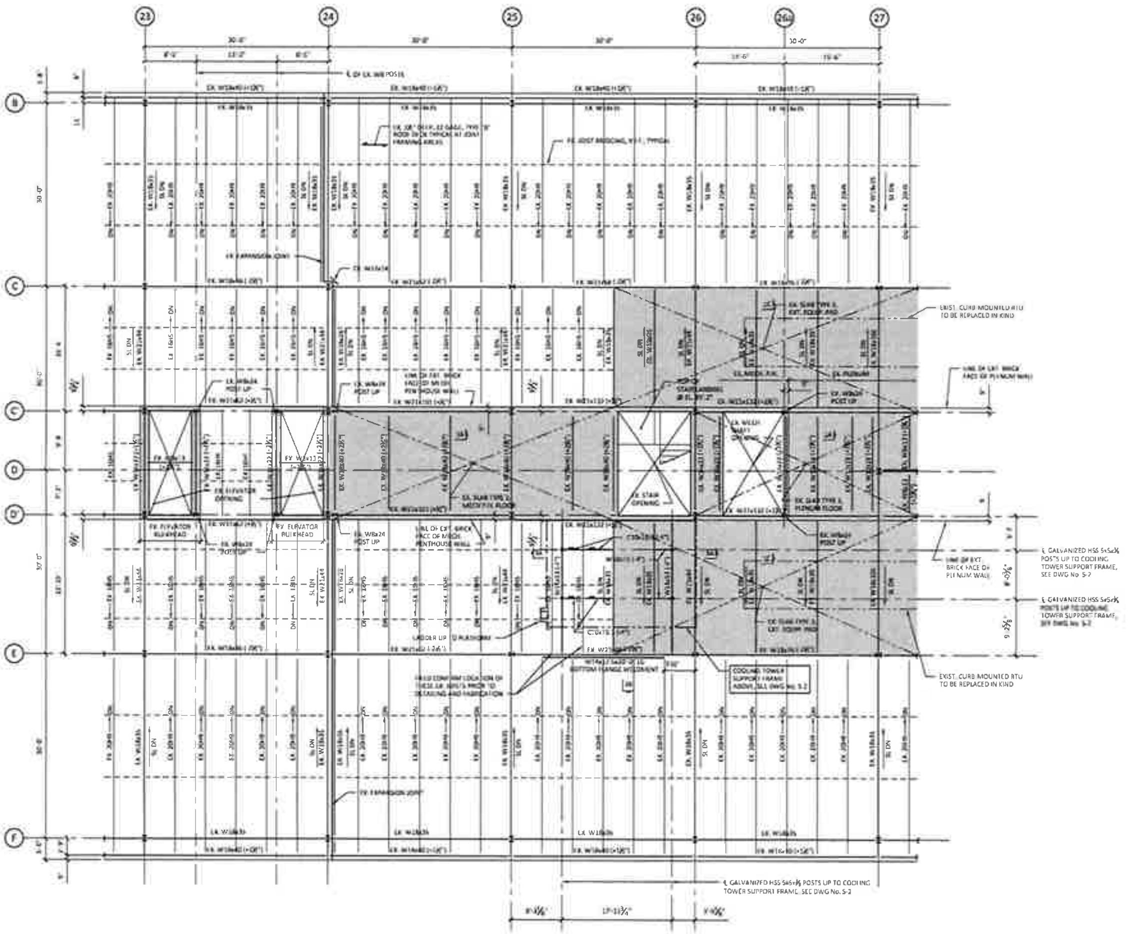


DRAWING TITLE
COLUMN SCHEDULE
& TYPICAL COLUMN
DETAILS
SCALE AS NOTED

DATE

REV.

DWG. NO.
S8


23
24
25
26
26A
27
B
C
C'
D
D'
E
F
30'-0"
EX. W18x40 (+1/2")
EX. W21x62 (+3/4")
SL DN
EX. EXPANSION JOINT
COOLING TOWER SUPPORT FRAME ABOVE, SEE DWG No. S-2
EX. STAIR OPENING
FV. ELEVATOR BULKHEAD
LADDER UP TO PLATFORM
EXIST. CURB MOUNTED RTU TO BE REPLACED IN KIND
LINE OF EXT. BRICK FACE OF PLENUM WALL
℄ GALVANIZED HSS 5x5x⅜ POSTS UP TO COOLING TOWER SUPPORT FRAME, SEE DWG No. S-2
17'-11¾"

