Crown Castle
3 Corporate Park Drive, Suite 101
Clifton Park, NY 12065

November 5, 2019

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

RE: **Notice of Exempt Modification for Verizon Wireless: 806371**
Verizon Site ID:1924
599 Matianuck Ave, Windsor, CT 06095
Latitude: 41° -49' 16.04"/ Longitude: -72° -40' 36.29"

Dear Ms. Bachman:

Verizon currently maintains twelve (12) antennas at the 100-foot level of the existing 100-foot monopole tower at 599 Matianuck Ave, Windsor, CT 06095. The tower is owned by Crown Castle and the land is owned by Town of Windsor CT. Verizon now intends to replace six (6) antennas and six (6) remote radios.

This facility was approved Connecticut Siting Council 11/12/1992, Docket No. 137.

Please accept this letter as notification pursuant to Regulations of Connecticut State Agencies § 16-50j- 73, for construction that constitutes an exempt modification pursuant to R.C.S.A. § 16-50j-72(b)(2). In accordance with R.S.C.A. § 16-50j-73, a copy of this letter is being sent to the Town Manager, Mr. Peter Souza and the Town Planner, Mr. Eric Barz, Town of Windsor Planning & Zoning Dept. The Town of Windsor owns the land and Crown Castle is the tower owner.

1. The proposed modifications will not result in an increase in the height of the existing tower.
2. The proposed modifications will not require the extension of the site boundary.
3. The proposed modification will not increase noise levels at the facility by six decibels or more, or to levels that exceed state and local criteria.

4. The operation of the replacement antennas will not increase radio frequency emissions at the facility to a level at or above the Federal Communication Commission safety standard.

5. The proposed modifications will not cause a change or alteration in the physical or environmental characteristics of the site.

6. The existing structure and its foundation can support the proposed loading.

For the foregoing reasons, Verizon respectfully submits that the proposed modifications to the above-reference telecommunications facility constitutes an exempt modification under R.C.S.A. § 16-50j-72(b)(2). Please send approval/rejection letter to Attn: Jeffrey Barbadora.

Sincerely,

Jeffrey Barbadora
Real Estate Specialist
12 Gill Street, Suite 5800, Woburn, MA 01801
781-729-0053
Jeff.Barbadora@crowncastle.com

Attachments:

Tab 1: Exhibit-1: Compound plan and elevation depicting the planned changes
Tab 2: Exhibit-2: Structural Modification Report
Tab 3: Exhibit-3: General Power Density Table Report (RF Emissions Analysis Report)

Town Manager – Mr. Peter Souza
Town of Windsor
275 Broad Street
Windsor, CT 06095
(860) 285-1800

Planning & Zoning/Town Planner-Mr. Eric Barz
Town of Windsor
275 Broad Street
Windsor, CT 06095
(860) 285-1981

-72.656686, 41.816128

599 MATIANUCK AVE

Parcel ID: 5420

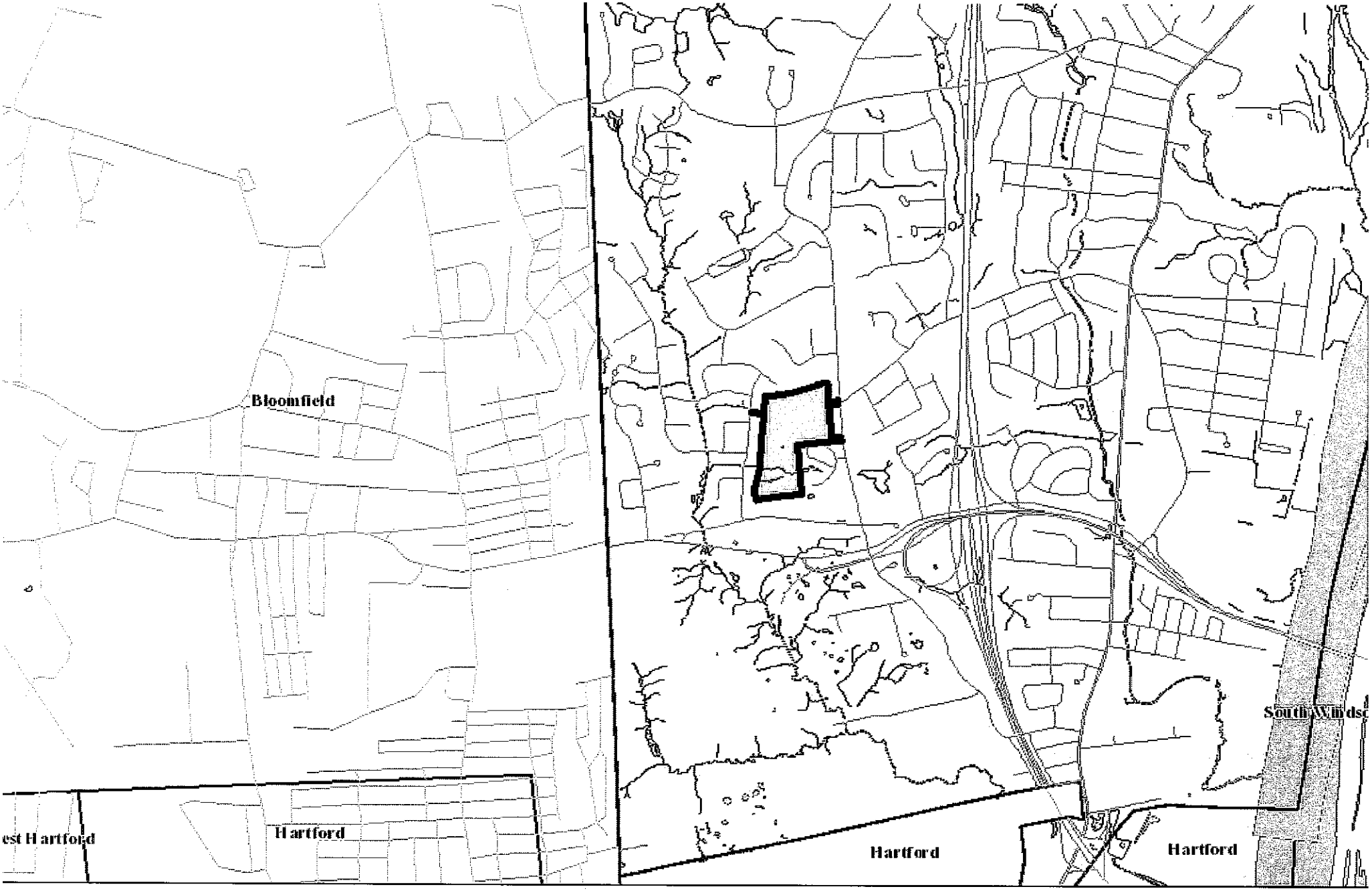
Owner Name: WINDSOR TOWN OF

Property Location: 599 MATIANUCK AVE

Co-Owner: LP WILSON COMMUNITY CENTER

Owner	Assessment	Sales

Address:



artford County, Connecticut

orizontal Datum is Connecticut State lane Feet, NAD83

1 inch = 2,774 feet

N E 0 1,150 2,300 4,600

MAP

WINDSOR

Property Boundaries not legally bindin for title or zoning purpose.

The Town of Windsor makes no warran as to th accuracy, reliability, or completenes of the information and is not responsib for any error or omissions for resul obtained from the use of the informatio

BK

STATE OF CONNECTICUT

CONNECTICUT SITING COUNCIL

136 Main Street, Suite 401
New Britain, Connecticut 06051-4225
Phone: 827-7682

November 13, 1992

David S. Malko, P.E.
Manager, Engineering & Regulatory Services
Bell Atlantic Metro Mobile
20 Alexander Drive
P.O. Box 5029
Wallingford, CT 06492

RE: DOCKET NO. 137 - Metro Mobile CTS of Hartford, Inc., Certificate of Environmental Compatibility and Public Need for the construction, maintenance, and operation of cellular facilities in the Towns of South Windsor and Windsor Connecticut.

Dear Mr. Malko:

At a public meeting on November 12, 1992, the Connecticut Siting Council (Council) considered and approved the construction at the South Windsor site as being in compliance with the Council's November 14, 1990, Decision and Order. The Council also conditionally approved the construction of the Windsor site as complying with the Council's Decision and Order provided that a silt fence is removed from the site and grass is established along the access drive. The Council will revisit the Windsor site in the spring to confirm the completion of these activities.

Enclosed please find the staff report concerning the field review of these sites.

Please contact me if you have any questions concerning this matter.

Very truly yours,

Joel M. Rinebold /SMH

Joel M. Rinebold
Executive Director

JMR/SMH/cp

enclosure

6572E-3

STATE OF CONNECTICUT

CONNECTICUT SITING COUNCIL

136 Main Street, Suite 401
New Britain, Connecticut 06051-4225
Phone: 827-7682

Docket No. 137
Metro Mobile CTS of Hartford, Inc.
Cellular Telecommunications Sites
Windsor and South Windsor
Staff Report
November 12, 1992

Metro Mobile CTS of Hartford, Inc. (Metro Mobile) submitted a final construction report to the Connecticut Siting Council (Council) on October 28, 1992, for the Windsor and South Windsor tower sites. Completion of construction and commencement of operation occurred in November 1991 for the Windsor site and July 1992 for the South Windsor site. On November 9, 1992, Fred Cunliffe of the Council's staff visited both sites.

The South Windsor site is set off U.S. Route 5 and adjacent to a stand of pine trees and railroad tracks within a heavy commercialized/industrial area. Since no deficiencies were observed, this site appears to be in compliance with the Council's Development and Management (D&M) Plan; therefore staff recommends final approval of this site.

The Windsor site lies behind the Town's community center and recreation fields. This tower is hidden within a wooded area with only the platform rising above the tree tops. Pine trees have been planted along the site's fence line facing the playing fields. The grass around the site is well established, but a synthetic silt fence still exists along the south side of the site. Most of the access road, which crosses the recreation fields, has been restored adequately, except for evidence of grass seed along the first 100 feet (± 10') of the access road. It appears there is some difficulty in establishing grass cover along this entry due to foot and vehicular traffic to and from the recreation fields for maintenance of the fields and the telecommunications site. In fact, lawn pavers that were proposed along the first 100 feet were either abandoned or covered over and approximately the first 20 feet of the entrance has gravel cover, per Town's request, to minimize erosion. This appears to be the only notable deviation from the D&M plan as proposed to the Council.

Metro Mobile contends that all construction including minor changes complies with Council approved Development and Management Plans.

Fred Cunliffe
Siting Analyst

6565E-2

Bell Atlantic Metro Mobile
20 Alexander Drive
P.O. Box 5029
Wallingford, CT 06492
203 269-8858

October 28, 1992

Mr. Joel M. Rinebold, Executive Director
Connecticut Siting Council
136 Main Street
Suite 401
New Britain, CT 06051

Re: Docket No. 137 - Metro Mobile CTS of Hartford, Inc.

Dear Mr. Rinebold:

This final report for the South Windsor and Windsor (South) sites is submitted in accordance with Section 16-50j-77(B)(4) of the Council's Rules of Practice which requires written notice of completion of construction.

Completion of site construction and commencement of commercial operation occurred in November, 1991 for the Windsor (South) site and July, 1992 for the South Windsor site. Construction of the South Windsor site complied with the respective filed and approved D & M plan without significant modification. In the case of the Windsor (South) site, construction generally complied with the D & M plan with the exception of the minor changes more fully described in my July 12, 1991 letter to you which addressed Mr. Bradshaw Smith's concerns (copy attached). In addition, at the Town's request, the end of the access road was surfaced with gravel to aid in road stability and erosion control.

I apologize for any inconvenience caused by the delay in submitting this report.

Very truly yours,

David S. Malko, P.E.
Manager, Engineering
& Regulatory Services

DSM:kd
Attachment

METRO MOBILE
The Cellular Phone Company
20 Alexander Drive
P.O. Box 5029
Wallingford, CT 06492
203-269-8858

July 12, 1991

Mr. Joel M. Rinebold
Connecticut Siting Council
136 Main Street
Suite 401
New Britain, CT 06051

Re: Docket No. 137 - Windsor (South) Cell Site

Dear Mr. Rinebold:

This is in response to Mr. Bradshaw Smith's May 28, 1991, comments concerning deviations from the Development and Management Plan (D&M plan) for the above reference site. The following addresses Mr. Smith's concerns.

One general issue which has contributed to the underlying concerns expressed in Mr. Smith's letter has been that CL&P has not yet installed the underground cable for the site. Early during the construction process it became apparent that CL&P was not going to be able to install the electric service in the desired time frame. At that time Metro Mobile offered to run conduit at Metro Mobile's expense so as not to require the fields to be disturbed again. CL&P, however, insisted on direct burial of its cable which will require further land disturbance at the site. Metro Mobile, therefore, has not fully restored the site, but will do so immediately after CL&P completes its trenching, which is currently scheduled for July 22, 1991.

The following addresses Mr. Smith's specific concerns:

1) The temporary access road was built, after consultation with the Town of Windsor, in such a manner that would allow the road to serve as both the temporary construction access and final permanent access in order to disturb the land only once. This road will be restored to the level specified in the D&M plan for the permanent road.

2) The culvert is made of corrugated metal pipe as specified in the D&M plan. A plastic culvert end has been placed on the ends of the pipe rather than the metal ends specified. We do not believe this change is significant. As indicated above, the site is not yet fully restored and therefore the grass has not fully taken hold in this area.

3) The lawn pavers are made of plastic which is consistent with the D&M plan, in that the site plan specifies "or approved equal". Plastic lawn pavers are equally as strong as concrete and are lighter and much easier to work with. The Town was not opposed to this change.

4) The grass has not taken over the lawn pavers due to the site not yet being fully restored and the road still being used quite often for construction related purposes.

5) Again, the site is not yet fully constructed so full restoration has not yet taken place.

6) The transformer pad was just recently installed within the fenced compound as indicated in the D&M plan.

7) The erosion to date has been minimal as Mr. Smith has indicated, and is regularly being monitored by Metro Mobile. Should future erosion take place Metro Mobile will take the necessary and proper actions to control both erosion and sedimentation.

Metro Mobile takes Mr. Smith's concerns seriously and will monitor the site regularly to make sure the site is in compliance with the D&M plan. After full construction has taken place Metro Mobile will restore the site fully and remediate any future erosion which could take place.

I hope this response adequately addresses the Council's and Mr. Smith's concerns.

Very truly yours,

David S. Malko, P.E.
Manager, Engineering &
Regulatory Services

DM:jaw

STATE OF CONNECTICUT

CONNECTICUT SITING COUNCIL

136 Main Street, Suite 401
New Britain, Connecticut 06051
Phone : 827-7682

April 18, 1991

Mr. David S. Malko
Metro Mobile
20 Alexander Drive
P.O. Box 5029
Wallingford, CT 06492

RE: DOCKET NO. 137 - Metro Mobile CTS of Hartford, Inc., Certificate of Environmental Compatibility and Public Need for the construction, maintenance, and operation of cellular facilities in the Towns of East Hartford, South Windsor, and Windsor Connecticut. South Windsor Cell Site: Development and Management Plan

Dear Mr. Malko:

At a meeting of the Connecticut Siting Council (Council) on April 18, 1991, the Council considered and approved the Development and Management (D&M) Plan for the South Windsor telecommunications tower site.

This approval applies only to the South Windsor site. Modifications to this D&M plan requires advance Council notification and approval. Please notify the Council when construction is complete.

Enclosed for your reference is a copy of the staff report for this D&M plan.

Very truly yours,

Gloria Dibble Pond/PE

Gloria Dibble Pond
Chairperson

GDP/foc
enclosure

cc: Parties & Intevenors
5262E-3

STATE OF CONNECTICUT

CONNECTICUT SITING COUNCIL

136 Main Street, Suite 401
New Britain, Connecticut 06051
Phone: 827-7682

Docket No. 137
Metro Mobile CTS of Hartford, Inc.
Development and Management Plan
South Windsor Cell Site
April 18, 1991

On April 8, 1991, Metro Mobile of CTS of Hartford, Inc. (Metro Mobile), submitted a Development and Management (D&M) Plan for the South Windsor cell site to the Connecticut Siting Council (Council). This D&M plan describes construction of a 110-foot monopole, equipment building, and security fence.

Access to this site would be over an existing driveway along the east property line to the rear of the lot. Sedimentation control barriers would be placed along the site's southern boundary. The D&M plan depicts a catch basin and two, 24-foot, four-foot square galleries to be installed just south of the site to control runoff on the lessor's property. Although this was not in the original proposal and because groundwater is three feet below grade, staff agrees with the proposed drainage control measures.

The 110-foot monopole tower has been relocated to the east side of the leased parcel to reduce the fall zone area to adjacent properties. A smaller 14-foot by 40-foot equipment building would be constructed instead of the proposed 20-foot by 40-foot building. The white pine trees located to the north of the site would not be disturbed.

The utilites serving the site would be placed underground approximately 390 feet from Burnham Street to the equipment building. The utility easement has been relocated, at the request of the Connecticut Light and Power and Company, to the west side of the lessor's property and has lessor's approval. The building foundation would be set 3.5 feet deep and the tower foundation approximately would be a 7-foot cube set seven feet deep and would be constructed per manufacturer's specifications to include Electronic Industry Association Standard No. 222. However there is ambiguity in the submittal for wind and ice loading of the tower and Metro Mobile confirms that the tower structure would be constructed for a wind loading of 90 MPH with .5-inch radial ice. The overall height of the tower with antennas would be no higher than 123 feet above ground level.

An eight-foot, chain link fence with security wire and one, 10-foot, two-leaf gate and one, four-foot, one-leaf gate would surround the site and crushed stone to a depth of four inches would be placed with the fenced area. Metro Mobile would repave and/or seed areas disturbed by construction.

All of the Council's orders regarding this D&M plan have been complied with and staff therefore recommends approval of this D&M plan.

Fred Cunliffe
Siting Analyst

5262E

Date: July 25,1990

Docket No. 137
Page 1 of 2

LIST OF PARTIES AND INTERVENORS - SERVICE LIST

tatus Granted	Status Holder (name, address & phone number)	Representative (name, address & phone number)
'arty [X] :ntervenor [ ]	Metro Mobile CTS of Hartford, Inc. 20 Alexander Drive P. O. Box 5029 Wallingford, CT 06492 Attn: Gary Schulman Vice President Of Northeast Operations	Robinson & Cole One Commercial Plaza Hartford, CT 06103-3597 (203) 275-8200 Attn: Earl W. Phillips
Pa [X] Intervenor [ ]	Town of East Hartford	Mr. G. Barry Goodberg Asst. Corporation Counsel Town of East Hartford 740 Main Street East Hartford, CT 06108 (203) 289-2781
Party [ ] Intervenor [X]	Town of South Windsor	Jean E. Zurbrigen Town Manager Town of South Windsor 1540 Sullivan Avenue South Windsor, CT 06074 (203) 644-2511

LIST OF PARTIES AND INTERVENORS - SERVICE LIST

Status Granted	Status Holder (name, address & phone number)	Representative (name, address & phone number)
Party [ ] Intervenor [X]	SNET Cellular, Inc.	Peter J. Tyrrell, Esq. SNET Cellular, Inc. 227 Church Street New Haven, CT 06506
Party [ ] Intervenor [ ]		
Party [ ] Intervenor [ ]		

STATE OF CONNECTICUT

CONNECTICUT SITING COUNCIL

136 Main Street, Suite 401
New Britain, Connecticut 06051
Phone: 827-7682

March 12, 1991

Mr. David S. Malko
Metro Mobile
20 Alexander Drive
P.O. Box 5029
Wallingford, CT 06492

RE: DOCKET NO. 137 - Metro Mobile CTS of Hartford, Inc., Certificate of Environmental Compatibility and Public Need for the construction, maintenance, and operation of cellular facilities in the Towns of East Hartford, South Windsor, and Windsor Connecticut. Windsor (South) Cell Site: Development and Management Plan Tower Foundation Design

Dear Mr. Malko:

At a meeting of the Connecticut Siting Council (Council) on March 11, 1991, the Council considered and approved the tower foundation design of the Development and Management (D&M) Plan for the Windsor (South) telecommunications tower site.

Enclosed for your reference is a copy of the staff report for this D&M plan.

This approval applies only to the Windsor (South) site. Modifications to this D&M plan requires advance Council notification and approval.

Very truly yours,

Gloria Dibble Pond

Gloria Dibble Pond
Chairperson

GDP/foc
enclosure

5077E

STATE OF CONNECTICUT

CONNECTICUT SITING COUNCIL

136 Main Street, Suite 401
New Britain, Connecticut 06051
Phone: 827-7682

Docket 137
Metro Mobile CTS of Hartford, Inc.
Development and Management Plan
Tower Foundation Design
Windsor (South) Site
March 11, 1991

On March 4, 1991, Metro Mobile CTS of Hartford, Inc. (Metro Mobile) submitted to the Connecticut Siting Council (Council) a tower foundation design pursuant to a Council's condition of approval of the Development and Management Plan for the Windsor (South) cell site.

The tower foundation would be placed on the west side of the site to the rear of the equipment building. A pier footing (caisson) would be drilled to a depth of 70 feet with a six-foot diameter. Construction of the caisson would be performed and inspected by the project geotechnical engineer. Concrete work would be in accordance with "Specifications for Structural Concrete for Buildings", ACI 301-89, including reinforcing steel. A soil boring report indicates no bedrock would be encountered and the ground water level is at 3.5 feet. If water is encountered during the placement of the tower foundation footing the water would be pumped to a 1,000 gallon detention tank and the overflow would be directed through the sedimentation barriers to the south of the site. This foundation design has a wind load of 90 mph with a 1/2 inch radial ice.

All of the Council's orders regarding this D&M plan have been complied with and staff therefore recommends approval of the tower foundation design as planned.

Fred Cunliffe
Siting Analyst

5077E-4

STATE OF CONNECTICUT

CONNECTICUT SITING COUNCIL

136 Main Street, Suite 401
New Britain, Connecticut 06051
Phone: 827-7682

February 14, 1991

Mr. David S. Malko
Metro Mobile
20 Alexander Drive
P.O. Box 5029
Wallingford, CT 06492

RE: DOCKET NO. 137 - Metro Mobile CTS of Hartford, Inc., Certificate of Environmental Compatibility and Public Need for the construction, maintenance, and operation of cellular facilities in the Towns of East Hartford, South Windsor, and Windsor Connecticut. Windsor (South) Cell Site: Development and Management Plan

Dear Mr. Malko:

At a meeting of the Connecticut Siting Council (Council) on February 11, 1991, the Council considered and approved the Development and Management (D&M) Plan for the Windsor (South) telecommunications tower site with the condition that the tower foundation design would be submitted for Council approval prior to the construction of the tower and tower foundation. All other site construction may proceed.

The Council's approval is contigent upon moving the sedimentation barrier along the south border of the site to the edge of the cleared area and to avoid removing trees of significant size, particularly a tree on the northwest corner of the site. Enclosed for your reference is a copy of the staff report for this D&M plan.

This approval applies only to the Windsor (South) site. Modifications to this D&M plan requires advance Council notification and approval.

Very truly yours,

Gloria Dibble Pond

Gloria Dibble Pond
Chairperson

GDP/foc
enclosure

cc: Parties & Intevenors
5077E

STATE OF CONNECTICUT

CONNECTICUT SITING COUNCIL

136 Main Street, Suite 401
New Britain, Connecticut 06051
Phone: 827-7682

Docket 137
Metro Mobile CTS of Hartford, Inc.
Development and Management Plan
Windsor (South) Site
February 11, 1991

On Janauary 24, 1991, Metro Mobile CTS of Hartford, Inc. (Metro Mobile) submitted to the Connecticut Siting Council (Council) a Development and Management (D&M) Plan for the Windsor (South) cell site. The site includes construction of a 100-foot monopole and 20-foot by 30-foot equipment building.

A temporary access road approximately 550 feet in length and 12 feet wide would be constructed from the edge of the parking lot to the site. The first 160 feet would be filled to raise the grade of the road and moved approximately eight feet south of the permanent easement to allow easier access for construction vehicles. After construction of the site, the temporary access road would be covered with top soil and seeded. The first 160 feet would involve removal of some of the fill, realignment of the access road within the easement, relocation and improvement of a 12-inch culvert, and the installation of lawn pavers. Field observations revealed that the permanent access road would be placed parallel on a slope for approximately 300 feet but tracks from vehicles showed that they have traveled 10 to 15 feet south of the marked easement indicating prudent avoidance of driving along the slope. Although Metro Mobile is aware of this slope no cut and fill would be required to level the access road and the applicant contends it is within safe operating limits for service vehicles.

The D&M plan depicts 330 linear feet of siltation fences and stone and fabric sedimentation barriers would be installed at the beginning of the temporary access road for approximately 240 feet to include protection of a field drain north of the road. The site would be surrounded by staked haybales except for the east side. Because of the close proximity to wetlands staff recommends the south border of sedimentation barriers be moved to the edge of the cleared area. Also, staff recommends that a tree on the northwest corner of the site not be removed as well as other trees of significant size bordering the site. Eleven, six-foot evergreen trees would be planted along the east side of the site providing some shielding to the playing fields. Metro Mobile would stabilize and restore all areas disturbed by construction including the temporary access road with loam and seed except within the fenced area which would have crushed stone throughout at a depth of four-inches.

The equipment building and tower would be placed within a 50-foot by 60-foot leased parcel surrounded by an eight-foot chain link security fence with a 10-foot, two-leaf gate for entry. The equipment building would be a prefabricated, concrete, 20-foot by 30-foot structure used to house telecommunications equipment. The utilities serving the site would be brought in underground along a 655 foot long, 20-foot wide easement from an existing utility pole on the parking lot. The monopole tower would have two cellular platforms, one supporting 12 antennas and the other 4 antennas, at a height of 84 feet and 97 feet, respectively. The overall height of the tower and antennas would be no higher than 113 feet. A soil boring report indicates the ground water level is at 3.5 feet. If water is encountered during the placement of the equipment building and tower foundation footings the water would be pumped to a 1,000 gallon detention tank and the overflow would be directed through the sedimentation barriers to the south of the site.

Although no drawings of the tower foundation have been submitted, Metro Mobile requests consideration of this item at a later date, and approval of the D&M plan as submitted. This would allow for placement of sedimentation barriers, site clearing, construction of the equipment building foundation and building, and a temporary access road to accomodate the lease which requires an accelerated construction schedule so as not to interfere with the use of the playing fields. Construction of the tower foundation and tower would commence only with Council approval.

To date, the Town of Windsor has not formerly approved the D&M plan, but they have not objectioned to the plan when consulted by Metro Mobile.

Fred Cunliffe
Siting Analyst

5077E

Date: July 25,1990

Docket No. 137
Page 1 of 2

LIST OF PARTIES AND INTERVENORS - SERVICE LIST

Status Granted	Status Holder (name, address & phone number)	Representative (name, address & phone number)
Party [X] Intervenor [ ]	Metro Mobile CTS of Hartford, Inc. 20 Alexander Drive P. O. Box 5029 Wallingford, CT 06492 Attn: Gary Schulman Vice President Of Northeast Operations	Robinson & Cole One Commercial Plaza Hartford, CT 06103-3597 (203) 275-8200 Attn: Earl W. Phillips
Pa [X] Intervenor [ ]	Town of East Hartford	Mr. G. Barry Goodberg Asst. Corporation Counsel Town of East Hartford 740 Main Street East Hartford, CT 06108 (203) 289-2781
Party [ ] Intervenor [X]	Town of South Windsor	Jean E. Zurbrigen Town Manager Town of South Windsor 1540 Sullivan Avenue South Windsor, CT 06074 (203) 644-2511

LIST OF PARTIES AND INTERVENORS - SERVICE LIST

Status Granted	Status Holder (name, address & phone number)	Representative (name, address & phone number)
Party [ ] Intervenor [X]	SNET Cellular, Inc.	Peter J. Tyrrell, Esq. SNET Cellular, Inc. 227 Church Street New Haven, CT 06506
Party [ ] Intervenor [ ]		
Party [ ] Intervenor [ ]		

METRO MOBILE

The Cellular Phone Company

20 Alexander Drive
P.O. Box 5029
Wallingford, CT 06492
203-269-8858

M E M O R A N D U M

TO: Gary Schulman
Art Lane
Dave Malko
Ron Losefsky
Marty Rippe
Howard Polnow

FROM: Jim Walz

SUBJ: Docket 137 - (Windsor South) Development and Management Plan Approval

DATE: February 20, 1991

By letter dated February 14, 1991, the Connecticut Siting Council approved the D&M Plan for the Windsor (South) site with the condition that the tower foundation design would be submitted for Council approval prior to the construction of the tower and tower foundation. ALL OTHER SITE CONSTRUCTION MAY PROCEED!!

In addition, THE SEDIMENTATION BARRIER ALONG THE SOUTH BORDER OF THE SITE MUST BE MOVED TO THE EDGE OF THE CLEARED AREA, and DURING CLEARING AVOIDANCE OF REMOVING TREES OF SIGNIFICANT SIZE, PARTICULARLY A TREE ON THE NORTHWEST CORNER OF THE SITE MUST BE EXERCISED!!

JAW

STATE OF CONNECTICUT

CONNECTICUT SITING COUNCIL

136 Main Street, Suite 401
New Britain, Connecticut 06051
Phone: 827-7682

November 21, 1990

Mr. Gary Schulman
Vice President of
Northeast Operations
Metro Mobile CTS of
Hartford, Inc.
20 Alexander Drive
P. O. Box 5029
Wallingford, CT 06492

RE: DOCKET NO. 137 - An application of Metro Mobile CTS of Hartford, Inc., for a Certificate of Environmental Compatibility and Public Need for the construction, maintenance, and operation of cellular facilities in the Towns of East Hartford, South Windsor, and Windsor, Connecticut.

Dear Mr. Schulman:

By its Decision and Order dated November 14, 1990, the Connecticut Siting Council granted a Certificate of Environmental Compatibility and Public Need for the construction, maintenance, and operation of cellular facilities in the Towns of South Windsor and Windsor, Connecticut.

Enclosed are the Council's Certificate, Findings of Fact, Opinion, and Decision and Order.

Very truly yours,

Joel M. Rinebold
Executive Director

JMR/bw

Enclosures - 3

cc: Earl W. Phillips
Council Members

4864E-6

DOCKET NO. 137 - An application of Metro Mobile CTS of Hartford, Inc., for a Certificate of Environmental Compatibility and Public Need for the construction, maintenance, and operation of cellular facilities in the Towns of East Hartford, South Windsor, and Windsor, Connecticut.

Connecticut Siting Council

November 14, 1990

FINDINGS OF FACT

1. Metro Mobile of CTS Hartford, Inc., (Metro Mobile) in accordance with the provisions of sections 16-50g to 16-50z of the Connecticut General Statutes (CGS), applied to the Connecticut Siting Council (Council) on May 17, 1990, for a Certificate of Environmental Compatibility and Public Need (Certificate) for the construction, operation, and maintenance of two telecommunications towers and associated equipment to provide increased domestic public cellular radio telecommunications service (cellular service) in the Towns of Windsor, South Windsor, and/or East Hartford, within the Hartford, Connecticut, New England County Metropolitan Area (NECMA). (Record)

2. Public Notice of the application, as required by CGS section 16-50l, was published twice in the Journal Inquirer and Hartford Courant. (Record)

3. The Council and its staff made inspections at the proposed and alternate cell sites in Windsor, South Windsor, and East Hartford, Connecticut, on August 15, 1990. During the field review, Metro Mobile flew balloons at each proposed and alternate cell site to simulate the height of each proposed and alternate tower. (Record)

4. Pursuant to CGS Section 16-50m, the Council, after giving due notice thereof, held a public hearing for the proposed application on August 15, 1990, beginning at 3:30 p.m., and reconvening at 7:00 p.m., in the South Windsor Town Hall Council Chambers, 1540 Sullivan Avenue, South Windsor, Connecticut. (Record)

5. The parties and intervenors to the proceeding are the applicant and the persons and organizations whose names are listed in the Decision and Order, which accompany these Findings of Fact. (Record)

6. The Department of Environmental Protection (DEP) filed written comments with the Council pursuant to CGS Section 16-50j. (Record)

7. Pursuant to CGS 16-501(e), the applicant provided a technical report and consulted with public officials from each town. (Metro Mobile V)

8. In 1981, the Federal Communications Commission (FCC) recognized the public need for technical improvement, wide-area coverage, high quality service, and establishing a competitive market for mobile telephone service. (Metro Mobile I, p.7; Docket 126, Finding of Fact 8)

9. The FCC has exercised its primary jurisdiction in determining need for the provision of cellular service, and the applicant is not required to demonstrate a public need for the service. (Metro Mobile I, p.7)

10. The FCC has determined that for the public interest two licenses would be granted to encourage competition in providing cellular service in each market area. One license is awarded to a wireline company, the other to a non-wireline company. (Metro Mobile I, p.7; Docket 126, Finding of Fact 10)

11. The FCC pre-empts state regulations in determining technical standards and a competitive market structure. (Metro Mobile I, p.8)

12. The FCC rules permit a licensee to modify its system, including the addition of new cell sites without prior approval by the FCC as long as the licensee's authorized service area is not enlarged. The proposed cell sites in this application would not enlarge Metro Mobile's authorized service area. (Metro Mobile I, p.9)

13. Cellular service consists of small overlapping broadcast regions. These regions or cells are limited in size by the location of a potential site within a cellular grid, its availability, its environmental compatability, and constraints imposed by laws of radio propagation. The system design provides for frequency reuse and handoff capability and must be able to accept orderly system expansion. (Metro Mobile I, tab 11, pp.2,3 & 6; Docket 126, Finding of Fact 12)

14. In selecting a cell site, Metro Mobile found no existing structures of adequate height, structural strength, or space availability in or near the search areas. (Metro Mobile I, Table 11, p.8)

15. The proposed or alternate sites would be sectorized, providing for a maximum call handling capacity by dividing a geographic service area into six areas or

29. The topographic elevation at the proposed site is 60 feet above mean sea level (AMSL). (Metro Mobile I, tab 1, p.6)

30. The proposed East Hartford site is on level terrain within a landscaped area of fruit and evergreen trees that do not exceed 20 feet in height. (Metro Mobile tab 5; DEP letter dated July 10, 1990)

31. The existing zoning of the proposed site is industrial (I-2 zone). Existing adjacent land uses include low density residential development (R-2 zone) to the south and east and industry (I-2 zone) to the north and west. (Transcript, p.133)

32. Utilities to the proposed East Hartford site would come in from Dolores Drive. (Metro Mobile I, tab 1, p.7)

33. Two transmit and six transmit/receive antennas, approximately 13 and 11 feet in length, respectively, would be mounted at the top of the proposed tower for an overall tower height of 113 feet above ground level (AGL). (Metro Mobile I, tab 1, p.8; Metro Mobile III, Q.10)

34. The fall zone of the proposed East Hartford tower would encompass three properties owned by Walter Demusz (Lessor), Burnham Business Park Associates, and Daniel Filimeno. Metro Mobile's equipment building and a small concrete building on the Lessor's property would be the only structures within the fall zone. (Metro Mobile III, Q.7, Attachment 5)

35. At the proposed East Hartford site the tower could be moved to the opposite corner and the building rotated 90 degrees clockwise so that the tower fall zone would only include the lessor's property and Delores Street. (Transcript, p.113)

36. At the proposed East Hartford site there are nine residences within a 1000-foot radius of the proposed tower. The nearest residence is located 620 feet from the proposed tower. (Metro Mobile I, tab 5, p.2)

37. The Town of East Hartford is not in favor of the proposed East Hartford site because of the close proximity of the proposed facility to a low density residential area. (Transcript p.40)

38. An existing 21-inch clay pipe crosses Metro Mobile's leased parcel at the proposed East Hartford site. The Town of East Hartford plans to abandon this drainage pipe. Runoff that previously flowed through this

Windsor, and Windsor proposed and alternate towers. No obstruction marking or lighting would be necessary for any of the proposed or alternate towers. (Metro Mobile I, tabs 1 and 2, p.12, tabs 6 and 7, p.13)

23. There are no known extant populations of federally endangered and threatened species or Connecticut "species of special concern" occurring at the East Hartford, South Windsor, and Windsor proposed and alternate sites. However, DEP records indicate that the federally endangered bald eagle may use large trees to perch during the winter in the vicinity of the Windsor alternate site. The DEP's Wildlife Division notes that "work activity west of the railroad tracks will not seriously effect wintering eagles." (Metro Mobile VI; DEP letters dated May 14 and May 31, 1990.)

Proposed East Hartford Tower Site

24. The proposed East Hartford cell site would be located to the rear of 303 Burnham Street, East Hartford. The proposed site is a 60-foot by 60-foot leased parcel within a 2.8 acre parcel owned by Walter Demusz. The large lot is used for manufacturing. The proposed tower would be located approximately 12.5 feet east of Dolores Drive, approximately 605 feet south of Burnham Street, approximately 162 feet west of an abutting property owned by Jene E. Britton, and approximately 12.5 feet north of an abutting property owned by Walter Demusz. (Metro Mobile I, tab 1, p.1, tab 5, p.1; Metro Mobile 3, Q.7, attachment 5)

25. At the proposed East Hartford site a 100-foot, self-supporting monopole tower and 20-foot by 40-foot equipment building would be constructed on the leased parcel. (Metro Mobile I, tab 1, p.1)

26. The preferred access to the proposed East Hartford site would be directly from Dolores Drive, a private road owned by Burnham Business Park Associates, which may be accepted as a public road by the Town of East Hartford. If this access does not become available, an alternate access approximately 600 feet in length could be constructed along an easement on the western property line of Walter Demusz parallel to Delores Drive extending from Burnham Street to the proposed cell site. (Metro Mobile I, tab 1, p.1; Metro Mobile IV, Q.10)

27. Dolores Drive was approved by the East Hartford Planning and Zoning Commission and was built within the last two years. The Town of East Hartford has yet to accept this road for public use. (Transcript, pp.139-141)

29. The topographic elevation at the proposed site is 60 feet above mean sea level (AMSL). (Metro Mobile I, tab 1, p.6)

30. The proposed East Hartford site is on level terrain within a landscaped area of fruit and evergreen trees that do not exceed 20 feet in height. (Metro Mobile tab 5; DEP letter dated July 10, 1990)

31. The existing zoning of the proposed site is industrial (I-2 zone). Existing adjacent land uses include low density residential development (R-2 zone) to the south and east and industry (I-2 zone) to the north and west. (Transcript, p.133).

32. Utilities to the proposed East Hartford site would come in from Dolores Drive. (Metro Mobile I, tab 1, p.7)

33. Two transmit and six transmit/receive antennas, approximately 13 and 11 feet in length, respectively, would be mounted at the top of the proposed tower for an overall tower height of 113 feet above ground level (AGL). (Metro Mobile I, tab 1, p.8; Metro Mobile III, Q.10)

34. The fall zone of the proposed East Hartford tower would encompass three properties owned by Walter Demusz (Lessor), Burnham Business Park Associates, and Daniel Filimeno. Metro Mobile's equipment building and a small concrete building on the Lessor's property would be the only structures within the fall zone. (Metro Mobile III, Q.7, Attachment 5)

35. At the proposed East Hartford site the tower could be moved to the opposite corner and the building rotated 90 degrees clockwise so that the tower fall zone would only include the lessor's property and Delores Street. (Transcript, p.113)

36. At the proposed East Hartford site there are nine residences within a 1000-foot radius of the proposed tower. The nearest residence is located 620 feet from the proposed tower. (Metro Mobile I, tab 5, p.2)

37. The Town of East Hartford is not in favor of the proposed East Hartford site because of the close proximity of the proposed facility to a low density residential area. (Transcript p.40)

38. An existing 21-inch clay pipe crosses Metro Mobile's leased parcel at the proposed East Hartford site. The Town of East Hartford plans to abandon this drainage pipe. Runoff that previously flowed through this

21-inch pipe would be diverted to a newly installed 24-inch pipe from a catch basin located north of the proposed site on the Lessor's property to a new catch basin on Dolores Drive. Metro Mobile could not identify any existing drainage easements or other rights-of-way associated with the existing 21-inch clay pipe. (Metro Mobile Late File 10)

39. The total estimated costs of construction, to be incurred by Metro Mobile, for the proposed East Hartford site would be:

Radio equipment	$483,400
Tower and antennas	$33,360
Power systems	$12,000
Building costs	$68,300
Site preparation/Installation	$134,000
Total	$731,060

(Metro Mobile, tab 1, p.9)

Alternate South Windsor Tower Site

40. As an alternate to the proposed East Hartford cell site, Metro Mobile proposes a cell site in South Windsor. The alternate South Windsor cell site would be located to the rear of 190 Burnham Street, South Windsor. The alternate South Windsor site would be a 35-foot by 70-foot leased parcel within a larger 1.04 acre parcel owned by Abraham Glassman. The remainder of the lot is used for industrial purposes. The proposed tower would be located approximately 15 feet east of abutting property owned by the State of Connecticut, approximately 10 feet south of abutting property owned by Meyer Gage Co., Inc., 100 feet west of abutting property owned by Albert B. Meyer, and approximately 382 feet north of Burnham Street. (Metro Mobile I, tab 2, p.1, tab 5, p.10; Metro Mobile III. Q.7, Attachment 5)

41. A 110-foot, self-supporting monopole tower and 20-foot by 40-foot equipment building would be constructed on the alternate South Windsor site. (Metro Mobile I, tab 2, p.1)

42. Access to the alternate South Windsor site would be over an existing driveway along the eastern property boundary on the lessor's property. (Metro Mobile I, tab.2, p.1; Metro Mobile II, Q.7)

43. The topographic elevation at the alternate site is 54 feet AMSL. (Metro Mobile I, tab 2, p.6)

44. The alternate South Windsor tower would be located on relatively level terrain within a partially cleared area

north of the existing parking area. White pine trees approximately 15 inches to 20 inches in diameter border the site to the north. (Metro Mobile I, tab 2, p.6, and DEP letter dated July 10, 1990)

45. The fall zone of the alternate South Windsor tower would encompass seven properties owned by Abraham Glassman (Lessor); Albert B. Meyer; Meyer Gage Co., Inc.; State of Connecticut; Consolidated Rail Corporation; Richard and Bernice A. Tonucci; and Arthur and Agnes Spielman. The north corner of the Lessor's building and Metro Mobile's equipment building would be the only structures within the fall zone. (Metro Mobile III, Q.7, Attachment 5)

46. The existing zoning of the alternate South Windsor site is industrial. Use of surrounding properties is for industry and commercial development. (Metro Mobile I, tab 2, p.6)

47. Utilities would be supplied to the alternate South Windsor site via an underground line along a 340-foot easement from Burnham Street. (Metro Mobile I, tab 5, p.10)

48. Two transmit and six transmit/receive antennas, approximately 13 and 11 feet in length, respectively, would be mounted at the top of the alternate South Windsor tower for an overall height of 123 feet AGL. (Metro Mobile I, tab 2, p.8; Metro Mobile III, Q.10)

49. At the alternate South Windsor site there are nine residences within 1000-feet of the proposed tower. The nearest residence is located 300 feet from the proposed tower. (Metro Mobile I, tab 5, p.11)

50. The Town of South Windsor does not object to the alternate South Windsor tower site; however, concerns related to visibility of the facility and power density emissions were stated. (Transcript pp. 32-37)

51. The estimated costs of construction, to be incurred by Metro Mobile, for the alternate South Windsor site would be:

Radio equipment	$483,400
Tower and antenna	$38,320
Power systems	$12,000
Building costs	$68,300
Site preparation/Installation	$159,000
Total	$761,020

(Metro Mobile I, tab 2, p.9)

Proposed East Hartford and Alternate South Windsor Sites

52. The proposed East Hartford or alternate South Windsor site would provide additional cellular traffic handling capacity and provide cellular service along U.S. Routes 5, 6, 44A, and Interstate Routes 91, 291, and 384. The proposed or alternate site would off-load traffic from the existing Hartford and Vernon cell sites, the approved Manchester cell site, and a proposed Windsor cell site. (Metro Mobile I, tab 2, p.22)

53. Fourteen sites were considered and twelve sites were rejected by Metro Mobile for the proposed East Hartford and alternate South Windsor site. Reasons for rejection are:
a) landowners unwilling to lease or sell land for construction of a cell site,
b) conflict with residential subdivision and/or industrial park development, and
c) close proximity to residences and wetlands.
(Metro Mobile I, tab 3)

54. According to the Connecticut Historical Commission, the proposed East Hartford and alternate South Windsor cell sites would have "no impact with respect to historic, architectural, or archaeological resources listed on or eligible for the National or State Register of Historic Plans". (Metro Mobile I, tab 4)

55. With 90 channels operating simultaneously at maximum power, the worst case electromagnetic radio frequency power density level would be 0.1526 milliwatts per square centimeter (mW/cm^2) at the base of the proposed East Hartford tower and 0.1239 mW/cm^2 at the base of the alternate South Windsor tower. The American National Standards Institute (ANSI) Safety Standard for the proposed frequency level 870-880 MHz, as adopted by the State of Connecticut pursuant to DEP regulations, is 2.92 mW/cm^2. (Metro Mobile I, tab 5, pp.2 and 11).

Proposed Windsor Tower Site

56. The proposed Windsor cell site would be located within a 34.43 acre recreation parcel, known as the L.P. Wilson Community Center, 599 Matianuck Avenue, Windsor, Connecticut. The proposed site would be a 50-foot by 60-foot leased parcel and the proposed tower would be located approximately 125 feet west of a soccer field sideline and approximately 285 feet east of the nearest property line. (Metro Mobile I, tab 10, p.1, tab 6, p.1; Metro Mobile III, Q.7, Attachment 5)

57. A proposed 100-foot, self-supporting monopole tower and a 20-foot by 30-foot equipment building would be constructed on the proposed Windsor leased parcel. (Metro Mobile I, tab 6, p.1, tab 10, p.1)

58. The proposed Windsor site access would be along a 20-foot wide by 655-feet long easement from the southwest corner of the Community Center parking lot to the leased parcel between soccer and baseball playing fields. Pre-formed concrete pads (lawn pavers) would be installed, backfilled, and seeded for approximately 100 feet from the parking lot providing a stabilized vegetated accessway. All disturbed areas within the accessway would be loamed and seeded once site construction is complete. (Metro Mobile I, tab 6, p.5 and 7; Metro Mobile III, Q.7, attachment 5)

59. The proposed Windsor site is zoned NZ (Public and Quasi Public Zoning). Land within a quarter mile radius of the proposed Windsor site is zoned for residential and agricultural uses. (Metro Mobile I, tab 6, p.6)

60. The topographic elevation at the proposed Windsor site is 94 feet AMSL. (Metro Mobile I, tab 6, p.6)

61. The proposed Windsor cell site would be within a wooded area with trees standing approximately 40 to 80 feet high. The proposed Windsor site is approximately 30 feet north of an intermittent stream and a wetland borders the site on three sides. The northwest and southwest corners of the leased parcel are approximately 14 and 17 feet, respectively, from the wetland boundaries. (Metro Mobile I, tab p.7; Metro Mobile III, Q.7; Metro Mobile IV, Q.4)

62. The Town of Windsor has an approved option/lease and has secured a Windsor Inland Wetlands and Watercourse permit for the proposed Windsor site. No Army Corps of Engineer permit would be required. (Metro Mobile I, tab 6, p.6 and 7; Metro Mobile II, Q.2, Attach 2; Metro Mobile IV, Q.19)

63. Trees and understory growth would be removed within a 70-foot by 105-foot "clearing limit" area of the proposed Windsor site. No trees of significant size would be removed, but branch pruning might be needed to provide clearance for construction of the proposed tower. (Metro Mobile I, tab 10, p.2, Metro Mobile IV, Qs.3 and 7; Transcript pp.96 and 97)

64. Utilities would be brought into the proposed Windsor site underground along the 20-foot wide utility and access strip from an existing utility pole located on the Community Center property. (Metro Mobile I, tab 6, p.7; Metro Mobile III, Q.7, attachment 5)

65. Metro Mobile would not construct the proposed Windsor site during the Town's soccer season. Routine maintenance would be planned not to interfere with lessor's use of the playing fields. (Transcript pp. 73 and 74)

66. The fall zone of the proposed Windsor tower would be on the lessor's property. Metro Mobile's equipment building would be the only structure within the fall zone. (Metro Mobile III, Q.7, Attachment 5)

67. Two transmit and six transmit/receive antennas, approximately 13 and 11 feet in length, respectively, would be mounted at the top of the proposed Windsor tower for an overall tower height of 113 feet AGL. (Metro Mobile I, tab 6, p.9; Metro Mobile III, Q.10)

68. Approximately 61 residences are located within a 1,000 foot radius of the proposed Windsor tower. The closest residence is approximately 380 feet west of the proposed tower. The L.P. Wilson Community Center is approximately 620 feet northeast of the proposed tower. (Metro Mobile I, tab 10, p.3)

69. The total estimated costs of construction, to be incurred by Metro Mobile, for the proposed Windsor site would be:

Radio Equipment	$491,600
Tower and Antenna	$33,360
Power Systems	$12,000
Building	$68,300
Site Preparation/Installation	$169,000
Total	$774,260

(Metro Mobile I, tab 6, p.10)

Alternate Windsor Tower Site

70. As an alternative to the proposed tower site , Metro Mobile proposes an alternate site on a 2.0 acre vacant lot at 280 T East Barber Street, Windsor, Connecticut, owned by Norman Grady and Stanley Cohen. The alternate tower would be 130 feet south of East Barber Street and approximately 130 feet east of abutting property owned by Vincent Spern and Salvatore Santangelo. (Metro Mobile I, tab 7, p.1; Metro Mobile III, Q.7, attachment 5)

71. A 130-foot, self-supporting monopole tower and a 14-foot by 40-foot equipment building would be constructed on the leased lot of the alternate Windsor site. (Metro Mobile I, tab 7, p.1)

72. A new gravel driveway approximately 10 feet in length would be constructed from East Barber Street to the gate of the leased parcel and would serve as a vehicle access to the alternate Windsor site. (Metro Mobile III, Q.7, attachment 5)

73. The topographic elevation of the alternate Windsor tower site is 32 feet AMSL. (Metro Mobile I, tab 7, p.6)

74. The alternate site is zoned I-1 (industrial). Other zones surrounding the alternate Windsor site are industrial, residential, and agricultural. Also, the cell site is located within a 100-year flood plain. (Metro Mobile I, tab 7, pp.6 and 7)

75. At the alternate Windsor site, "controlled fill" would be necessary to raise the floor of the proposed equipment building approximately four feet above ground elevation to keep it above the 100-year flood plain. "Controlled fill" would be compacted, free draining soil (typically gravel). (Metro Mobile III Q.7, attachment 5; Metro Mobile IV, Q.23)

76. The alternate Windsor site is within a vacant parcel containing small trees and herbaceous growth. An inland wetland is located on the southern portion of the leased parcel. The wetlands are outside the proposed fenced facility and outside the construction area. No Inland Wetland and Watercourse permit would be necessary to develop this site. (Metro Mobile I, tab 7, p.7)

77. Utility connections to the alternate Windsor site would be from existing utility poles on the south side of East Barber Street. (Metro Mobile I, tab 7, p.1)

78. The fall zone of the alternate Windsor tower would be within the leased parcel. Metro Mobile's equipment building would be the only structure within the fall zone. (Metro Mobile I, tab 7, p.1)

79. The Connecticut River would be approximately 1,320 feet east of the alternate Windsor site. Also, 55 residences would be located within a 1,000-foot radius of the alternate tower with all being located west and north of the cell site. The closest residence would be 220 feet northwest of the alternate tower base. (Metro Mobile I, tab 7, p.7).

80. Two transmit and six transmit/receive antennas, approximately 13 and 11 feet in length, respectively, would be mounted at the top of the alternate Windsor tower for an overall tower height of 143 feet AGL. (Metro Mobile I, tab 7, p.9; Metro Mobile III, Q.10)

81. The total estimated costs of construction, to be incurred by Metro Mobile, for the alternate Windsor site would be:

Radio Equipment	$491,600
Tower and antenna	$39,800
Power systems	$12,000
Building	$68,300
Site preparation/Installation	$159,000
Total	$770,700.

(Metro Mobile I, tab 7, p.10)

Proposed and Alternate Windsor Sites

82. Ten sites were considered and eight sites were rejected by Metro Mobile for the proposed and alternate Windsor site. Reasons for rejection are:
   a) inability to co-exist on an AM transmitting tower,
   b) incompatible with existing and future land use by town and private landowners, and
   c) close proximity to residences.

(Metro Mobile I, tab 8)

83. According to the Connecticut Historical Commission, the proposed and alternate Windsor cell sites would have no effect with respect to historic, architectural, or archaeological resources. (Metro Mobile I, tab 9)

84. The proposed or alternate Windsor site would provide additional cellular traffic handling capacity and provide cellular service along U.S. Route 5, and Interstate Routes 84, 91, and 291. The proposed or alternate site would off-load traffic from existing cell sites in Hartford and Windsor, the approved northwest Hartford cell site, and the proposed East Hartford or alternate South Windsor cell site. (Metro Mobile I, tab 6, p.24)

85. Visibility of the proposed Windsor site would be limited due to the heavily wooded area. Approximately 20 feet of the proposed tower would rise above the tree tops. (Metro Mobile I, tab 6, p.7)

86. The alternate Windsor tower would be located in an open area along Interstate 291 and the Connecticut River. Although 60-foot to 80-foot trees would screen the alternate Windsor tower to river traffic, as much as 80 to 100 feet of the alternate tower would be visible to Sharson Park and a boat launch approximately 550 feet east of the alternate site. While some vegetative growth would help shield the tower to homes west of the tower, portions of the tower would be visible to adjacent residences. (Metro Mobile I, tab 10, pp.12 and 13).

87. With 90 channels operating simultaneously at maximum power, the worst case electromagnetic radio frequency power density level would be 0.1526 mW/cm^2 at the base of the proposed Windsor tower and 0.0863 mW/cm at the base of the alternate Windsor tower. The ANSI safety standard for the proposed frequency level, 870-880 MHz, as adopted by the State of Connecticut pursuant to DEP regulations is 2.92 MW/cm^2. (Metro Mobile I, tab 10, pp.2 and 12)

DOCKET NO. 137 - An application of Metro Mobile CTS of Hartford, Inc., for a Certificate of Environmental Compatibility and Public Need for the construction, maintenance, and operation of cellular facilities in the Towns of East Hartford, South Windsor, and Windsor, Connecticut.

Connecticut Siting Council

November 14, 1990

OPINION

On May 17, 1990, Metro Mobile of CTS Hartford, Inc. (Metro Mobile), applied to the Connecticut Siting Council (Council) for a Certificate of Environmental Compatability and Public Need (Certificate) to construct, operate, and maintain two cellular telecommunications towers and associated equipment in the Towns of East Hartford, South Windsor, and Windsor, Connecticut.

A determination of public need for cellular telephone facilities has been pre-empted by the Federal Communications Commission (FCC). Under Connecticut State law, the Council must balance the need to develop the proposed sites as cellular telecommunications facilities with the need to protect the environment, including public health and safety.

In finding a proposed tower site, an applicant must find a site or suitable tower to share, offering the desired coverage that would not have substantial effect on the environment and adjacent landowners. Because Metro Mobile does not have the power to take land through eminent domain, acquisition of a site requires consent of the property owners to either lease or sell land rights.

The proposed or alternate sites would be added to an existing cellular network grid to help eliminate the overload of calls between adjacent cell sites on the existing system. However, this added capacity to the existing cellular grid would not expand the existing coverage area, as licensed by the FCC.

The proposed East Hartford site would be located within an industrial zoned area approximately 605 feet south of 303 Burnham Street. The proposed East Hartford site is on level terrain with a small plantation of fruit and pine trees. A low-density residential area is adjacent to the site. Metro Mobile would construct a 100-foot monopole tower with six cellular antennas attached to the top adding 13 feet for an overall structure height of 113 feet above ground level (AGL). A fall zone of this tower would encompass three properties and a private road including Metro Mobile's equipment building and a small concrete building owned by the lessor. An access road

from Dolores Drive has been proposed by the applicant, however, the availability is not certain. The Town of East Hartford approved the construction of Dolores Drive but has not accepted the private road for public use. An alternate accessway over 600 feet from Burnham Road has been proposed but this would cause the removal of more trees if constructed. This alternate access would result in unnecessary construction since it would be parallel to Dolores Drive. In addition, the drainage rights and plans to relocate an existing drainage pipe that crosses Metro Mobile's leased parcel to Dolores Drive are provisional because of the uncertain status of Dolores Drive.

The alternate South Windsor site is within an industrially zoned area approximately 382 feet north of 190 Burnham Street. Metro Mobile would construct a 110-foot monopole tower with six cellular antennas attached to the top adding 13 feet for an overall structure height of 123 feet AGL. The fall zone of the alternate tower would encompass seven properties including a railway as well as the applicant's equipment building. However if the tower and building were moved within the leased parcel the number of properties within the fall zone could be reduced to five. Access to the alternate site would be along an existing driveway. The South Windsor alternate site is on level terrain within a previously disturbed area off the edge of a parking lot with some shrub growth. A stand of pine trees are located along the northern boundary of the leased parcel. If approved, we would require the applicant not to disturb these trees as they could provide screening for the alternate facility.

The Town of East Hartford is not in favor of the proposed tower location because of the visibility to a near by residential area. While the proposed East Hartford site is zoned industrial it does abut an area zoned residential and has some uncertainty where the access road would be constructed as well as the potential to impact a plantation of trees. On the other hand, the Town of South Windsor stated that the alternate tower would be consistent with existing landuses. Although the alternate tower is ten feet higher than the proposed tower, there is little difference in elevation relative to mean sea level and the taller tower would not substantially effect visibility or increase the quality of the applicant's service. Furthermore, we believe the alternate tower is more suitable than the proposed tower because it is well within an established commercially developed area, is closer to compatible transportation arteries, has an existing access road, and is partially screened by some mature pine trees. Consequently, the Council will deny the proposed East Hartford site and issue a Certificate for the alternate South Windsor site.

The proposed Windsor tower site would be located within a public/quasi-public zoned area approximately 285 feet east of the nearest property line and approximately 620 feet southwest of the L.P. Wilson Community Center building. The proposed Windsor site is within a wooded area with trees standing 40 to 80 feet high and surrounded on three sides by a wetland and intermittent stream. Metro Mobile would construct a 100-foot monopole tower with six cellular antennas attached to the top adding 13 feet for an overall structure height of 113 feet AGL. The fall zone of the proposed tower would be completely within the lessor's property with Metro Mobile's building the only structure within the fall zone. The fall zone of the tower would not encroach on any of the nearby playing fields. The accessway would be over a recreation area between two playing fields leading to the site at the edge of the wooded area. The substrate of the accessway would be reinforced for the first 100 feet with the remaining area to be rehabilitated to its original grass state after construction.

The alternate Windsor tower would be within an industrially zoned area approximately 130 feet south of East Barber Street. This site is a two acre lot with a south facing slope covered with shrub-scrub vegetation and a wetland on the southern portion of the parcel. The applicant would construct a 130-foot monopole tower with six cellular antennas attached to the top adding 13 feet for an overall structure height of 143 feet AGL. The fall zone would be within the leased parcel and Metro Mobile's equipment building would be the only structure within the fall zone of the tower. Access to the leased parcel would be directly from East Barber Street and no construction or facility boundaries would impact the wetland, however, the alternate Windsor site is within a 100 year flood plain and approximately 1,300 feet east of the Connecticut river. This area of the Connecticut river serves as a wintering habitat for the federally endangered bald eagle.

The proposed and alternate Windsor tower sites are in two different ecological habitats creating their own individual site characteristics. Although the proposed Windsor tower is within a wooded area, most of the trees to be removed are small in diameter and no trees of significant size would be removed. After construction the proposed Windsor tower would remain mostly sheltered to adjacent land uses by the heavily wooded area surrounding the proposed site. Nonetheless, we would require the applicant to plant additional shrubs and trees along the border of the leased parcel facing the playing fields to provide screening for the facility. Also, the blind nature of the access road would help diminish the presence of the facility on town property. Furthermore, we find no substantial

conflict between the use of the recreational fields and the proposed towers. In addition, the Town of Windsor has received an Inland Wetland and Watercourse permit to develop the proposed site and its Town Council and Board of Education have voted to develop this parcel as a cellular site.

The alternate Windsor tower site is within a flood plain. Although there is some industrial and residential development in the immediate area we do not believe it prudent to build in a flood plain. In relation to ground level, the alternate tower would be 30 feet taller than the proposed tower, and because of the low vegetation growth surrounding this tower site it would be more visible than the proposed tower. Therefore the Council will deny the alternate Windsor site and issue a Certificate for the proposed Windsor site.

Electromagnetic radio frequency power densities are a concern to the Council and residents living in the vicinity of any telecommunications tower. In this proceeding, the power density level at the base of the proposed Windsor and alternate South Windsor towers would be 19 and 23 times, respectively, below the American National Standards Institute safety standards for the proposed frequencies.

There are no known existing populations of Connecticut species of special concern or federal endangered or threatened species occurring at the proposed Windsor and alternate South Windsor sites. The construction of the proposed Windsor and alternate South Windsor towers would have no effect on the State's historic, architectural, or archaeological resources listed on or eligible for the National Register of Historic Places.

Furthermore, the development of these facilities and their access roads are not likely to have any substantial effects on the natural environments of the sites including effects on the quality of the air, water, and ecology of the sites.

Based on its record in this proceeding, the council finds that the effects associated with the construction, operation, and maintenance of a cellular facility and its associated equipment building at the proposed Windsor and alternate South Windsor sites, including effects on the natural environment; ecological integrity and balance; public health and safety; scenic, historic, and recreational values; forests and parks; air and water purity; and fish and wildlife need not be in conflict either alone or cumulatively with other effects, and are not sufficient reasons to deny the application.

The Council will require Metro Mobile to submit a Development and Management (D&M) plan for approval prior to the commencement of any construction or clearing at the proposed Windsor and alternate South Windsor sites. This D&M plan shall include detailed plans of the towers, tower foundations, soil boring reports, equipment buildings, access roads, security fences, erosion and sedimentation control plans consistent with the Connecticut Guidelines of Soil Erosion and Sedimentation Control, and landscaping plans.

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DOCKET NO. 137 - An application of Metro Mobile CTS of Hartford, Inc., for a Certificate of Environmental Compatibility and Public Need for the construction, maintenance, and operation of cellular facilities in the Towns of East Hartford, South Windsor, and Windsor, Connecticut.

Connecticut Siting Council

November 14, 1990

Decision and Order

Pursuant to the foregoing Findings of Fact and Opinion, the Connecticut Siting Council finds that the effects associated with the construction, operation, and maintenance of two cellular telecommunications towers and associated equipment at the proposed Windsor and alternate South Windsor sites including effects on the natural environment; ecological integrity and balance; public health and safety; scenic, historic, and recreational values; forests and parks; air and water purity; and fish and wildlife need not be in conflict either alone or cumulatively with other effects, are not in conflict with the policies of the State concerning such effects, and are not sufficient reason to deny the application, and therefore directs that a Certificate of Environmental Compatability and Public Need (Certificate), as provided by section 16-50k of the Connecticut General Statutes (CGS), be issued to Metro Mobile CTS of Hartford, Inc., for the construction, operation, and maintenance of a cellular telecommunications tower, associated equipment, and building at the proposed Windsor site and alternate South Windsor site.

The facilities shall be constructed, operated, and maintained substantially as specified in the Council's record in this matter, and subject to the following conditions:

1. The facilities shall be constructed in accordance with the State of Connecticut Basic Building Code.

2. The self-supporting monopole towers shall be no taller than necessary to provide the proposed communication service and in no event shall the towers exceed a total height of 123 feet above ground level (AGL) at the alternate South Windsor site and 113 feet AGL at the proposed Windsor site, with antennas and appurtenances.

3. The Certificate holder shall prepare a Development and Management (D&M) Plan, for approval by the Council, for these sites in compliance with sections 16-50j-75 through 16-50j-77 of the Regulations of State Agencies. The D&M plan shall include detailed plans of the towers, tower foundations, soil boring reports, equipment buildings, access roads, security fences, erosion and sedimentation control plans consistent with the Connecticut Guidelines of Soil Erosion and Sedimentation Control, and landscaping plans.

At the alternate South Windsor site the applicant shall relocate the tower on the eastern half the leased parcel to reduce the amount of properties within the fall zone.

All pine trees bordering the alternate South Windsor site shall be flagged and protected from removal during site construction.

At the proposed Windsor site the applicant shall plant additional shrubs and trees along the border of the leased parcel facing the playing fields.

4. The Certificate Holder shall comply with any existing and future radio frequency (RF) standard promulgated by State or federal regulatory agencies. Upon the establishment of any new governmental RF standards, the facilities granted in this Decision and Order shall be brought into compliance with such standards.

5. The Certificate Holder shall provide the Council a recalculated report of electromagnetic radio frequency power density if and when circumstances in operation cause a change in power densities above the levels originally calculated and provided in the application.

6. The Certificate Holder shall permit public or private entities to share space on the proposed towers for fair consideration, or shall provide any requesting entity with specific legal, technical, environmental, or economic reasons precluding such tower sharing.

7. If the facilities do not initially provide, or permanently cease to provide cellular service following completion of construction, this Decision and Order shall be void, and the tower(s) and all associated equipment shall be dismantled and removed or reapplication for any new use shall be made to the Council before any such new use is made.

8. Unless otherwise approved by the Council, this Decision and Order shall be void if all construction authorized herein is not completed within three years of the effective date of this Decision and Order or within three years after all appeals to this Decision and Order have been resolved.

Pursuant to Section 16-50p, we hereby direct that a copy of the Findings of Fact, Opinion, and Decision and Order be served on each person listed below, and notice of issuance shall be published in the Hartford Courant and Journal Inquirer.

By this Decision and Order, the Council disposes of the legal rights, duties, and privileges of each party named or admitted to the proceeding in accordance with section 16-50j-17 of the Regulations of State Agencies.

The parties to this proceeding are:

(PARTIES)	(ITS REPRESENTATIVES)
Metro Mobile CTS of Hartford, Inc. 20 Alexander Drive P.O. Box 5029 Wallingford, CT. 06492 Attn: Gary Schulman	Robinson & Cole One Commercial Plaza Hartford, CT. 06103-3597 Attn: Earl W. Phillips
Town of East Hartford	Mr. G. Barry Goodberg Asst. Corp. Counsel Town of East Hartford 740 Main Street East Hartford, CT. 06108
(INTEVENORS)	**(ITS REPRESENTATIVES)**
Town of South Windsor	Jean E. Zurbrigen Town Manager Town of South Windsor 1540 Sullivan Avenue South Windsor, CT. 06074
SNET Cellular, Inc.	Peter J. Tyrrell, Esq. SNET Cellular, Inc. 227 Church Street New Haven, CT 06506

CERTIFICATION

The undersigned members of the Connecticut Siting Council hereby certify that they have heard this case in Docket No. 137 or read the record thereof, and that we voted as follows:

Dated at New Britain, Connecticut the 14th day of November, 1990.

Council Members	Vote Cast
Gloria Dibble Pond Chairperson	Yes
Commissioner Peter Boucher Designee: Mark Marcus	Yes
Commissioner Leslie Carothers Designee: Brian Emerick	Yes
Harry E. Covey	No
Mortimer A. Gelston	Yes
Daniel P. Lynch, Jr.	Abstain
Paulann H. Sheets	Absent
William H. Smith	Yes
Colin C. Tait	Absent

CERTIFICATE

OF

ENVIRONMENTAL COMPATIBILITY AND PUBLIC NEED

Pursuant to section 16-50k of the General Statutes of Connecticut, as amended, the Connecticut Siting Council hereby issues a Certificate of Environmental Compatibility and Public Need to Metro Mobile CTS of Hartford, Inc., for a Certificate of Environmental Compatibility and Public Need for the construction, maintenance, and operation of cellular facilities in the Towns of South Windsor and Windsor, Connecticut. This Certificate is issued in accordance with and subject to the terms and conditions set forth in the Decision and Order of the Council on November 14, 1990.

By order of the Council,

Gloria Dibble Pond

Gloria Dibble Pond, Chairperson

November 14, 1990

4864E-5

Site Name: Windsor South, CT
Cumulative Power Density

Operator	Operating Frequency	Number of Trans.	ERP Per Trans.	Total ERP	Distance to Target	Calculated Power Density	Maximum Permissible Exposure*	Fraction of MPE
	(MHz)		(watts)	(watts)	(feet)	(mW/cm^2)	(mW/cm^2)	(%)
VZW PCS	1970	1	4960	4960	97	0.1896	1.0	18.96%
VZW Cellular LTE	869	1	1940	1940	97	0.0741	0.579333333	12.80%
VZW Cellular	869	3	411	1233	97	0.0471	0.579333333	8.13%
VZW AWS	2145	1	4680	4680	97	0.1789	1.0	17.89%
VZW 700	746	1	2450	2450	97	0.0936	0.497333333	18.83%

Total Percentage of Maximum Permissible Exposure 76.61%

*Guidelines adopted by the FCC on August 1, 1996, 47 CFR Section 1.13101 based on NCRP Report 86, 1986 and generally on ANSI/IEEE C95.1

MHz = Megahertz
mW/cm^2 = milliwatts per square centimeter
ERP = Effective Radiated Power

Absolute worst case maximum values used, including the following assumptions:
1. closest accessible point is distance from antenna to base of pole;
2. continuous transmission from all available channels at full power for indefinite time period; and,
3. all RF energy is assumed to be directed solely to the base of the pole.

-1992

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PAUL J. FORD & COMPANY

Date: **August 20, 2019**

Denice Nicholson
Crown Castle
3 Corporate Dr
Clifton Park, NY 12065

Paul J. Ford and Company
250 E. Broad St., Ste 600
Columbus, OH 43215
614-221-6679

Subject:	**Structural Analysis Report**	
Carrier Designation:	***Verizon Wireless* Co-Locate**	
	Carrier Site Number:	1924
	Carrier Site Name:	Windsor South CT
Crown Castle Designation:	**Crown Castle BU Number:**	806371
	Crown Castle Site Name:	HRT 096 943227
	Crown Castle JDE Job Number:	582366
	Crown Castle Work Order Number:	1765009
	Crown Castle Order Number:	499007 Rev. 0
Engineering Firm Designation:	**Paul J. Ford and Company Project Number:**	37519-3216.001.7805
Site Data:	**HRT 96599 MATIANUCK AVE, WINDSOR, Hartford County, CT**	
	Latitude *41° 49' 16.04"*, Longitude *-72° 40' 36.29"*	
	100 Foot - Monopole Tower	

Dear Denice Nicholson,

Paul J. Ford and Company is pleased to submit this **"Structural Analysis Report"** to determine the structural integrity of the above mentioned tower.

The purpose of the analysis is to determine acceptability of the tower stress level. Based on our analysis we have determined the tower stress level for the structure and foundation, under the following load case, to be:

LC5: Proposed Equipment Configuration **52.9%** **Sufficient Capacity**

This analysis utilizes an ultimate 3-second gust wind speed of 125 mph as required by the 2018 Connecticut State Building Code and Appendix N. Applicable Standard references and design criteria are listed in Section 2 - Analysis Criteria.

Respectfully submitted by:

Robert C. Kozak Jr., P.E.
Project Engineer
rkozak@pauljford.com

STATE OF CONNECTICUT · JUSTIN T. KLINE · No. 30301 · LICENSED PROFESSIONAL ENGINEER

2019.08.22 16:55:16-04'00'

TABLE OF CONTENTS

1) INTRODUCTION

This tower is a 100 ft Monopole tower designed by VALMONT in January of 1991.

The tower has been modified per reinforcement drawings prepared by PJF in November of 2014. Reinforcement consist of shaft reinforcement.

2) ANALYSIS CRITERIA

TIA-222 Revision:	TIA-222-H
Risk Category:	II
Wind Speed:	125 mph
Exposure Category:	B
Topographic Factor:	1
Ice Thickness:	2 in
Wind Speed with Ice:	50 mph
Service Wind Speed:	60 mph

Table 1 - Proposed Equipment Configuration

Mounting Level (ft)	Center Line Elevation (ft)	Number of Antennas	Antenna Manufacturer	Antenna Model	Number of Feed Lines	Feed Line Size (in)
98.0	103.0	1	gps	GPS_A	6 1	1-5/8 1-1/4
	100.0	6	commscope	NNHH-65B-R4		
		6	decibel	DB844G65ZAXY		
		3	samsung telecommunications	RFV01U-D1A		
		3	samsung telecommunications	RFV01U-D2A		
	98.0	1	perfect vision	PV-LPP12M-HR-B w/ PV-PKBK Kickers		
		1	raycap	RRFDC-3315-PF-48		

Table 2 - Other Considered Equipment

Mounting Level (ft)	Center Line Elevation (ft)	Number of Antennas	Antenna Manufacturer	Antenna Model	Number of Feed Lines	Feed Line Size (in)
86.0	86.0	1	tower mounts	Platform Mount [LP 601-1]	--	--

3) ANALYSIS PROCEDURE

Table 3 - Documents Provided

Document	Remarks	Reference	Source
4-GEOTECHNICAL REPORTS	FDH, 1463CQ1600, 4/16/2014	262194	CCISITES
4-TOWER FOUNDATION DRAWINGS/DESIGN/SPECS	EDP, 19038, 4/26/1991	262191	CCISITES
4-TOWER MANUFACTURER DRAWINGS	Valmont, DC0728Z, 1/22/1991	2562465	CCISITES
4-TOWER REINFORCEMENT DESIGN/DRAWINGS/DATA	PJF, 37514-2522.001.7700, 11/21/2014	5408647	CCISITES
4-POST-MODIFICATION INSPECTION	GPD, 2014777.806371.02, 3/12/2015	5594558	CCISITES

3.1) Analysis Method

tnxTower (version 8.0.5.0), a commercially available analysis software package, was used to create a three-dimensional model of the tower and calculate member stresses for various loading cases. Selected output from the analysis is included in Appendix A.

tnxTower was used to determine the loads on the modified structure. Additional calculations were performed to determine the stresses in the pole and in the reinforcing elements. These calculations are presented in Appendix C.

3.2) Assumptions

1) Tower and structures were built in accordance with the manufacturer's specifications.
2) The tower and structures have been maintained in accordance with the manufacturer's specification.
3) The configuration of antennas, transmission cables, mounts and other appurtenances are as specified in Tables 1 and 2 and the referenced drawings.
4) Base plate grout was not installed at the time of the analysis and has not been considered.
5) Monopole was modified in conformance with the referenced modification drawings.

This analysis may be affected if any assumptions are not valid or have been made in error. Paul J. Ford and Company should be notified to determine the effect on the structural integrity of the tower.

4) ANALYSIS RESULTS

Table 4 - Section Capacity (Summary)

Elevation (ft)	Component Type	Size	Critical Element	% Capacity	Pass / Fail
100 - 95	Pole	TP15.961x14.76x0.281	Pole	6.5%	Pass
95 - 90	Pole	TP17.162x15.961x0.281	Pole	12.6%	Pass
90 - 85	Pole	TP18.363x17.162x0.281	Pole	17.7%	Pass
85 - 80	Pole	TP19.564x18.363x0.281	Pole	22.5%	Pass
80 - 75	Pole	TP20.765x19.564x0.281	Pole	26.3%	Pass
75 - 70	Pole	TP21.966x20.765x0.281	Pole	29.3%	Pass
70 - 65	Pole	TP23.167x21.966x0.281	Pole	31.8%	Pass
65 - 63.08	Pole	TP23.628x23.167x0.281	Pole	32.8%	Pass
63.08 - 62.83	Pole + Reinf.	TP23.688x23.628x0.5685	Reinf. 2 Tension Rupture	26.3%	Pass
62.83 - 57.83	Pole + Reinf.	TP24.889x23.688x0.5435	Reinf. 2 Tension Rupture	28.6%	Pass
57.83 - 55	Pole + Reinf.	TP26.57x24.889x0.5435	Reinf. 2 Tension Rupture	29.8%	Pass
55 - 50	Pole + Reinf.	TP26.206x25.007x0.594	Reinf. 2 Tension Rupture	29.4%	Pass
50 - 45	Pole + Reinf.	TP27.406x26.206x0.5815	Reinf. 2 Tension Rupture	31.1%	Pass
45 - 40	Pole + Reinf.	TP28.605x27.406x0.569	Reinf. 2 Tension Rupture	32.6%	Pass
40 - 35	Pole + Reinf.	TP29.805x28.605x0.5565	Reinf. 2 Tension Rupture	34.0%	Pass
35 - 31.5	Pole + Reinf.	TP30.644x29.805x0.5565	Reinf. 2 Tension Rupture	34.9%	Pass
31.5 - 31.25	Pole + Reinf.	TP30.704x30.644x0.6315	Reinf. 1 Tension Rupture	30.3%	Pass
31.25 - 26.25	Pole + Reinf.	TP31.903x30.704x0.619	Reinf. 1 Tension Rupture	31.5%	Pass
26.25 - 21.25	Pole + Reinf.	TP33.103x31.903x0.6065	Reinf. 1 Tension Rupture	32.6%	Pass
21.25 - 16.25	Pole + Reinf.	TP34.302x33.103x0.594	Reinf. 1 Tension Rupture	33.6%	Pass
16.25 - 11.25	Pole + Reinf.	TP35.501x34.302x0.594	Reinf. 1 Tension Rupture	34.6%	Pass
11.25 - 6.25	Pole + Reinf.	TP36.701x35.501x0.5815	Reinf. 1 Tension Rupture	35.6%	Pass

Elevation (ft)	Component Type	Size	Critical Element	% Capacity	Pass / Fail
6.25 - 4	Pole + Reinf.	TP37.241x36.701x0.5753	Reinf. 1 Tension Rupture	36.0%	Pass
4 - 3.75	Pole + Reinf.	TP37.3x37.241x0.694	Reinf. 3 Connection	37.1%	Pass
3.75 - 0	Pole + Reinf.	TP38.2x37.3x0.6815	Reinf. 3 Connection	37.9%	Pass
				Summary	
			Pole	32.8%	Pass
			Reinforcement	37.9%	Pass
			Overall	37.9%	Pass

Table 5 - Tower Component Stresses vs. Capacity – LC5

Notes	Component	Elevation (ft)	% Capacity	Pass / Fail
1	Anchor Rods	0	33.6	Pass
1	Base Plate	0	22.9	Pass
1	Base Foundation Soil Interaction	0	52.9	Pass
1	Base Foundation Structural Steel	0	24.2	Pass

Structure Rating (max from all components) =	52.9%

Notes:

- All structural ratings are per TIA-222-H Section 15.5

1) See additional documentation in "Appendix C – Additional Calculations" for calculations supporting the % capacity consumed.

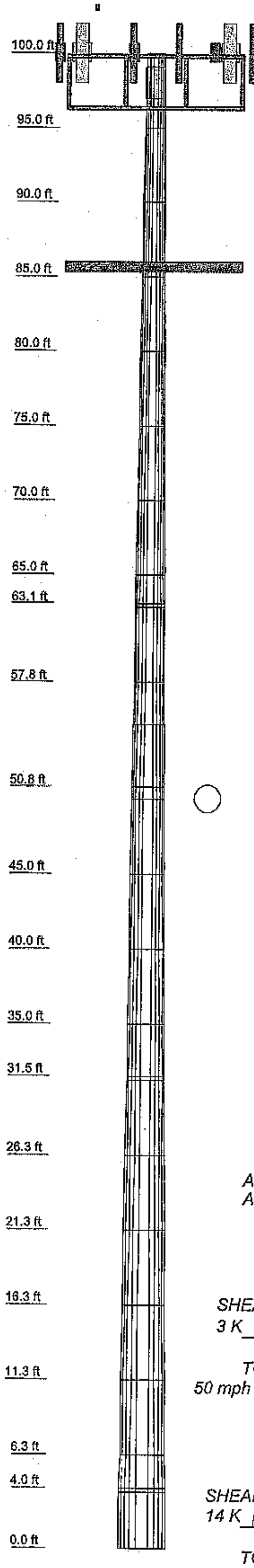
4.1) Recommendations

The tower and its foundation have sufficient capacity to carry the proposed load configuration. No modifications are required at this time.