PARTIAL ROOF FRAMING PLAN

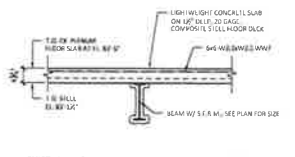
⅜"=1'-0"

TOP OF EXISTING STEEL AT EL. 82'-10¼" UNLESS OTHERWISE NOTED THUS (±), FROM EL. 82'-10¼"

EXISTING STEEL SLOPES TO DRAIN

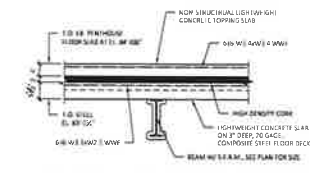
TOP OF NEW STEEL BEAMS TO BE LEVEL AT THE TOP OF STEEL ELEVATIONS INDICATED ON PLAN

▨ INDICATES EXISTING CONCRETE SLAB ON METAL DECK, CONSTRUCTION VARIES. SEE SECTIONS 1A, 1B AND 1C THIS DRAWING


LIGHTWEIGHT CONCRETE SLAB ON 1½" DECK, 20 GAGE COMPOSITE STEEL FLOOR DECK
T.O. EX. PLENUM FLOOR SLAB AT EL. 82'-6"
6x6 W2.9xW2.9 WWF
T.O. STEEL EL. 82'-1½"
BEAM W/ S.F.R.M., SEE PLAN FOR SIZE

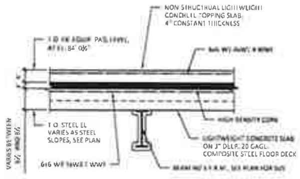
EXISTING PLENUM FLOOR SLAB TYPE 1 SECTION 1A

¾"=1'-0"


NON STRUCTURAL LIGHTWEIGHT CONCRETE TOPPING SLAB
T.O. EX. PENTHOUSE FLOOR SLAB AT EL. 84'-6"
6x6 W1.4xW1.4 WWF
HIGH DENSITY CORK
LIGHTWEIGHT CONCRETE SLAB ON 3" DEEP, 20 GAGE, COMPOSITE STEEL FLOOR DECK
T.O. STEEL EL. 83'-1½"
6x6 W2.9xW2.9 WWF
BEAM W/ S.F.R.M., SEE PLAN FOR SIZE

EXISTING MECHANICAL PENTHOUSE FLOOR SLAB TYPE 2 SECTION 1B

¾"=1'-0"


NON STRUCTURAL LIGHTWEIGHT CONCRETE TOPPING SLAB, 4" CONSTANT THICKNESS
T.O. EX. EQUIP. PAD (TYP.) AT EL. 84'-0½"
6x6 W1.4xW1.4 WWF
HIGH DENSITY CORK
LIGHTWEIGHT CONCRETE SLAB ON 3" DECK, 20 GAGE, COMPOSITE STEEL FLOOR DECK
T.O. STEEL EL. VARIES AS STEEL SLOPES, SEE PLAN
VARIES BETWEEN
6x6 W2.9xW2.9 WWF
BEAM W/ S.F.R.M., SEE PLAN FOR SIZE

EXISTING EXTERIOR EQUIPMENT PAD/SLAB TYPE 3 SECTION 1C

¾"=1'-0"

GENERAL NOTES:

1. ALL WORK SHALL CONFORM TO THE CONNECTICUT BASIC BUILDING CODE (2003 INTERNATIONAL BUILDING CODE AND THE 2005 CONNECTICUT SUPPLEMENT & 2009 AMENDMENT).

2. WORK THESE STRUCTURAL DRAWINGS WITH THE ARCHITECTURAL, MECHANICAL & ELECTRICAL DRAWINGS.

3. VERIFY AND COORDINATE ALL PERTINENT DIMENSIONS AND EXISTING CONDITIONS. NOTIFY THE ENGINEER OF ANY EXISTING CONDITIONS WHICH DIFFER FROM THOSE SHOWN ON THESE DRAWINGS FOR POSSIBLE MODIFICATION OF THE STRUCTURAL DESIGN.