APPENDIX A

TNXTOWER OUTPUT

Section	Length (ft)	Number of Sides	Thickness (in)	Socket Length (ft)	Top Dia (in)	Bot Dia (in)	Grade	Weight (K)
1	5.0000	12	0.2810		14.7600	15.9610	A572-65	0.2
2	5.0000	12	0.2810		15.9610	17.1620		0.3
3	5.0000	12	0.2810		17.1620	18.3630		0.3
4	5.0000	12	0.2810		18.3630	19.5641		0.3
5	5.0000	12	0.2810		19.5641	20.7651		0.3
6	5.0000	12	0.2810		20.7651	21.9661		0.3
7	5.0000	12	0.2810		21.9661	23.1671		0.3
8	[illegible]	12	[illegible]		[illegible]	[illegible]		0.1
9	[illegible]	12	[illegible]		[illegible]	[illegible]		0.0
10	5.0000	12	0.5435		23.6888	[illegible]		0.7
11	[illegible]	12	0.5435	4.1667	24.8894	26.5700		1.0
12	[illegible]	12	0.5940		25.0071	26.2065		0.8
13	5.0000	12	0.5815		26.2065	27.4058		0.8
14	5.0000	12	0.5690		27.4058	28.6052		0.8
15	5.0000	12	0.5565		28.6052	29.8045		0.8
16	[illegible]	12	[illegible]		[illegible]	[illegible]		0.6
17	[illegible]	12	[illegible]		[illegible]	[illegible]		0.0
18	5.0000	12	0.6190		30.7043	31.9033		1.0
19	5.0000	12	0.6065		31.9034	33.1028		1.0
20	5.0000	12	0.5940		33.1028	34.3021		1.0
21	5.0000	12	0.5940		34.3021	35.5015		1.1
22	5.0000	12	0.5815		35.5015	36.7008		1.1
23	[illegible]	12	[illegible]		[illegible]	[illegible]		0.5
24	[illegible]	12	[illegible]		[illegible]	[illegible]		[illegible]
25	3.7500	12	[illegible]		[illegible]	[illegible]		0.9
								14.3



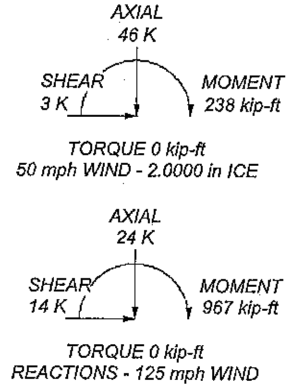
MATERIAL STRENGTH

GRADE	Fy	Fu	GRADE	Fy	Fu
A572-65	65 ksi	80 ksi			

TOWER DESIGN NOTES

1. Tower is located in Hartford County, Connecticut.
2. Tower designed for Exposure B to the TIA-222-H Standard.
3. Tower designed for a 125 mph basic wind in accordance with the TIA-222-H Standard.
4. Tower is also designed for a 50 mph basic wind with 2.00 in ice. Ice is considered to increase in thickness with height.
5. Deflections are based upon a 60 mph wind.
6. Tower Risk Category II.
7. Topographic Category 1 with Crest Height of 0.0000 ft
8. TIA-222-H Annex S

ALL REACTIONS ARE FACTORED



PJFLogo
Paul J. Ford and Company
250 E. Broad St., Ste 600
Columbus, OH 43215
Phone: 614-221-6679
FAX:

Job: **100' MP; HRT 096 943227; Windsor, CT**			
Project: **PJF# 37519-3216 (BU# 806371)**			
Client: CCI	Drawn by: Robert Kozak		App'd:
Code: TIA-222-H	Date: 08/22/19		Scale: NTS
Path:			Dwg No. E-1

Tower Input Data

The tower is a monopole.
This tower is designed using the TIA-222-H standard.
The following design criteria apply:

1) Tower is located in Hartford County, Connecticut.
2) Tower base elevation above sea level: 87.0000 ft.
3) Basic wind speed of 125 mph.
4) Risk Category II.
5) Exposure Category B.
6) Simplified Topographic Factor Procedure for wind speed-up calculations is used.
7) Topographic Category: 1.
8) Crest Height: 0.0000 ft.
9) Nominal ice thickness of 2.0000 in.
10) Ice thickness is considered to increase with height.
11) Ice density of 56.00 pcf.
12) A wind speed of 50 mph is used in combination with ice.
13) Deflections calculated using a wind speed of 60 mph.
14) TIA-222-H Annex S.
15) A non-linear (P-delta) analysis was used.
16) Pressures are calculated at each section.
17) Stress ratio used in pole design is 1.05.
18) Tower analysis based on target reliabilities in accordance with Annex S.
19) Load Modification Factors used: $K_{es}(F_w) = 0.95$, $K_{es}(t_i) = 0.85$.
20) Local bending stresses due to climbing loads, feed line supports, and appurtenance mounts are not considered.

Options

Consider Moments - Legs	Distribute Leg Loads As Uniform	Use ASCE 10 X-Brace Ly Rules
Consider Moments - Horizontals	Assume Legs Pinned	Calculate Redundant Bracing Forces
Consider Moments - Diagonals	√ Assume Rigid Index Plate	Ignore Redundant Members in FEA
Use Moment Magnification	√ Use Clear Spans For Wind Area	SR Leg Bolts Resist Compression
Use Code Stress Ratios	Use Clear Spans For KL/r	All Leg Panels Have Same Allowable
√ Use Code Safety Factors - Guys	Retension Guys To Initial Tension	Offset Girt At Foundation
Escalate Ice	√ Bypass Mast Stability Checks	√ Consider Feed Line Torque
Always Use Max Kz	√ Use Azimuth Dish Coefficients	Include Angle Block Shear Check
Use Special Wind Profile	√ Project Wind Area of Appurt.	Use TIA-222-H Bracing Resist. Exemption
Include Bolts In Member Capacity	Autocalc Torque Arm Areas	Use TIA-222-H Tension Splice Exemption
Leg Bolts Are At Top Of Section	Add IBC .6D+W Combination	Poles
Secondary Horizontal Braces Leg	Sort Capacity Reports By Component	√ Include Shear-Torsion Interaction
Use Diamond Inner Bracing (4 Sided)	Triangulate Diamond Inner Bracing	Always Use Sub-Critical Flow
SR Members Have Cut Ends	Treat Feed Line Bundles As Cylinder	Use Top Mounted Sockets
SR Members Are Concentric	Ignore KL/ry For 60 Deg. Angle Legs	Pole Without Linear Attachments
		Pole With Shroud Or No Appurtenances
		Outside and Inside Corner Radii Are Known

Tapered Pole Section Geometry

Section	Elevation ft	Section Length ft	Splice Length ft	Number of Sides	Top Diameter in	Bottom Diameter in	Wall Thickness in	Bend Radius in	Pole Grade
L1	100.0000-95.0000	5.0000	0.00	12	14.7600	15.9610	0.2810	1.1240	A572-65 (65 ksi)
L2	95.0000-	5.0000	0.00	12	15.9610	17.1620	0.2810	1.1240	A572-65

Section	Elevation ft	Section Length ft	Splice Length ft	Number of Sides	Top Diameter in	Bottom Diameter in	Wall Thickness in	Bend Radius in	Pole Grade
	90.0000								(65 ksi)
L3	90.0000-85.0000	5.0000	0.00	12	17.1620	18.3630	0.2810	1.1240	A572-65 (65 ksi)
L4	85.0000-80.0000	5.0000	0.00	12	18.3630	19.5641	0.2810	1.1240	A572-65 (65 ksi)
L5	80.0000-75.0000	5.0000	0.00	12	19.5641	20.7651	0.2810	1.1240	A572-65 (65 ksi)
L6	75.0000-70.0000	5.0000	0.00	12	20.7651	21.9661	0.2810	1.1240	A572-65 (65 ksi)
L7	70.0000-65.0000	5.0000	0.00	12	21.9661	23.1671	0.2810	1.1240	A572-65 (65 ksi)
L8	65.0000-63.0800	1.9200	0.00	12	23.1671	23.6283	0.2810	1.1240	A572-65 (65 ksi)
L9	63.0800-62.8300	0.2500	0.00	12	23.6283	23.6884	0.5685	2.2740	A572-65 (65 ksi)
L10	62.8300-57.8300	5.0000	0.00	12	23.6884	24.8894	0.5435	2.1740	A572-65 (65 ksi)
L11	57.8300-50.8333	6.9967	4.17	12	24.8894	26.5700	0.5435	2.1740	A572-65 (65 ksi)
L12	50.8333-50.0000	5.0000	0.00	12	25.0071	26.2065	0.5940	2.3760	A572-65 (65 ksi)
L13	50.0000-45.0000	5.0000	0.00	12	26.2065	27.4058	0.5815	2.3260	A572-65 (65 ksi)
L14	45.0000-40.0000	5.0000	0.00	12	27.4058	28.6052	0.5690	2.2760	A572-65 (65 ksi)
L15	40.0000-35.0000	5.0000	0.00	12	28.6052	29.8045	0.5565	2.2260	A572-65 (65 ksi)
L16	35.0000-31.5000	3.5000	0.00	12	29.8045	30.6441	0.5565	2.2260	A572-65 (65 ksi)
L17	31.5000-31.2500	0.2500	0.00	12	30.6441	30.7041	0.6315	2.5260	A572-65 (65 ksi)
L18	31.2500-26.2500	5.0000	0.00	12	30.7041	31.9034	0.6190	2.4760	A572-65 (65 ksi)
L19	26.2500-21.2500	5.0000	0.00	12	31.9034	33.1028	0.6065	2.4260	A572-65 (65 ksi)
L20	21.2500-16.2500	5.0000	0.00	12	33.1028	34.3021	0.5940	2.3760	A572-65 (65 ksi)
L21	16.2500-11.2500	5.0000	0.00	12	34.3021	35.5015	0.5940	2.3760	A572-65 (65 ksi)
L22	11.2500-6.2500	5.0000	0.00	12	35.5015	36.7008	0.5815	2.3260	A572-65 (65 ksi)
L23	6.2500-4.0000	2.2500	0.00	12	36.7008	37.2405	0.5753	2.3010	A572-65 (65 ksi)
L24	4.0000-3.7500	0.2500	0.00	12	37.2405	37.3005	0.6940	2.7760	A572-65 (65 ksi)
L25	3.7500-0.0000	3.7500		12	37.3005	38.2000	0.6815	2.7260	A572-65 (65 ksi)

Tapered Pole Properties

Section	Tip Dia. in	Area in^2	I in^4	r in	C in	I/C in^3	J in^4	It/Q in^2	w in	w/t
L1	15.1816	13.1009	350.5612	5.1835	7.6457	45.8509	710.3320	6.4479	3.2026	11.397
	16.4249	14.1876	445.2333	5.6134	8.2678	53.8514	902.1634	6.9827	3.5245	12.543
L2	16.4249	14.1876	445.2333	5.6134	8.2678	53.8514	902.1634	6.9827	3.5245	12.543
	17.6683	15.2743	555.5781	6.0434	8.8899	62.4952	1125.7519	7.5175	3.8463	13.688
L3	17.6683	15.2743	555.5781	6.0434	8.8899	62.4952	1125.7519	7.5175	3.8463	13.688
	18.9117	16.3610	682.7961	6.4734	9.5121	71.7822	1383.5300	8.0524	4.1682	14.834
L4	18.9117	16.3610	682.7961	6.4734	9.5121	71.7822	1383.5300	8.0524	4.1682	14.834
	20.1551	17.4477	828.0876	6.9033	10.1342	81.7123	1677.9301	8.5872	4.4901	15.979
L5	20.1551	17.4477	828.0876	6.9033	10.1342	81.7123	1677.9301	8.5872	4.4901	15.979
	21.3985	18.5344	992.6533	7.3333	10.7563	92.2857	2011.3846	9.1221	4.8120	17.124
L6	21.3985	18.5344	992.6533	7.3333	10.7563	92.2857	2011.3846	9.1221	4.8120	17.124
	22.6419	19.6211	1177.6934	7.7633	11.3784	103.5022	2386.3261	9.6569	5.1338	18.27
L7	22.6419	19.6211	1177.6934	7.7633	11.3784	103.5022	2386.3261	9.6569	5.1338	18.27
	23.8852	20.7078	1384.4085	8.1932	12.0006	115.3619	2805.1869	10.1918	5.4557	19.415

Section	Tip Dia. in	Area in²	I in⁴	r in	C in	I/C in³	J in⁴	It/Q in²	w in	w/t
L8	23.8852	20.7078	1384.4085	8.1932	12.0006	115.3619	2805.1869	10.1918	5.4557	19.415
	24.3627	21.1251	1469.8002	8.3583	12.2395	120.0870	2978.2137	10.3971	5.5793	19.855
L9	24.2613	42.2126	2865.0953	8.2554	12.2395	234.0867	5805.4599	20.7757	4.8088	8.459
	24.3234	42.3225	2887.5369	8.2769	12.2706	235.3222	5850.9327	20.8299	4.8249	8.487
L10	24.3323	40.5051	2769.5213	8.2859	12.2706	225.7044	5611.8009	19.9354	4.8919	9.001
	25.5756	42.6070	3223.4228	8.7158	12.8927	250.0193	6531.5285	20.9699	5.2138	9.593
L11	25.5756	42.6070	3223.4228	8.7158	12.8927	250.0193	6531.5285	20.9699	5.2138	9.593
	27.3156	45.5482	3938.1176	9.3175	13.7633	286.1326	7979.6939	22.4174	5.6642	10.422
L12	26.7145	46.6945	3552.2169	8.7399	12.9537	274.2241	7197.7544	22.9816	5.1100	8.603
	26.9214	48.9885	4101.8895	9.1693	13.5750	302.1658	8311.5403	24.1107	5.4314	9.144
L13	26.9258	47.9810	4021.4525	9.1737	13.5750	296.2404	8148.5530	23.6148	5.4649	9.398
	28.1675	50.2267	4612.9524	9.6031	14.1962	324.9421	9347.0922	24.7201	5.7863	9.951
L14	28.1719	49.1699	4520.1049	9.6076	14.1962	318.4018	9158.9580	24.1999	5.8198	10.228
	29.4136	51.3674	5153.6079	10.0370	14.8175	347.8057	10442.606 9	25.2815	6.1413	10.793
L15	29.4180	50.2613	5047.1364	10.0414	14.8175	340.6202	10226.866 7	24.7371	6.1748	11.096
	30.6596	52.4105	5722.6555	10.4708	15.4388	370.6682	11595.651 6	25.7948	6.4962	11.673
L16	30.6596	52.4105	5722.6555	10.4708	15.4388	370.6682	11595.651 6	25.7948	6.4962	11.673
	31.5288	53.9149	6229.7310	10.7714	15.8736	392.4576	12623.124 0	26.5353	6.7212	12.078
L17	31.5023	61.0285	7016.5836	10.7445	15.8736	442.0274	14217.500 6	30.0364	6.5202	10.325
	31.5644	61.1504	7058.7267	10.7660	15.9047	443.8138	14302.894 0	30.0964	6.5363	10.35
L18	31.5688	59.9649	6927.6367	10.7705	15.9047	435.5716	14037.270 2	29.5129	6.5698	10.614
	32.8105	62.3555	7789.6221	11.1998	16.5260	471.3565	15783.886 2	30.6895	6.8912	11.133
L19	32.8149	61.1207	7641.4719	11.2043	16.5260	462.3918	15483.693 7	30.0817	6.9247	11.417
	34.0565	63.4629	8554.0699	11.6337	17.1472	498.8602	17332.864 8	31.2345	7.2461	11.947
L20	34.0610	62.1789	8387.4415	11.6381	17.1472	489.1427	16995.230 5	30.6025	7.2796	12.255
	35.3026	64.4728	9350.4286	12.0675	17.7685	526.2364	18946.503 3	31.7316	7.6010	12.796
L21	35.3026	64.4728	9350.4286	12.0675	17.7685	526.2364	18946.503 3	31.7316	7.6010	12.796
	36.5443	66.7668	10384.439 7	12.4969	18.3898	564.6861	21041.690 3	32.8606	7.9225	13.337
L22	36.5487	65.3852	10176.836 8	12.5013	18.3898	553.3970	20621.030 5	32.1806	7.9560	13.682
	37.7903	67.6309	11261.855 4	12.9307	19.0110	592.3856	22819.572 3	33.2859	8.2774	14.235
L23	37.7926	66.9156	11146.596 6	12.9330	19.0110	586.3229	22586.026 7	32.9338	8.2941	14.418
	38.3513	67.9153	11653.680 3	13.1262	19.2906	604.1122	23613.515 7	33.4258	8.4388	14.67
L24	38.3094	81.6698	13923.209 8	13.0837	19.2906	721.7618	28212.197 9	40.1954	8.1205	11.701
	38.3715	81.8038	13991.860 2	13.1051	19.3217	724.1544	28351.302 2	40.2613	8.1366	11.724
L25	38.3759	80.3578	13753.925 5	13.1096	19.3217	711.8400	27869.181 9	39.5497	8.1701	11.988
	39.3071	82.3317	14792.585 3	13.4316	19.7876	747.5684	29973.788 3	40.5212	8.4112	12.342

Tower Elevation ft	Gusset Area (per face) ft²	Gusset Thickness in	Gusset Grade	Adjust. Factor A_f	Adjust. Factor A_r	Weight Mult.	Double Angle Stitch Bolt Spacing Diagonals in	Double Angle Stitch Bolt Spacing Horizontals in	Double Angle Stitch Bolt Spacing Redundants in
L1 100.0000-95.0000				1	1	1			
L2 95.0000-90.0000				1	1	1			

Tower Elevation ft	Gusset Area (per face) ft²	Gusset Thickness in	Gusset Grade	Adjust. Factor A_f	Adjust. Factor A_r	Weight Mult.	Double Angle Stitch Bolt Spacing Diagonals in	Double Angle Stitch Bolt Spacing Horizontals in	Double Angle Stitch Bolt Spacing Redundants in
L3 90.0000-85.0000				1	1	1			
L4 85.0000-80.0000				1	1	1			
L5 80.0000-75.0000				1	1	1			
L6 75.0000-70.0000				1	1	1			
L7 70.0000-65.0000				1	1	1			
L8 65.0000-63.0800				1	1	1			
L9 63.0800-62.8300				1	1	0.926345			
L10 62.8300-57.8300				1	1	0.945666			
L11 57.8300-50.8333				1	1	0.934022			
L12 50.8333-50.0000				1	1	0.952737			
L13 50.0000-45.0000				1	1	0.9557			
L14 45.0000-40.0000				1	1	0.960341			
L15 40.0000-35.0000				1	1	0.966576			
L16 35.0000-31.5000				1	1	0.956853			
L17 31.5000-31.2500				1	1	0.949121			
L18 31.2500-26.2500				1	1	0.952085			
L19 26.2500-21.2500				1	1	0.956404			
L20 21.2500-16.2500				1	1	0.962028			
L21 16.2500-11.2500				1	1	0.948872			
L22 11.2500-6.2500				1	1	0.956392			
L23 6.2500-4.0000				1	1	0.96119			
L24 4.0000-3.7500				1	1	0.821766			
L25 3.7500-0.0000				1	1	0.828599			

Feed Line/Linear Appurtenances - Entered As Round Or Flat

Description	Sector	Exclude From Torque Calculation	Component Type	Placement ft	Total Number	Number Per Row	Start/End Position	Width or Diameter in	Perimeter in	Weight plf
HBF114-133-3MJ(1-1/4) ***	B	No	Surface Ar (CaAa)	98.0000 - 0.0000	1	1	0.225 0.225	1.5400		0.90
CCI-065125 (W)	A	No	Surface Af (CaAa)	35.5000 - 0.5000	1	1	-0.458 -0.458	6.5000	15.5000	0.00
CCI-065125 (W)	C	No	Surface Af (CaAa)	35.5000 - 0.5000	1	1	-0.458 -0.458	6.5000	15.5000	0.00
CCI-065125 (W)	B	No	Surface Af (CaAa)	35.5000 - 0.5000	1	1	-0.458 -0.458	6.5000	15.5000	0.00
CCI-060100 (W)	A	No	Surface Af (CaAa)	65.5833 - 35.5000	1	1	-0.458 -0.458	6.0000	14.0000	0.00

Description	Sector	Exclude From Torque Calculation	Component Type	Placement ft	Total Number	Number Per Row	Start/End Position	Width or Diameter in	Perimeter in	Weight plf
CCI-060100 (W)	C	No	Surface Af (CaAa)	65.5833 - 35.5000	1	1	-0.458 -0.458	6.0000	14.0000	0.00
CCI-060100 (W)	B	No	Surface Af (CaAa)	65.5833 - 35.5000	1	1	-0.458 -0.458	6.0000	14.0000	0.00

Feed Line/Linear Appurtenances - Entered As Area

Description	Face or Leg	Allow Shield	Exclude From Torque Calculation	Component Type	Placement ft	Total Number		C_AA_A ft²/ft	Weight plf
HJ7-50A(1-5/8)	C	No	No	Inside Pole	98.0000 - 0.0000	6	No Ice	0.0000	1.04
							1/2" Ice	0.0000	1.04
							1" Ice	0.0000	1.04
							2" Ice	0.0000	1.04

Feed Line/Linear Appurtenances Section Areas

Tower Section	Tower Elevation ft	Face	A_R ft²	A_F ft²	C_AA_A In Face ft²	C_AA_A Out Face ft²	Weight K
L1	100.0000-95.0000	A	0.000	0.000	0.000	0.000	0.00
		B	0.000	0.000	0.462	0.000	0.00
		C	0.000	0.000	0.000	0.000	0.02
L2	95.0000-90.0000	A	0.000	0.000	0.000	0.000	0.00
		B	0.000	0.000	0.770	0.000	0.00
		C	0.000	0.000	0.000	0.000	0.03
L3	90.0000-85.0000	A	0.000	0.000	0.000	0.000	0.00
		B	0.000	0.000	0.770	0.000	0.00
		C	0.000	0.000	0.000	0.000	0.03
L4	85.0000-80.0000	A	0.000	0.000	0.000	0.000	0.00
		B	0.000	0.000	0.770	0.000	0.00
		C	0.000	0.000	0.000	0.000	0.03
L5	80.0000-75.0000	A	0.000	0.000	0.000	0.000	0.00
		B	0.000	0.000	0.770	0.000	0.00
		C	0.000	0.000	0.000	0.000	0.03
L6	75.0000-70.0000	A	0.000	0.000	0.000	0.000	0.00
		B	0.000	0.000	0.770	0.000	0.00
		C	0.000	0.000	0.000	0.000	0.03
L7	70.0000-65.0000	A	0.000	0.000	0.583	0.000	0.00
		B	0.000	0.000	1.353	0.000	0.00
		C	0.000	0.000	0.583	0.000	0.03
L8	65.0000-63.0800	A	0.000	0.000	1.920	0.000	0.00
		B	0.000	0.000	2.216	0.000	0.00
		C	0.000	0.000	1.920	0.000	0.01
L9	63.0800-62.8300	A	0.000	0.000	0.250	0.000	0.00
		B	0.000	0.000	0.288	0.000	0.00
		C	0.000	0.000	0.250	0.000	0.00
L10	62.8300-57.8300	A	0.000	0.000	5.000	0.000	0.00
		B	0.000	0.000	5.770	0.000	0.00
		C	0.000	0.000	5.000	0.000	0.03
L11	57.8300-50.8333	A	0.000	0.000	6.997	0.000	0.00
		B	0.000	0.000	8.074	0.000	0.01
		C	0.000	0.000	6.997	0.000	0.04
L12	50.8333-50.0000	A	0.000	0.000	0.833	0.000	0.00
		B	0.000	0.000	0.962	0.000	0.00
		C	0.000	0.000	0.833	0.000	0.01
L13	50.0000-45.0000	A	0.000	0.000	5.000	0.000	0.00
		B	0.000	0.000	5.770	0.000	0.00
		C	0.000	0.000	5.000	0.000	0.03

Tower Section	Tower Elevation ft	Face	A_R ft^2	A_F ft^2	C_AA_A In Face ft^2	C_AA_A Out Face ft^2	Weight K
L14	45.0000-40.0000	A	0.000	0.000	5.000	0.000	0.00
		B	0.000	0.000	5.770	0.000	0.00
		C	0.000	0.000	5.000	0.000	0.03
L15	40.0000-35.0000	A	0.000	0.000	5.042	0.000	0.00
		B	0.000	0.000	5.812	0.000	0.00
		C	0.000	0.000	5.042	0.000	0.03
L16	35.0000-31.5000	A	0.000	0.000	3.792	0.000	0.00
		B	0.000	0.000	4.331	0.000	0.00
		C	0.000	0.000	3.792	0.000	0.02
L17	31.5000-31.2500	A	0.000	0.000	0.271	0.000	0.00
		B	0.000	0.000	0.309	0.000	0.00
		C	0.000	0.000	0.271	0.000	0.00
L18	31.2500-26.2500	A	0.000	0.000	5.417	0.000	0.00
		B	0.000	0.000	6.187	0.000	0.00
		C	0.000	0.000	5.417	0.000	0.03
L19	26.2500-21.2500	A	0.000	0.000	5.417	0.000	0.00
		B	0.000	0.000	6.187	0.000	0.00
		C	0.000	0.000	5.417	0.000	0.03
L20	21.2500-16.2500	A	0.000	0.000	5.417	0.000	0.00
		B	0.000	0.000	6.187	0.000	0.00
		C	0.000	0.000	5.417	0.000	0.03
L21	16.2500-11.2500	A	0.000	0.000	5.417	0.000	0.00
		B	0.000	0.000	6.187	0.000	0.00
		C	0.000	0.000	5.417	0.000	0.03
L22	11.2500-6.2500	A	0.000	0.000	5.417	0.000	0.00
		B	0.000	0.000	6.187	0.000	0.00
		C	0.000	0.000	5.417	0.000	0.03
L23	6.2500-4.0000	A	0.000	0.000	2.438	0.000	0.00
		B	0.000	0.000	2.784	0.000	0.00
		C	0.000	0.000	2.438	0.000	0.01
L24	4.0000-3.7500	A	0.000	0.000	0.271	0.000	0.00
		B	0.000	0.000	0.309	0.000	0.00
		C	0.000	0.000	0.271	0.000	0.00
L25	3.7500-0.0000	A	0.000	0.000	3.521	0.000	0.00
		B	0.000	0.000	4.098	0.000	0.00
		C	0.000	0.000	3.521	0.000	0.02

Feed Line/Linear Appurtenances Section Areas - With Ice

Tower Section	Tower Elevation ft	Face or Leg	Ice Thickness in	A_R ft^2	A_F ft^2	C_AA_A In Face ft^2	C_AA_A Out Face ft^2	Weight K
L1	100.0000-95.0000	A	1.894	0.000	0.000	0.000	0.000	0.00
		B		0.000	0.000	1.599	0.000	0.03
		C		0.000	0.000	0.000	0.000	0.02
L2	95.0000-90.0000	A	1.885	0.000	0.000	0.000	0.000	0.00
		B		0.000	0.000	2.655	0.000	0.04
		C		0.000	0.000	0.000	0.000	0.03
L3	90.0000-85.0000	A	1.874	0.000	0.000	0.000	0.000	0.00
		B		0.000	0.000	2.644	0.000	0.04
		C		0.000	0.000	0.000	0.000	0.03
L4	85.0000-80.0000	A	1.863	0.000	0.000	0.000	0.000	0.00
		B		0.000	0.000	2.633	0.000	0.04
		C		0.000	0.000	0.000	0.000	0.03
L5	80.0000-75.0000	A	1.851	0.000	0.000	0.000	0.000	0.00
		B		0.000	0.000	2.621	0.000	0.04
		C		0.000	0.000	0.000	0.000	0.03
L6	75.0000-70.0000	A	1.839	0.000	0.000	0.000	0.000	0.00
		B		0.000	0.000	2.609	0.000	0.04
		C		0.000	0.000	0.000	0.000	0.03
L7	70.0000-65.0000	A	1.826	0.000	0.000	0.796	0.000	0.01
		B		0.000	0.000	3.392	0.000	0.05
		C		0.000	0.000	0.796	0.000	0.04
L8	65.0000-63.0800	A	1.817	0.000	0.000	2.618	0.000	0.03
		B		0.000	0.000	3.611	0.000	0.04

Tower Section	Tower Elevation ft	Face or Leg	Ice Thickness in	A_R ft²	A_F ft²	C_AA_A In Face ft²	C_AA_A Out Face ft²	Weight K
		C		0.000	0.000	2.618	0.000	0.04
L9	63.0800-62.8300	A	1.813	0.000	0.000	0.341	0.000	0.00
		B		0.000	0.000	0.470	0.000	0.01
		C		0.000	0.000	0.341	0.000	0.01
L10	62.8300-57.8300	A	1.806	0.000	0.000	6.806	0.000	0.07
		B		0.000	0.000	9.381	0.000	0.11
		C		0.000	0.000	6.806	0.000	0.10
L11	57.8300-50.8333	A	1.787	0.000	0.000	9.497	0.000	0.10
		B		0.000	0.000	13.075	0.000	0.16
		C		0.000	0.000	9.497	0.000	0.14
L12	50.8333-50.0000	A	1.774	0.000	0.000	1.131	0.000	0.01
		B		0.000	0.000	1.557	0.000	0.02
		C		0.000	0.000	1.131	0.000	0.02
L13	50.0000-45.0000	A	1.763	0.000	0.000	6.763	0.000	0.07
		B		0.000	0.000	9.296	0.000	0.11
		C		0.000	0.000	6.763	0.000	0.10
L14	45.0000-40.0000	A	1.743	0.000	0.000	6.743	0.000	0.07
		B		0.000	0.000	9.257	0.000	0.11
		C		0.000	0.000	6.743	0.000	0.10
L15	40.0000-35.0000	A	1.722	0.000	0.000	6.763	0.000	0.07
		B		0.000	0.000	9.255	0.000	0.11
		C		0.000	0.000	6.763	0.000	0.10
L16	35.0000-31.5000	A	1.701	0.000	0.000	4.983	0.000	0.05
		B		0.000	0.000	6.712	0.000	0.08
		C		0.000	0.000	4.983	0.000	0.07
L17	31.5000-31.2500	A	1.691	0.000	0.000	0.355	0.000	0.00
		B		0.000	0.000	0.478	0.000	0.01
		C		0.000	0.000	0.355	0.000	0.01
L18	31.2500-26.2500	A	1.677	0.000	0.000	7.093	0.000	0.07
		B		0.000	0.000	9.540	0.000	0.11
		C		0.000	0.000	7.093	0.000	0.10
L19	26.2500-21.2500	A	1.645	0.000	0.000	7.062	0.000	0.07
		B		0.000	0.000	9.476	0.000	0.11
		C		0.000	0.000	7.062	0.000	0.10
L20	21.2500-16.2500	A	1.606	0.000	0.000	7.023	0.000	0.07
		B		0.000	0.000	9.400	0.000	0.10
		C		0.000	0.000	7.023	0.000	0.10
L21	16.2500-11.2500	A	1.557	0.000	0.000	6.974	0.000	0.06
		B		0.000	0.000	9.301	0.000	0.10
		C		0.000	0.000	6.974	0.000	0.10
L22	11.2500-6.2500	A	1.488	0.000	0.000	6.905	0.000	0.06
		B		0.000	0.000	9.164	0.000	0.09
		C		0.000	0.000	6.905	0.000	0.09
L23	6.2500-4.0000	A	1.411	0.000	0.000	3.072	0.000	0.03
		B		0.000	0.000	4.054	0.000	0.04
		C		0.000	0.000	3.072	0.000	0.04
L24	4.0000-3.7500	A	1.372	0.000	0.000	0.339	0.000	0.00
		B		0.000	0.000	0.447	0.000	0.00
		C		0.000	0.000	0.339	0.000	0.00
L25	3.7500-0.0000	A	1.276	0.000	0.000	4.350	0.000	0.03
		B		0.000	0.000	5.884	0.000	0.05
		C		0.000	0.000	4.350	0.000	0.06

Feed Line Center of Pressure

Section	Elevation ft	CP_X in	CP_Z in	CP_X Ice in	CP_Z Ice in
L1	100.0000-95.0000	0.5886	-0.0308	1.2008	-0.0629
L2	95.0000-90.0000	0.9258	-0.0485	1.8368	-0.0963
L3	90.0000-85.0000	0.9265	-0.0486	1.8651	-0.0977
L4	85.0000-80.0000	0.9272	-0.0486	1.8900	-0.0991
L5	80.0000-75.0000	0.9278	-0.0486	1.9117	-0.1002
L6	75.0000-70.0000	0.9283	-0.0487	1.9304	-0.1012
L7	70.0000-65.0000	0.7902	-0.0414	1.6943	-0.0888

Section	Elevation	CP_X	CP_Z	CP_X Ice	CP_Z Ice
	ft	in	in	in	in
L8	65.0000-63.0800	0.3312	-0.0174	0.8430	-0.0442
L9	63.0800-62.8300	0.3337	-0.0175	0.8494	-0.0445
L10	62.8300-57.8300	0.3384	-0.0177	0.8621	-0.0452
L11	57.8300-50.8333	0.3490	-0.0183	0.8900	-0.0466
L12	50.8333-50.0000	0.3518	-0.0184	0.8984	-0.0471
L13	50.0000-45.0000	0.3566	-0.0187	0.9076	-0.0476
L14	45.0000-40.0000	0.3648	-0.0191	0.9275	-0.0486
L15	40.0000-35.0000	0.3709	-0.0194	0.9425	-0.0494
L16	35.0000-31.5000	0.3632	-0.0190	0.9277	-0.0486
L17	31.5000-31.2500	0.3661	-0.0192	0.9337	-0.0489
L18	31.2500-26.2500	0.3699	-0.0194	0.9412	-0.0493
L19	26.2500-21.2500	0.3769	-0.0198	0.9536	-0.0500
L20	21.2500-16.2500	0.3838	-0.0201	0.9629	-0.0505
L21	16.2500-11.2500	0.3904	-0.0205	0.9678	-0.0507
L22	11.2500-6.2500	0.3968	-0.0208	0.9650	-0.0506
L23	6.2500-4.0000	0.4013	-0.0210	0.9528	-0.0499
L24	4.0000-3.7500	0.4030	-0.0211	0.9447	-0.0495
L25	3.7500-0.0000	0.4338	-0.0227	0.9854	-0.0516

Note: For pole sections, center of pressure calculations do not consider feed line shielding.

Shielding Factor Ka

Tower Section	Feed Line Record No.	Description	Feed Line Segment Elev.	K_a No Ice	K_a Ice
L1	3	HBF114-133-3MJ(1-1/4)	95.00 - 98.00	1.0000	1.0000
L2	3	HBF114-133-3MJ(1-1/4)	90.00 - 95.00	1.0000	1.0000
L3	3	HBF114-133-3MJ(1-1/4)	85.00 - 90.00	1.0000	1.0000
L4	3	HBF114-133-3MJ(1-1/4)	80.00 - 85.00	1.0000	1.0000
L5	3	HBF114-133-3MJ(1-1/4)	75.00 - 80.00	1.0000	1.0000
L6	3	HBF114-133-3MJ(1-1/4)	70.00 - 75.00	1.0000	1.0000
L7	3	HBF114-133-3MJ(1-1/4)	65.00 - 70.00	1.0000	1.0000
L7	8	CCI-060100 (W)	65.00 - 65.58	1.0000	1.0000
L7	9	CCI-060100 (W)	65.00 - 65.58	1.0000	1.0000
L7	10	CCI-060100 (W)	65.00 - 65.58	1.0000	1.0000
L8	3	HBF114-133-3MJ(1-1/4)	63.08 - 65.00	1.0000	1.0000
L8	8	CCI-060100 (W)	63.08 - 65.00	1.0000	1.0000
L8	9	CCI-060100 (W)	63.08 - 65.00	1.0000	1.0000
L8	10	CCI-060100 (W)	63.08 - 65.00	1.0000	1.0000
L9	3	HBF114-133-3MJ(1-1/4)	62.83 - 63.08	1.0000	1.0000
L9	8	CCI-060100 (W)	62.83 - 63.08	1.0000	1.0000
L9	9	CCI-060100 (W)	62.83 - 63.08	1.0000	1.0000
L9	10	CCI-060100 (W)	62.83 - 63.08	1.0000	1.0000
L10	3	HBF114-133-3MJ(1-1/4)	57.83 - 62.83	1.0000	1.0000
L10	8	CCI-060100 (W)	57.83 - 62.83	1.0000	1.0000

Tower Section	Feed Line Record No.	Description	Feed Line Segment Elev.	K_a No Ice	K_a Ice
L10	9	CCI-060100 (W)	57.83 - 62.83	1.0000	1.0000
L10	10	CCI-060100 (W)	57.83 - 62.83	1.0000	1.0000
L11	3	HBF114-133-3MJ(1-1/4)	50.83 - 57.83	1.0000	1.0000
L11	8	CCI-060100 (W)	50.83 - 57.83	1.0000	1.0000
L11	9	CCI-060100 (W)	50.83 - 57.83	1.0000	1.0000
L11	10	CCI-060100 (W)	50.83 - 57.83	1.0000	1.0000
L13	3	HBF114-133-3MJ(1-1/4)	45.00 - 50.00	1.0000	1.0000
L13	8	CCI-060100 (W)	45.00 - 50.00	1.0000	1.0000
L13	9	CCI-060100 (W)	45.00 - 50.00	1.0000	1.0000
L13	10	CCI-060100 (W)	45.00 - 50.00	1.0000	1.0000
L14	3	HBF114-133-3MJ(1-1/4)	40.00 - 45.00	1.0000	1.0000
L14	8	CCI-060100 (W)	40.00 - 45.00	1.0000	1.0000
L14	9	CCI-060100 (W)	40.00 - 45.00	1.0000	1.0000
L14	10	CCI-060100 (W)	40.00 - 45.00	1.0000	1.0000
L15	3	HBF114-133-3MJ(1-1/4)	35.00 - 40.00	1.0000	1.0000
L15	5	CCI-065125 (W)	35.00 - 35.50	1.0000	1.0000
L15	6	CCI-065125 (W)	35.00 - 35.50	1.0000	1.0000
L15	7	CCI-065125 (W)	35.00 - 35.50	1.0000	1.0000
L15	8	CCI-060100 (W)	35.50 - 40.00	1.0000	1.0000
L15	9	CCI-060100 (W)	35.50 - 40.00	1.0000	1.0000
L15	10	CCI-060100 (W)	35.50 - 40.00	1.0000	1.0000
L16	3	HBF114-133-3MJ(1-1/4)	31.50 - 35.00	1.0000	1.0000
L16	5	CCI-065125 (W)	31.50 - 35.00	1.0000	1.0000
L16	6	CCI-065125 (W)	31.50 - 35.00	1.0000	1.0000
L16	7	CCI-065125 (W)	31.50 - 35.00	1.0000	1.0000
L17	3	HBF114-133-3MJ(1-1/4)	31.25 - 31.50	1.0000	1.0000
L17	5	CCI-065125 (W)	31.25 - 31.50	1.0000	1.0000
L17	6	CCI-065125 (W)	31.25 - 31.50	1.0000	1.0000
L17	7	CCI-065125 (W)	31.25 - 31.50	1.0000	1.0000
L18	3	HBF114-133-3MJ(1-1/4)	26.25 - 31.25	1.0000	1.0000
L18	5	CCI-065125 (W)	26.25 - 31.25	1.0000	1.0000
L18	6	CCI-065125 (W)	26.25 - 31.25	1.0000	1.0000
L18	7	CCI-065125 (W)	26.25 - 31.25	1.0000	1.0000
L19	3	HBF114-133-3MJ(1-1/4)	21.25 - 26.25	1.0000	1.0000
L19	5	CCI-065125 (W)	21.25 -	1.0000	1.0000

Tower Section	Feed Line Record No.	Description	Feed Line Segment Elev.	K_a No Ice	K_a Ice
L19	6	CCI-065125 (W)	26.25 - 21.25	1.0000	1.0000
L19	7	CCI-065125 (W)	26.25 - 21.25	1.0000	1.0000
L20	3	HBF114-133-3MJ(1-1/4)	26.25 - 16.25	1.0000	1.0000
L20	5	CCI-065125 (W)	21.25 - 16.25	1.0000	1.0000
L20	6	CCI-065125 (W)	21.25 - 16.25	1.0000	1.0000
L20	7	CCI-065125 (W)	21.25 - 16.25	1.0000	1.0000
L21	3	HBF114-133-3MJ(1-1/4)	21.25 - 11.25	1.0000	1.0000
L21	5	CCI-065125 (W)	16.25 - 11.25	1.0000	1.0000
L21	6	CCI-065125 (W)	16.25 - 11.25	1.0000	1.0000
L21	7	CCI-065125 (W)	16.25 - 11.25	1.0000	1.0000
L22	3	HBF114-133-3MJ(1-1/4)	16.25 - 6.25	1.0000	1.0000
L22	5	CCI-065125 (W)	11.25 - 6.25	1.0000	1.0000
L22	6	CCI-065125 (W)	11.25 - 6.25	1.0000	1.0000
L22	7	CCI-065125 (W)	11.25 - 6.25	1.0000	1.0000
L23	3	HBF114-133-3MJ(1-1/4)	6.25 - 4.00	1.0000	1.0000
L23	5	CCI-065125 (W)	6.25 - 4.00	1.0000	1.0000
L23	6	CCI-065125 (W)	6.25 - 4.00	1.0000	1.0000
L23	7	CCI-065125 (W)	6.25 - 4.00	1.0000	1.0000
L24	3	HBF114-133-3MJ(1-1/4)	4.00 - 3.75	1.0000	1.0000
L24	5	CCI-065125 (W)	4.00 - 3.75	1.0000	1.0000
L24	6	CCI-065125 (W)	4.00 - 3.75	1.0000	1.0000
L24	7	CCI-065125 (W)	4.00 - 3.75	1.0000	1.0000
L25	3	HBF114-133-3MJ(1-1/4)	3.75 - 0.00	1.0000	1.0000
L25	5	CCI-065125 (W)	3.75 - 0.50	1.0000	1.0000
L25	6	CCI-065125 (W)	3.75 - 0.50	1.0000	1.0000
L25	7	CCI-065125 (W)	3.75 - 0.50	1.0000	1.0000

Discrete Tower Loads

Description	Face or Leg	Offset Type	Offsets: Horz Lateral Vert ft ft ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft²	C_AA_A Side ft²	Weight K
(2) DB844G65ZAXY	A	From Leg	4.0000 0.00 2.00	0.00	98.0000	No Ice 1/2" Ice 1" Ice 2" Ice	4.3407 4.6564 4.9790 5.6453	3.6148 3.9204 4.2329 4.8790	0.02 0.05 0.09 0.17
(2) DB844G65ZAXY	B	From Leg	4.0000 0.00 2.00	0.00	98.0000	No Ice 1/2" Ice 1" Ice 2" Ice	4.3407 4.6564 4.9790 5.6453	3.6148 3.9204 4.2329 4.8790	0.02 0.05 0.09 0.17
(2) DB844G65ZAXY	C	From Leg	4.0000 0.00 2.00	0.00	98.0000	No Ice 1/2" Ice 1" Ice 2" Ice	4.3407 4.6564 4.9790 5.6453	3.6148 3.9204 4.2329 4.8790	0.02 0.05 0.09 0.17
GPS_A	C	From Leg	4.0000 0.00 5.00	0.00	98.0000	No Ice 1/2" Ice	0.2550 0.3205 0.3934	0.2550 0.3205 0.3934	0.00 0.00 0.01

Description	Face or Leg	Offset Type	Offsets: Horz Lateral Vert ft ft ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft^2	C_AA_A Side ft^2	Weight K
						1" Ice	0.5614	0.5614	0.02
						2" Ice			
RRFDC-3315-PF-48	A	From Leg	4.0000 0.00 0.00	0.00	98.0000	No Ice	3.3636	2.1921	0.03
						1/2" Ice	3.5972	2.3950	0.06
						1" Ice	3.8383	2.6056	0.09
						2" Ice	4.3426	3.0491	0.17
(2) NNHH-65B-R4	A	From Leg	4.0000 0.00 2.00	0.00	98.0000	No Ice	7.6200	3.0100	0.08
						1/2" Ice	8.1200	3.4500	0.15
						1" Ice	8.6300	3.9000	0.23
						2" Ice	9.6800	4.8200	0.41
(2) NNHH-65B-R4	B	From Leg	4.0000 0.00 2.00	0.00	98.0000	No Ice	7.6200	3.0100	0.08
						1/2" Ice	8.1200	3.4500	0.15
						1" Ice	8.6300	3.9000	0.23
						2" Ice	9.6800	4.8200	0.41
(2) NNHH-65B-R4	C	From Leg	4.0000 0.00 2.00	0.00	98.0000	No Ice	7.6200	3.0100	0.08
						1/2" Ice	8.1200	3.4500	0.15
						1" Ice	8.6300	3.9000	0.23
						2" Ice	9.6800	4.8200	0.41
(2) RFV01U-D2A	A	From Leg	4.0000 0.00 2.00	0.00	98.0000	No Ice	1.8750	1.0125	0.07
						1/2" Ice	2.0454	1.1445	0.09
						1" Ice	2.2231	1.2840	0.11
						2" Ice	2.6009	1.5851	0.15
RFV01U-D2A	B	From Leg	4.0000 0.00 2.00	0.00	98.0000	No Ice	1.8750	1.0125	0.07
						1/2" Ice	2.0454	1.1445	0.09
						1" Ice	2.2231	1.2840	0.11
						2" Ice	2.6009	1.5851	0.15
RFV01U-D1A	B	From Leg	4.0000 0.00 2.00	0.00	98.0000	No Ice	1.8750	1.2500	0.08
						1/2" Ice	2.0454	1.3926	0.10
						1" Ice	2.2231	1.5426	0.12
						2" Ice	2.6009	1.8648	0.18
(2) RFV01U-D1A	C	From Leg	4.0000 0.00 2.00	0.00	98.0000	No Ice	1.8750	1.2500	0.08
						1/2" Ice	2.0454	1.3926	0.10
						1" Ice	2.2231	1.5426	0.12
						2" Ice	2.6009	1.8648	0.18
PV-LPP12M-HR-B	C	None		0.00	98.0000	No Ice	35.0300	35.0300	1.86
						1/2" Ice	44.4600	44.4600	2.52
						1" Ice	53.7200	53.7200	3.33
						2" Ice	72.2900	72.2900	5.42
Platform Mount [LP 602-1]	C	None		0.00	98.0000	No Ice	31.0700	31.0700	1.34
						1/2" Ice	34.8200	34.8200	1.97
						1" Ice	38.4800	38.4800	2.67
						2" Ice	45.6000	45.6000	4.31
****									
Platform Mount [LP 601-1]	C	None		0.00	86.0000	No Ice	28.5000	28.5000	1.12
						1/2" Ice	31.6900	31.6900	1.68
						1" Ice	34.8700	34.8700	2.28
						2" Ice	41.2300	41.2300	3.65
****									

Tower Pressures - No Ice

G_H = 1.100

Section Elevation ft	z ft	K_z	q_z psf	A_G ft²	Face	A_F ft²	A_R ft²	A_{leg} ft²	Leg %	C_AA_A In Face ft²	C_AA_A Out Face ft²
L1 100.0000-95.0000	97.4674	0.981	35.30	6.585	A	0.000	6.585	6.585	100.00	0.000	0.000
					B	0.000	6.585		100.00	0.462	0.000
					C	0.000	6.585		100.00	0.000	0.000
L2 95.0000-90.0000	92.4698	0.966	34.78	7.103	A	0.000	7.103	7.103	100.00	0.000	0.000
					B	0.000	7.103		100.00	0.770	0.000
					C	0.000	7.103		100.00	0.000	0.000
L3 90.0000-85.0000	87.4718	0.951	34.23	7.621	A	0.000	7.621	7.621	100.00	0.000	0.000
					B	0.000	7.621		100.00	0.770	0.000
					C	0.000	7.621		100.00	0.000	0.000
L4 85.0000-80.0000	82.4736	0.935	33.66	8.139	A	0.000	8.139	8.139	100.00	0.000	0.000
					B	0.000	8.139		100.00	0.770	0.000
					C	0.000	8.139		100.00	0.000	0.000
L5 80.0000-75.0000	77.4752	0.919	33.06	8.657	A	0.000	8.657	8.657	100.00	0.000	0.000
					B	0.000	8.657		100.00	0.770	0.000
					C	0.000	8.657		100.00	0.000	0.000
L6 75.0000-70.0000	72.4766	0.901	32.44	9.175	A	0.000	9.175	9.175	100.00	0.000	0.000
					B	0.000	9.175		100.00	0.770	0.000
					C	0.000	9.175		100.00	0.000	0.000
L7 70.0000-65.0000	67.4778	0.883	31.78	9.693	A	0.000	9.693	9.693	100.00	0.583	0.000
					B	0.000	9.693		100.00	1.353	0.000
					C	0.000	9.693		100.00	0.583	0.000
L8 65.0000-63.0800	64.0368	0.87	31.31	3.860	A	0.000	3.860	3.860	100.00	1.920	0.000
					B	0.000	3.860		100.00	2.216	0.000
					C	0.000	3.860		100.00	1.920	0.000
L9 63.0800-62.8300	62.9549	0.866	31.16	0.506	A	0.000	0.506	0.506	100.00	0.250	0.000
					B	0.000	0.506		100.00	0.288	0.000
					C	0.000	0.506		100.00	0.250	0.000
L10 62.8300-57.8300	60.3094	0.855	30.78	10.397	A	0.000	10.397	10.397	100.00	5.000	0.000
					B	0.000	10.397		100.00	5.770	0.000
					C	0.000	10.397		100.00	5.000	0.000
L11 57.8300-50.8333	54.2936	0.83	29.87	15.419	A	0.000	15.419	15.419	100.00	6.997	0.000
					B	0.000	15.419		100.00	8.074	0.000
					C	0.000	15.419		100.00	6.997	0.000
L12 50.8333-50.0000	50.4161	0.813	29.24	1.862	A	0.000	1.862	1.862	100.00	0.833	0.000
					B	0.000	1.862		100.00	0.962	0.000
					C	0.000	1.862		100.00	0.833	0.000
L13 50.0000-45.0000	47.4814	0.799	28.75	11.478	A	0.000	11.478	11.478	100.00	5.000	0.000
					B	0.000	11.478		100.00	5.770	0.000
					C	0.000	11.478		100.00	5.000	0.000
L14 45.0000-40.0000	42.4822	0.774	27.85	11.997	A	0.000	11.997	11.997	100.00	5.000	0.000
					B	0.000	11.997		100.00	5.770	0.000
					C	0.000	11.997		100.00	5.000	0.000
L15 40.0000-35.0000	37.4829	0.747	26.87	12.516	A	0.000	12.516	12.516	100.00	5.042	0.000
					B	0.000	12.516		100.00	5.812	0.000
					C	0.000	12.516		100.00	5.042	0.000
L16 35.0000-31.5000	33.2419	0.721	25.96	9.069	A	0.000	9.069	9.069	100.00	3.792	0.000
					B	0.000	9.069		100.00	4.331	0.000
					C	0.000	9.069		100.00	3.792	0.000
L17 31.5000-31.2500	31.3750	0.71	25.54	0.657	A	0.000	0.657	0.657	100.00	0.271	0.000
					B	0.000	0.657		100.00	0.309	0.000
					C	0.000	0.657		100.00	0.271	0.000
L18 31.2500-26.2500	28.7340	0.7	25.19	13.412	A	0.000	13.412	13.412	100.00	5.417	0.000
					B	0.000	13.412		100.00	6.187	0.000
					C	0.000	13.412		100.00	5.417	0.000
L19 26.2500-21.2500	23.7346	0.7	25.19	13.932	A	0.000	13.932	13.932	100.00	5.417	0.000
					B	0.000	13.932		100.00	6.187	0.000
					C	0.000	13.932		100.00	5.417	0.000
L20 21.2500-16.2500	18.7352	0.7	25.19	14.451	A	0.000	14.451	14.451	100.00	5.417	0.000
					B	0.000	14.451		100.00	6.187	0.000
					C	0.000	14.451		100.00	5.417	0.000
L21 16.2500-11.2500	13.7357	0.7	25.19	14.968	A	0.000	14.968	14.968	100.00	5.417	0.000
					B	0.000	14.968		100.00	6.187	0.000
					C	0.000	14.968		100.00	5.417	0.000

Section Elevation ft	z ft	K_z	q_z psf	A_G ft²	Face	A_F ft²	A_R ft²	A_{leg} ft²	Leg %	C_AA_A In Face ft²	C_AA_A Out Face ft²
L22 11.2500-6.2500	8.7362	0.7	25.19	15.487	A	0.000	15.487	15.487	100.00	5.417	0.000
					B	0.000	15.487		100.00	6.187	0.000
					C	0.000	15.487		100.00	5.417	0.000
L23 6.2500-4.0000	5.1223	0.7	25.19	7.138	A	0.000	7.138	7.138	100.00	2.438	0.000
					B	0.000	7.138		100.00	2.784	0.000
					C	0.000	7.138		100.00	2.438	0.000
L24 4.0000-3.7500	3.8750	0.7	25.19	0.799	A	0.000	0.799	0.799	100.00	0.271	0.000
					B	0.000	0.799		100.00	0.309	0.000
					C	0.000	0.799		100.00	0.271	0.000
L25 3.7500-0.0000	1.8676	0.7	25.19	12.138	A	0.000	12.138	12.138	100.00	3.521	0.000
					B	0.000	12.138		100.00	4.098	0.000
					C	0.000	12.138		100.00	3.521	0.000

Tower Pressure - With Ice

G_H = 1.100

Section Elevation ft	z ft	K_z	q_z psf	t_z in	A_G ft²	Face	A_F ft²	A_R ft²	A_{leg} ft²	Leg %	C_AA_A In Face ft²	C_AA_A Out Face ft²
L1 100.0000-95.0000	97.4674	0.981	5.65	1.8945	8.163	A	0.000	8.163	8.163	100.00	0.000	0.000
						B	0.000	8.163		100.00	1.599	0.000
						C	0.000	8.163		100.00	0.000	0.000
L2 95.0000-90.0000	92.4698	0.966	5.56	1.8845	8.673	A	0.000	8.673	8.673	100.00	0.000	0.000
						B	0.000	8.673		100.00	2.655	0.000
						C	0.000	8.673		100.00	0.000	0.000
L3 90.0000-85.0000	87.4718	0.951	5.48	1.8741	9.183	A	0.000	9.183	9.183	100.00	0.000	0.000
						B	0.000	9.183		100.00	2.644	0.000
						C	0.000	9.183		100.00	0.000	0.000
L4 85.0000-80.0000	82.4736	0.935	5.39	1.8631	9.691	A	0.000	9.691	9.691	100.00	0.000	0.000
						B	0.000	9.691		100.00	2.633	0.000
						C	0.000	9.691		100.00	0.000	0.000
L5 80.0000-75.0000	77.4752	0.919	5.29	1.8515	10.200	A	0.000	10.200	10.200	100.00	0.000	0.000
						B	0.000	10.200		100.00	2.621	0.000
						C	0.000	10.200		100.00	0.000	0.000
L6 75.0000-70.0000	72.4766	0.901	5.19	1.8392	10.708	A	0.000	10.708	10.708	100.00	0.000	0.000
						B	0.000	10.708		100.00	2.609	0.000
						C	0.000	10.708		100.00	0.000	0.000
L7 70.0000-65.0000	67.4778	0.883	5.09	1.8261	11.215	A	0.000	11.215	11.215	100.00	0.796	0.000
						B	0.000	11.215		100.00	3.392	0.000
						C	0.000	11.215		100.00	0.796	0.000
L8 65.0000-63.0800	64.0368	0.87	5.01	1.8165	4.441	A	0.000	4.441	4.441	100.00	2.618	0.000
						B	0.000	4.441		100.00	3.611	0.000
						C	0.000	4.441		100.00	2.618	0.000
L9 63.0800-62.8300	62.9549	0.866	4.99	1.8134	0.582	A	0.000	0.582	0.582	100.00	0.341	0.000
						B	0.000	0.582		100.00	0.470	0.000
						C	0.000	0.582		100.00	0.341	0.000
L10 62.8300-57.8300	60.3094	0.855	4.92	1.8057	11.902	A	0.000	11.902	11.902	100.00	6.806	0.000
						B	0.000	11.902		100.00	9.381	0.000
						C	0.000	11.902		100.00	6.806	0.000
L11 57.8300-50.8333	54.2936	0.83	4.78	1.7868	17.503	A	0.000	17.503	17.503	100.00	9.497	0.000
						B	0.000	17.503		100.00	13.075	0.000
						C	0.000	17.503		100.00	9.497	0.000
L12 50.8333-50.0000	50.4161	0.813	4.68	1.7736	2.110	A	0.000	2.110	2.110	100.00	1.131	0.000
						B	0.000	2.110		100.00	1.557	0.000
						C	0.000	2.110		100.00	1.131	0.000
L13 50.0000-45.0000	47.4814	0.799	4.60	1.7630	12.947	A	0.000	12.947	12.947	100.00	6.763	0.000
						B	0.000	12.947		100.00	9.296	0.000
						C	0.000	12.947		100.00	6.763	0.000
L14 45.0000-40.0000	42.4822	0.774	4.46	1.7435	13.450	A	0.000	13.450	13.450	100.00	6.743	0.000
						B	0.000	13.450		100.00	9.257	0.000
						C	0.000	13.450		100.00	6.743	0.000
L15 40.0000-35.0000	37.4829	0.747	4.30	1.7218	13.951	A	0.000	13.951	13.951	100.00	6.763	0.000
						B	0.000	13.951		100.00	9.255	0.000

Section Elevation ft	z ft	K_z	q_z psf	t_z in	A_G ft²	Face	A_F ft²	A_R ft²	A_{leg} ft²	Leg %	C_AA_A In Face ft²	C_AA_A Out Face ft²
						C	0.000	13.951		100.00	6.763	0.000
L16 35.0000-31.5000	33.2419	0.721	4.15	1.7012	10.062	A	0.000	10.062	10.062	100.00	4.983	0.000
						B	0.000	10.062		100.00	6.712	0.000
						C	0.000	10.062		100.00	4.983	0.000
L17 31.5000-31.2500	31.3750	0.71	4.09	1.6914	0.727	A	0.000	0.727	0.727	100.00	0.355	0.000
						B	0.000	0.727		100.00	0.478	0.000
						C	0.000	0.727		100.00	0.355	0.000
L18 31.2500-26.2500	28.7340	0.7	4.03	1.6766	14.810	A	0.000	14.810	14.810	100.00	7.093	0.000
						B	0.000	14.810		100.00	9.540	0.000
						C	0.000	14.810		100.00	7.093	0.000
L19 26.2500-21.2500	23.7346	0.7	4.03	1.6449	15.302	A	0.000	15.302	15.302	100.00	7.062	0.000
						B	0.000	15.302		100.00	9.476	0.000
						C	0.000	15.302		100.00	7.062	0.000
L20 21.2500-16.2500	18.7352	0.7	4.03	1.6064	15.789	A	0.000	15.789	15.789	100.00	7.023	0.000
						B	0.000	15.789		100.00	9.400	0.000
						C	0.000	15.789		100.00	7.023	0.000
L21 16.2500-11.2500	13.7357	0.7	4.03	1.5573	16.266	A	0.000	16.266	16.266	100.00	6.974	0.000
						B	0.000	16.266		100.00	9.301	0.000
						C	0.000	16.266		100.00	6.974	0.000
L22 11.2500-6.2500	8.7362	0.7	4.03	1.4884	16.728	A	0.000	16.728	16.728	100.00	6.905	0.000
						B	0.000	16.728		100.00	9.164	0.000
						C	0.000	16.728		100.00	6.905	0.000
L23 6.2500-4.0000	5.1223	0.7	4.03	1.4111	7.668	A	0.000	7.668	7.668	100.00	3.072	0.000
						B	0.000	7.668		100.00	4.054	0.000
						C	0.000	7.668		100.00	3.072	0.000
L24 4.0000-3.7500	3.8750	0.7	4.03	1.3722	0.856	A	0.000	0.856	0.856	100.00	0.339	0.000
						B	0.000	0.856		100.00	0.447	0.000
						C	0.000	0.856		100.00	0.339	0.000
L25 3.7500-0.0000	1.8676	0.7	4.03	1.2756	12.935	A	0.000	12.935	12.935	100.00	4.350	0.000
						B	0.000	12.935		100.00	5.884	0.000
						C	0.000	12.935		100.00	4.350	0.000

Tower Pressure - Service

G_H = 1.100

Section Elevation ft	z ft	K_z	q_z psf	A_G ft²	Face	A_F ft²	A_R ft²	A_{leg} ft²	Leg %	C_AA_A In Face ft²	C_AA_A Out Face ft²
L1 100.0000-95.0000	97.4674	0.981	7.66	6.585	A	0.000	6.585	6.585	100.00	0.000	0.000
					B	0.000	6.585		100.00	0.462	0.000
					C	0.000	6.585		100.00	0.000	0.000
L2 95.0000-90.0000	92.4698	0.966	7.55	7.103	A	0.000	7.103	7.103	100.00	0.000	0.000
					B	0.000	7.103		100.00	0.770	0.000
					C	0.000	7.103		100.00	0.000	0.000
L3 90.0000-85.0000	87.4718	0.951	7.43	7.621	A	0.000	7.621	7.621	100.00	0.000	0.000
					B	0.000	7.621		100.00	0.770	0.000
					C	0.000	7.621		100.00	0.000	0.000
L4 85.0000-80.0000	82.4736	0.935	7.30	8.139	A	0.000	8.139	8.139	100.00	0.000	0.000
					B	0.000	8.139		100.00	0.770	0.000
					C	0.000	8.139		100.00	0.000	0.000
L5 80.0000-75.0000	77.4752	0.919	7.17	8.657	A	0.000	8.657	8.657	100.00	0.000	0.000
					B	0.000	8.657		100.00	0.770	0.000
					C	0.000	8.657		100.00	0.000	0.000
L6 75.0000-70.0000	72.4766	0.901	7.04	9.175	A	0.000	9.175	9.175	100.00	0.000	0.000
					B	0.000	9.175		100.00	0.770	0.000
					C	0.000	9.175		100.00	0.000	0.000
L7 70.0000-65.0000	67.4778	0.883	6.90	9.693	A	0.000	9.693	9.693	100.00	0.583	0.000
					B	0.000	9.693		100.00	1.353	0.000
					C	0.000	9.693		100.00	0.583	0.000
L8 65.0000-63.0800	64.0368	0.87	6.79	3.860	A	0.000	3.860	3.860	100.00	1.920	0.000
					B	0.000	3.860		100.00	2.216	0.000
					C	0.000	3.860		100.00	1.920	0.000
L9 63.0800-	62.9549	0.866	6.76	0.506	A	0.000	0.506	0.506	100.00	0.250	0.000

Section Elevation ft	z ft	K_z	q_z psf	A_G ft²	Face	A_F ft²	A_R ft²	A_{leg} ft²	Leg %	C_AA_A In Face ft²	C_AA_A Out Face ft²
62.8300					B	0.000	0.506		100.00	0.288	0.000
					C	0.000	0.506		100.00	0.250	0.000
L10 62.8300-57.8300	60.3094	0.855	6.68	10.397	A	0.000	10.397	10.397	100.00	5.000	0.000
					B	0.000	10.397		100.00	5.770	0.000
					C	0.000	10.397		100.00	5.000	0.000
L11 57.8300-50.8333	54.2936	0.83	6.48	15.419	A	0.000	15.419	15.419	100.00	6.997	0.000
					B	0.000	15.419		100.00	8.074	0.000
					C	0.000	15.419		100.00	6.997	0.000
L12 50.8333-50.0000	50.4161	0.813	6.35	1.862	A	0.000	1.862	1.862	100.00	0.833	0.000
					B	0.000	1.862		100.00	0.962	0.000
					C	0.000	1.862		100.00	0.833	0.000
L13 50.0000-45.0000	47.4814	0.799	6.24	11.478	A	0.000	11.478	11.478	100.00	5.000	0.000
					B	0.000	11.478		100.00	5.770	0.000
					C	0.000	11.478		100.00	5.000	0.000
L14 45.0000-40.0000	42.4822	0.774	6.04	11.997	A	0.000	11.997	11.997	100.00	5.000	0.000
					B	0.000	11.997		100.00	5.770	0.000
					C	0.000	11.997		100.00	5.000	0.000
L15 40.0000-35.0000	37.4829	0.747	5.83	12.516	A	0.000	12.516	12.516	100.00	5.042	0.000
					B	0.000	12.516		100.00	5.812	0.000
					C	0.000	12.516		100.00	5.042	0.000
L16 35.0000-31.5000	33.2419	0.721	5.63	9.069	A	0.000	9.069	9.069	100.00	3.792	0.000
					B	0.000	9.069		100.00	4.331	0.000
					C	0.000	9.069		100.00	3.792	0.000
L17 31.5000-31.2500	31.3750	0.71	5.54	0.657	A	0.000	0.657	0.657	100.00	0.271	0.000
					B	0.000	0.657		100.00	0.309	0.000
					C	0.000	0.657		100.00	0.271	0.000
L18 31.2500-26.2500	28.7340	0.7	5.47	13.412	A	0.000	13.412	13.412	100.00	5.417	0.000
					B	0.000	13.412		100.00	6.187	0.000
					C	0.000	13.412		100.00	5.417	0.000
L19 26.2500-21.2500	23.7346	0.7	5.47	13.932	A	0.000	13.932	13.932	100.00	5.417	0.000
					B	0.000	13.932		100.00	6.187	0.000
					C	0.000	13.932		100.00	5.417	0.000
L20 21.2500-16.2500	18.7352	0.7	5.47	14.451	A	0.000	14.451	14.451	100.00	5.417	0.000
					B	0.000	14.451		100.00	6.187	0.000
					C	0.000	14.451		100.00	5.417	0.000
L21 16.2500-11.2500	13.7357	0.7	5.47	14.968	A	0.000	14.968	14.968	100.00	5.417	0.000
					B	0.000	14.968		100.00	6.187	0.000
					C	0.000	14.968		100.00	5.417	0.000
L22 11.2500-6.2500	8.7362	0.7	5.47	15.487	A	0.000	15.487	15.487	100.00	5.417	0.000
					B	0.000	15.487		100.00	6.187	0.000
					C	0.000	15.487		100.00	5.417	0.000
L23 6.2500-4.0000	5.1223	0.7	5.47	7.138	A	0.000	7.138	7.138	100.00	2.438	0.000
					B	0.000	7.138		100.00	2.784	0.000
					C	0.000	7.138		100.00	2.438	0.000
L24 4.0000-3.7500	3.8750	0.7	5.47	0.799	A	0.000	0.799	0.799	100.00	0.271	0.000
					B	0.000	0.799		100.00	0.309	0.000
					C	0.000	0.799		100.00	0.271	0.000
L25 3.7500-0.0000	1.8676	0.7	5.47	12.138	A	0.000	12.138	12.138	100.00	3.521	0.000
					B	0.000	12.138		100.00	4.098	0.000
					C	0.000	12.138		100.00	3.521	0.000

Load Combinations

Comb. No.	Description
1	Dead Only
2	1.2 Dead+1.0 Wind 0 deg - No Ice
3	0.9 Dead+1.0 Wind 0 deg - No Ice
4	1.2 Dead+1.0 Wind 30 deg - No Ice
5	0.9 Dead+1.0 Wind 30 deg - No Ice
6	1.2 Dead+1.0 Wind 60 deg - No Ice
7	0.9 Dead+1.0 Wind 60 deg - No Ice
8	1.2 Dead+1.0 Wind 90 deg - No Ice
9	0.9 Dead+1.0 Wind 90 deg - No Ice
10	1.2 Dead+1.0 Wind 120 deg - No Ice

Comb. No.	Description
11	0.9 Dead+1.0 Wind 120 deg - No Ice
12	1.2 Dead+1.0 Wind 150 deg - No Ice
13	0.9 Dead+1.0 Wind 150 deg - No Ice
14	1.2 Dead+1.0 Wind 180 deg - No Ice
15	0.9 Dead+1.0 Wind 180 deg - No Ice
16	1.2 Dead+1.0 Wind 210 deg - No Ice
17	0.9 Dead+1.0 Wind 210 deg - No Ice
18	1.2 Dead+1.0 Wind 240 deg - No Ice
19	0.9 Dead+1.0 Wind 240 deg - No Ice
20	1.2 Dead+1.0 Wind 270 deg - No Ice
21	0.9 Dead+1.0 Wind 270 deg - No Ice
22	1.2 Dead+1.0 Wind 300 deg - No Ice
23	0.9 Dead+1.0 Wind 300 deg - No Ice
24	1.2 Dead+1.0 Wind 330 deg - No Ice
25	0.9 Dead+1.0 Wind 330 deg - No Ice
26	1.2 Dead+1.0 Ice
27	1.2 Dead+1.0 Wind 0 deg+1.0 Ice
28	1.2 Dead+1.0 Wind 30 deg+1.0 Ice
29	1.2 Dead+1.0 Wind 60 deg+1.0 Ice
30	1.2 Dead+1.0 Wind 90 deg+1.0 Ice
31	1.2 Dead+1.0 Wind 120 deg+1.0 Ice
32	1.2 Dead+1.0 Wind 150 deg+1.0 Ice
33	1.2 Dead+1.0 Wind 180 deg+1.0 Ice
34	1.2 Dead+1.0 Wind 210 deg+1.0 Ice
35	1.2 Dead+1.0 Wind 240 deg+1.0 Ice
36	1.2 Dead+1.0 Wind 270 deg+1.0 Ice
37	1.2 Dead+1.0 Wind 300 deg+1.0 Ice
38	1.2 Dead+1.0 Wind 330 deg+1.0 Ice
39	Dead+Wind 0 deg - Service
40	Dead+Wind 30 deg - Service
41	Dead+Wind 60 deg - Service
42	Dead+Wind 90 deg - Service
43	Dead+Wind 120 deg - Service
44	Dead+Wind 150 deg - Service
45	Dead+Wind 180 deg - Service
46	Dead+Wind 210 deg - Service
47	Dead+Wind 240 deg - Service
48	Dead+Wind 270 deg - Service
49	Dead+Wind 300 deg - Service
50	Dead+Wind 330 deg - Service

Maximum Member Forces

Section No.	Elevation ft	Component Type	Condition	Gov. Load Comb.	Axial K	Major Axis Moment kip-ft	Minor Axis Moment kip-ft
L1	100 - 95	Pole	Max Tension	27	0.00	-0.00	-0.00
			Max. Compression	26	-15.20	0.17	0.57
			Max. Mx	20	-5.19	20.75	0.09
			Max. My	2	-5.18	0.07	20.96
			Max. Vy	20	-5.41	20.75	0.09
			Max. Vx	2	-5.46	0.07	20.96
			Max. Torque	18			-0.24
L2	95 - 90	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	26	-15.80	0.15	0.60
			Max. Mx	20	-5.53	48.45	0.11
			Max. My	2	-5.52	0.08	48.92
			Max. Vy	20	-5.68	48.45	0.11
			Max. Vx	2	-5.73	0.08	48.92
			Max. Torque	18			-0.24
L3	90 - 85	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	26	-20.13	0.11	0.62
			Max. Mx	20	-7.20	78.63	0.14
			Max. My	2	-7.19	0.10	79.36
			Max. Vy	20	-7.07	78.63	0.14
			Max. Vx	2	-7.13	0.10	79.36
			Max. Torque	18			-0.24

Section No.	Elevation ft	Component Type	Condition	Gov. Load Comb.	Axial K	Major Axis Moment kip-ft	Minor Axis Moment kip-ft
L4	85 - 80	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	26	-20.80	0.08	0.65
			Max. Mx	20	-7.59	114.67	0.16
			Max. My	2	-7.59	0.11	115.66
			Max. Vy	20	-7.35	114.67	0.16
			Max. Vx	2	-7.40	0.11	115.66
			Max. Torque	18			-0.24
L5	80 - 75	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	26	-21.51	0.05	0.67
			Max. Mx	20	-8.02	152.13	0.18
			Max. My	2	-8.02	0.13	153.38
			Max. Vy	20	-7.64	152.13	0.18
			Max. Vx	2	-7.69	0.13	153.38
			Max. Torque	18			-0.24
L6	75 - 70	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	26	-22.25	0.01	0.69
			Max. Mx	20	-8.47	191.03	0.21
			Max. My	2	-8.47	0.14	192.54
			Max. Vy	20	-7.93	191.03	0.21
			Max. Vx	2	-7.98	0.14	192.54
			Max. Torque	18			-0.24
L7	70 - 65	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	26	-23.04	-0.03	0.71
			Max. Mx	20	-8.95	231.41	0.23
			Max. My	2	-8.95	0.16	233.18
			Max. Vy	20	-8.23	231.41	0.23
			Max. Vx	2	-8.28	0.16	233.18
			Max. Torque	18			-0.24
L8	65 - 63.08	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	26	-23.43	-0.04	0.72
			Max. Mx	20	-9.14	247.36	0.24
			Max. My	2	-9.13	0.16	249.23
			Max. Vy	20	-8.40	247.36	0.24
			Max. Vx	2	-8.45	0.16	249.23
			Max. Torque	18			-0.24
L9	63.08 - 62.83	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	26	-23.50	-0.04	0.72
			Max. Mx	20	-9.18	249.46	0.24
			Max. My	2	-9.18	0.16	251.35
			Max. Vy	20	-8.42	249.46	0.24
			Max. Vx	2	-8.47	0.16	251.35
			Max. Torque	18			-0.24
L10	62.83 - 57.83	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	26	-24.90	-0.08	0.75
			Max. Mx	20	-10.04	292.67	0.26
			Max. My	2	-10.03	0.18	294.82
			Max. Vy	20	-8.88	292.67	0.26
			Max. Vx	2	-8.93	0.18	294.82
			Max. Torque	18			-0.24
L11	57.83 - 50.8333	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	26	-25.71	-0.11	0.76
			Max. Mx	20	-10.53	318.15	0.27
			Max. My	2	-10.53	0.18	320.44
			Max. Vy	20	-9.14	318.15	0.27
			Max. Vx	2	-9.19	0.18	320.44
			Max. Torque	18			-0.24
L12	50.8333 - 50	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	26	-28.21	-0.15	0.78
			Max. Mx	20	-12.22	365.05	0.30
			Max. My	2	-12.21	0.20	367.60
			Max. Vy	20	-9.63	365.05	0.30
			Max. Vx	2	-9.68	0.20	367.60
			Max. Torque	18			-0.24
L13	50 - 45	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	26	-29.77	-0.19	0.81
			Max. Mx	20	-13.23	414.31	0.32

Section No.	Elevation ft	Component Type	Condition	Gov. Load Comb.	Axial K	Major Axis Moment kip-ft	Minor Axis Moment kip-ft
			Max. My	2	-13.23	0.21	417.12
			Max. Vy	20	-10.09	414.31	0.32
			Max. Vx	2	-10.14	0.21	417.12
			Max. Torque	18			-0.24
L14	45 - 40	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	26	-31.37	-0.23	0.83
			Max. Mx	20	-14.27	465.86	0.34
			Max. My	2	-14.27	0.22	468.94
			Max. Vy	20	-10.54	465.86	0.34
			Max. Vx	2	-10.60	0.22	468.94
			Max. Torque	18			-0.24
L15	40 - 35	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	26	-33.00	-0.28	0.86
			Max. Mx	20	-15.35	519.69	0.36
			Max. My	2	-15.35	0.24	523.03
			Max. Vy	20	-11.00	519.69	0.36
			Max. Vx	2	-11.05	0.24	523.03
			Max. Torque	18			-0.24
L16	35 - 31.5	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	26	-34.17	-0.31	0.88
			Max. Mx	20	-16.12	558.72	0.38
			Max. My	2	-16.11	0.25	562.24
			Max. Vy	20	-11.32	558.72	0.38
			Max. Vx	2	-11.37	0.25	562.24
			Max. Torque	18			-0.24
L17	31.5 - 31.25	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	26	-34.26	-0.31	0.88
			Max. Mx	20	-16.18	561.55	0.38
			Max. My	2	-16.18	0.25	565.09
			Max. Vy	20	-11.34	561.55	0.38
			Max. Vx	2	-11.39	0.25	565.09
			Max. Torque	18			-0.24
L18	31.25 - 26.25	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	26	-36.09	-0.36	0.90
			Max. Mx	20	-17.43	619.35	0.40
			Max. My	2	-17.43	0.26	623.15
			Max. Vy	20	-11.79	619.35	0.40
			Max. Vx	2	-11.84	0.26	623.15
			Max. Torque	18			-0.24
L19	26.25 - 21.25	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	26	-37.94	-0.40	0.93
			Max. Mx	20	-18.71	679.45	0.42
			Max. My	2	-18.71	0.27	683.51
			Max. Vy	20	-12.26	679.45	0.42
			Max. Vx	2	-12.31	0.27	683.51
			Max. Torque	18			-0.24
L20	21.25 - 16.25	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	26	-39.81	-0.45	0.96
			Max. Mx	20	-20.01	741.91	0.45
			Max. My	2	-20.01	0.28	746.23
			Max. Vy	20	-12.74	741.91	0.45
			Max. Vx	2	-12.79	0.28	746.23
			Max. Torque	18			-0.24
L21	16.25 - 11.25	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	26	-41.71	-0.49	0.98
			Max. Mx	20	-21.35	806.79	0.47
			Max. My	2	-21.35	0.29	811.36
			Max. Vy	20	-13.23	806.79	0.47
			Max. Vx	2	-13.28	0.29	811.36
			Max. Torque	18			-0.24
L22	11.25 - 6.25	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	26	-43.61	-0.54	1.01
			Max. Mx	20	-22.72	874.14	0.49
			Max. My	2	-22.72	0.30	878.97
			Max. Vy	20	-13.73	874.14	0.49

Section No.	Elevation ft	Component Type	Condition	Gov. Load Comb.	Axial K	Major Axis Moment kip-ft	Minor Axis Moment kip-ft
			Max. Vx	2	-13.78	0.30	878.97
			Max. Torque	18			-0.24
L23	6.25 - 4	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	26	-44.47	-0.56	1.02
			Max. Mx	20	-23.34	905.27	0.50
			Max. My	2	-23.34	0.31	910.21
			Max. Vy	20	-13.96	905.27	0.50
			Max. Vx	2	-14.01	0.31	910.21
			Max. Torque	18			-0.24
L24	4 - 3.75	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	26	-44.56	-0.56	1.02
			Max. Mx	20	-23.42	908.76	0.50
			Max. My	2	-23.42	0.31	913.72
			Max. Vy	20	-13.98	908.76	0.50
			Max. Vx	2	-14.03	0.31	913.72
			Max. Torque	18			-0.24
L25	3.75 - 0	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	26	-45.98	-0.59	1.04
			Max. Mx	20	-24.50	961.89	0.52
			Max. My	2	-24.50	0.32	967.04
			Max. Vy	20	-14.37	961.89	0.52
			Max. Vx	2	-14.42	0.32	967.04
			Max. Torque	18			-0.24

Maximum Reactions

Location	Condition	Gov. Load Comb.	Vertical K	Horizontal, X K	Horizontal, Z K
Pole	Max. Vert	26	45.98	0.00	0.00
	Max. H_x	20	24.50	14.36	0.00
	Max. H_z	2	24.50	0.00	14.41
	Max. M_x	2	967.04	0.00	14.41
	Max. M_z	8	942.49	-13.46	-0.00
	Max. Torsion	6	0.24	-11.66	6.75
	Min. Vert	7	18.37	-11.66	6.75
	Min. H_x	8	24.50	-13.46	-0.00
	Min. H_z	14	24.50	-0.00	-13.51
	Min. M_x	14	-947.24	-0.00	-13.51
	Min. M_z	20	-961.89	14.36	0.00
	Min. Torsion	18	-0.24	12.44	-7.20

Tower Mast Reaction Summary

Load Combination	Vertical K	$Shear_x$ K	$Shear_z$ K	Overturning Moment, M_x kip-ft	Overturning Moment, M_z kip-ft	Torque kip-ft
Dead Only	20.42	0.00	0.00	-0.12	-0.05	0.00
1.2 Dead+1.0 Wind 0 deg - No Ice	24.50	-0.00	-14.41	-967.04	0.32	-0.08
0.9 Dead+1.0 Wind 0 deg - No Ice	18.37	-0.00	-14.41	-961.74	0.33	-0.08
1.2 Dead+1.0 Wind 30 deg - No Ice	24.50	7.18	-12.48	-837.32	-480.71	-0.18
0.9 Dead+1.0 Wind 30 deg - No Ice	18.37	7.18	-12.48	-832.72	-478.08	-0.18
1.2 Dead+1.0 Wind 60 deg - No Ice	24.50	11.66	-6.75	-473.52	-816.05	-0.24
0.9 Dead+1.0 Wind 60 deg - No Ice	18.37	11.66	-6.75	-470.87	-811.54	-0.24
1.2 Dead+1.0 Wind 90 deg -	24.50	13.46	0.00	0.22	-942.49	-0.24