4. THE INSTALLATION OF THE NEW STRUCTURAL FRAMING MAY REQUIRE THE TEMPORARY REMOVAL OF BUILDING SERVICES AND FINISHES. THE CONTRACTOR IS TO DETERMINE THE EXTENT OF THESE TEMPORARY REMOVALS AND IS TO COORDINATE THE RESTORATION OF DISTURBED COMPONENTS WITH THE FINAL REQUIREMENTS OF THE ALTERATION PROGRAM. ALL REQUIRED TEMPORARY OR PERMANENT MODIFICATIONS TO BUILDING SERVICES ARE TO BE COORDINATED WITH THE BUILDING MANAGEMENT PERSONNEL.

5. ALL WORK ON EXISTING STRUCTURES SHALL BE ACCOMPLISHED WITH THE UTMOST CARE. THE CONTRACTOR SHALL ASSUME RESPONSIBILITY FOR PROVIDING ANY TEMPORARY SUPPORTS, SHORING, BRACING, DUST-PROOFING AND VENTILATION AS MAY BE REQUIRED TO ASSURE NO DAMAGE TO EXISTING INSTALLATIONS.

6. THE COOLING TOWER SUPPORT FRAME HAS BEEN DESIGNED FOR A SERVICE PLATFORM LIVE LOAD OF 75 PSF AND AN EVAPCO, INC. MODEL NO. USS-19-714 COOLING TOWER HAVING AN OPERATING WEIGHT OF 12,940 LB INCLUDING ALLOWANCES FOR ACCESSORIES.

7. THE EXISTING MAIN ROOF FRAMING AFFECTED BY THIS PROGRAM WAS ANALYZED FOR THE NEW LOADS FROM THE COOLING TOWER SUPPORT FRAME IN COMBINATION WITH BASE BUILDING DESIGN LOADS. STRENGTHENING MEASURES HAVE BEEN DESIGNED FOR THE EXISTING FRAMING, WHERE NECESSARY, AS SPECIFIED ON THESE DRAWINGS.

CONCRETE NOTES:

1. THIS SECTION APPLIES TO CONCRETE TO RESTORE SLABS WHICH HAVE BEEN PARTIALLY REMOVED FOR THE INSTALLATION OF SUPPORT FRAME POSTS.

2. ALL CONCRETE WORK SHALL BE CONFORM TO ACI-301, ACI-315 AND ACI-318.

3. ALL CAST-IN-PLACE CONCRETE SHALL BE CONTROLLED LIGHT WEIGHT CONCRETE WITH A COMPRESSIVE STRENGTH OF 4,000 PSI AT 28 DAYS. THE CONCRETE IS TO BE MADE WITH TYPE I PORTLAND CEMENT CONFORMING TO ASTM C150, 3/4" MAXIMUM AGGREGATE SIZE LIGHT WEIGHT AGGREGATES CONFORMING TO ASTM C330 AND POTABLE WATER. THE CONCRETE IS TO BE PROPORTIONED TO HAVE A UNIT WEIGHT OF 115 PCF ± 3 PCF, 3" TO 4" SLUMP AND 4% TO 6% ENTRAINED AIR. LOW RANGE WATER REDUCING AGENTS ARE PERMITTED. CHLORIDE CONTAINING ADDITIVES ARE NOT PERMITTED.

STEEL NOTES:

1. ALL DETAILING, FABRICATION AND ERECTION OF STRUCTURAL STEEL SHALL CONFORM TO THE AISC "SPECIFICATION FOR THE DESIGN, FABRICATION AND ERECTION OF STRUCTURAL STEEL FOR BUILDINGS" AND THE AISC "CODE OF STANDARD PRACTICE FOR STEEL BUILDINGS AND BRIDGES", LATEST EDITIONS.

2. ALL WIDE FLANGE STEEL SHAPES SHALL CONFORM TO THE "STANDARD SPECIFICATION FOR STRUCTURAL SHAPES FOR USE IN BUILDING FRAMING", ASTM A992 (FY = 50 KSI). STEEL FOR TUBES SHALL CONFORM TO ASTM A500, GRADE B. STEEL FOR PIPE GUARD RAILS SHALL CONFORM TO ASTM A53, TYPE "E" OR "S". ALL OTHER STEEL SHALL CONFORM TO ASTM A36.

3. ALL BOLTED CONNECTIONS SHALL BE IN ACCORDANCE WITH THE AISC "SPECIFICATION FOR STRUCTURAL JOINTS USING ASTM A325 OR A490 BOLTS", LATEST EDITION.