Load Combination	Vertical K	$Shear_x$ K	$Shear_z$ K	Overturning Moment, M_x kip-ft	Overturning Moment, M_z kip-ft	Torque kip-ft
No Ice						
0.9 Dead+1.0 Wind 90 deg - No Ice	18.37	13.46	0.00	0.26	-937.29	-0.24
1.2 Dead+1.0 Wind 120 deg - No Ice	24.50	12.44	7.21	483.62	-833.31	-0.17
0.9 Dead+1.0 Wind 120 deg - No Ice	18.37	12.44	7.21	481.02	-828.76	-0.17
1.2 Dead+1.0 Wind 150 deg - No Ice	24.50	7.19	12.48	837.39	-481.35	-0.05
0.9 Dead+1.0 Wind 150 deg - No Ice	18.37	7.19	12.48	832.87	-478.72	-0.05
1.2 Dead+1.0 Wind 180 deg - No Ice	24.50	0.00	13.51	947.24	-0.43	0.08
0.9 Dead+1.0 Wind 180 deg - No Ice	18.37	0.00	13.51	942.05	-0.41	0.08
1.2 Dead+1.0 Wind 210 deg - No Ice	24.50	-6.73	11.70	820.13	470.84	0.18
0.9 Dead+1.0 Wind 210 deg - No Ice	18.37	-6.73	11.70	815.64	468.26	0.18
1.2 Dead+1.0 Wind 240 deg - No Ice	24.50	-12.44	7.20	482.98	832.83	0.24
0.9 Dead+1.0 Wind 240 deg - No Ice	18.37	-12.44	7.20	480.39	828.31	0.24
1.2 Dead+1.0 Wind 270 deg - No Ice	24.50	-14.36	-0.00	-0.52	961.89	0.24
0.9 Dead+1.0 Wind 270 deg - No Ice	18.37	-14.36	-0.00	-0.48	956.67	0.24
1.2 Dead+1.0 Wind 300 deg - No Ice	24.50	-11.66	-6.76	-474.17	816.31	0.17
0.9 Dead+1.0 Wind 300 deg - No Ice	18.37	-11.66	-6.76	-471.51	811.82	0.17
1.2 Dead+1.0 Wind 330 deg - No Ice	24.50	-6.73	-11.70	-820.80	471.49	0.05
0.9 Dead+1.0 Wind 330 deg - No Ice	18.37	-6.73	-11.70	-816.23	468.90	0.05
1.2 Dead+1.0 Ice	45.98	0.00	-0.00	-1.04	-0.59	-0.00
1.2 Dead+1.0 Wind 0 deg+1.0 Ice	45.98	-0.00	-3.14	-237.63	-0.53	-0.02
1.2 Dead+1.0 Wind 30 deg+1.0 Ice	45.98	1.57	-2.72	-205.90	-118.24	-0.06
1.2 Dead+1.0 Wind 60 deg+1.0 Ice	45.98	2.66	-1.54	-118.15	-202.46	-0.07
1.2 Dead+1.0 Wind 90 deg+1.0 Ice	45.98	3.07	0.00	-1.02	-233.73	-0.07
1.2 Dead+1.0 Wind 120 deg+1.0 Ice	45.98	2.71	1.57	117.23	-204.52	-0.05
1.2 Dead+1.0 Wind 150 deg+1.0 Ice	45.98	1.57	2.72	203.77	-118.38	-0.02
1.2 Dead+1.0 Wind 180 deg+1.0 Ice	45.98	0.00	3.08	233.13	-0.69	0.02
1.2 Dead+1.0 Wind 210 deg+1.0 Ice	45.98	-1.53	2.67	201.71	115.88	0.06
1.2 Dead+1.0 Wind 240 deg+1.0 Ice	45.98	-2.71	1.57	117.09	203.22	0.07
1.2 Dead+1.0 Wind 270 deg+1.0 Ice	45.98	-3.13	-0.00	-1.18	234.80	0.07
1.2 Dead+1.0 Wind 300 deg+1.0 Ice	45.98	-2.66	-1.54	-118.29	201.32	0.05
1.2 Dead+1.0 Wind 330 deg+1.0 Ice	45.98	-1.54	-2.67	-204.00	116.02	0.02
Dead+Wind 0 deg - Service	20.42	-0.00	-3.13	-209.22	0.03	-0.02
Dead+Wind 30 deg - Service	20.42	1.56	-2.71	-181.17	-103.99	-0.04
Dead+Wind 60 deg - Service	20.42	2.53	-1.47	-102.49	-176.50	-0.05
Dead+Wind 90 deg - Service	20.42	2.92	0.00	-0.04	-203.85	-0.05
Dead+Wind 120 deg - Service	20.42	2.70	1.56	104.50	-180.24	-0.04
Dead+Wind 150 deg - Service	20.42	1.56	2.71	181.00	-104.13	-0.01
Dead+Wind 180 deg -	20.42	0.00	2.93	204.75	-0.13	0.02

Load Combination	Vertical	$Shear_x$	$Shear_z$	Overturning Moment, M_x	Overturning Moment, M_z	Torque
	K	K	K	kip-ft	kip-ft	kip-ft
Service						
Dead+Wind 210 deg - Service	20.42	-1.46	2.54	177.26	101.78	0.04
Dead+Wind 240 deg - Service	20.42	-2.70	1.56	104.36	180.07	0.05
Dead+Wind 270 deg - Service	20.42	-3.12	-0.00	-0.20	207.98	0.05
Dead+Wind 300 deg - Service	20.42	-2.53	-1.47	-102.63	176.49	0.04
Dead+Wind 330 deg - Service	20.42	-1.46	-2.54	-177.59	101.92	0.01

Solution Summary

	Sum of Applied Forces			Sum of Reactions			
Load Comb.	PX K	PY K	PZ K	PX K	PY K	PZ K	% Error
1	0.00	-20.42	0.00	0.00	20.42	0.00	0.000%
2	-0.00	-24.50	-14.41	0.00	24.50	14.41	0.000%
3	-0.00	-18.37	-14.41	0.00	18.37	14.41	0.000%
4	7.18	-24.50	-12.48	-7.18	24.50	12.48	0.000%
5	7.18	-18.37	-12.48	-7.18	18.37	12.48	0.000%
6	11.66	-24.50	-6.75	-11.66	24.50	6.75	0.000%
7	11.66	-18.37	-6.75	-11.66	18.37	6.75	0.000%
8	13.46	-24.50	0.00	-13.46	24.50	-0.00	0.000%
9	13.46	-18.37	0.00	-13.46	18.37	-0.00	0.000%
10	12.44	-24.50	7.21	-12.44	24.50	-7.21	0.000%
11	12.44	-18.37	7.21	-12.44	18.37	-7.21	0.000%
12	7.19	-24.50	12.48	-7.19	24.50	-12.48	0.000%
13	7.19	-18.37	12.48	-7.19	18.37	-12.48	0.000%
14	0.00	-24.50	13.51	-0.00	24.50	-13.51	0.000%
15	0.00	-18.37	13.51	-0.00	18.37	-13.51	0.000%
16	-6.73	-24.50	11.70	6.73	24.50	-11.70	0.000%
17	-6.73	-18.37	11.70	6.73	18.37	-11.70	0.000%
18	-12.44	-24.50	7.20	12.44	24.50	-7.20	0.000%
19	-12.44	-18.37	7.20	12.44	18.37	-7.20	0.000%
20	-14.36	-24.50	-0.00	14.36	24.50	0.00	0.000%
21	-14.36	-18.37	-0.00	14.36	18.37	0.00	0.000%
22	-11.66	-24.50	-6.76	11.66	24.50	6.76	0.000%
23	-11.66	-18.37	-6.76	11.66	18.37	6.76	0.000%
24	-6.73	-24.50	-11.70	6.73	24.50	11.70	0.000%
25	-6.73	-18.37	-11.70	6.73	18.37	11.70	0.000%
26	0.00	-45.98	0.00	0.00	45.98	0.00	0.000%
27	-0.00	-45.98	-3.14	0.00	45.98	3.14	0.000%
28	1.57	-45.98	-2.72	-1.57	45.98	2.72	0.000%
29	2.66	-45.98	-1.54	-2.66	45.98	1.54	0.000%
30	3.07	-45.98	0.00	-3.07	45.98	-0.00	0.000%
31	2.71	-45.98	1.57	-2.71	45.98	-1.57	0.000%
32	1.57	-45.98	2.72	-1.57	45.98	-2.72	0.000%
33	0.00	-45.98	3.08	-0.00	45.98	-3.08	0.000%
34	-1.53	-45.98	2.67	1.53	45.98	-2.67	0.000%
35	-2.71	-45.98	1.57	2.71	45.98	-1.57	0.000%
36	-3.13	-45.98	-0.00	3.13	45.98	0.00	0.000%
37	-2.66	-45.98	-1.54	2.66	45.98	1.54	0.000%
38	-1.54	-45.98	-2.67	1.54	45.98	2.67	0.000%
39	-0.00	-20.42	-3.13	0.00	20.42	3.13	0.000%
40	1.56	-20.42	-2.71	-1.56	20.42	2.71	0.000%
41	2.53	-20.42	-1.47	-2.53	20.42	1.47	0.000%
42	2.92	-20.42	0.00	-2.92	20.42	-0.00	0.000%
43	2.70	-20.42	1.56	-2.70	20.42	-1.56	0.000%
44	1.56	-20.42	2.71	-1.56	20.42	-2.71	0.000%
45	0.00	-20.42	2.93	-0.00	20.42	-2.93	0.000%
46	-1.46	-20.42	2.54	1.46	20.42	-2.54	0.000%
47	-2.70	-20.42	1.56	2.70	20.42	-1.56	0.000%
48	-3.12	-20.42	-0.00	3.12	20.42	0.00	0.000%
49	-2.53	-20.42	-1.47	2.53	20.42	1.47	0.000%

Load Comb.	Sum of Applied Forces PX K	PY K	PZ K	Sum of Reactions PX K	PY K	PZ K	% Error
50	-1.46	-20.42	-2.54	1.46	20.42	2.54	0.000%

Non-Linear Convergence Results

Load Combination	Converged?	Number of Cycles	Displacement Tolerance	Force Tolerance
1	Yes	4	0.00000001	0.00000001
2	Yes	4	0.00000001	0.00019848
3	Yes	4	0.00000001	0.00010672
4	Yes	5	0.00000001	0.00013842
5	Yes	5	0.00000001	0.00006662
6	Yes	5	0.00000001	0.00014401
7	Yes	5	0.00000001	0.00006975
8	Yes	4	0.00000001	0.00031744
9	Yes	4	0.00000001	0.00019731
10	Yes	5	0.00000001	0.00013862
11	Yes	5	0.00000001	0.00006676
12	Yes	5	0.00000001	0.00014268
13	Yes	5	0.00000001	0.00006877
14	Yes	4	0.00000001	0.00019458
15	Yes	4	0.00000001	0.00010383
16	Yes	5	0.00000001	0.00014316
17	Yes	5	0.00000001	0.00006930
18	Yes	5	0.00000001	0.00013709
19	Yes	5	0.00000001	0.00006601
20	Yes	4	0.00000001	0.00032482
21	Yes	4	0.00000001	0.00020187
22	Yes	5	0.00000001	0.00014297
23	Yes	5	0.00000001	0.00006920
24	Yes	5	0.00000001	0.00013939
25	Yes	5	0.00000001	0.00006736
26	Yes	4	0.00000001	0.00000001
27	Yes	4	0.00000001	0.00036432
28	Yes	4	0.00000001	0.00058110
29	Yes	4	0.00000001	0.00060860
30	Yes	4	0.00000001	0.00036558
31	Yes	4	0.00000001	0.00056798
32	Yes	4	0.00000001	0.00058439
33	Yes	4	0.00000001	0.00035606
34	Yes	4	0.00000001	0.00058756
35	Yes	4	0.00000001	0.00056221
36	Yes	4	0.00000001	0.00036619
37	Yes	4	0.00000001	0.00059983
38	Yes	4	0.00000001	0.00058194
39	Yes	4	0.00000001	0.00003368
40	Yes	4	0.00000001	0.00007133
41	Yes	4	0.00000001	0.00007786
42	Yes	4	0.00000001	0.00003540
43	Yes	4	0.00000001	0.00007133
44	Yes	4	0.00000001	0.00007483
45	Yes	4	0.00000001	0.00003340
46	Yes	4	0.00000001	0.00007642
47	Yes	4	0.00000001	0.00007049
48	Yes	4	0.00000001	0.00003565
49	Yes	4	0.00000001	0.00007625
50	Yes	4	0.00000001	0.00007218

Maximum Tower Deflections - Service Wind

Section No.	Elevation ft	Horz. Deflection in	Gov. Load Comb.	Tilt °	Twist °
L1	100 - 95	5.76	39	0.58	0.00

Section No.	Elevation ft	Horz. Deflection in	Gov. Load Comb.	Tilt °	Twist °
L2	95 - 90	5.15	39	0.57	0.00
L3	90 - 85	4.56	39	0.55	0.00
L4	85 - 80	4.00	39	0.52	0.00
L5	80 - 75	3.47	39	0.48	0.00
L6	75 - 70	2.99	39	0.44	0.00
L7	70 - 65	2.56	39	0.39	0.00
L8	65 - 63.08	2.18	39	0.34	0.00
L9	63.08 - 62.83	2.05	39	0.32	0.00
L10	62.83 - 57.83	2.03	39	0.32	0.00
L11	57.83 - 50.8333	1.72	39	0.29	0.00
L12	55 - 50	1.55	39	0.27	0.00
L13	50 - 45	1.27	39	0.26	0.00
L14	45 - 40	1.02	39	0.23	0.00
L15	40 - 35	0.80	39	0.20	0.00
L16	35 - 31.5	0.60	39	0.17	0.00
L17	31.5 - 31.25	0.49	39	0.15	0.00
L18	31.25 - 26.25	0.48	39	0.15	0.00
L19	26.25 - 21.25	0.33	39	0.13	0.00
L20	21.25 - 16.25	0.22	39	0.10	0.00
L21	16.25 - 11.25	0.12	39	0.08	0.00
L22	11.25 - 6.25	0.06	39	0.05	0.00
L23	6.25 - 4	0.02	39	0.03	0.00
L24	4 - 3.75	0.01	39	0.02	0.00
L25	3.75 - 0	0.01	39	0.02	0.00

Critical Deflections and Radius of Curvature - Service Wind

Elevation ft	Appurtenance	Gov. Load Comb.	Deflection in	Tilt °	Twist °	Radius of Curvature ft
98.0000	(2) DB844G65ZAXY	39	5.51	0.58	0.00	20511
86.0000	Platform Mount [LP 601-1]	39	4.11	0.53	0.00	8400

Maximum Tower Deflections - Design Wind

Section No.	Elevation ft	Horz. Deflection in	Gov. Load Comb.	Tilt °	Twist °
L1	100 - 95	26.63	2	2.68	0.01
L2	95 - 90	23.83	2	2.66	0.00
L3	90 - 85	21.10	2	2.56	0.00
L4	85 - 80	18.49	2	2.41	0.00
L5	80 - 75	16.06	2	2.23	0.00
L6	75 - 70	13.84	2	2.02	0.00
L7	70 - 65	11.84	2	1.79	0.00
L8	65 - 63.08	10.09	2	1.56	0.00
L9	63.08 - 62.83	9.48	2	1.47	0.00
L10	62.83 - 57.83	9.40	2	1.46	0.00
L11	57.83 - 50.8333	7.94	2	1.33	0.00
L12	55 - 50	7.18	2	1.26	0.00
L13	50 - 45	5.90	2	1.18	0.00
L14	45 - 40	4.73	2	1.05	0.00
L15	40 - 35	3.69	2	0.92	0.00
L16	35 - 31.5	2.80	2	0.79	0.00
L17	31.5 - 31.25	2.25	2	0.70	0.00
L18	31.25 - 26.25	2.21	2	0.69	0.00
L19	26.25 - 21.25	1.55	2	0.58	0.00
L20	21.25 - 16.25	1.00	2	0.46	0.00
L21	16.25 - 11.25	0.58	2	0.35	0.00
L22	11.25 - 6.25	0.27	2	0.24	0.00
L23	6.25 - 4	0.08	2	0.13	0.00
L24	4 - 3.75	0.03	2	0.07	0.00

Section No.	Elevation ft	Horz. Deflection in	Gov. Load Comb.	Tilt °	Twist °
L25	3.75 - 0	0.03	2	0.07	0.00

Critical Deflections and Radius of Curvature - Design Wind

Elevation ft	Appurtenance	Gov. Load Comb.	Deflection in	Tilt °	Twist °	Radius of Curvature ft
98.0000	(2) DB844G65ZAXY	2	25.51	2.68	0.00	4496
86.0000	Platform Mount [LP 601-1]	2	19.00	2.44	0.00	1824

Compression Checks

Pole Design Data

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	A in²	P_u K
L1	100 - 95 (1)	TP15.961x14.76x0.281	5.0000	0.0000	0.0	14.187 6	-5.18
L2	95 - 90 (2)	TP17.162x15.961x0.281	5.0000	0.0000	0.0	15.274 3	-5.52
L3	90 - 85 (3)	TP18.363x17.162x0.281	5.0000	0.0000	0.0	16.361 0	-7.19
L4	85 - 80 (4)	TP19.5641x18.363x0.281	5.0000	0.0000	0.0	17.447 7	-7.59
L5	80 - 75 (5)	TP20.7651x19.5641x0.28 1	5.0000	0.0000	0.0	18.534 4	-8.02
L6	75 - 70 (6)	TP21.9661x20.7651x0.28 1	5.0000	0.0000	0.0	19.621 1	-8.47
L7	70 - 65 (7)	TP23.1671x21.9661x0.28 1	5.0000	0.0000	0.0	20.707 8	-8.95
L8	65 - 63.08 (8)	TP23.6283x23.1671x0.28 1	1.9200	0.0000	0.0	21.125 1	-9.13
L9	63.08 - 62.83 (9)	TP23.6884x23.6283x0.56 85	0.2500	0.0000	0.0	42.322 5	-9.18
L10	62.83 - 57.83 (10)	TP24.8894x23.6884x0.54 35	5.0000	0.0000	0.0	42.607 0	-10.03
L11	57.83 - 50.8333 (11)	TP26.57x24.8894x0.5435	6.9967	0.0000	0.0	43.796 6	-10.53
L12	50.8333 - 50 (12)	TP26.2065x25.0071x0.59 4	5.0000	0.0000	0.0	48.988 5	-12.21
L13	50 - 45 (13)	TP27.4058x26.2065x0.58 15	5.0000	0.0000	0.0	50.226 7	-13.23
L14	45 - 40 (14)	TP28.6052x27.4058x0.56 9	5.0000	0.0000	0.0	51.367 4	-14.27
L15	40 - 35 (15)	TP29.8045x28.6052x0.55 65	5.0000	0.0000	0.0	52.410 5	-15.35
L16	35 - 31.5 (16)	TP30.6441x29.8045x0.55 65	3.5000	0.0000	0.0	53.914 9	-16.11
L17	31.5 - 31.25 (17)	TP30.7041x30.6441x0.63 15	0.2500	0.0000	0.0	61.150 4	-16.18
L18	31.25 - 26.25 (18)	TP31.9034x30.7041x0.61 9	5.0000	0.0000	0.0	62.355 5	-17.43
L19	26.25 - 21.25 (19)	TP33.1028x31.9034x0.60 65	5.0000	0.0000	0.0	63.462 9	-18.71

Section No.	Elevation	Size	L	L_u	Kl/r	A	P_u
	ft		ft	ft		in^2	K
L20	21.25 - 16.25 (20)	TP34.3021x33.1028x0.594	5.0000	0.0000	0.0	64.4728	-20.01
L21	16.25 - 11.25 (21)	TP35.5015x34.3021x0.594	5.0000	0.0000	0.0	66.7668	-21.35
L22	11.25 - 6.25 (22)	TP36.7008x35.5015x0.5815	5.0000	0.0000	0.0	67.6309	-22.72
L23	6.25 - 4 (23)	TP37.2405x36.7008x0.5753	2.2500	0.0000	0.0	67.9153	-23.34
L24	4 - 3.75 (24)	TP37.3005x37.2405x0.694	0.2500	0.0000	0.0	81.8038	-23.42
L25	3.75 - 0 (25)	TP38.2x37.3005x0.6815	3.7500	0.0000	0.0	82.3317	-24.50

Pole Bending Design Data

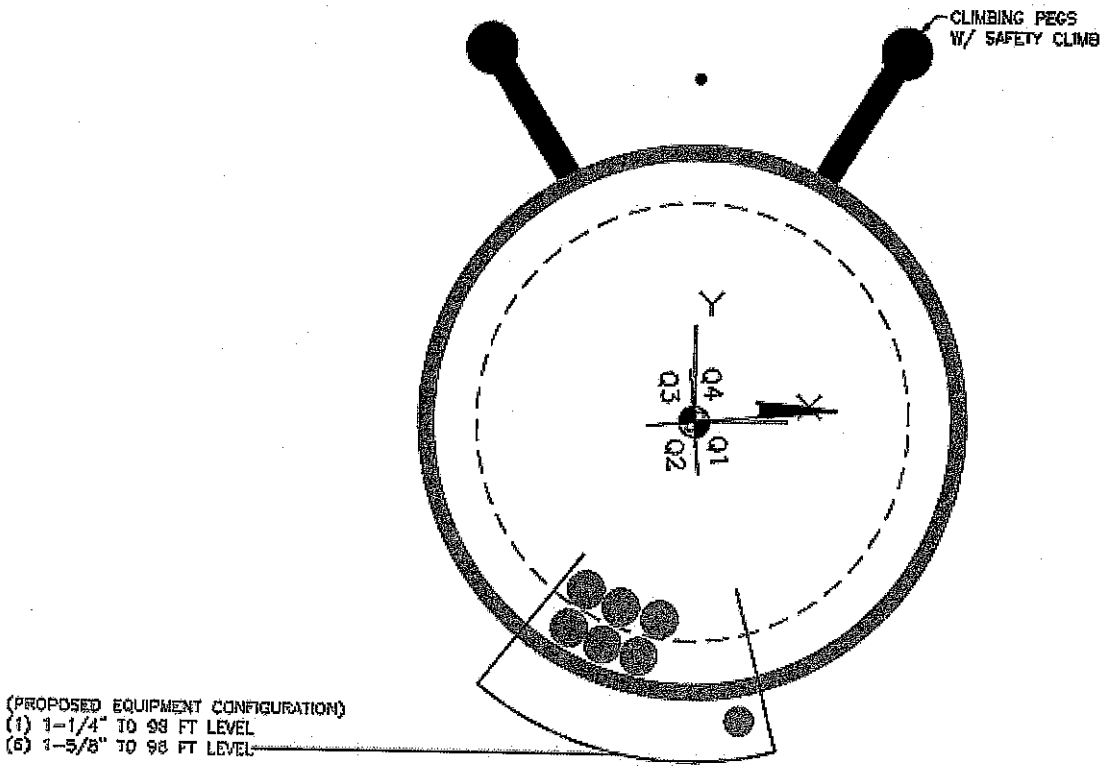
Section No.	Elevation	Size	M_{ux}	M_{uy}
	ft		kip-ft	kip-ft
L1	100 - 95 (1)	TP15.961x14.76x0.281	20.96	0.00
L2	95 - 90 (2)	TP17.162x15.961x0.281	48.92	0.00
L3	90 - 85 (3)	TP18.363x17.162x0.281	79.36	0.00
L4	85 - 80 (4)	TP19.5641x18.363x0.281	115.66	0.00
L5	80 - 75 (5)	TP20.7651x19.5641x0.281	153.38	0.00
L6	75 - 70 (6)	TP21.9661x20.7651x0.281	192.54	0.00
L7	70 - 65 (7)	TP23.1671x21.9661x0.281	233.18	0.00
L8	65 - 63.08 (8)	TP23.6283x23.1671x0.281	249.24	0.00
L9	63.08 - 62.83 (9)	TP23.6884x23.6283x0.5685	251.35	0.00
L10	62.83 - 57.83 (10)	TP24.8894x23.6884x0.5435	294.82	0.00
L11	57.83 - 50.8333 (11)	TP26.57x24.8894x0.5435	320.44	0.00
L12	50.8333 - 50 (12)	TP26.2065x25.0071x0.594	367.60	0.00
L13	50 - 45 (13)	TP27.4058x26.2065x0.5815	417.12	0.00
L14	45 - 40 (14)	TP28.6052x27.4058x0.569	468.94	0.00
L15	40 - 35 (15)	TP29.8045x28.6052x0.5565	523.03	0.00
L16	35 - 31.5 (16)	TP30.6441x29.8045x0.5565	562.24	0.00
L17	31.5 - 31.25 (17)	TP30.7041x30.6441x0.6315	565.09	0.00
L18	31.25 - 26.25 (18)	TP31.9034x30.7041x0.619	623.15	0.00
L19	26.25 - 21.25 (19)	TP33.1028x31.9034x0.6065	683.51	0.00
L20	21.25 - 16.25 (20)	TP34.3021x33.1028x0.594	746.23	0.00
L21	16.25 - 11.25 (21)	TP35.5015x34.3021x0.594	811.36	0.00
L22	11.25 - 6.25 (22)	TP36.7008x35.5015x0.5815	878.97	0.00
L23	6.25 - 4 (23)	TP37.2405x36.7008x0.5753	910.22	0.00
L24	4 - 3.75 (24)	TP37.3005x37.2405x0.694	913.72	0.00
L25	3.75 - 0 (25)	TP38.2x37.3005x0.6815	967.04	0.00

Pole Shear Design Data

Section No.	Elevation ft	Size	Actual V_u K	Actual T_u kip-ft
L1	100 - 95 (1)	TP15.961x14.76x0.281	5.46	0.08
L2	95 - 90 (2)	TP17.162x15.961x0.281	5.73	0.08
L3	90 - 85 (3)	TP18.363x17.162x0.281	7.13	0.08
L4	85 - 80 (4)	TP19.5641x18.363x0.281	7.40	0.08
L5	80 - 75 (5)	TP20.7651x19.5641x0.281	7.69	0.08
L6	75 - 70 (6)	TP21.9661x20.7651x0.281	7.98	0.08
L7	70 - 65 (7)	TP23.1671x21.9661x0.281	8.28	0.08
L8	65 - 63.08 (8)	TP23.6283x23.1671x0.281	8.45	0.08
L9	63.08 - 62.83 (9)	TP23.6884x23.6283x0.5685	8.47	0.08
L10	62.83 - 57.83 (10)	TP24.8894x23.6884x0.5435	8.93	0.08
L11	57.83 - 50.8333 (11)	TP26.57x24.8894x0.5435	9.19	0.08
L12	50.8333 - 50 (12)	TP26.2065x25.0071x0.594	9.68	0.08
L13	50 - 45 (13)	TP27.4058x26.2065x0.5815	10.14	0.08
L14	45 - 40 (14)	TP28.6052x27.4058x0.569	10.60	0.08
L15	40 - 35 (15)	TP29.8045x28.6052x0.5565	11.05	0.08
L16	35 - 31.5 (16)	TP30.6441x29.8045x0.5565	11.37	0.08
L17	31.5 - 31.25 (17)	TP30.7041x30.6441x0.6315	11.39	0.08
L18	31.25 - 26.25 (18)	TP31.9034x30.7041x0.619	11.84	0.08
L19	26.25 - 21.25 (19)	TP33.1028x31.9034x0.6065	12.31	0.08
L20	21.25 - 16.25 (20)	TP34.3021x33.1028x0.594	12.79	0.08
L21	16.25 - 11.25 (21)	TP35.5015x34.3021x0.594	13.28	0.08
L22	11.25 - 6.25 (22)	TP36.7008x35.5015x0.5815	13.78	0.08
L23	6.25 - 4 (23)	TP37.2405x36.7008x0.5753	14.01	0.08
L24	4 - 3.75 (24)	TP37.3005x37.2405x0.694	14.03	0.08
L25	3.75 - 0 (25)	TP38.2x37.3005x0.6815	14.42	0.08

APPENDIX B

BASE LEVEL DRAWING



BUSINESS UNIT: 806371 TOWER ID: C_BASELEVEL

APPENDIX C

ADDITIONAL CALCULATIONS

CCIpole

per TIA-222- H

Site BU: 806371

Work Order: _____

CROWN CASTLE

Pole Geometry

	Pole Height Above Base (ft)	Section Length (ft)	Lap Splice Length (ft)	Number of Sides	Top Diameter (in)	Bottom Diameter (in)	Wall Thickness (in)	Bend Radius (in)	Pole Material
1	100	49.1667	4.1667	12	14.76	26.57	0.281	Auto	A572-65
2	55	55	0	12	25.01	38.2	0.344	Auto	A572-65

Reinforcement Configuration

	Bottom Effective Elevation (ft)	Top Effective Elevation (ft)	Type	Model	Number	1	2	3	4	5	6	7	8	9	10	11	12
1	4	31.5	plate	CCI-AFP-065125	3		o				o				o		
2	31.5	63.08	plate	CCI-AFP-060100	3		o				o				o		
3	0	4	plate	FP 1.25 x 7_1	3	c				c				c			
4																	
5																	
6																	
7																	
8																	
9																	
10																	

Reinforcement Details

	B (in)	H (in)	Gross Area (in^2)	Pole Face to Centroid (in)	Bottom Termination Length (in)	Top Termination Length (in)	L_u (in)	Net Area (in^2)	Bolt Hole Size (in)	Reinforcement Material
1	6.5	1.25	8.125	0.625	42.000	42.000	19.000	6.563	1.1875	A572-65
2	6	1	6	0.5	30.000	30.000	16.000	4.750	1.1875	A572-65
3	1.25	7	8.75	3.5	n/a	n/a	0.000	8.750	0.0000	A572-65

TNX Geometry Input

Increment (ft): 5

	Section Height (ft)	Section Length (ft)	Lap Splice Length (ft)	Number of Sides	Top Diameter (in)	Bottom Diameter (in)	Wall Thickness (in)	Tapered Pole Grade	Weight Multiplier
1	100 - 95	5		12	14.760	15.961	0.281	A572-65	1.000
2	95 - 90	5		12	15.961	17.162	0.281	A572-65	1.000
3	90 - 85	5		12	17.162	18.363	0.281	A572-65	1.000
4	85 - 80	5		12	18.363	19.564	0.281	A572-65	1.000
5	80 - 75	5		12	19.564	20.765	0.281	A572-65	1.000
6	75 - 70	5		12	20.765	21.966	0.281	A572-65	1.000
7	70 - 65	5		12	21.966	23.167	0.281	A572-65	1.000
8	65 - 63.08	1.92		12	23.167	23.628	0.281	A572-65	1.000
9	63.08 - 62.83	0.25		12	23.628	23.688	0.5685	A572-65	0.926
10	62.83 - 57.83	5		12	23.688	24.889	0.5435	A572-65	0.946
11	57.83 - 55	6.9967	4.1667	12	24.889	26.570	0.5435	A572-65	0.934
12	55 - 50	5		12	25.007	26.206	0.594	A572-65	0.953
13	50 - 45	5		12	26.206	27.406	0.5815	A572-65	0.956
14	45 - 40	5		12	27.406	28.605	0.569	A572-65	0.960
15	40 - 35	5		12	28.605	29.805	0.5565	A572-65	0.967
16	35 - 31.5	3.5		12	29.805	30.644	0.5565	A572-65	0.957
17	31.5 - 31.25	0.25		12	30.644	30.704	0.6315	A572-65	0.949
18	31.25 - 26.25	5		12	30.704	31.903	0.619	A572-65	0.952
19	26.25 - 21.25	5		12	31.903	33.103	0.6065	A572-65	0.956
20	21.25 - 16.25	5		12	33.103	34.302	0.594	A572-65	0.962
21	16.25 - 11.25	5		12	34.302	35.501	0.594	A572-65	0.949
22	11.25 - 6.25	5		12	35.501	36.701	0.5815	A572-65	0.956
23	6.25 - 4	2.25		12	36.701	37.241	0.57525	A572-65	0.961
24	4 - 3.75	0.25		12	37.241	37.300	0.694	A572-65	0.822
25	3.75 - 0	3.75		12	37.300	38.200	0.6815	A572-65	0.829

TNX Section Forces

Increment (ft):	5	TNX Output		
	Section Height (ft)	P_u (K)	M_{ux} (kip-ft)	V_u (K)
1	100 - 95	5.18	20.96	5.46
2	95 - 90	5.52	48.92	5.73
3	90 - 85	7.19	79.36	7.13
4	85 - 80	7.59	115.66	7.40
5	80 - 75	8.02	153.38	7.69
6	75 - 70	8.47	192.54	7.98
7	70 - 65	8.95	233.18	8.28
8	65 - 63.08	9.13	249.24	8.45
9	63.08 - 62.83	9.18	251.35	8.47
10	62.83 - 57.83	10.03	294.82	8.93
11	57.83 - 55	10.53	320.44	9.19
12	55 - 50	12.21	367.60	9.68
13	50 - 45	13.23	417.12	10.14
14	45 - 40	14.27	468.94	10.60
15	40 - 35	15.35	523.03	11.05
16	35 - 31.5	16.11	562.24	11.37
17	31.5 - 31.25	16.18	565.09	11.39
18	31.25 - 26.25	17.43	623.15	11.84
19	26.25 - 21.25	18.71	683.51	12.31
20	21.25 - 16.25	20.01	746.23	12.79
21	16.25 - 11.25	21.35	811.36	13.28
22	11.25 - 6.25	22.72	878.97	13.78
23	6.25 - 4	23.34	910.21	14.01
24	4 - 3.75	23.42	913.72	14.03
25	3.75 - 0	24.50	967.04	14.42

Analysis Results

Elevation (ft)	Component Type	Size	Critical Element	% Capacity	Pass / Fail
100 - 95	Pole	TP15.961x14.76x0.281	Pole	6.5%	Pass
95 - 90	Pole	TP17.162x15.961x0.281	Pole	12.6%	Pass
90 - 85	Pole	TP18.363x17.162x0.281	Pole	17.7%	Pass
85 - 80	Pole	TP19.564x18.363x0.281	Pole	22.5%	Pass
80 - 75	Pole	TP20.765x19.564x0.281	Pole	26.3%	Pass
75 - 70	Pole	TP21.966x20.765x0.281	Pole	29.3%	Pass
70 - 65	Pole	TP23.167x21.966x0.281	Pole	31.8%	Pass
65 - 63.08	Pole	TP23.628x23.167x0.281	Pole	32.8%	Pass
63.08 - 62.83	Pole + Reinf.	TP23.688x23.628x0.5685	Reinf. 2 Tension Rupture	26.3%	Pass
62.83 - 57.83	Pole + Reinf.	TP24.889x23.688x0.5435	Reinf. 2 Tension Rupture	28.6%	Pass
57.83 - 55	Pole + Reinf.	TP26.57x24.889x0.5435	Reinf. 2 Tension Rupture	29.8%	Pass
55 - 50	Pole + Reinf.	TP26.206x25.007x0.594	Reinf. 2 Tension Rupture	29.4%	Pass
50 - 45	Pole + Reinf.	TP27.406x26.206x0.5815	Reinf. 2 Tension Rupture	31.1%	Pass
45 - 40	Pole + Reinf.	TP28.605x27.406x0.569	Reinf. 2 Tension Rupture	32.6%	Pass
40 - 35	Pole + Reinf.	TP29.805x28.605x0.5565	Reinf. 2 Tension Rupture	34.0%	Pass
35 - 31.5	Pole + Reinf.	TP30.644x29.805x0.5565	Reinf. 2 Tension Rupture	34.9%	Pass
31.5 - 31.25	Pole + Reinf.	TP30.704x30.644x0.6315	Reinf. 1 Tension Rupture	30.3%	Pass
31.25 - 26.25	Pole + Reinf.	TP31.903x30.704x0.619	Reinf. 1 Tension Rupture	31.5%	Pass
26.25 - 21.25	Pole + Reinf.	TP33.103x31.903x0.6065	Reinf. 1 Tension Rupture	32.6%	Pass
21.25 - 16.25	Pole + Reinf.	TP34.302x33.103x0.594	Reinf. 1 Tension Rupture	33.6%	Pass
16.25 - 11.25	Pole + Reinf.	TP35.501x34.302x0.594	Reinf. 1 Tension Rupture	34.6%	Pass
11.25 - 6.25	Pole + Reinf.	TP36.701x35.501x0.5815	Reinf. 1 Tension Rupture	35.6%	Pass
6.25 - 4	Pole + Reinf.	TP37.241x36.701x0.5753	Reinf. 1 Tension Rupture	36.0%	Pass
4 - 3.75	Pole + Reinf.	TP37.3x37.241x0.694	Reinf. 3 Connection	37.1%	Pass
3.75 - 0	Pole + Reinf.	TP38.2x37.3x0.6815	Reinf. 3 Connection	37.9%	Pass
				Summary	
			Pole	32.8%	Pass
			Reinforcement	37.9%	Pass
			Overall	37.9%	Pass

Additional Calculations

Section Elevation (ft)	Moment of Inertia (in^4)			Area (in^2)			% Capacity*			
	Pole	Reinf.	Total	Pole	Reinf.	Total	Pole	R1	R2	R3
100 - 95	446	n/a	446	14.17	n/a	14.17	6.5%			
95 - 90	556	n/a	556	15.25	n/a	15.25	12.6%			
90 - 85	684	n/a	684	16.34	n/a	16.34	17.7%			
85 - 80	829	n/a	829	17.42	n/a	17.42	22.5%			
80 - 75	994	n/a	994	18.51	n/a	18.51	26.3%			
75 - 70	1179	n/a	1179	19.59	n/a	19.59	29.3%			
70 - 65	1386	n/a	1386	20.68	n/a	20.68	31.8%			
65 - 63.08	1472	n/a	1472	21.09	n/a	21.09	32.8%			
63.08 - 62.83	1483	1399	2882	21.15	18.00	39.15	16.4%		26.3%	
62.83 - 57.83	1723	1536	3259	22.23	18.00	40.23	18.2%		28.6%	
57.83 - 55	1870	1616	3486	22.85	18.00	40.85	19.2%		29.8%	
55 - 50	2449	1693	4142	28.61	18.00	46.61	18.4%		29.4%	
50 - 45	2806	1843	4649	29.93	18.00	47.93	19.5%		31.1%	
45 - 40	3196	2000	5196	31.26	18.00	49.26	20.4%		32.6%	
40 - 35	3620	2163	5783	32.59	18.00	50.59	21.6%		34.0%	
35 - 31.5	3938	2281	6219	33.51	18.00	51.51	22.4%		34.9%	
31.5 - 31.25	3962	3156	7117	33.58	24.38	57.96	19.8%	30.3%		
31.25 - 26.25	4450	3393	7844	34.91	24.38	59.28	20.8%	31.5%		
26.25 - 21.25	4977	3640	8617	36.23	24.38	60.61	21.8%	32.6%		
21.25 - 16.25	5544	3896	9440	37.56	24.38	61.94	22.9%	33.6%		
16.25 - 11.25	6152	4160	10312	38.89	24.38	63.26	23.9%	34.6%		
11.25 - 6.25	6804	4433	11236	40.21	24.38	64.59	24.9%	35.6%		
6.25 - 4	7111	4559	11670	40.81	24.38	65.19	25.3%	36.0%		
4 - 3.75	7146	6883	14029	40.88	26.25	67.13	22.0%			37.1%
3.75 - 0	7680	7165	14845	41.87	26.25	68.12	22.8%			37.9%

Note: Section capacity checked in 5 degree increments.
Rating per TIA-222-H Section 15.5.

Monopole Base Plate Connection

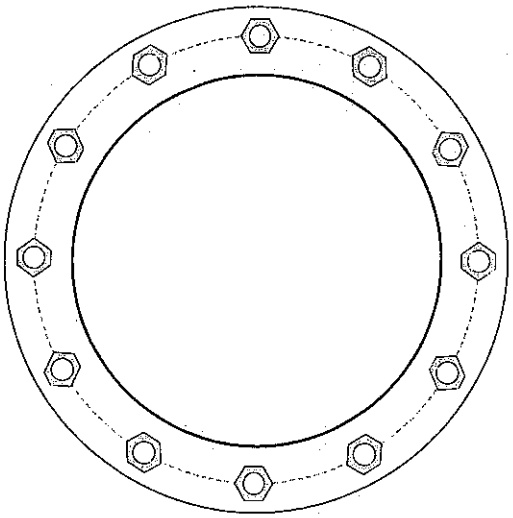
CROWN CASTLE

Site Info	
BU #	827297
Site Name	
Order #	

Analysis Considerations	
TIA-222 Revision	H
Grout Considered:	No
l_{er} (in)	1.5

Applied Loads	
Moment (kip-ft)	967.04
Axial Force (kips)	24.50
Shear Force (kips)	14.42

**TIA-222-H Section 15.5 Applied*



Connection Properties

Anchor Rod Data

(12) 2-1/4" ø bolts (A615-75 N; Fy=75 ksi, Fu=100 ksi) on 46.05" BC

Base Plate Data

52.05" OD x 2.5" Plate (A572-60; Fy=60 ksi, Fu=75 ksi)

Stiffener Data

N/A

Pole Data

38.2" x 0.344" 12-sided pole (A572-65; Fy=65 ksi, Fu=80 ksi)

Analysis Results

Anchor Rod Summary *(units of kips, kip-in)*

Pu_c = 85.96	ϕPn_c = 243.75	**Stress Rating**
Vu = 1.2	ϕVn = 73.13	**33.6%**
Mu = n/a	ϕMn = n/a	**Pass**

Base Plate Summary

Max Stress (ksi):	12.99	(Flexural)
Allowable Stress (ksi):	54	
Stress Rating:	**22.9%**	**Pass**

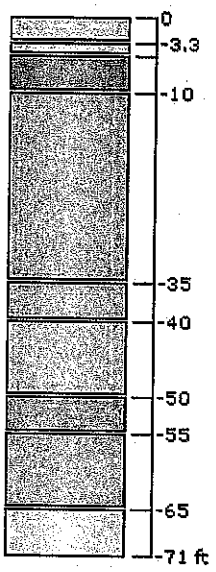
RSPile Analysis Information
37519-3216.001.7805 / 806371

Project Summary

Document Name	37519-3216.001.7805
Project Title	37519-3216.001.7805 / 806371
Author	RCK/KAT
Company	PJF
Date Created	8/21/2019, 3:33:06 PM
Last saved with RSPile version	2.016

Soil Layers

Layer Name	Color	Layer Type	Thickness [ft]	Depth [ft]
0-3.3		Lateral: API Method for Sand, Axial: Mosher Sand	3.3	0
3.3-5		Lateral: API Method for Sand, Axial: Mosher Sand	1.7	3.3
5-10		Lateral: API Method for Sand, Axial: Mosher Sand	5	5
10-35		Lateral: Elastic, Axial: Coyle and Reese	25	10
35-40		Lateral: API Method for Sand, Axial: Mosher Sand	5	35
40-50		Lateral: API Method for Sand, Axial: Mosher Sand	10	40
50-55		Lateral: API Method for Sand, Axial: Mosher Sand	5	50
55-65		Lateral: API Method for Sand, Axial: Mosher Sand	10	55
65-71		Lateral: API Method for Sand, Axial: Mosher Sand	6	65



Soil Properties

0-3.3

Property	Value
Name	0-3.3
Color	
Soil Type	Lateral: API Method for Sand, Axial: Mosher Sand
Unit Weight (lbs/ft3)	110
Sat. Unit Weight (lbs/ft3)	110
Phi (degrees)	1
User-defined Es	0
Ultimate Shear Resistance (psf)	1
Ultimate End Bearing Resistance (psf)	1
Friction Angle (degrees)	1
Initial Modulus of Subgrade Reaction (lbs/ft3)	1

3.3-5

Property	Value
Name	3.3-5
Color	
Soil Type	Lateral: API Method for Sand, Axial: Mosher Sand
Unit Weight (lbs/ft3)	110
Sat. Unit Weight (lbs/ft3)	110
Phi (degrees)	30
User-defined Es	0
Ultimate Shear Resistance (psf)	1
Ultimate End Bearing Resistance (psf)	1
Friction Angle (degrees)	30
Initial Modulus of Subgrade Reaction (lbs/ft3)	43200

5-10

Property	Value
Name	5-10
Color	
Soil Type	Lateral: API Method for Sand, Axial: Mosher Sand
Unit Weight (lbs/ft3)	110
Sat. Unit Weight (lbs/ft3)	110
Phi (degrees)	10
User-defined Es	0
Ultimate Shear Resistance (psf)	480
Ultimate End Bearing Resistance (psf)	1
Friction Angle (degrees)	30
Initial Modulus of Subgrade Reaction (lbs/ft3)	43200

10-35

Property	Value
Name	10-35
Color	
Soil Type	Lateral: Elastic, Axial: Coyle and Reese
Unit Weight (lbs/ft3)	110
Sat. Unit Weight (lbs/ft3)	110
Shear Strength (psf)	300
E50	0.03
Ultimate Shear Resistance (psf)	200
Ultimate End Bearing Resistance (psf)	1
Elastic Subgrade Reaction (lbs/ft3)	51840

35-40

Property	Value
Name	35-40
Color	
Soil Type	Lateral: API Method for Sand, Axial: Mosher Sand
Unit Weight (lbs/ft3)	100
Sat. Unit Weight (lbs/ft3)	100
Phi (degrees)	25
User-defined Es	0
Ultimate Shear Resistance (psf)	370
Ultimate End Bearing Resistance (psf)	1
Friction Angle (degrees)	25
Initial Modulus of Subgrade Reaction (lbs/ft3)	34560

40-50

Property	Value
Name	40-50
Color	
Soil Type	Lateral: API Method for Sand, Axial: Mosher Sand
Unit Weight (lbs/ft3)	105
Sat. Unit Weight (lbs/ft3)	105
Phi (degrees)	28
User-defined Es	0
Ultimate Shear Resistance (psf)	660
Ultimate End Bearing Resistance (psf)	1
Friction Angle (degrees)	28
Initial Modulus of Subgrade Reaction (lbs/ft3)	34560

50-55

Property	Value
Name	50-55
Color	
Soil Type	Lateral: API Method for Sand, Axial: Mosher Sand
Unit Weight (lbs/ft3)	110
Sat. Unit Weight (lbs/ft3)	110
Phi (degrees)	30
User-defined Es	0
Ultimate Shear Resistance (psf)	1070
Ultimate End Bearing Resistance (psf)	1
Friction Angle (degrees)	30
Initial Modulus of Subgrade Reaction (lbs/ft3)	103680

55-65

Property	Value
Name	55-65
Color	
Soil Type	Lateral: API Method for Sand, Axial: Mosher Sand
Unit Weight (lbs/ft3)	105
Sat. Unit Weight (lbs/ft3)	105
Phi (degrees)	28
User-defined Es	0
Ultimate Shear Resistance (psf)	740
Ultimate End Bearing Resistance (psf)	1
Friction Angle (degrees)	28
Initial Modulus of Subgrade Reaction (lbs/ft3)	34560

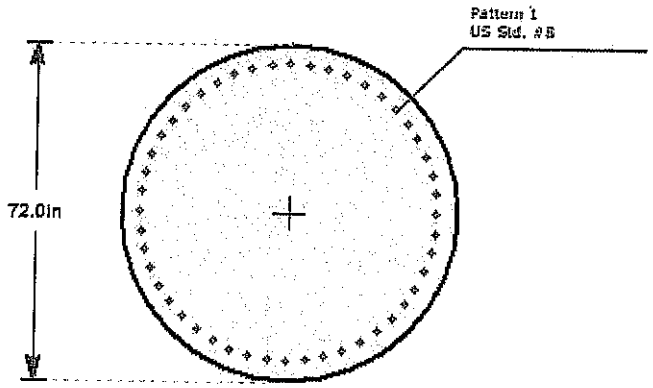
65-71

Property	Value
Name	65-71
Color	
Soil Type	Lateral: API Method for Sand, Axial: Mosher Sand
Unit Weight (lbs/ft3)	105
Sat. Unit Weight (lbs/ft3)	105
Phi (degrees)	28
User-defined Es	0
Ultimate Shear Resistance (psf)	770
Ultimate End Bearing Resistance (psf)	1
Friction Angle (degrees)	28
Initial Modulus of Subgrade Reaction (lbs/ft3)	34560

Pile Properties

Drilled Pier

Property	Value
Name	Drilled Pier
Color	
Pile Type	Reinforced Concrete
Pile Cross Section	Circle
Diameter (ft)	6
Compressive Strength (psf)	5.184e+006



Reinforcement

#	Location X (in)	Location Y (in)	Rebar Size	Bundled	Yield Stress (psf)	Elastic Modulus (psf)
1	31.61	0	US Std. #8		8640000.00	4176000000.00
2	31.33	4.125	US Std. #8		8640000.00	4176000000.00
3	30.53	8.18	US Std. #8		8640000.00	4176000000.00
4	29.2	12.09	US Std. #8		8640000.00	4176000000.00
5	27.37	15.8	US Std. #8		8640000.00	4176000000.00
6	25.07	19.24	US Std. #8		8640000.00	4176000000.00
7	22.35	22.35	US Std. #8		8640000.00	4176000000.00
8	19.24	25.07	US Std. #8		8640000.00	4176000000.00
9	15.8	27.37	US Std. #8		8640000.00	4176000000.00
10	12.09	29.2	US Std. #8		8640000.00	4176000000.00
11	8.18	30.53	US Std. #8		8640000.00	4176000000.00
12	4.125	31.33	US Std. #8		8640000.00	4176000000.00
13	1.935e-015	31.61	US Std. #8		8640000.00	4176000000.00
14	-4.125	31.33	US Std. #8		8640000.00	4176000000.00
15	-8.18	30.53	US Std. #8		8640000.00	4176000000.00
16	-12.09	29.2	US Std. #8		8640000.00	4176000000.00
17	-15.8	27.37	US Std. #8		8640000.00	4176000000.00
18	-19.24	25.07	US Std. #8		8640000.00	4176000000.00
19	-22.35	22.35	US Std. #8		8640000.00	4176000000.00
20	-25.07	19.24	US Std. #8		8640000.00	4176000000.00
21	-27.37	15.8	US Std. #8		8640000.00	4176000000.00
22	-29.2	12.09	US Std. #8		8640000.00	4176000000.00
23	-30.53	8.18	US Std. #8		8640000.00	4176000000.00
24	-31.33	4.125	US Std. #8		8640000.00	4176000000.00
25	-31.61	3.87e-015	US Std. #8		8640000.00	4176000000.00
26	-31.33	-4.125	US Std. #8		8640000.00	4176000000.00
27	-30.53	-8.18	US Std. #8		8640000.00	4176000000.00
28	-29.2	-12.09	US Std. #8		8640000.00	4176000000.00
29	-27.37	-15.8	US Std. #8		8640000.00	4176000000.00
30	-25.07	-19.24	US Std. #8		8640000.00	4176000000.00
31	-22.35	-22.35	US Std. #8		8640000.00	4176000000.00
32	-19.24	-25.07	US Std. #8		8640000.00	4176000000.00
33	-15.8	-27.37	US Std. #8		8640000.00	4176000000.00
34	-12.09	-29.2	US Std. #8		8640000.00	4176000000.00
35	-8.18	-30.53	US Std. #8		8640000.00	4176000000.00
36	-4.125	-31.33	US Std. #8		8640000.00	4176000000.00
37	-5.806e-015	-31.61	US Std. #8		8640000.00	4176000000.00
38	4.125	-31.33	US Std. #8		8640000.00	4176000000.00
39	8.18	-30.53	US Std. #8		8640000.00	4176000000.00
40	12.09	-29.2	US Std. #8		8640000.00	4176000000.00
41	15.8	-27.37	US Std. #8		8640000.00	4176000000.00
42	19.24	-25.07	US Std. #8		8640000.00	4176000000.00
43	22.35	-22.35	US Std. #8		8640000.00	4176000000.00
44	25.07	-19.24	US Std. #8		8640000.00	4176000000.00
45	27.37	-15.8	US Std. #8		8640000.00	4176000000.00
46	29.2	-12.09	US Std. #8		8640000.00	4176000000.00
47	30.53	-8.18	US Std. #8		8640000.00	4176000000.00
48	31.33	-4.125	US Std. #8		8640000.00	4176000000.00

Pile Settings

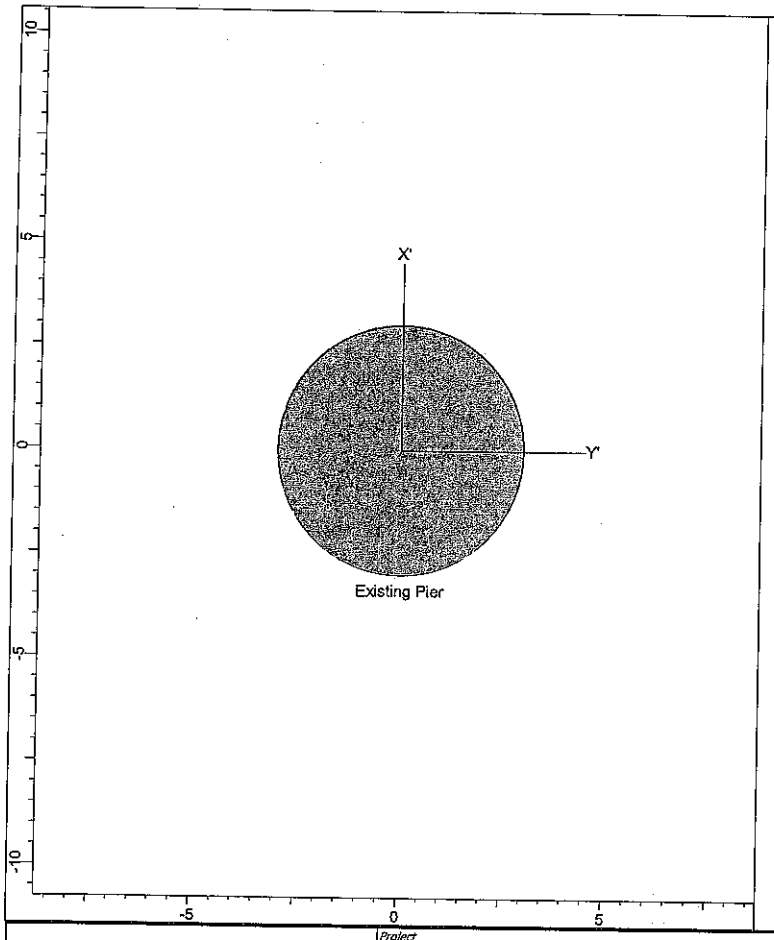
Existing Pier

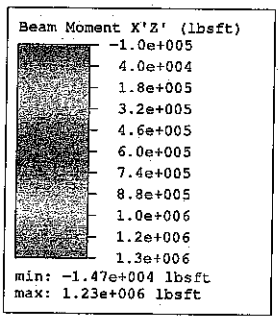
General	
Property	Drilled Pier
Location	0, 0
Elevation:	0 (ft)
Length:	70 (ft)

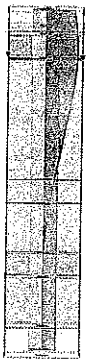
Orientation	
Elevation (ft)	0
Length (ft)	70
Ground Slope Angle (°)	0
Alpha Angle (°)	0
Beta Angle (°)	90
Rotation Angle (°)	0

Loading

Loading Type			Static
Load Factor Profile			Factored
Type	**Value**	**LRFD**	**Factor**
Force Z, (lbs)	-17170	D	1
Moment X, (lbsft)	1.09575e+006	D	1
Shear Y, (lbs)	-22900	D	1



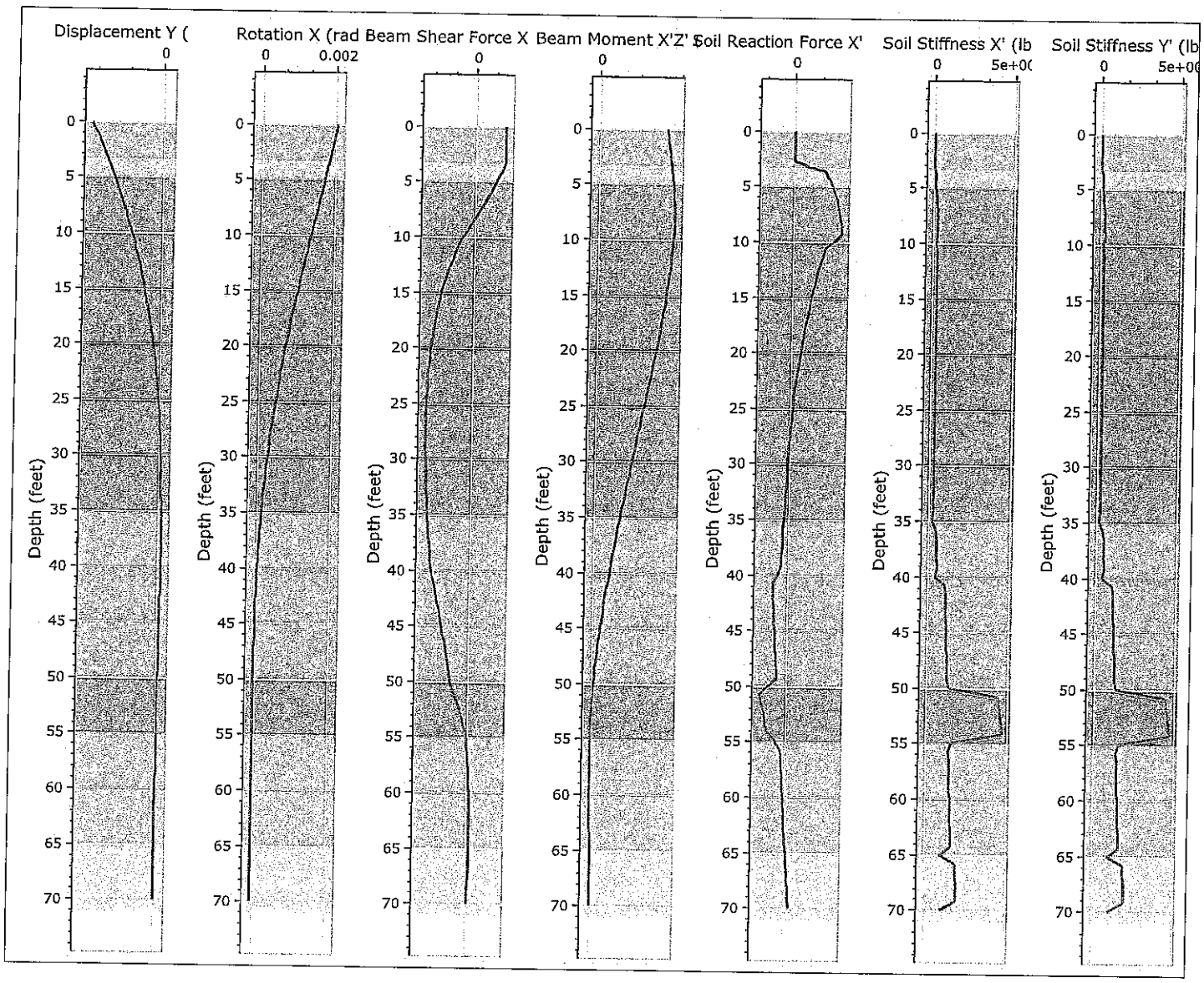




rocscience

RSPILE 2.016

Project	37519-3216.001.7805 / 806371		
Analysis Description			
Drawn By	RCK/KAT	Company	PJF
Date	8/21/2019, 3:33:06 PM	File Name	37519-3216.001.7805.rspile2


Displacement Y (
Rotation X (rad
Beam Shear Force X
Beam Moment X'Z'
Soil Reaction Force X'
Soil Stiffness X' (lb
Soil Stiffness Y' (lb
0
0.002
5e+0(
Depth (feet)
0
5
10
15
20
25
30
35
40
45
50
55
60
65
70

Project Title: 37519-3216.001.7805 / 806371
Filename: 37519-3216.001.7805

Depth (feet)	Displacement Y (in)	Rotation X (rad)	Beam Shear Force X' (lbs)	Beam Moment X'Z' (lbsft)	Soil Reaction Force X' (lbs/ft)	Soil Stiffness X' (lbs/ft)	Soil Stiffness Y' (lbs/ft)
0	-0.365145935	0.002035284	22900.00222	1095390.056	0	0	0
0.550000072	-0.351535382	0.002000744	22899.99557	1107980.918	0.01611204	0.302500035	0.302500039
1.100000143	-0.338154098	0.001965809	22899.98458	1120571.781	0.030997463	0.60500007	0.605000079
1.650000215	-0.325004686	0.00193048	22899.9618	1133162.625	0.04468815	0.907500106	0.907500118
2.200000286	-0.31208975	0.001894755	22899.93542	1145753.47	0.057216461	1.210000142	1.210000157
2.750000358	-0.299411899	0.001858636	22899.89917	1158344.279	0.068615235	1.512500179	1.512500197
3.300000429	-0.286973737	0.001822123	22787.68353	1170971.074	1689.461227	10008.42101	10098.47814
3.583334855	-0.280664542	0.001803159	21912.57062	1177213.819	3590.227439	43492.49804	43860.11891
3.866669282	-0.274424993	0.001784096	20880.78775	1183424.468	3789.87613	46954.94027	47328.14027
4.150003708	-0.268259224	0.001764937	19766.59573	1189027.731	3978.034362	50418.9511	50796.16162
4.433338134	-0.262164289	0.001745688	18626.56582	1194630.541	4154.85772	53884.33915	54264.18299
4.71667256	-0.256144596	0.001726353	17413.73733	1199567.38	4320.615234	57350.91257	57732.20435
5.000006987	-0.250196796	0.001706939	16005.74398	1204690.645	4475.460103	48744.18028	49050.10148
5.625006245	-0.23734792	0.001663865	13275.35595	1213178.924	4779.798895	151037.4911	151874.9163
6.250005503	-0.224855612	0.001620495	10244.54215	1221499.944	5034.496141	167924.0298	168749.8684
6.875004762	-0.21274635	0.001576897	6996.830864	1225900.225	5242.514533	184815.3731	185624.8204
7.50000402	-0.201000192	0.001533144	3691.49999	1230291.849	5405.8446	201710.1036	202499.7724
8.125003279	-0.189643616	0.001489309	252.5073742	1230471.347	5527.660292	218606.8086	219374.7242
8.750002537	**-0.178653301**	**0.001445467**	**-3217.953376**	**1230643.184**	**5609.835039**	**235504.7196**	**236249.676**
9.375001795	-0.168054964	0.001401698	-6748.424581	1226442.055	5655.683033	252402.8678	253124.6276
10.00000105	-0.157822678	0.001358078	-10246.63605	1222214.767	4878.838588	124501.783	124676.4642
10.73529514	-0.146271584	0.001307053	-13184.57274	1212514.684	3791.359466	228705.8458	228705.8458
11.47058923	-0.135204492	0.001256434	-15918.41537	1202796.635	3504.500447	228705.8458	228705.8458
12.20588331	-0.124636825	0.001206304	-18343.00826	1189286.655	3230.586507	228705.8458	228705.8458
12.9411774	-0.114539308	0.001156738	-20669.18131	1175780.029	2968.85885	228705.8458	228705.8458
13.67647149	-0.104922881	0.001107807	-22713.56097	1159059.982	2719.601077	228705.8458	228705.8458
14.41176557	-0.095760631	0.001059575	-24668.5133	1142343.167	2482.115556	228705.8458	228705.8458
15.14705966	-0.087059526	0.001012102	-26368.12476	1122938.734	2256.582913	228705.8458	228705.8458
15.88235375	-0.078794894	0.000965441	-27986.95	1103537.4	2042.363654	228705.8458	228705.8458
16.61764783	-0.070970207	0.00091964	-29375.79266	1081923.593	1839.547765	228705.8458	228705.8458
17.35294192	-0.063562912	0.000874744	-30692.11214	1060312.742	1647.55066	228705.8458	228705.8458
18.08823601	-0.056573425	0.000830793	-31802.64237	1036916.107	1466.383196	228705.8458	228705.8458
18.82353009	-0.049981186	0.000787821	-32848.51397	1013522.28	1295.512316	228705.8458	228705.8458
19.55882418	-0.043783967	0.00074586	-33711.57157	988723.2235	1134.880427	228705.8458	228705.8458
20.29411827	-0.03796306	0.000704937	-34517.42161	963926.8224	984.0025193	228705.8458	228705.8458
21.02941235	-0.032513982	0.000665077	-35162.17718	938062.0249	842.7624237	228705.8458	228705.8458
21.76470644	-0.027419738	0.000626301	-35756.75265	912199.7272	710.719622	228705.8458	228705.8458
22.50000053	-0.022673938	0.000588625	-36210.67338	885564.6197	587.7084479	228705.8458	228705.8458
23.23529461	-0.018261161	0.000552065	-36621.01193	858931.8544	473.3292935	228705.8458	228705.8458
23.9705887	-0.014173429	0.000516632	-36909.84325	831783.1275	367.3752988	228705.8458	228705.8458
24.70588279	-0.010396766	0.000482337	-37161.25844	804636.5851	269.4841844	228705.8458	228705.8458
25.44117687	-0.006921893	0.000449187	-37309.01933	777194.7155	179.4154526	228705.8458	228705.8458
26.17647096	-0.003736134	0.000417186	-37425.09903	749754.8732	96.84059991	228705.8458	228705.8458
26.91176505	-0.00082918	0.000386338	-37454.08878	722206.646	21.49232467	228705.8458	228705.8458
27.64705913	0.001810478	0.000356644	-37456.70444	694660.2903	-46.92759864	228705.8458	228705.8458
28.38235322	0.004193948	0.000328105	-37387.51894	667161.3034	-108.7071352	228705.8458	228705.8458
29.11764731	0.006331699	0.000300717	-37296.84395	639664.0347	-164.1176537	228705.8458	228705.8458
29.85294139	0.008235428	0.000274479	-37148.39958	612341.1731	-213.4623057	228705.8458	228705.8458
30.58823548	0.009914696	0.000249385	-36982.93488	585019.879	-256.9889263	228705.8458	228705.8458
31.32352957	0.011381598	0.000225431	-36772.49848	557973.749	-295.0110096	228705.8458	228705.8458
32.05882365	0.01264491	0.000202611	-36549.1037	530929.039	-327.7560645	228705.8458	228705.8458
32.79411774	0.013716964	0.000180917	-36292.32693	504236.3546	-355.5436851	228705.8458	228705.8458
33.52941183	0.01460587	0.000160341	-36026.25569	477544.9461	-378.5841296	228705.8458	228705.8458
34.26470591	0.015324052	0.000140876	-35737.21254	451260.8632	-397.1994196	228705.8458	228705.8458
35	0.01587907	0.000122513	-35422.03159	424949.2187	-507.4514779	152162.5822	152163.6708
35.83333294	0.016328364	0.000103019	-34913.66119	395818.7305	-659.5733834	403943.1773	403949.2689
36.66666587	0.016597582	8.49075E-05	-34352.83447	366710.325	-710.2785441	427940.8207	427949.2431
37.49999881	0.016706778	6.81559E-05	-33732.33962	338585.4026	-755.0424077	451937.6017	451949.2152
38.33333174	0.016664236	5.27399E-05	-33094.49987	310462.7448	-793.1122408	475936.5758	475949.1918
39.16666468	0.016490045	0.000038634	-32413.31353	283438.6516	-824.3969913	499935.9794	499949.1688
39.99999762	0.016191148	2.58115E-05	-31640.16638	256373.5575	-1356.743603	377835.0081	377844.342
40.71428359	0.015858462	1.58167E-05	-30386.11928	234615.8478	-1859.475265	1005038.556	1005061.517
41.42856956	0.01546036	6.7058E-06	-29059.92029	212907.5202	-1844.602079	1022672.268	1022694.183
42.14285553	0.015015054	-1.5595E-06	-27753.60342	193079.5923	-1822.361999	1040306.099	1040326.85
42.85714149	0.014518499	-9.0173E-06	-26456.77902	173253.5829	-1791.964378	1057940.046	1057959.516
43.57142746	0.013987806	-1.57054E-05	-25195.91279	155254.9329	-1755.24012	1075574.051	1075592.182
44.28571343	0.013418471	-2.16603E-05	-23949.52476	137257.9361	-1711.403847	1093208.114	1093224.848
44.9999994	0.01282638	-2.69183E-05	-22752.9391	121006.6844	-1662.275742	1110842.185	1110857.514
45.71428537	0.012206774	-3.15144E-05	-21575.07137	104756.8214	-1607.089169	1128476.264	1128490.181
46.42857134	0.011574224	-3.54824E-05	-20458.62525	90146.75892	-1547.622112	1146110.31	1146122.847
47.14285731	0.010923916	-3.88554E-05	-19364.39974	75537.82522	-1483.141297	1163744.327	1163755.513
47.85714328	0.010269038	-4.16646E-05	-18341.03165	62442.61744	-1415.354974	1181378.28	1181388.18
48.57142925	0.009604901	-4.39403E-05	-17342.66858	49348.28609	-1343.578638	1199012.177	1199020.846
49.28571522	0.008943284	-4.57111E-05	-16422.48096	37625.5759	-1269.42751	1216645.992	1216653.512
50.00000119	0.008279778	-4.70043E-05	-15242.66494	25686.83356	-2384.512067	1388531.542	1388569.511
50.83333413	0.007540188	-4.79639E-05	-12673.17601	14920.35321	-3311.559099	4391876.74	4391996.986
51.66666706	0.006833422	-4.84218E-05	-9969.679698	4404.54429	-3050.371398	4463898.527	4463996.925

52.5	0.006185531	-4.84832E-05	-7582.341247	-1864.332994	-2805.706328	4535916.594	4535996.863
53.33333294	0.005572339	-4.82447E-05	-5295.609254	-8137.260545	-2567.697086	4607932.011	4607996.802
54.16666587	0.00501434	-0.000047795	-3295.765979	-10834.1285	-2346.684204	4679944.617	4679996.742
54.99999881	0.004489769	-4.72154E-05	-1560.350549	-13408.64413	-1422.348584	1527415.607	1527426.43
55.71428478	0.004068958	-4.66625E-05	-941.8481369	-13909.06951	-652.8925931	1375345.905	1375347.407
56.42857075	0.003658782	-4.60827E-05	-485.957246	-14564.32861	-594.6038338	1392978.87	1392980.074
57.14285672	0.00326243	-4.54889E-05	-92.2040015	-14612.17612	-536.9023663	1410611.795	1410612.74
57.85714269	0.002875931	-4.48928E-05	280.9548257	-14660.08974	-479.2120508	1428244.685	1428245.407
58.57142866	0.002501593	-0.000044305	592.5495974	-14218.63071	-421.9828419	1445877.541	1445878.073
59.28571463	0.002135953	-4.37349E-05	883.7141476	-13777.20829	-364.6987206	1463510.368	1463510.739
60.0000006	0.001780483	-4.31907E-05	1113.638276	-12963.60939	-307.6674331	1481143.165	1481143.406
60.71428657	0.001432261	-4.26792E-05	1323.184615	-12149.99798	-250.441081	1498775.937	1498776.072
61.42857254	0.00109196	-4.22064E-05	1471.400213	-11081.19415	-193.1834277	1516408.685	1516408.739
62.14285851	0.000757238	-4.17768E-05	1599.126384	-10012.31087	-135.523953	1534041.405	1534041.405
62.85714448	0.000428	-4.13939E-05	1664.868766	-8805.937234	-77.48040012	1551674.072	1551674.072
63.57143044	0.000102523	-4.10597E-05	1709.799204	-7599.401549	-18.77054848	1569306.738	1569306.738
64.28571641	-0.000220027	-4.07754E-05	1691.399133	-6374.993956	40.73650061	1586939.405	1586939.405
65.00000238	-0.000540714	-4.05406E-05	1652.111962	-5145.628906	101.2216384	869142.2691	869142.2691
65.83333532	-0.000914526	-4.03272E-05	1526.276636	-3852.957616	173.3941322	1895999.207	1895999.231
66.66666826	-0.001288597	-4.01746E-05	1366.624057	-2559.693051	247.4107282	1919999.096	1919999.21
67.50000119	-0.0016664	-4.00757E-05	1112.875221	-1613.64771	323.9482042	1943998.954	1943999.189
68.33333413	-0.00204734	-4.00212E-05	826.8177911	-666.6644388	402.9166026	1967998.779	1967999.168
69.16666706	-0.00243602	-0.000039999	439.9436485	-283.9401178	485.2550089	1991998.568	1991999.147
70	-0.002830412	-3.99943E-05	136.6593889	84.73177049	570.6108532	1007997.952	1007998.353

PAUL J. FORD & COMPANY
250 E Broad St, Ste 600 • Columbus, OH 43215
Phone 614.221.6679 www.pauljford.com

Job Number: 37519-3216.001.7805
Site Number:
Site Name:
By: RCK
Date: 8/22/2019

Version 1.3a, Effective 07/03/2019

DRILLED PIER STEEL ANALYSIS - STEEL CALCULATIONS - TIA-222-H

BASED ON ACI 318-14, SECTION 10 (ASSUMING TIE REINFORCEMENT)

Factored Internal Loads from Analysis

Reference Standard =	TIA-222-H	
ACI Code =	ACI 318-14	
Maximum Ratio =	100.0%	
Axial Load, Pu =	16.0	kips, (+Comp, -Tension)
Moment, Mu =	1230.7	k-ft (Must be Positive)
Depth to Analysis Section =	8.75	ft, from Grade

Factored Internal Loads

Load Factor =	1.0	
Axial Load, Pu = ΦPn =	16.0	kips
Moment, Mu =	1230.7	k-ft

Drilled Pier Geometry and Concrete Specifications

Diameter =	72	in
fc' =	3	ksi
εc =	0.003	in/in
β1 =	0.85	
Ag =	4071.5	in^2
Height Above Grade =	0.25	ft
Depth Below Grade =	70	ft

Nominal Axial Load and Moment

ΦPn(max) =	6531.6	kips
ΦPn(min) =	-2047.7	kips
ΦPn =	16.0	kips
Φ =	0.900	
ΦMn (Resultant) =	4836.1	k-ft
at θ =	0.00	degrees
NA Depth =	14.46	in

Rebar Size and Specifications

	Existing	Bar Circle 2	
Bar Size =	#8		
Override Bar Diameter =			in
Bar Diameter =	1.0000	0.0000	in
Bar Area =	0.7900	0.0000	in^2
Effective Bar Area =	0.7900	0.0000	in^2
Number Bars =	48		
Spacing =	Symmetric		
fy =	60		ksi
Es =	29000	29000	ksi
εy =	0.00207	0.00000	in/in
Tie Size =	#5		
Clear Cover to Ties =	3		in
Bar Circle =	63.5		in
Adjust =	4.0000		
% of Area Effective =	100.0%	100.0%	
Include in Calcs =	Yes	No	
Bar Circle Valid =	Yes	No	

AXIAL RATIO* = 0.2% OK

MOMENT RATIO* = 24.2% OK

*Rating per TIA-222-H Section 15.5

Minimum Required Steel

Seismic Design Category =	D		
As(min) =	20.36	sq in	TIA-222-H, 9.4.1
As =	37.92	sq in	
Stl Area Reduction Factor =	1.00		

Drilled Pier Foundation

BU # : 806371
Site Name:
Order Number:

TIA-222 Revison: H
Tower Type: Monopole

CROWN CASTLE

Applied Loads	Comp.	Uplift
Moment (kip-ft)	967.04	
Axial Force (kips)	24.5	
Shear Force (kips)	14.42	

Material Properties		
Concrete Strength, f'c:	3	ksi
Rebar Strength, Fy:	60	ksi

Pier Design Data		
Depth	70	ft
Ext. Above Grade	0.25	ft
Pier Section 1		
From 0.25' above grade to 70' below grade		
Pier Diameter	6	ft

Analysis Results		
Soil Lateral Capacity	*Compression*	*Uplift*
D_{req} (ft from TOC)	34.81	-
Soil Safety Factor	37.92	-
Max Moment (kip-ft)	1225.52	-
Rating*	3.3%	-
Soil Vertical Capacity	*Compression*	*Uplift*
Skin Friction (kips)	458.89	-
End Bearing (kips)	0.00	-
Weight of Concrete (kips)	230.50	-
Total Capacity (kips)	458.89	-
Axial (kips)	255.00	-
Rating*	52.9%	-

Check Limitation	
Apply TIA-222-H Section 15.5:	☑
N/A	☐

Soil Interaction Rating*	52.9%

*Rating per TIA-222-H Section 15.5

Groundwater Depth: 10 ft

Soil Profile — # of Layers: 9

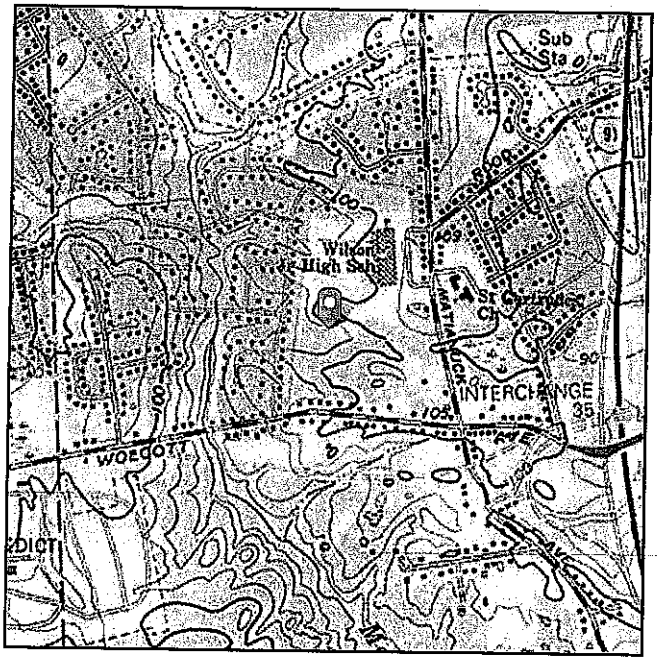
Layer	Top (ft)	Bottom (ft)	Thickness (ft)	γ_{soil} (pcf)	$\gamma_{concrete}$ (pcf)	Cohesion (ksf)	Angle of Friction (degrees)	Calculated Ultimate Skin Friction Comp (ksf)	Calculated Ultimate Skin Friction Uplift (ksf)	Ultimate Skin Friction Comp Override (ksf)	Ultimate Skin Friction Uplift Override (ksf)	Ult. Gross Bearing Capacity (ksf)	SPT Blow Count	Soil Type
1	0	5	5	110	150	0	0	0.000	0.000	0.00	0.00			Cohesionless
2	5	10	5	110	150		30	0.000	0.000	0.48	0.48			Cohesionless
3	10	35	25	52.6	87.6	0.3		0.165	0.165	0.20	0.20			Cohesive
4	35	40	5	37.6	87.6		25	0.000	0.000	0.37	0.37			Cohesionless
5	40	50	10	42.6	87.6		28	0.000	0.000	0.66	0.66			Cohesionless
6	50	55	5	47.6	87.6		30	0.000	0.000	1.07	1.07			Cohesionless
7	55	65	10	42.6	87.6		28	0.00	0.00	0.74	0.74			Cohesionless
8	65	69	4	42.6	87.6		28	0.00	0.00	0.77	0.77			Cohesionless
9	69	70	1	42.6	87.6		28	0.00	0.00	0.78	0.78	0		Cohesionless

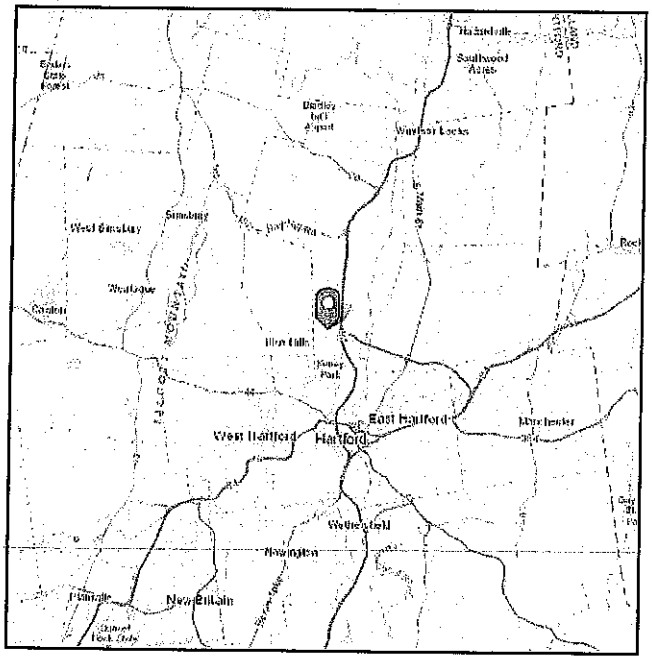
ASCE 7 Hazards Report

Address:
No Address at This Location

Standard: ASCE/SEI 7-10
Risk Category: II
Soil Class: D - Stiff Soil

Elevation: 86.65 ft (NAVD 88)
Latitude: 41.821122
Longitude: -72.676667





Wind

Results:

Wind Speed:	122 Vmph
10-year MRI	76 Vmph
25-year MRI	86 Vmph
50-year MRI	92 Vmph
100-year MRI	99 Vmph
Data Source:	ASCE/SEI 7-10, Fig. 26.5-1A and Figs. CC-1–CC-4, incorporating errata of March 12, 2014
Date Accessed:	Tue Aug 20 2019

Value provided is 3-second gust wind speeds at 33 ft above ground for Exposure C Category, based on linear interpolation between contours. Wind speeds are interpolated in accordance with the 7-10 Standard. Wind speeds correspond to approximately a 7% probability of exceedance in 50 years (annual exceedance probability = 0.00143, MRI = 700 years).