4. BOLTED CONNECTIONS SHALL BE BASED ON 3/4" Ø A325 SC BOLTS.

5. WELDING MATERIALS, PROCEDURES AND QUALITY CONTROL SHALL BE IN ACCORDANCE WITH THE AWS D1.1, "STRUCTURAL WELDING CODE - STEEL", LATEST EDITION.

6. WELDED CONNECTIONS SHALL BE BASED ON E70XX ELECTRODES. MINIMUM WELD SHALL BE 1/4" CONTINUOUS ALL-AROUND FILLET WELD UNLESS OTHERWISE NOTED.

7. PROVIDE APPROPRIATE FIRE PROTECTION MEASURES DURING ALL FIELD WELDING OPERATIONS.

8. ALL EXTERIOR EXPOSURE STEEL SHALL BE HOT-DIP GALVANIZED AFTER FABRICATION IN ACCORDANCE WITH ASTM A123. FIELD TOUCH PAINT SCARS, ABRASIONS, SHOP MASKED AREAS & FIELD WELD AREAS WITH ZRC COLD GALVANIZING COMPOUND BY THE ZRC CORPORATION.

9. ALL INTERIOR STEEL IS TO RECEIVE FIRE-PROOFING AND IS TO BE UNPAINTED, HOWEVER, REMOVE MILL SCALE & LOOSE RUST BY HAND POWER TOOL CLEANING PRIOR TO DELIVERY TO THE JOB SITE.

10. SPRAY FIRE PROOFING IS TO MATCH THE EXISTING SYSTEM AND FIRE RESISTANCE RATING. FIRE-PROOFING IS NOT SHOWN IN SECTIONS AND DETAILS FOR CLARITY. THE CONTRACTOR IS TO RESTORE FIRE PROOFING THAT IS DAMAGED DURING THE WORK OR WHICH IS INTENTENTIONALLY REMOVED FOR CONNECTIONS. FIRE-PROOFING REMOVED FOR THE INSTALLATION OF WELDMENTS IS TO BE RESTORED DURING WELDMENT FIRE-PROOFING INSTALLATION.

2	9-22-14	FOR CONSTRUCTION	DI	JMM
1	7-3-14	FOR PERMIT, BID AND CONSTRUCTION	DI	JMM
ISSUE	DATE	DESCRIPTION	BY	CHK.

DRAWN: DI | CHECKED: JMM | DATE: 7-3-14

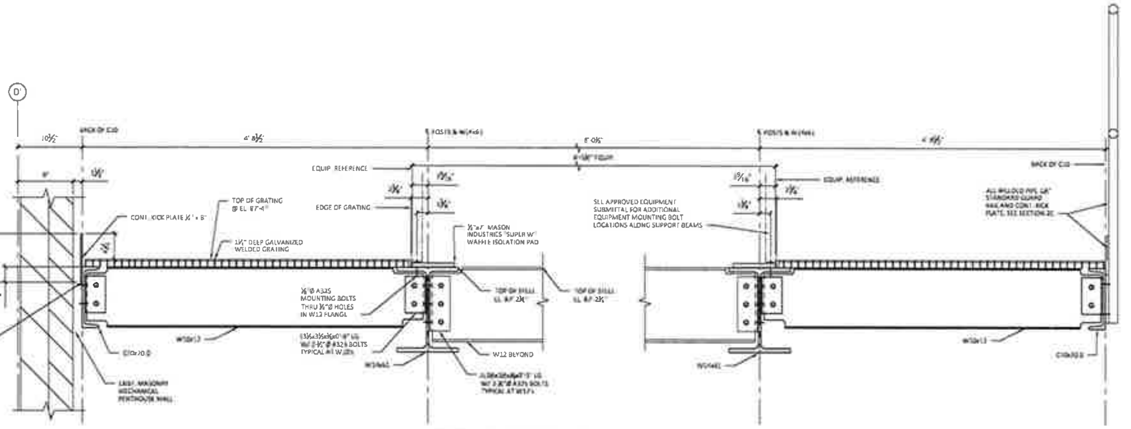
TITLE:
PARTIAL ROOF FRAMING PLAN
AT COOLING TOWER SUPPORTS,
EXISTING CONDITION SECTIONS AND NOTES