Site is in a hurricane-prone region as defined in ASCE/SEI 7-10 Section 26.2. Glazed openings need not be protected against wind-borne debris.

Mountainous terrain, gorges, ocean promontories, and special wind regions should be examined for unusual wind conditions.

ASCE
AMERICAN SOCIETY OF CIVIL ENGINEERS

Ice

Results:

Ice Thickness:	1.00 in.
Concurrent Temperature:	5 F
Gust Speed:	50 mph
Data Source:	Standard ASCE/SEI 7-10, Figs. 10-2 through 10-8
Date Accessed:	Tue Aug 20 2019

Ice thicknesses on structures in exposed locations at elevations higher than the surrounding terrain and in valleys and gorges may exceed the mapped values.

Values provided are equivalent radial ice thicknesses due to freezing rain with concurrent 3-second gust speeds, for a 50-year mean recurrence interval, and temperatures concurrent with ice thicknesses due to freezing rain. Thicknesses for ice accretions caused by other sources shall be obtained from local meteorological studies. Ice thicknesses in exposed locations at elevations higher than the surrounding terrain and in valleys and gorges may exceed the mapped values.

REVIEWED
By Mike Laverty at 1:20 pm, Oct 04, 2019

verizon

WINDSOR SOUTH CT
599 MATIANUCK AVE
WINDSOR, CT 06095

PROJECT SUMMARY

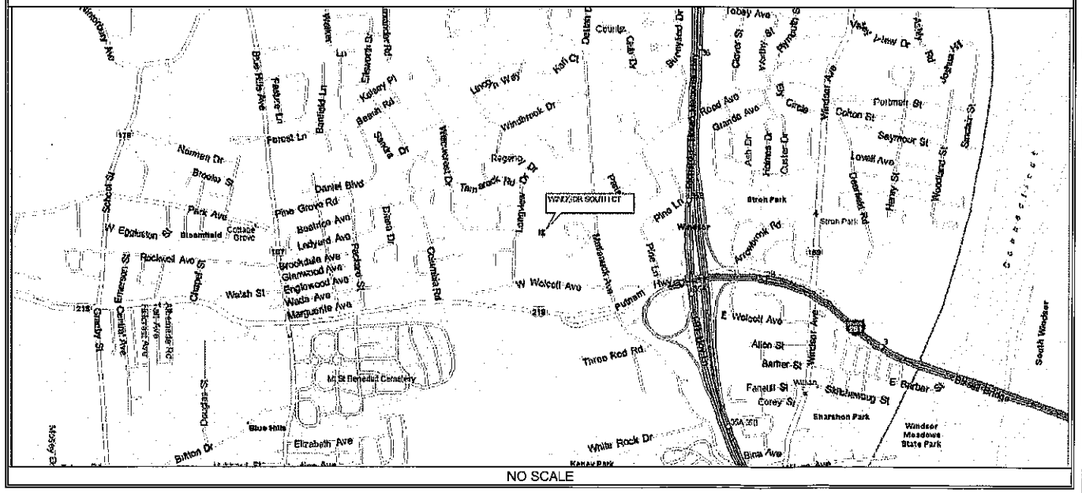
SITE NAME:	WINDSOR SOUTH CT
SITE ADDRESS:	599 MATIANUCK AVE WINDSOR, CT 06095
TOWER OWNER:	CROWN CASTLE 2000 CORPORATE DR CANONSBURG, PA 15317
BU NUMBER:	806371
MAP NUMBER:	57
LOT NUMBER:	30
CUSTOMER/APPLICANT:	VERIZON WIRELESS 400 FRIEBERG PARKWAY WESTBOROUGH, MA 01581
CONTACT:	DAN MYZYRI (617) 945-7288
NAD83	
LATITUDE:	41° 49' 16.04" N
LONGITUDE:	72° 40' 36.29" W
ELEVATION:	126'
CURRENT ZONING:	NZ
A&E FIRM:	B+T GROUP 1717 S. BOULDER, SUITE 300 TULSA, OK 74119 STEVE THORNHILL (918) 587-4630
OCCUPANCY TYPE:	UNMANNED
A.D.A. COMPLIANCE:	FACILITY IS UNMANNED AND NOT FOR HUMAN HABITATION.

CODE COMPLIANCE

ALL WORK SHALL BE PERFORMED AND MATERIALS INSTALLED IN ACCORDANCE WITH THE CURRENT EDITIONS OF THE FOLLOWING CODES AS ADOPTED BY THE LOCAL GOVERNING AUTHORITIES. NOTHING IN THESE PLANS IS TO BE CONSTRUED TO PERMIT WORK NOT CONFORMING TO THESE CODES:

CODE TYPE	CODE
BUILDING	2018 CT STATE BUILDING CODE
STRUCTURAL	2018 CT STATE BUILDING CODE
MECHANICAL	2018 CT STATE BUILDING CODE
ELECTRICAL	NEC 2017

LOCATION MAP



NO SCALE

DRIVING DIRECTIONS

DEPART FROM BRADLEY INTERNATIONAL AIRPORT ON TERMINAL RD. ROAD NAME CHANGES TO BRADLEY FIELD CONNECTOR. ROAD NAME CHANGES TO CT-20 [BRADLEY FIELD CONNECTOR]. TAKE RAMP (RIGHT) ONTO I-91 [RICHARD P HORAN MEMORIAL HWY]. AT EXIT 35B, TURN LEFT ONTO RAMP. TURN RIGHT ONTO CT-218 [PUTNAM HWY]. TURN RIGHT ONTO MATIANUCK AVE, THEN IMMEDIATELY TURN LEFT ONTO W WOLCOTT AVE. TURN RIGHT ONTO LONGVIEW DR. TURN RIGHT ONTO ACCESS ROAD AND ARRIVE AT WINDSOR SOUTH CT.

DRAWING INDEX

SHEET #	SHEET DESCRIPTION	REV. #
T-1	TITLE SHEET	0
A-1	COMPOUND PLAN AND TOWER ELEVATION	0
A-2	EQUIPMENT DETAILS	0
A-3	PLATFORM MOUNT DETAIL	0

A/E DOCUMENT REVIEW STATUS

TITLE	SIGNATURE	DATE
OWNER:		
R.F. ENGINEER:		
CONSTRUCTION MGR.:		
LEASING & ZONING:		
VERIZON WIRELESS:		

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

DO NOT SCALE DRAWINGS

ALL DRAWINGS CONTAINED HEREIN ARE FORMATTED FOR 11x17. CONTRACTOR SHALL VERIFY ALL PLANS AND EXISTING DIMENSIONS AND CONDITIONS ON THE JOB SITE AND SHALL IMMEDIATELY NOTIFY THE ENGINEER IN WRITING OF ANY DISCREPANCIES BEFORE PROCEEDING WITH THE WORK OR BE RESPONSIBLE FOR SAME.

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WINDSOR SOUTH CT
599 MATIANUCK AVE
WINDSOR, CT 06095
EXISTING MONOPOLE

PROJECT NO:	138446.001.01
CHECKED BY:	RMC

ISSUED FOR:

REV	DATE	DRWN	DESCRIPTION
0	9/18/19	RFC	CONSTRUCTION

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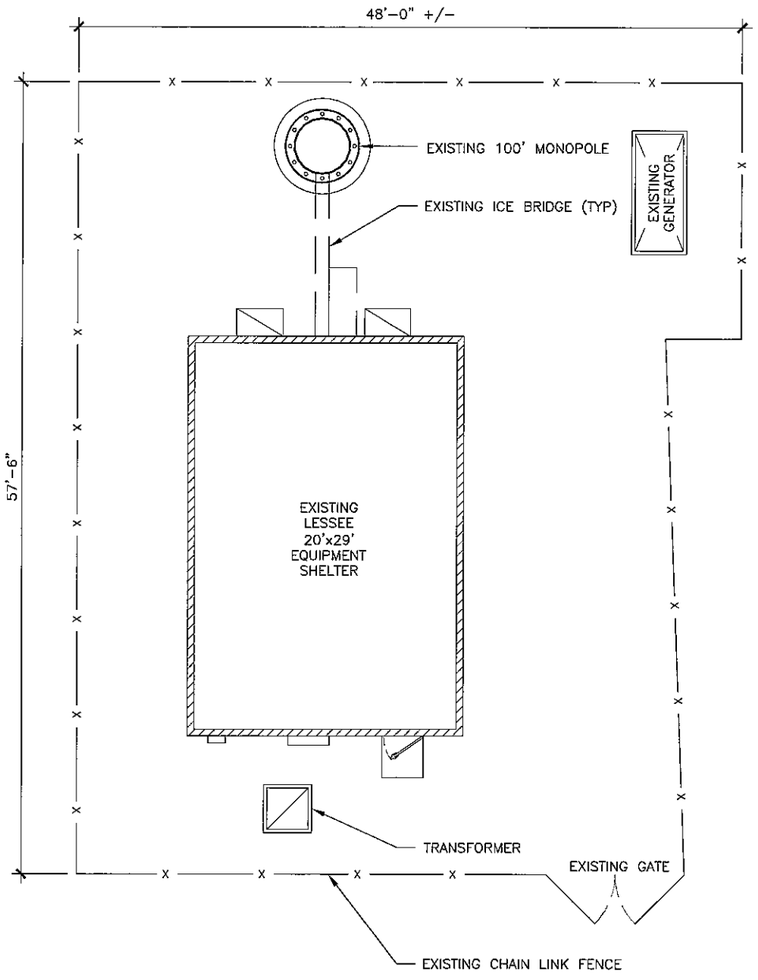
STATE OF CONNECTICUT * SCOTT W. THORNHILL * 31627 LICENSED PROFESSIONAL ENGINEER
9/18/19

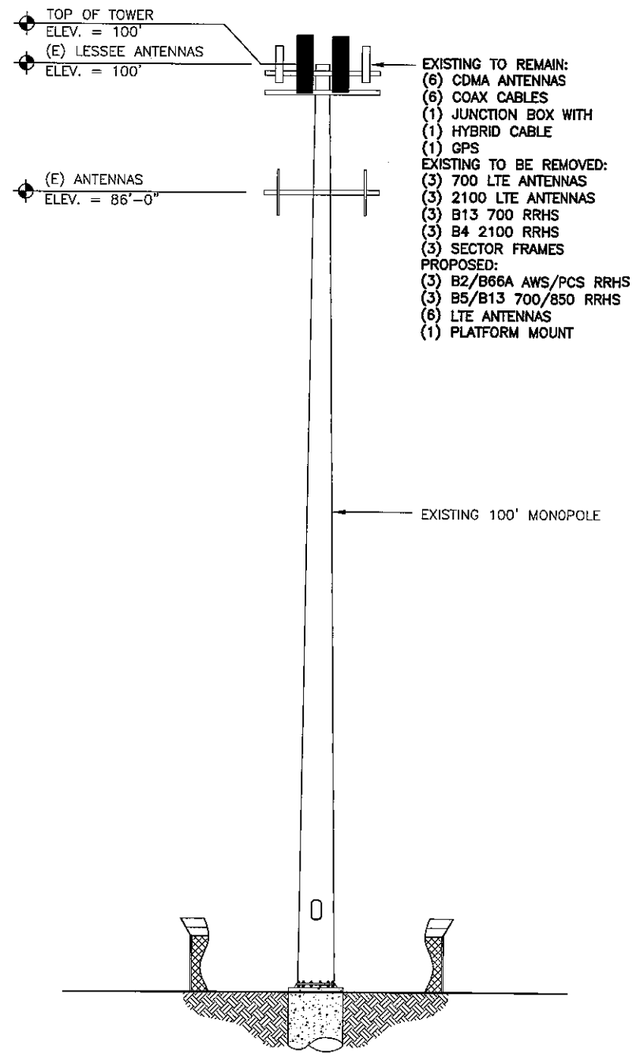
SHEET NUMBER:	REVISION:
T-1	0

138446_806371_HRT 096 943227.dwg - Sheet:T-1 - User: rcorson - Sep 18, 2019 - 9:53am

NOTES:
1. CONTRACTOR TO VERIFY EXACT COAX AND ANTENNA INSTALLATION AND ANTENNA HEIGHT WITH LATEST RF DATA SHEETS PRIOR TO INSTALLATION.
2. STRUCTURAL ANALYSIS DONE BY OTHERS.
3. VERIZON SHALL PROVIDE A STRUCTURAL ANALYSIS OF THE TOWER PREPARED BY A LICENSED STATE STRUCTURAL ENGINEER CERTIFYING THAT THE EXISTING TOWER AND PROPOSED IMPROVEMENTS HAVE SUFFICIENT CAPACITY TO SUPPORT ALL NEW WORK THAT WILL BE DONE IN COMPLIANCE WITH THE CURRENT EDITION OF BUILDING CODES AND EIA/TIA CRITERIA. THE CONTRACTOR IS RESPONSIBLE TO CONFIRM THAT ANY AND ALL IMPROVEMENTS REQUIRED BY THE STRUCTURAL ANALYSIS CERTIFICATION ARE PROPERLY INSTALLED PRIOR TO THE ADDITION OF ANTENNAS, SUPPORTS AND APPURTENANCES PROPOSED ON THESE DRAWING OTHERWISE NOTED IN THE STRUCTURAL ANALYSIS.CAP AND WEATHERPROFF UNUSED ANTENNA PORTS.
4. ESTIMATED HYBRIFLEX CABLE LENGTH: 150' (EACH RUN)



Per RFDS Antenna CL is proposed at 97.1 ft.



1 COMPOUND PLAN
SCALE: 0' 4' 8' 16' 32'

N

2 FINAL TOWER ELEVATION
SCALE: 0' 8' 16' 32' 48'

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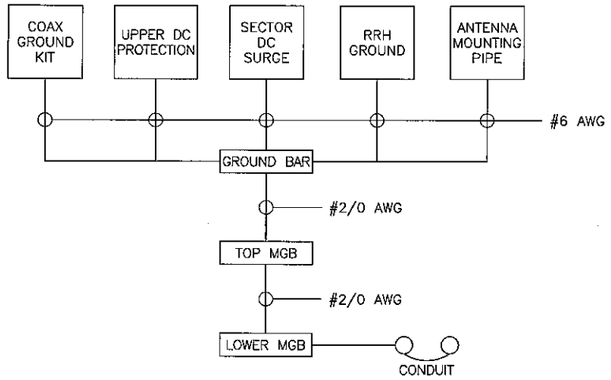
9/18/19

SHEET NUMBER:	REVISION:
A-1	0

NOTE:
1. INSTALL ALL EQUIPMENT, MOUNTING BRACKETS AND HARDWARE ACCORDING WITH MANUFACTURE'S RECOMMENDATIONS.
2. GROUND DISTRIBUTION BOXES, MOUNTING PIPES AND RRHs IN ACCORDANCE WITH MANUFACTURE'S RECOMMENDATIONS.
3. INSTALLED EQUIPMENT AND MOUNTING BRACKETS SHALL NOT INTERFERE WITH CLIMBING ACCESS NOR ANT INSTALLED SAFETY DEVICES.
4. EQUIPMENT TO BE INSTALLED AT VERIZON'S RAD. CENTER IN ACCORDANCE WITH TOWER STRUCTURAL ANALYSIS (ANALYSIS BY OTHERS).

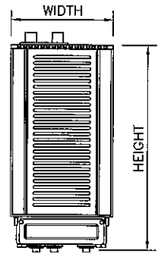


NOTE:
1. BOND ANTENNA GROUNDING KIT CABLES TO TOP CIBE.
2. BOND ANTENNA GROUNDING KIT CABLE TO BOTTOM CIBE.
3. TYPICAL FOR ALL SECTORS.

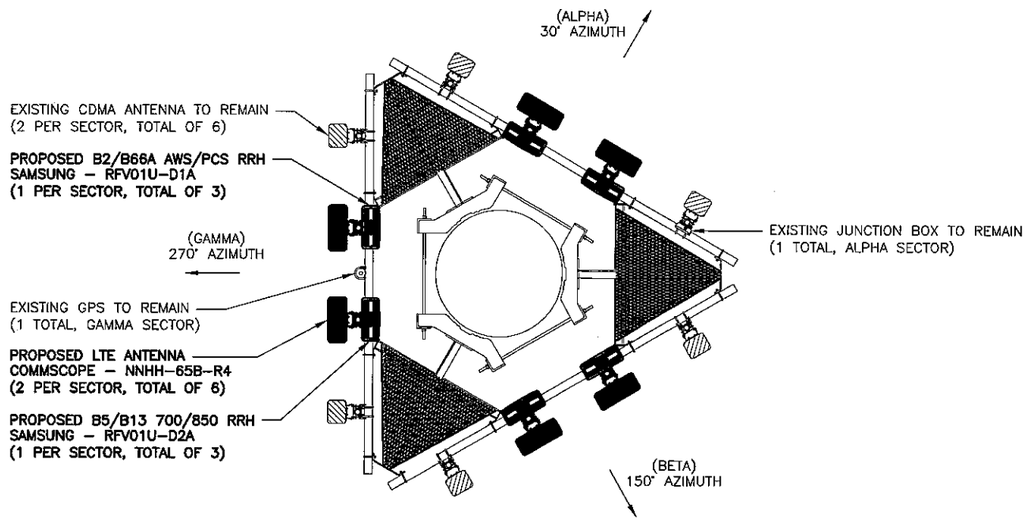
1 GROUNDING SCHEMATIC DIAGRAM
SCALE: N.T.S.

REMOTE RADIO HEAD DIMENSIONS (INCHES)

MODEL	HEIGHT	WIDTH	DEPTH	WEIGHT
RRH-BR049 RFV01U-D1A	15.0"	15.0"	10.0"	84.4 LBS
RRH-BR04C RFV01U-D2A	15.0"	15.0"	8.1"	70.3 LBS



2 RRH SPECIFICATIONS
SCALE: N.T.S.



3 PROPOSED ANTENNA ORIENTATION
SCALE: N.T.S.

N

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SHEET NUMBER:	REVISION:
A-2	0

PV-LPP
L.I.F.E. MOUNT™ LOW PROFILE PLATFORM

TABLE 1: PLATFORM CONFIGURATIONS

PART NUMBER	DESCRIPTION	MIN POLE OD	MAX POLE OD	WEIGHT (LBS)	INCLUDED PARTS									
					PIPE-312X150	PIPE-312X174	PIPE-238X150	PIPE-238X174	PV-RM1045	PV-RM3060	PV-LPP12-01	PV-LPP14-01	PV-LPPH	PV-PHK12-B
PV-LPP12M-B	12'6" FACE PLATFORM	10"	34"	1267	3	-	-	-	1	-	3	-	1	0
PV-LPP14M-B	14'6" FACE PLATFORM	10"	35"	1365	-	3	-	-	1	-	-	3	1	0
PV-LPP14L-B	14'6" FACE PLATFORM LARGE POLE	33"	60"	1370	-	3	-	-	-	1	3	-	1	0
PV-LPP12M-HR-B	12'6" FACE PLATFORM W/ HANDRAIL	10"	34"	1522	3	-	3	-	1	-	3	-	1	1
PV-LPP14M-HR-B	14'6" FACE PLATFORM W/ HANDRAIL	10"	35"	1641	-	3	-	3	1	-	-	3	1	1
PV-LPP14L-HR-B	14'6" FACE PLATFORM W/ HANDRAIL, LARGE POLE	33"	60"	1647	-	3	-	3	-	1	3	-	1	1

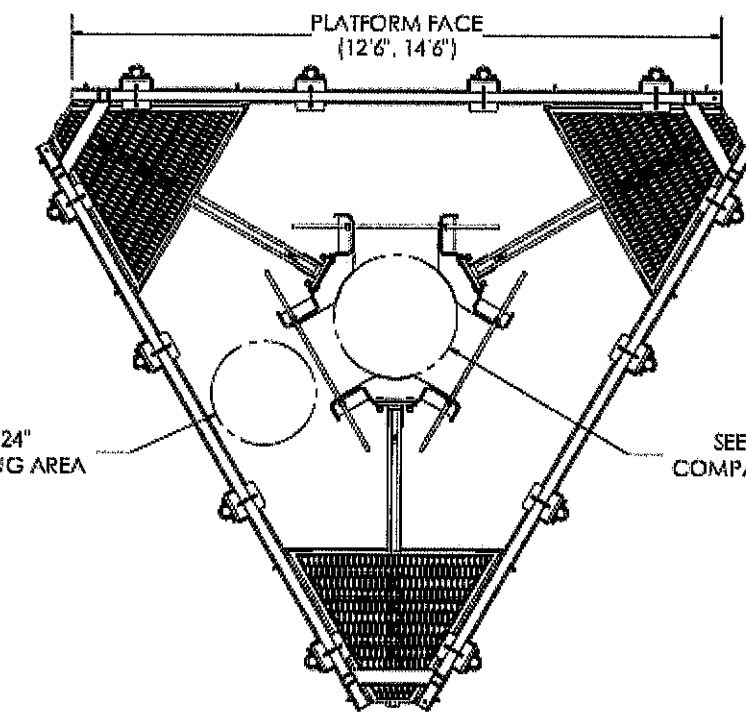
TABLE 2: ANTENNA PIPE OPTIONS***

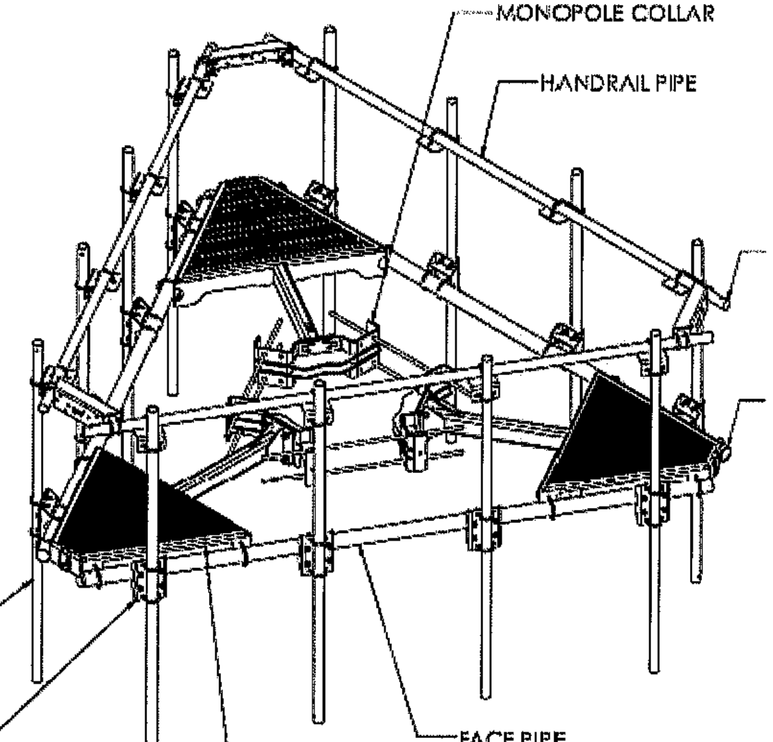
OD	LENGTH	ANTENNA PIPE	WEIGHT (LBS)
2-3/8"	72"	PIPE-238X72	22
	96"	PIPE-238X96	29
	126"	PIPE-238X126	38
2-7/8"	84"	PIPE-278X84	41
	96"	PIPE-278X96	46.5
	126"	PIPE-278X126	61
3-1/2"	72"	PIPE-312X72	46
	96"	PIPE-312X96	61
	126"	PIPE-312X126	80

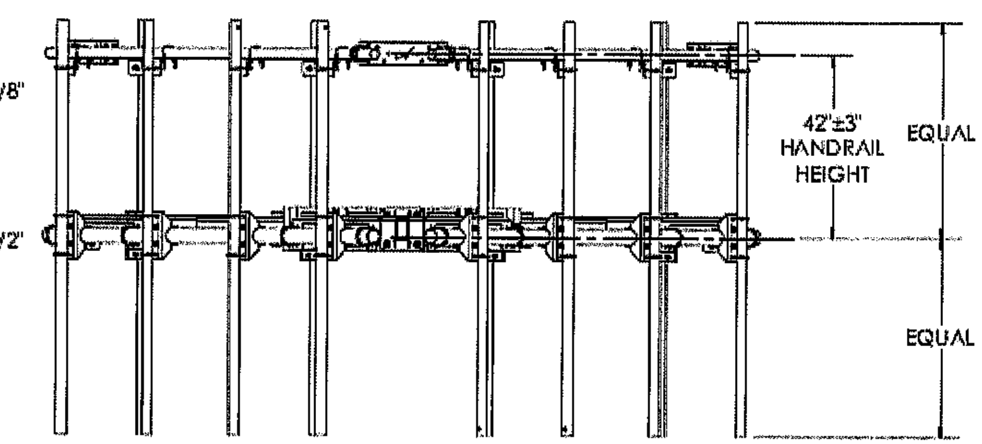
***PLATFORM WITH HANDRAIL KITS ARE COMPATIBLE WITH 2-3/8" OD HANDRAIL PIPE ONLY

TABLE 3: CROSSOVER BRACKETS

PART NUMBER	COMPATIBLE ANTENNA PIPE	WEIGHT (LBS)
PV-XP-2030-HD	2-3/8" OD	12.5
PV-XP-2530-HD	2-7/8" OD	12.75
PV-XP-3030-HD	3-1/2" OD	13







FAIL-SAFE L.I.F.E. MOUNTS™

SHEET: 1 OF 4	THIRD ANGLE PROJECTION	CATEGORY: 02_Monopole	7	UPDATED LOADING, TEMPLATE	1/14/18
		SERIES: 01_Triangular	6	VSW LOADING	1/19/17
3/13/2018	SCALE: 1:36	TYPE: PV-LPP_LIFE Mount	5	HEAVY-S LOADING	4/13/16
DIMENSIONS ARE IN INCHES TOLERANCES U.N.O. HOLES: +1/16", -1/32" ANGULAR: PROFILE±1/4°, BEND±2° ALL OTHERS: ±1/16"		BY: DJN	4	L.I.F.E. MOUNT™ UPDATE	2/22/16
		CHECKED: SJS	3	REDESIGNED COLLAR	12/30/15
		STATUS: APPROVED	REV	DESCRIPTION	DATE

PERFECTVISION® MANUFACTURING
L.I.F.E. MOUNT™ LOW PROFILE PLATFORM
DOCUMENT NUMBER: LPP-ENG-01-R7
REV: 7

C:\Users\Dominick\Documents\PV\Stock\PV Sales Catalog\SW Working Files\Engineering Details

138446_806371_HRT 096 943227.dwg - SheetA-3 - User: rcarson - Sep 18, 2019 - 9:54am

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PROJECT NO: 138446.001.01
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IT IS A VIOLATION OF LAW FOR ANY PERSON, UNLESS THEY ARE ACTING UNDER THE DIRECTION OF A LICENSED PROFESSIONAL ENGINEER, TO ALTER THIS DOCUMENT.

SHEET NUMBER: A-3
REVISION: 0

Date: July 29, 2019

Charles R. McGuirt II
Crown Castle
3530 Toringdon Way, Suite 300,
Charlotte, NC 28277
(704) 405-6607

CLS Engineering PLLC
319 Chapanoke Road, Suite 118
Raleigh, NC 27603
(405) 348-5460
Engineering@clsengineeringpllc.com

Subject: **Mount Replacement Report**

Carrier Designation:

Verizon Wireless Equipment Change-Out
Carrier Site Number: NG1924
Carrier Site Name: Windsor South CT

Crown Castle Designation:

Crown Castle BU Number: 806371
Crown Castle Site Name: HRT 096 943227
Crown Castle JDE Job Number: 582366
Crown Castle Order Number: 499007 Rev. 0

Engineering Firm Designation:

CLS Engineering PLLC Project #: 42284-NG1924-02-MR

Site Data:

HRT 96 599 Matianuck Avenue, Windsor, CT 06095, Hartford County
Latitude: 41° 49' 16.04" Longitude: -72° 40' 36.29"

Structure Information:

Tower Height & Type: 100 ft Monopole
Mount Elevation: 98 ft
Mount Width & Type: 12.5 ft Perfect Vision PV-LPP12M-HR-B Platform Mount w/ PV-PKBK Kickers

Dear Charles R. McGuirt II,

CLS Engineering PLLC is pleased to submit this **"Mount Replacement Report"** to determine the structural integrity of Verizon Wireless's antenna mounting system with the proposed appurtenance and equipment addition on the above mentioned supporting tower structure. Analysis of the existing supporting tower structure is to be completed by others and therefore is not part of this analysis. Analysis of the antenna mounting system as a tie-off point for fall protection or rigging is not part of this document.

The purpose of the analysis is to determine acceptability of the mount stress level. Based on our analysis we have determined the mount stress level to be:

PerfectVision PV-LPP12M-HR-B Platform Mount w/ PV-PKBK Kickers Sufficient*

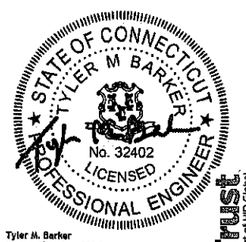
***Sufficient upon completion of the changes listed in the 'Conclusion and Recommendations' section of this report.**

This analysis utilizes an ultimate 3-second gust wind speed of 125 mph as required by the 2018 Connecticut State Building Code. Applicable Standard references and design criteria are listed in Section 2 - Analysis Criteria.

Mount analysis prepared by: Jeff Sparks

Respectfully Submitted by:

Tyler M. Barker, P.E.
Director of Engineering



Tyler M. Barker
CLS Engineering, PLLC
Director of Engineering
PE # 32402 Exp. 1/31/2020
COA # PEC.001833 Exp. 8/14/2019

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Digitally signed by Tyler Barker
DN: c=US, o=Telamon Corporation, ou=A01427E000001 6A4525ADF800001D 17, cn=Tyler Barker
Date: 2019.07.30 09:05:52 -04'00'

TABLE OF CONTENTS

1. INTRODUCTION

The proposed equipment is to be mounted to the proposed PerfectVision PV-LPP12M-HR-B Platform Mount w/ PV-PKBK Kickers. This proposed mounting configuration was analyzed using RISA-3D, a commercially available finite element analysis software package. A selection of input and output from our analysis is attached to the end of this report.

2. ANALYSIS CRITERIA

STANDARD	2015 IBC / 2018 Connecticut State Building Code / TIA-222-G
BASIC WIND SPEED	125 mph, V_{ult} / 96.8 mph, V_{asd} (3-Second Gust)
BASIC WIND SPEED W/ ICE	50 mph (3-Second Gust) w/ 1" Radial Ice (Escalating)
EXPOSURE CATEGORY	B
MAX. TOPOGRAPHIC FACTOR,	1.00
RISK CATEGORY	II
MAINTENANCE LIVE LOAD	L_M: 500 lb

Table 1 - Final Equipment Configuration

ELEVATION (ft)		ANTENNAS	
MOUNT	**RAD.**	**#**	**NAME**
98.0	103.0	1	GPS GPS_A
	100.0	6	Decibel DB844G65ZAXY
		3	Samsung RFV01U-D1A
		3	Samsung RFV01U-D2A
		6	Commscope NNHH-65B-R4
	98.0	1	Raycap RRFDC-3315-PF-48

3. ANALYSIS PROCEDURE

Table 2 - Documents Provided

STRUCTURAL DATA	Site Photos, dated September 14, 2018 Perfect Vision Document Number: LPP-ENG-01-R7 Rev. 7, dated January 16, 2018 Perfect Vision Document: Monopole Kicker Brace Kit Rev. 0, dated April 11, 2017
PREVIOUS ANALYSES	Mount Analysis by CLS Group, CLS Group Project #42284-NG1924-01-MA, dated July 15, 2019 Structural Analysis by Paul J. Ford and Company, Paul J. Ford and Company Project #37514-2522.001.7700, dated November 21, 2014
LOADING DATA	Crown Castle Order #499007, Rev. 0, dated July 1, 2019

3.1. Analysis Method

RISA-3D, a commercially available analysis software package, was used to create a three-dimensional model of the antenna mounting system and calculate member stresses for various loading cases. This analysis was performed in accordance with Crown Castle's ENG-SOW-10208 Tower Mount Analysis (Revision B).

4. ANALYSIS RESULTS

Table 3 - Mount Component Stresses vs. Capacity

COMPONENT	PEAK USAGE	RESULT
Support Rail	72%	Pass
Bracing Members	70%	Pass
Mount Pipes	46%	Pass
Reinforcement Members	25%	Pass
Connections	23%	Pass
Platform Base	16%	Pass
Stand-Off Horizontals	15%	Pass

Structure Rating (max from all components) =	72%

Notes:
1) See additional documentation in "Appendix C - Software Analysis Output" for calculations supporting the % capacity consumed.

4.1 Conclusion and Recommendations

According to our structural analysis, the mounts have been found to **PASS PENDING REPLACEMENT**. The mounting configuration considered in this analysis will be capable of supporting the referenced loading pursuant to referenced standards once the following scope is executed:

- Remove existing platform mount and install (1) new PerfectVison PV-LPP12M-HR-B Platform Mount.
- Install (1) PerfectVision PV-PKBK-M Monopole Platform Kicker Kit as shown. Field-cut kicker angle as required. Maintain minimum bolt edge distance. Connect kicker kit to (1) proposed PerfectVision PV-RM1240 Monopole Collar included in kit.
- Install (4) PerfectVision PIPE-238X96 antenna mount pipes per sector (12 total). Connect to platform base horizontal member using (12) PerfectVision PV-XP-2030-HD crossover brackets such that they are equidistant from each other as shown in the assembly drawings.
- Install support rail kit 3'-6" above the platform base. Connect to all mount pipes using PerfectVision PV-XP-2020 crossover plates in lieu of the crossover angles included in proposed platform kit.
- Install existing and proposed RRUS and TMAs behind the antennas.

See "Appendix E: Installation Sketches and Mount Assembly Drawings" for additional details.

5. ASSUMPTIONS AND CONDITIONS

This analysis is inclusive of the antenna supporting frames/mounts and all recorded connections that will support the equipment listed in this report. It considers only the theoretical capacity of structural components and it is not a condition assessment. The validity of the analysis may be dependent on the accuracy of structural information supplied by others. The client is responsible for verifying this information. If any provided information is revised after completion of this analysis, CLS Engineering PLLC should be notified immediately to revise results.

This analysis assumes the following:

1. The tower or other superstructure and mounts (if existing) were properly constructed as per the original design and have been properly maintained in accordance with applicable code standards.
2. Member sizes and strengths are accurate as supplied or are assumed as stated in the calculations.
3. In the absence of sufficient design information, all welds and connections are assumed to develop at least the capacity of the connected member, unless otherwise stated in this analysis.
4. All prior structural modifications, if any, are assumed to be correctly installed and fully effective.
5. The loading configuration is complete and accurate as supplied and/or as modeled in the previous analysis. All appurtenances are assumed to be properly installed and supported as per manufacturer requirements.
6. Some conservative assumptions may be used regarding appurtenances and their projected areas based on careful interpretation of data supplied, previous experience and standard industry practice.

All opinions and conclusions are considered accurate to a reasonable degree of engineering certainty based upon the evidence available at the time of the report. All opinions and conclusions contained herein are subject to revision based upon receipt of new or updated information. All services are provided exercising a level of care and diligence equivalent to the standard of our profession. No warranty or guarantee, either expressed or implied, is offered. All services are confidential in nature and this report will not be released to any other party without the client's consent. The use of this analysis is limited to the expressed purpose for which it was commissioned and it may not be reused, copied or disseminated for any other purpose without consent from CLS Engineering PLLC.

All services were performed, results obtained and recommendations made in accordance with generally accepted engineering principles and practices. CLS Engineering PLLC is not responsible for the conclusions, opinions or recommendations made by others based on the information supplied in this analysis.

It is not possible to have the fully detailed information necessary to perform a complete and thorough analysis of every structural sub-component of an existing structure. The structural analysis by CLS Engineering PLLC verifies the adequacy of the primary members of the structure. CLS Engineering PLLC provides a limited scope of service in that we cannot verify the adequacy of every weld, bolt, gusset, etc.