PROJECT:
SHIPPAN LANDING
208 HARBOR DRIVE
STAMFORD, CT

Pelliccione & Associates, LLC

JOB No. 11/4318

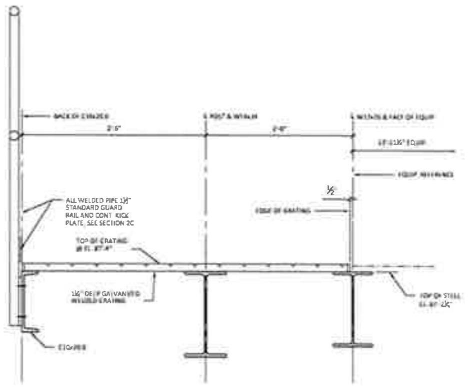
DRAWING No. S-1


D'
10½"
BACK OF C10
4'-8½"
℄ POSTS & W(4x6)
8'-0½"
8'-1⅛" EQUIP
℄ POSTS & W(4x6)
4'-8½"
BACK OF C10
EQUIP. REFERENCE
EDGE OF GRATING
CONT. KICK PLATE ¼" x 8"
TOP OF GRATING @ EL 87'-4"
1¼" DEEP GALVANIZED WELDED GRATING
½"x7" MASON INDUSTRIES "SUPER W" WAFFLE ISOLATION PAD
⅝"Ø A325 MOUNTING BOLTS THRU ¾"Ø HOLES IN W12 FLANGE
TOP OF STEEL EL 87'-2¾"
W10x12
C10x20.0
W12 BEYOND
W14x61
EXIST. MASONRY MECHANICAL PENTHOUSE WALL
SEE APPROVED EQUIPMENT SUBMITTAL FOR ADDITIONAL EQUIPMENT MOUNTING BOLT LOCATIONS ALONG SUPPORT BEAMS
EQUIP. REFERENCE
ALL WELDED PIPE 1½" STANDARD GUARD RAIL AND CONT. KICK PLATE, SEE SECTION 2C

GENERAL ARRANGEMENT ND COOLING TOWER MOUNTING - SECTION 2A

1½" = 1'-0"

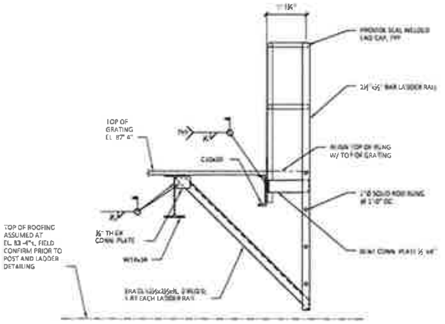
- ALL STEEL GRATING, BEAMS, CONNECTION COMPONENTS AND HARDWARE ARE TO BE GALVANIZED
- CLEAN ALL FIELD WELDS, GRIND SMOOTH AND PAINT WITH COLD GALVANIZING COMPOUND


BACK OF C10x20.0
℄ POST & W14x...
℄ W12x... & FACE OF EQUIP
2'-6"
2'-0"
EQUIP
EQUIP. REFERENCE
½
EDGE OF GRATING
ALL WELDED PIPE 1½" STANDARD GUARD RAIL AND CONT. KICK PLATE, SEE SECTION 2C
TOP OF GRATING @ EL 87'-4"
1¼" DEEP GALVANIZED WELDED GRATING
TOP OF STEEL EL 87'-2¾"
C10x20.0

GENERAL ARRANGEMENT AND COOLING TOWER MOUNTING - SECTION 2B

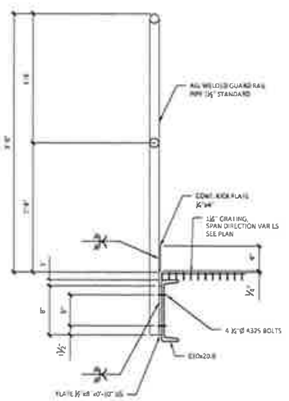
1½" = 1'-0"

- ALL STEEL GRATING, BEAMS, CONNECTION COMPONENTS AND HARDWARE ARE TO BE GALVANIZED
- CLEAN ALL FIELD WELDS, GRIND SMOOTH AND PAINT WITH COLD GALVANIZING COMPOUND


PROVIDE SEAL WELDED END CAP, TYP
2½"x½" BAR LADDER RAIL
TOP OF GRATING EL 87'-4"
C10x20
ALIGN TOP OF RUNG W/ TOP OF GRATING
1"Ø SOLID ROD RUNG @ 1'-0" OC
½" THICK CONN PLATE
W14x34
BENT CONN PLATE ½"
TOP OF ROOFING ASSUMED AT EL 83'-4"±, FIELD CONFIRM PRIOR TO POST AND LADDER DETAILING
BRACE L2½x2½x¼, 2 REQ'D, 1 AT EACH LADDER RAIL

SECTION 2D

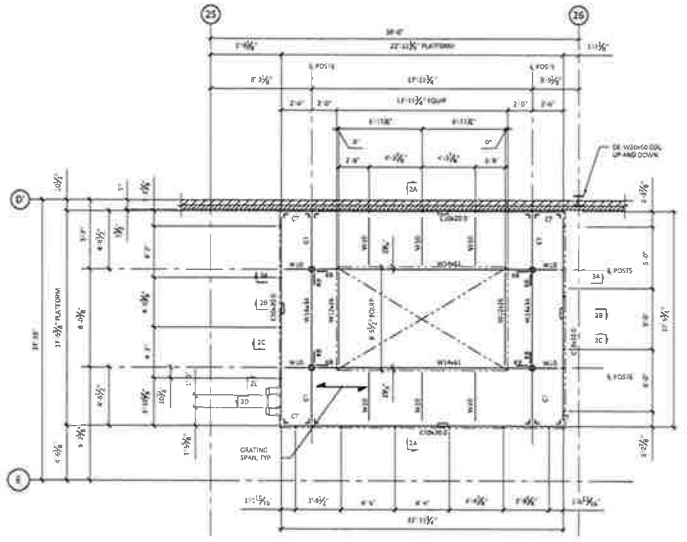
¾" = 1'-0"


3'-6"
ALL WELDED GUARD RAIL PIPE 1½" STANDARD
CONT. KICK PLATE ¼"x4"
1¼" GRATING, SPAN DIRECTION VARIES SEE PLAN
4 ⅝"Ø A325 BOLTS
C10x20.0
PLATE ½"x8"x0'-10" LG
1½"

TYPICAL GUARD RAIL DETAIL 2C

1½" = 1'-0"

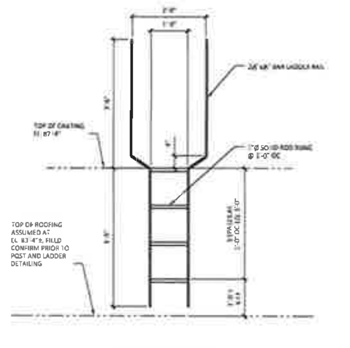
- ALL COMPONENTS AND HARDWARE ARE TO BE GALVANIZED
- CLEAN ALL FIELD WELDS, GRIND SMOOTH AND PAINT WITH COLD GALVANIZING COMPOUND



COOLING TOWER SUPPORT FRAME PLAN

¼" = 1'-0"

- TOP OF GRATING AT EL 87'-4"
- TOP OF STEEL AT EL 87'-2¾"
- TOP OF COOLING TOWER ISOLATION PADS AT EL [illegible]
- SURFACE PLATFORM W/ BORDEN GRATING S SIZE No. 5 TYPE W/B GALVANIZED WELDED GRATING HAVING 1¼"x3⁄16" BEARING BARS AT 1³⁄₁₆" OC AND ¼" TWISTED CROSS BARS AT 4" OC. SPAN GRATING NORTH SOUTH. PROVIDE 1¼"x3⁄16" WELDED BANDING BARS AT ALL CUT EDGES. WELD GRATING TO SUPPORTING STEEL AS RECOMMENDED BY THE MANUFACTURER. CLEAN FIELD WELDS AND PAINT WITH COLD GALVANIZING COMPOUND.
- ALL STEEL COMPONENTS AND HARDWARE ARE TO BE GALVANIZED
- [illegible]
- [illegible]
- DESIGN CRITERIA:
  - COOLING TOWER: EVAPCO, INC. MODEL No. USS 19-734 HAVING AN OPERATING WEIGHT OF 10,780 LB. PLUS 2,160 LB. ALLOWANCE FOR ACCESSORIES
  - SERVICE PLATFORM: [illegible] PSF LIVE LOAD


2'-8"
1'-8"
2½"x½" BAR LADDER RAIL
TOP OF GRATING EL 87'-4"
1"Ø SOLID ROD RUNG @ 1'-0" OC
TOP OF ROOFING ASSUMED AT EL 83'-4"±, FIELD CONFIRM PRIOR TO POST AND LADDER DETAILING
EQUAL SPACES 1'-0" OC

LADDER ELEVATION 2E

¾" = 1'-0"

2	7-23-14	FOR CONSTRUCTION	DJ	AMM
1	7-3-14	FOR PERMIT, BID AND CONSTRUCTION	DJ	AMM
ISSUE	DATE	DESCRIPTION	BY	CHK

DRAWN: DJ | CHECKED: AMM | DATE: 7-3-14

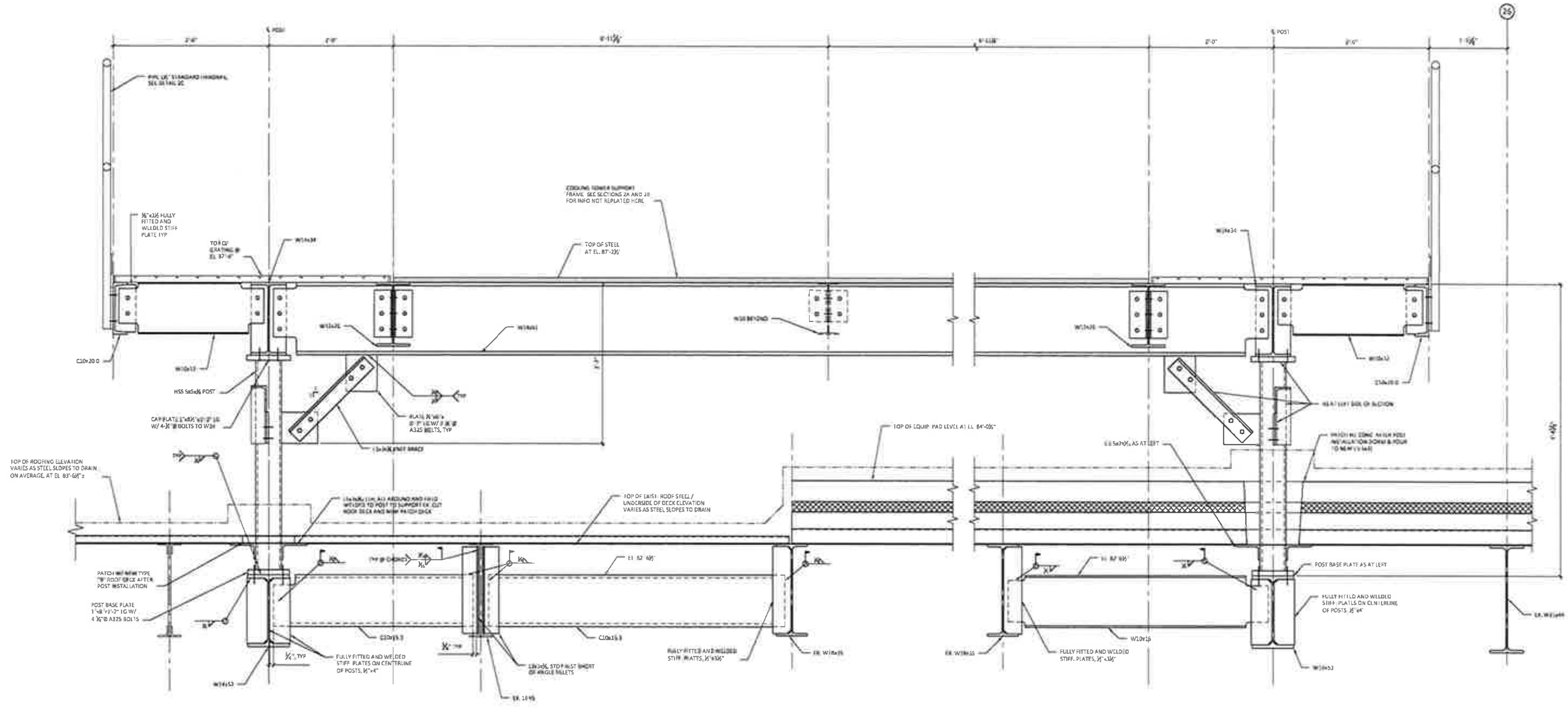
TITLE:
COOLING TOWER SUPPORT FRAME PLAN,
SECTIONS AND DETAILS

PROJECT:
SHIPPAN LANDING
208 HARBOR DRIVE
STAMFORD, CT

Pelliccione & Associates, LLC
CONSULTING STRUCTURAL ENGINEERS

JOB No.: 11/43B

DRAWING No.: S-2



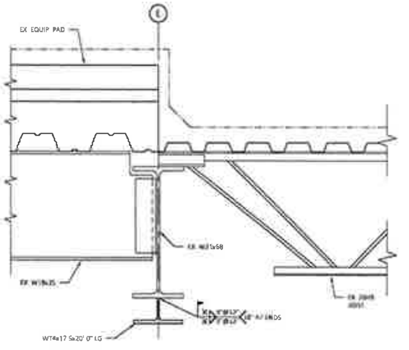
26
℄ POST
2'-6"
2'-0"
8'-11⅜"
6'-11⅞"
2'-0"
2'-6"
1'-10⅜"
1'-4⅝"
PIPE 1½" STANDARD HANDRAIL, SEE DETAIL 2C
⅜"x1½ FULLY FITTED AND WELDED STIFF PLATE TYP
TOP OF GRATING @ EL. 87'-4"
W14x34
COOLING TOWER SUPPORT FRAME. SEE SECTIONS 2A AND 2B FOR INFO NOT REPLATED HERE
TOP OF STEEL AT EL. 87'-2½"
W18 BEYOND
W12x26
C10x20.0
W10x12
HSS 5x5x⅜ POST
CAP PLATE 1"x8½"x0'-8" LG W/ 4-¾"Ø BOLTS TO W14
PLATE ⅜"x6"x 0'-7" LG W/ 2-¾"Ø A325 BOLTS, TYP
TYP
TOP OF ROOFING ELEVATION VARIES AS STEEL SLOPES TO DRAIN ON AVERAGE, AT EL. 83'-6¼"±
TOP OF EXIST. ROOF STEEL / UNDERSIDE OF DECK ELEVATION VARIES AS STEEL SLOPES TO DRAIN
TOP OF EQUIP. PAD LEVEL AT EL. 84'-0¾"
EL. 82'-6½"
PATCH W/ NEW TYPE "B" ROOF DECK AFTER POST INSTALLATION
POST BASE PLATE 1"x8"x1'-2" LG W/ 4-¾"Ø A325 BOLTS
FULLY FITTED AND WELDED STIFF. PLATES ON CENTERLINE OF POSTS, ½"x4"
¾", TYP
W14x53
C10x15.3
FULLY FITTED AND WELDED STIFF. PLATES, ½"x3½"
EX. 18K5
EX. W18x35
W10x16
POST BASE PLATE AS AT LEFT
FULLY FITTED AND WELDED STIFF. PLATES ON CENTERLINE OF POSTS, ½"x4"
EX. W21x44
W14x53
W10x12
C10x20.0
EX. L5x3x5/16 AS AT LEFT

SECTION 3A

1½"=1'-0"

ALL EXPOSED STEEL AND HARDWARE ABOVE ROOF IS TO BE GALVANIZED

NEW STEEL AT ROOF FRAMING IS TO BE SPRAY FIRE PROOFED TO MATCH EXIST. SYSTEM (NOT SHOWN FOR CLARITY). NOTE THAT EXISTING TYPE "B" ROOF DECK AND EXISTING 18H5 OPEN WEB JOISTS ARE ALSO SPRAY FIRE PROOFED



SECTION 3B

1½"=1'-0"

NEW STEEL AT ROOF FRAMING IS TO BE SPRAY FIRE PROOFED TO MATCH EXIST. SYSTEM (NOT SHOWN FOR CLARITY). NOTE THAT EXISTING TYPE "B" ROOF DECK AND EXISTING 18H5 OPEN WEB JOISTS ARE ALSO SPRAY FIRE PROOFED

ISSUE	DATE	DESCRIPTION	BY	CHK
2	7.23.14	FOR CONSTRUCTION	[illegible]	JMM
1	7.2.14	FOR PERMIT, BID AND CONSTRUCTION	[illegible]	JMM

DRAWN: [illegible] CHECKED: JMM DATE: 7.2.14

TITLE:
SECTIONS AND DETAILS

PROJECT:
SHIPPAN LANDING
208 HARBOR DRIVE
STAMFORD, CT

Pelliccione & Associates, LLC

JOB No. 1/4318

DRAWING No. S-3

7/22/2014 5:44:35 PM