APPENDIX A

SOFTWARE INPUT CALCULATIONS

Wind & Ice Loading

Nominal Mount Elevation (AGL), z_{mount}	98 ft	K_e	0.90
Nominal Rad Elevation (AGL), z_{rad}	100 ft	K_d	0.95
TIA Standard	G	K_z	0.98
Basic Wind Speed, V_{ult} (bare)	125 mph	K_{zt}	1.00
Basic Wind Speed, V (ice)	50 mph	I (wind)	-
Design Ice Thickness, t_i	1 in	t_z	2.23 in
Exposure Category	B	G_h	1.00
Risk Category	II	q_z (bare)	37.3 psf
Seismic Response Coeff., C_s	-	q_z (ice)	6.0 psf

Live Loading

At Mount Pipes, L_{LD}	500 lb	
Joint Labels Considered		M1
		M2
		M3
		M4

Member Distributed Loading

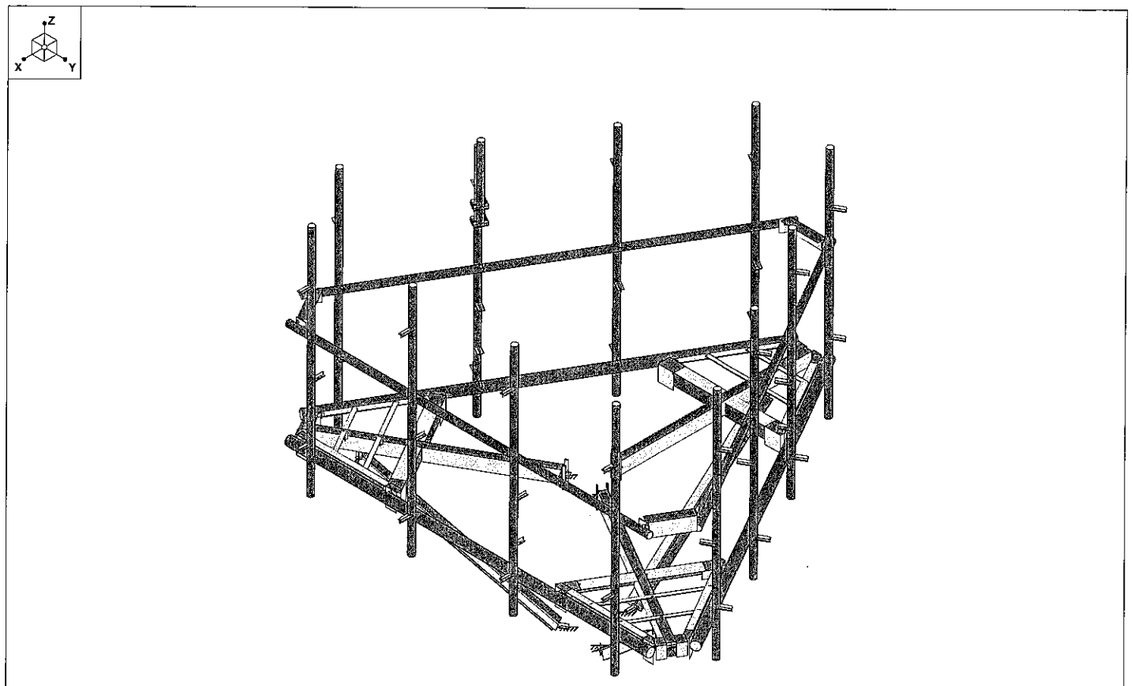
Section Set Label	Shape Label	F_a (lb/ft)		Ice Wt. (lb/ft)
		Bare	Ice	
Offsett Tube	HSS3x3x3/8"	28.00	2.73	19.95
End Plate Angle	L5x4x0.25	28.00	2.73	21.27
Grating Angle 2	L6.4x4.750x0.25	35.84	2.83	25.00
Grating Angle 4	L7.25x2.375x0.25	40.80	2.89	22.35
Grating Angle 3	L2.375x1.25x0.25	13.30	3.84	13.30
Grating PL 2	PL3.50x0.25	8.40	3.22	9.11
Grating Angle 1	L4.75x4.5x0.25	26.60	2.72	21.70
Platform Horizontal Pipe	PIPE_3.0	11.76	4.28	15.81
Support Rail	PIPE_2.0	7.98	3.67	12.55
MOD Stabilizer	L3X3X3	18.90	2.90	15.07
Conn. PL	PL8.5x3/8	47.60	6.97	21.47
SR Conn Plate	PL5x0.1875	28.00	5.09	15.07
SR Conn Angle	L5.5063.5625X3	30.80	2.77	21.36
Mount Pipe	PIPE_3.0	7.98	3.67	12.55
Threaded Rod	TR1/2"	1.68	2.67	7.44

Appurtenances

Appurtenance Model	Starbs	Azimuth Offset (°, Lc)	Rad Elev. Override (ft)	Swap Width & Depth	Area Factor		Qty. per Azimuth			Total Qty. Override	0° Joints		120° Joints		240° Joints		Height (in)	Width (in)	Depth (in)	Weight (Bare) (lb)	Shape	Weight of Ice (lb)	EPA_a (Bare) (ft²)		EPA_a (Ice) (ft²)		F_a (Bare) (lb)		F_a (Ice) (lb)	
					Front	Side	0°	120°	240°		1	2	1	2	1	2							N	T	N	T	N	T	N	T
DB844G65ZAW			100	f"			1	1	1	3	A1	A2	B1	B2	G1	G2	48	10	8	16	Flat	146.42	4.34	3.61	8.59	5.80	146.71	122.17	35.84	31.35
NNH4-65B-R4			100	f"			1	1	1	3	A3	A4	B3	B4	G3	G4	0	0	0	77.4	Generic	322.39	7.62	3.01	9.85	4.98	257.54	101.73	63.29	25.91
NNH4-65B-R4			100	f"			1	1	1	3	A5	A6	B5	B6	B5	B6	0	0	0	77.4	Generic	322.39	7.62	3.01	9.85	4.98	257.54	101.73	63.29	25.91
DB844G65ZAW			100	f"			1	1	1	3	A7	A8	B7	B8	B7	B8	48	10	8	16	Flat	146.42	4.34	3.61	8.59	5.80	146.71	122.17	35.84	31.35
GPS_A			103	f"				1		1			BGPS				5	6.12	6.12	0.87	Flat	16.98	0.29	0.29	0.84	0.84	8.69	8.69	4.57	4.57
RRFDC-3315-PF-48			98	f"	0.6		1			1	A/C/P						25.66	15.73	10.25	32	Flat	155.82	1.68	2.19	2.53	3.59	58.51	73.66	13.62	19.86
RFV01U-D1A			100	f"	0.5				1	1			BR3		GR3		15	15	10	84.4	Flat	81.97	0.94	1.25	1.58	2.35	31.69	42.25	8.54	12.89
RFV01U-D1A			100	f"	0.5				1						GR1		15	15	10	84.4	Flat	81.97	0.94	1.25	1.58	2.35	31.69	42.25	8.54	12.89
RFV01U-D2A			100	f"	0.5		1	1			A/R2		BR2				15	15	8.1	70.3	Flat	73.44	0.94	1.01	1.58	2.04	31.69	34.22	8.54	11.03
RFV01U-D2A			100	f"	0.5		1				A/R3						15	15	8.1	70.3	Flat	73.44	0.94	1.01	1.58	2.04	31.69	34.22	8.54	11.03

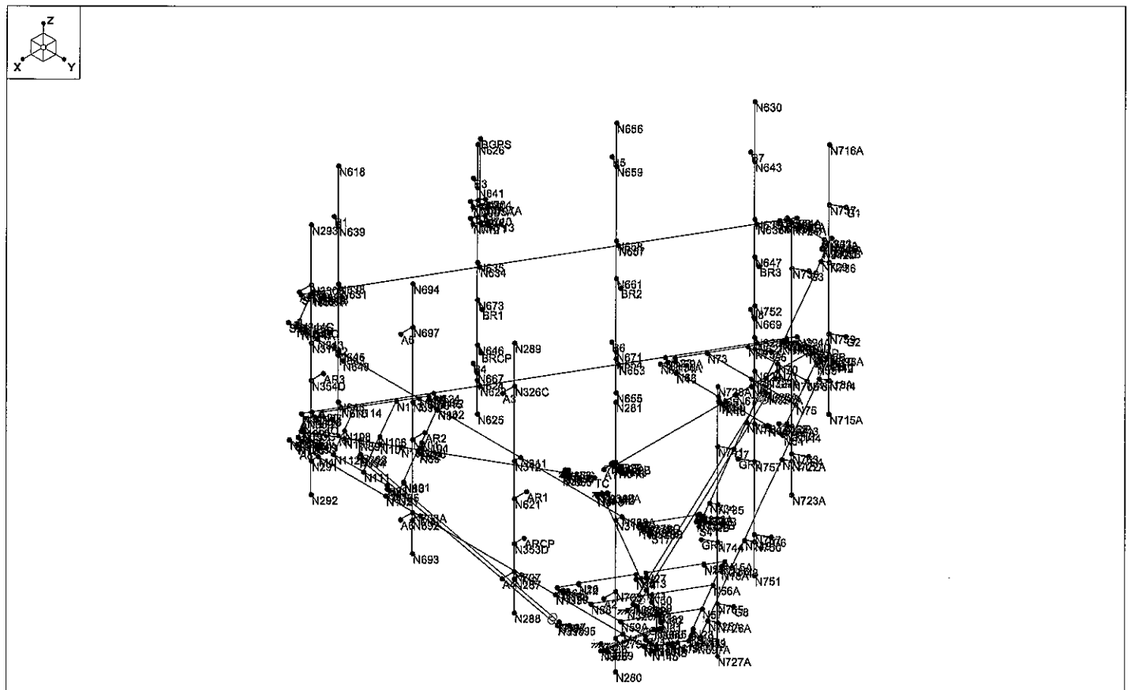
APPENDIX B

WIRE FRAME AND RENDERED MODELS



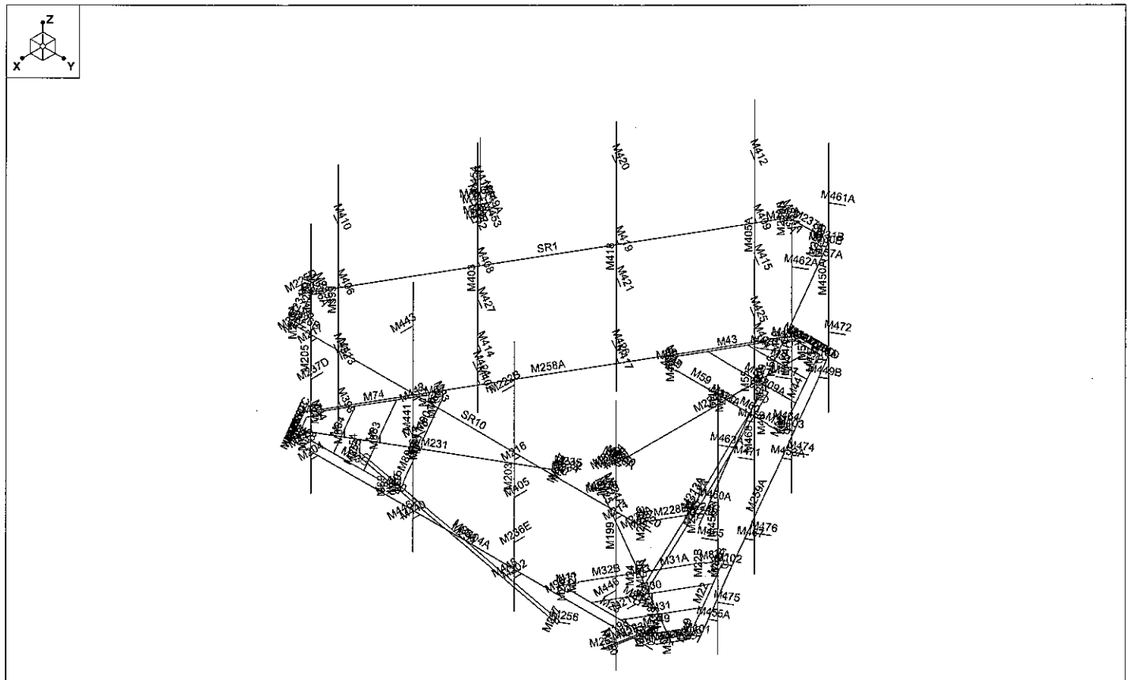
Envelope Only Solution

CLS	42284-NG1924-HRT 096 943227	SK - 1
JSS		July 23, 2019 at 2:07 PM
42284-NG1924-02-MR	Rendered	42284-NG1924-02-MR.r3d



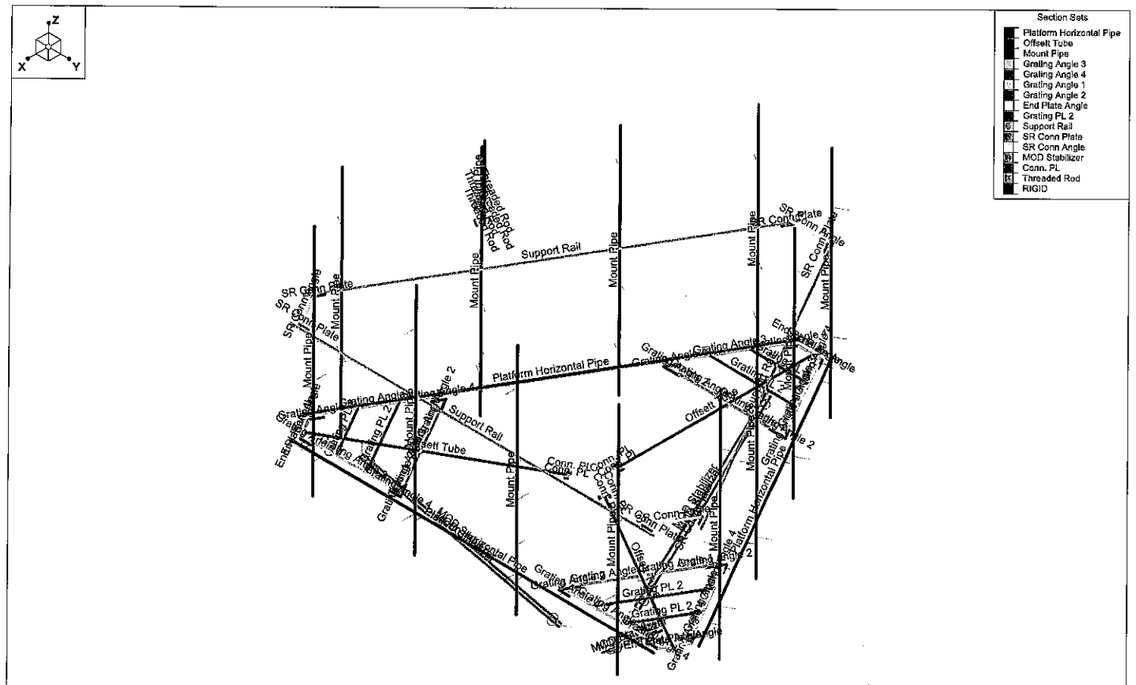
Envelope Only Solution

CLS	42284-NG1924-HRT 096 943227	SK - 2
JSS		July 23, 2019 at 2:07 PM
42284-NG1924-02-MR	Joint Labels	42284-NG1924-02-MR.r3d



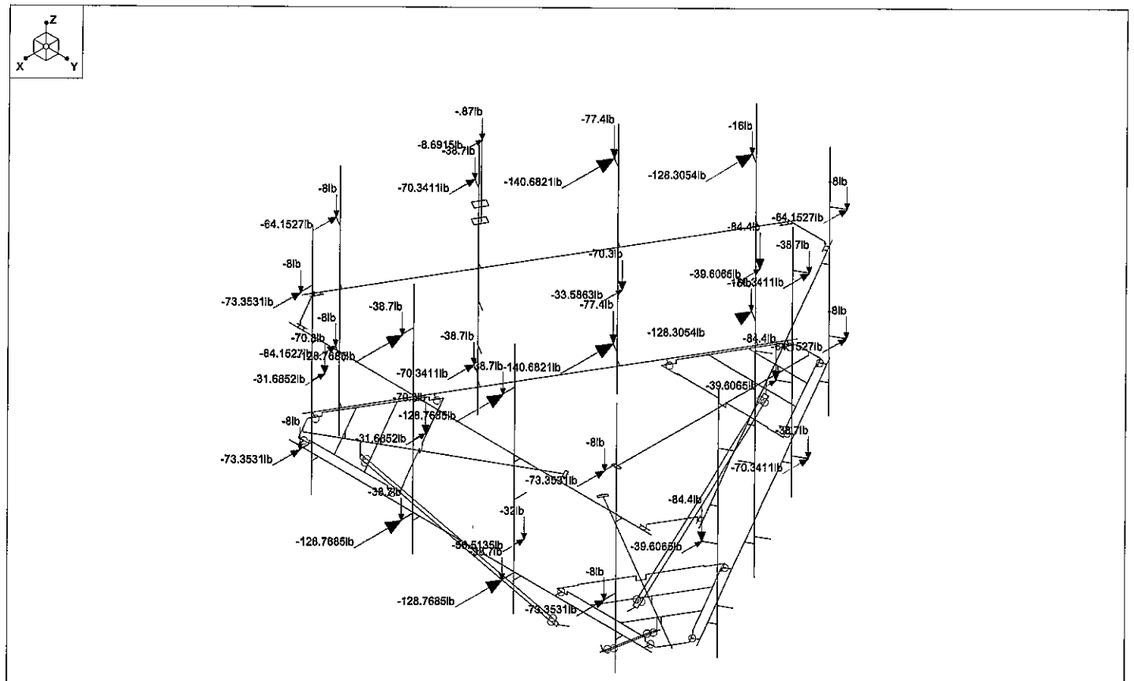
Envelope Only Solution

CLS	42284-NG1924-HRT 096 943227	SK - 3
JSS		July 23, 2019 at 2:07 PM
42284-NG1924-02-MR	Member Labels	42284-NG1924-02-MR.r3d



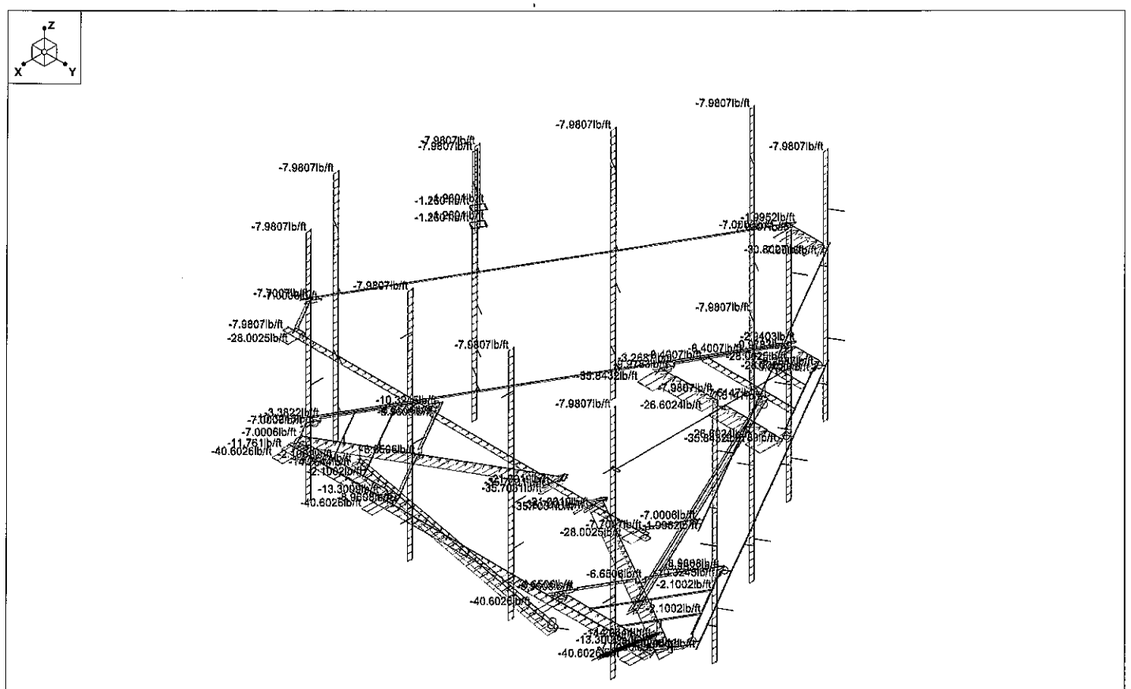
Envelope Only Solution

CLS	42284-NG1924-HRT 096 943227	SK - 4
JSS		July 23, 2019 at 2:07 PM
42284-NG1924-02-MR	Section Sets	42284-NG1924-02-MR.r3d



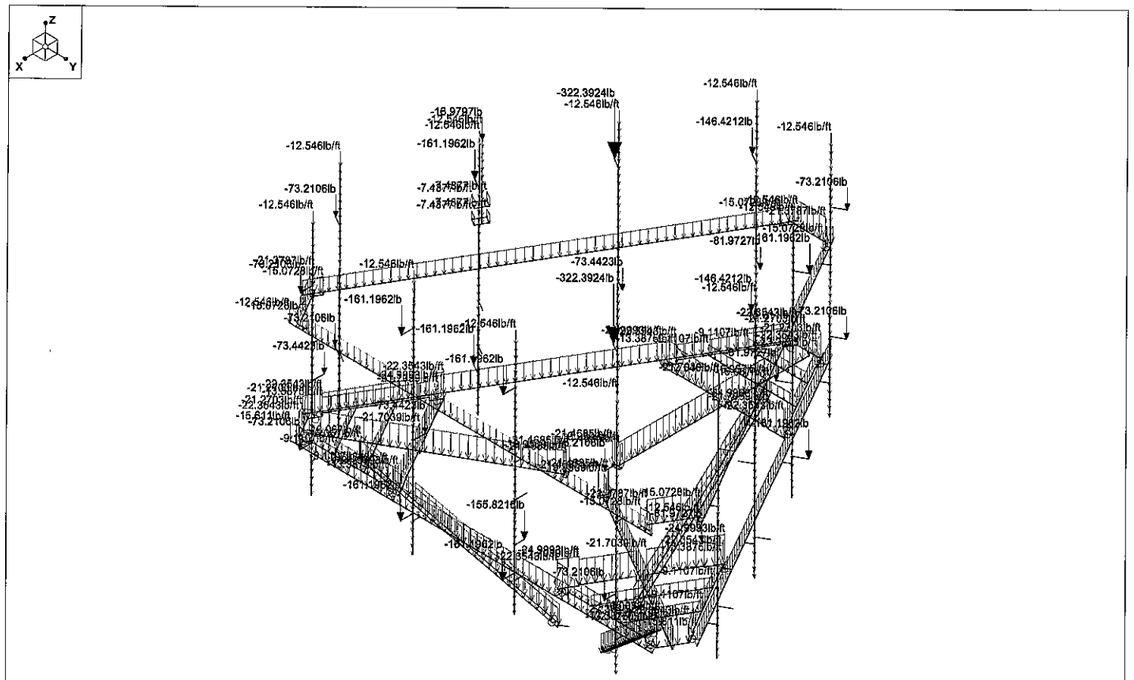
Loads: LC 1, DISPLAY (1.0D + 1.0W_0°)
Envelope Only Solution

CLS	42284-NG1924-HRT 096 943227	SK - 5
JSS		July 23, 2019 at 2:08 PM
42284-NG1924-02-MR	Joint Loads - Dead and Normal Wind	42284-NG1924-02-MR.r3d



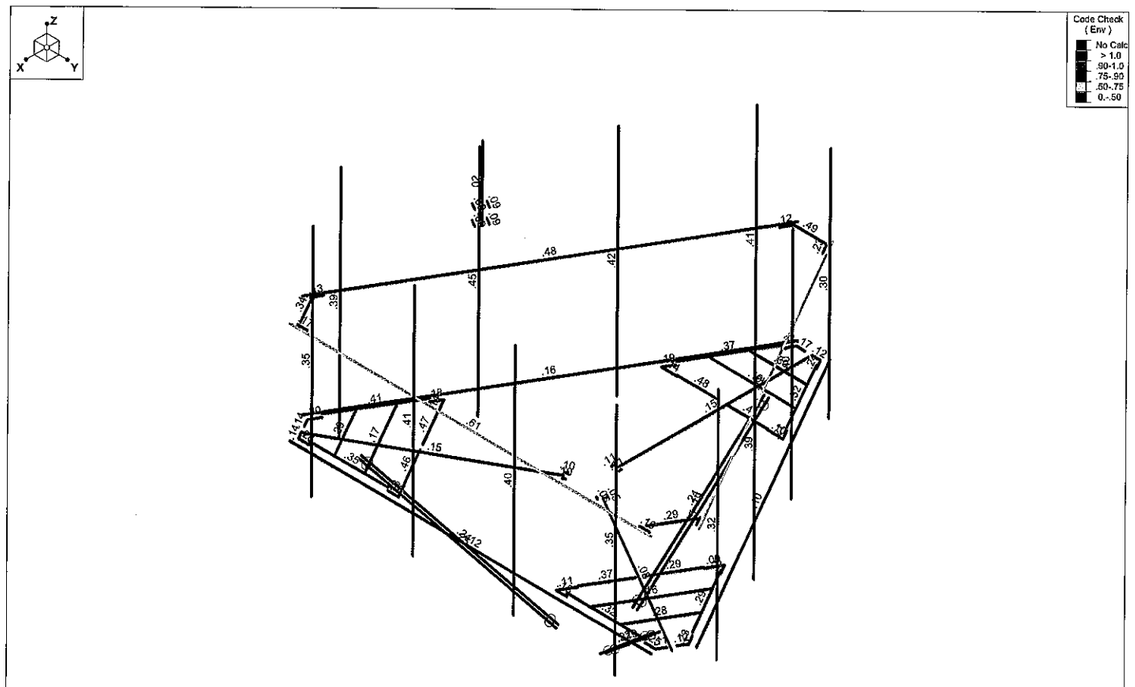
Loads: BLC 4, Structure Wind 0°
Envelope Only Solution

CLS	42284-NG1924-HRT 096 943227	SK - 6
JSS		July 23, 2019 at 2:08 PM
42284-NG1924-02-MR	Distributed Loads - Normal Wind	42284-NG1924-02-MR.r3d



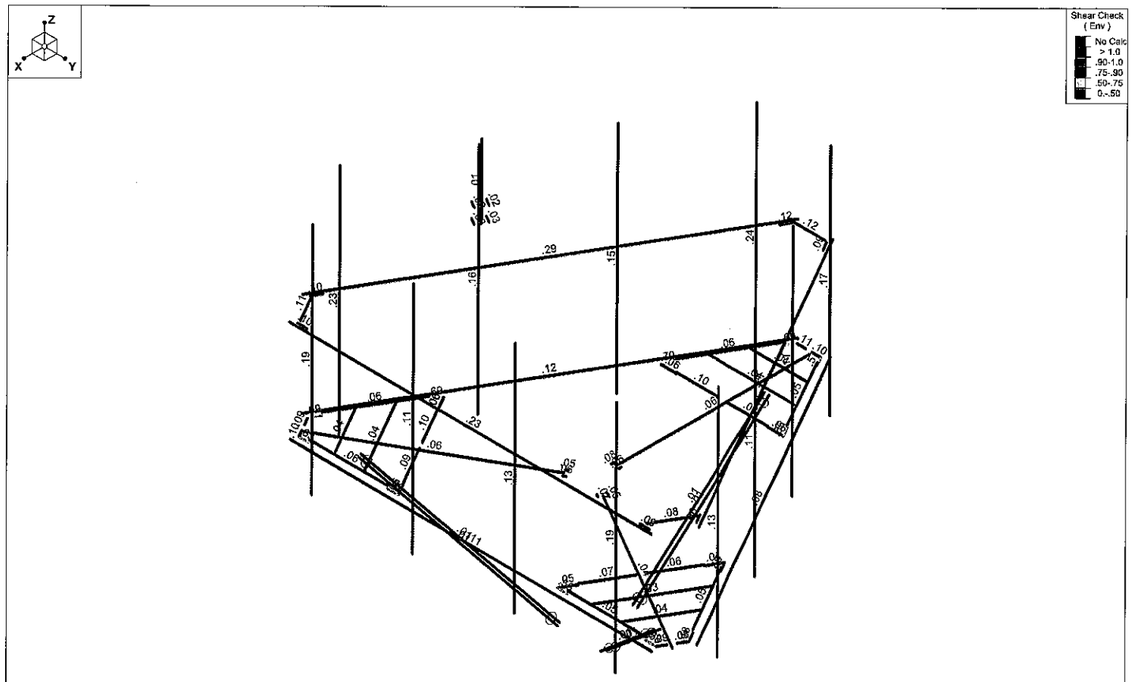
Loads: BLC 2, Ice Dead
Envelope Only Solution

CLS	42284-NG1924-HRT 096 943227	SK - 7
JSS		July 23, 2019 at 2:08 PM
42284-NG1924-02-MR	Ice Dead Loads	42284-NG1924-02-MR.r3d



Member Code Checks Displayed (Enveloped)
Envelope Only Solution

CLS	42284-NG1924-HRT 096 943227	SK - 8
JSS		July 23, 2019 at 2:09 PM
42284-NG1924-02-MR	Envelope Member Unity Check Results - Bending	42284-NG1924-02-MR.r3d



Member Shear Checks Displayed (Enveloped)
Envelope Only Solution

CLS	42284-NG1924-HRT 096 943227	SK - 9
JSS		July 23, 2019 at 2:09 PM
42284-NG1924-02-MR	Envelope Member Check Results - Shear	42284-NG1924-02-MR.r3d

APPENDIX C

SOFTWARE ANALYSIS OUTPUT

Company : CLS
Designer : JSS
Job Number : 42284-NG1924-02-MR
Model Name : 42284-NG1924-HRT 096 943227

July 23, 2019
2:06 PM
Checked By: CAR

Basic Load Cases

	BLC Description	Category	X Gra...	Y Gra...	Z Gravity	Joint	Point	Distrib...	Area(Member)	Surface(Plate/Wall)
1	Dead	DL			-1	32				
2	Ice Dead	RL				32		89		
4	Structure Wind 0°	None						86		
5	Structure Wind 30°	None						152		
6	Structure Wind 45°	None						178		
7	Structure Wind 60°	None						172		
8	Structure Wind 90°	None						76		
9	Structure Wind 120°	None						164		
10	Structure Wind 135°	None						178		
11	Structure Wind 150°	None						152		
12	Structure Wind w/ Ice 0°	None						86		
13	Structure Wind w/ Ice 30°	None						152		
14	Structure Wind w/ Ice 45°	None						178		
15	Structure Wind w/ Ice 60°	None						172		
16	Structure Wind w/ Ice 90°	None						76		
17	Structure Wind w/ Ice 120°	None						164		
18	Structure Wind w/ Ice 135°	None						178		
19	Structure Wind w/ Ice 150°	None						152		
20	Antenna Wind 0°	None				32				
21	Antenna Wind 30°	None				64				
22	Antenna Wind 45°	None				64				
23	Antenna Wind 60°	None				64				
24	Antenna Wind 90°	None				32				
25	Antenna Wind 120°	None				64				
26	Antenna Wind 135°	None				64				
27	Antenna Wind 150°	None				64				
28	Antenna Wind w/ Ice 0°	None				32				
29	Antenna Wind w/ Ice 30°	None				64				
30	Antenna Wind w/ Ice 45°	None				64				
31	Antenna Wind w/ Ice 60°	None				64				
32	Antenna Wind w/ Ice 90°	None				32				
33	Antenna Wind w/ Ice 120°	None				64				
34	Antenna Wind w/ Ice 135°	None				64				
35	Antenna Wind w/ Ice 150°	None				64				
39	Maintenance Live 500 (1)	OL1				1				
40	Maintenance Live 500 (2)	OL2				1				
41	Maintenance Live 500 (3)	OL3				1				
42	Maintenance Live 500 (4)	OL4				1				

Load Combinations

	Description	Solve	P...	S...	B...	Fa...	BLC	Fa...	BLC	Fa...	B...	Fa...	B...	Fa...	B...	Fa...	B...	Fa...	B...	Fa...	B...	Fa...	B...	Fa...
1	DISPLAY (1.0D + 1.0W 0°)	Yes	Y		DL	1	20	1																
2	1.4D	Yes	Y		DL	1.4																		
3	1.2D + 1.0W 0°	Yes	Y		DL	1.2	4	1	20	1														
4	1.2D + 1.0W_30°	Yes	Y		DL	1.2	5	1	21	1														
5	1.2D + 1.0W_45°	Yes	Y		DL	1.2	6	1	22	1														
6	1.2D + 1.0W_60°	Yes	Y		DL	1.2	7	1	23	1														
7	1.2D + 1.0W_90°	Yes	Y		DL	1.2	8	1	24	1														
8	1.2D + 1.0W_120°	Yes	Y		DL	1.2	9	1	25	1														
9	1.2D + 1.0W_135°	Yes	Y		DL	1.2	10	1	26	1														
10	1.2D + 1.0W_150°	Yes	Y		DL	1.2	11	1	27	1														
11	1.2D + 1.0W_180°	Yes	Y		DL	1.2	4	-1	20	-1														
12	1.2D + 1.0W_210°	Yes	Y		DL	1.2	5	-1	21	-1														
13	1.2D + 1.0W_225°	Yes	Y		DL	1.2	6	-1	22	-1														

Load Combinations (Continued)

	Description	Solve	P...	S...	B...	Fa...	BLC	Fa...	BLC	Fa...	B...	Fa...	B...	Fa...	B...	Fa...	B...	Fa...	B...	Fa...	B...	Fa...	B...	Fa...
14	1.2D + 1.0W_240°	Yes	Y		DL	1.2	7	-1	23	-1														
15	1.2D + 1.0W_270°	Yes	Y		DL	1.2	8	-1	24	-1														
16	1.2D + 1.0W_300°	Yes	Y		DL	1.2	9	-1	25	-1														
17	1.2D + 1.0W_315°	Yes	Y		DL	1.2	10	-1	26	-1														
18	1.2D + 1.0W_330°	Yes	Y		DL	1.2	11	-1	27	-1														
19	1.2D + 1.0Di + 1.0Wi_0°	Yes	Y		DL	1.2	12	1	28	1	RL	1												
20	1.2D + 1.0Di + 1.0Wi_30°	Yes	Y		DL	1.2	13	1	29	1	RL	1												
21	1.2D + 1.0Di + 1.0Wi_45°	Yes	Y		DL	1.2	14	1	30	1	RL	1												
22	1.2D + 1.0Di + 1.0Wi_60°	Yes	Y		DL	1.2	15	1	31	1	RL	1												
23	1.2D + 1.0Di + 1.0Wi_90°	Yes	Y		DL	1.2	16	1	32	1	RL	1												
24	1.2D + 1.0Di + 1.0Wi_120°	Yes	Y		DL	1.2	17	1	33	1	RL	1												
25	1.2D + 1.0Di + 1.0Wi_135°	Yes	Y		DL	1.2	18	1	34	1	RL	1												
26	1.2D + 1.0Di + 1.0Wi_150°	Yes	Y		DL	1.2	19	1	35	1	RL	1												
27	1.2D + 1.0Di + 1.0Wi_180°	Yes	Y		DL	1.2	12	-1	28	-1	RL	1												
28	1.2D + 1.0Di + 1.0Wi_210°	Yes	Y		DL	1.2	13	-1	29	-1	RL	1												
29	1.2D + 1.0Di + 1.0Wi_225°	Yes	Y		DL	1.2	14	-1	30	-1	RL	1												
30	1.2D + 1.0Di + 1.0Wi_240°	Yes	Y		DL	1.2	15	-1	31	-1	RL	1												
31	1.2D + 1.0Di + 1.0Wi_270°	Yes	Y		DL	1.2	16	-1	32	-1	RL	1												
32	1.2D + 1.0Di + 1.0Wi_300°	Yes	Y		DL	1.2	17	-1	33	-1	RL	1												
33	1.2D + 1.0Di + 1.0Wi_315°	Yes	Y		DL	1.2	18	-1	34	-1	RL	1												
34	1.2D + 1.0Di + 1.0Wi_330°	Yes	Y		DL	1.2	19	-1	35	-1	RL	1												
35	1.2D + 1.5Lm_1 + 1.0Wm_0°	Yes	Y		DL	1.2	4	.0...	20	.0...	O...	1.5												
36	1.2D + 1.5Lm_1 + 1.0Wm_30°	Yes	Y		DL	1.2	5	.0...	21	.0...	O...	1.5												
37	1.2D + 1.5Lm_1 + 1.0Wm_45°	Yes	Y		DL	1.2	6	.0...	22	.0...	O...	1.5												
38	1.2D + 1.5Lm_1 + 1.0Wm_60°	Yes	Y		DL	1.2	7	.0...	23	.0...	O...	1.5												
39	1.2D + 1.5Lm_1 + 1.0Wm_90°	Yes	Y		DL	1.2	8	.0...	24	.0...	O...	1.5												
40	1.2D + 1.5Lm_1 + 1.0Wm_120°	Yes	Y		DL	1.2	9	.0...	25	.0...	O...	1.5												
41	1.2D + 1.5Lm_1 + 1.0Wm_135°	Yes	Y		DL	1.2	10	.0...	26	.0...	O...	1.5												
42	1.2D + 1.5Lm_1 + 1.0Wm_150°	Yes	Y		DL	1.2	11	.0...	27	.0...	O...	1.5												
43	1.2D + 1.5Lm_1 + 1.0Wm_180°	Yes	Y		DL	1.2	4	-.0...	20	-.0...	O...	1.5												
44	1.2D + 1.5Lm_1 + 1.0Wm_210°	Yes	Y		DL	1.2	5	-.0...	21	-.0...	O...	1.5												
45	1.2D + 1.5Lm_1 + 1.0Wm_225°	Yes	Y		DL	1.2	6	-.0...	22	-.0...	O...	1.5												
46	1.2D + 1.5Lm_1 + 1.0Wm_240°	Yes	Y		DL	1.2	7	-.0...	23	-.0...	O...	1.5												
47	1.2D + 1.5Lm_1 + 1.0Wm_270°	Yes	Y		DL	1.2	8	-.0...	24	-.0...	O...	1.5												
48	1.2D + 1.5Lm_1 + 1.0Wm_300°	Yes	Y		DL	1.2	9	-.0...	25	-.0...	O...	1.5												
49	1.2D + 1.5Lm_1 + 1.0Wm_315°	Yes	Y		DL	1.2	10	-.0...	26	-.0...	O...	1.5												
50	1.2D + 1.5Lm_1 + 1.0Wm_330°	Yes	Y		DL	1.2	11	-.0...	27	-.0...	O...	1.5												
51	1.2D + 1.5Lm_2 + 1.0Wm_0°	Yes	Y		DL	1.2	4	.0...	20	.0...	O...	1.5												
52	1.2D + 1.5Lm_2 + 1.0Wm_30°	Yes	Y		DL	1.2	5	.0...	21	.0...	O...	1.5												
53	1.2D + 1.5Lm_2 + 1.0Wm_45°	Yes	Y		DL	1.2	6	.0...	22	.0...	O...	1.5												
54	1.2D + 1.5Lm_2 + 1.0Wm_60°	Yes	Y		DL	1.2	7	.0...	23	.0...	O...	1.5												
55	1.2D + 1.5Lm_2 + 1.0Wm_90°	Yes	Y		DL	1.2	8	.0...	24	.0...	O...	1.5												
56	1.2D + 1.5Lm_2 + 1.0Wm_120°	Yes	Y		DL	1.2	9	.0...	25	.0...	O...	1.5												
57	1.2D + 1.5Lm_2 + 1.0Wm_135°	Yes	Y		DL	1.2	10	.0...	26	.0...	O...	1.5												
58	1.2D + 1.5Lm_2 + 1.0Wm_150°	Yes	Y		DL	1.2	11	.0...	27	.0...	O...	1.5												
59	1.2D + 1.5Lm_2 + 1.0Wm_180°	Yes	Y		DL	1.2	4	-.0...	20	-.0...	O...	1.5												
60	1.2D + 1.5Lm_2 + 1.0Wm_210°	Yes	Y		DL	1.2	5	-.0...	21	-.0...	O...	1.5												
61	1.2D + 1.5Lm_2 + 1.0Wm_225°	Yes	Y		DL	1.2	6	-.0...	22	-.0...	O...	1.5												
62	1.2D + 1.5Lm_2 + 1.0Wm_240°	Yes	Y		DL	1.2	7	-.0...	23	-.0...	O...	1.5												
63	1.2D + 1.5Lm_2 + 1.0Wm_270°	Yes	Y		DL	1.2	8	-.0...	24	-.0...	O...	1.5												
64	1.2D + 1.5Lm_2 + 1.0Wm_300°	Yes	Y		DL	1.2	9	-.0...	25	-.0...	O...	1.5												
65	1.2D + 1.5Lm_2 + 1.0Wm_315°	Yes	Y		DL	1.2	10	-.0...	26	-.0...	O...	1.5												
66	1.2D + 1.5Lm_2 + 1.0Wm_330°	Yes	Y		DL	1.2	11	-.0...	27	-.0...	O...	1.5												
67	1.2D + 1.5Lm_3 + 1.0Wm_0°	Yes	Y		DL	1.2	4	.0...	20	.0...	O...	1.5												
68	1.2D + 1.5Lm_3 + 1.0Wm_30°	Yes	Y		DL	1.2	5	.0...	21	.0...	O...	1.5												
69	1.2D + 1.5Lm_3 + 1.0Wm_45°	Yes	Y		DL	1.2	6	.0...	22	.0...	O...	1.5												
70	1.2D + 1.5Lm_3 + 1.0Wm_60°	Yes	Y		DL	1.2	7	.0...	23	.0...	O...	1.5												

Load Combinations (Continued)

	Description	Solve	P...	S...	B...	Fa...	BLC	Fa...	BLC	Fa...	B...	Fa...	B...	Fa...	B...	Fa...	B...	Fa...	B...	Fa...	B...	Fa...	B...	Fa...
71	1.2D + 1.5Lm_3 + 1.0Wm_90°	Yes	Y		DL	1.2	8	.0...	24	.0...	O...	1.5												
72	1.2D + 1.5Lm_3 + 1.0Wm_120°	Yes	Y		DL	1.2	9	.0...	25	.0...	O...	1.5												
73	1.2D + 1.5Lm_3 + 1.0Wm_135°	Yes	Y		DL	1.2	10	.0...	26	.0...	O...	1.5												
74	1.2D + 1.5Lm_3 + 1.0Wm_150°	Yes	Y		DL	1.2	11	.0...	27	.0...	O...	1.5												
75	1.2D + 1.5Lm_3 + 1.0Wm_180°	Yes	Y		DL	1.2	4	-.0...	20	-.0...	O...	1.5												
76	1.2D + 1.5Lm_3 + 1.0Wm_210°	Yes	Y		DL	1.2	5	-.0...	21	-.0...	O...	1.5												
77	1.2D + 1.5Lm_3 + 1.0Wm_225°	Yes	Y		DL	1.2	6	-.0...	22	-.0...	O...	1.5												
78	1.2D + 1.5Lm_3 + 1.0Wm_240°	Yes	Y		DL	1.2	7	-.0...	23	-.0...	O...	1.5												
79	1.2D + 1.5Lm_3 + 1.0Wm_270°	Yes	Y		DL	1.2	8	-.0...	24	-.0...	O...	1.5												
80	1.2D + 1.5Lm_3 + 1.0Wm_300°	Yes	Y		DL	1.2	9	-.0...	25	-.0...	O...	1.5												
81	1.2D + 1.5Lm_3 + 1.0Wm_315°	Yes	Y		DL	1.2	10	-.0...	26	-.0...	O...	1.5												
82	1.2D + 1.5Lm_3 + 1.0Wm_330°	Yes	Y		DL	1.2	11	-.0...	27	-.0...	O...	1.5												
83	1.2D + 1.5Lm_4 + 1.0Wm_0°	Yes	Y		DL	1.2	4	.0...	20	.0...	O...	1.5												
84	1.2D + 1.5Lm_4 + 1.0Wm_30°	Yes	Y		DL	1.2	5	.0...	21	.0...	O...	1.5												
85	1.2D + 1.5Lm_4 + 1.0Wm_45°	Yes	Y		DL	1.2	6	.0...	22	.0...	O...	1.5												
86	1.2D + 1.5Lm_4 + 1.0Wm_60°	Yes	Y		DL	1.2	7	.0...	23	.0...	O...	1.5												
87	1.2D + 1.5Lm_4 + 1.0Wm_90°	Yes	Y		DL	1.2	8	.0...	24	.0...	O...	1.5												
88	1.2D + 1.5Lm_4 + 1.0Wm_120°	Yes	Y		DL	1.2	9	.0...	25	.0...	O...	1.5												
89	1.2D + 1.5Lm_4 + 1.0Wm_135°	Yes	Y		DL	1.2	10	.0...	26	.0...	O...	1.5												
90	1.2D + 1.5Lm_4 + 1.0Wm_150°	Yes	Y		DL	1.2	11	.0...	27	.0...	O...	1.5												
91	1.2D + 1.5Lm_4 + 1.0Wm_180°	Yes	Y		DL	1.2	4	-.0...	20	-.0...	O...	1.5												
92	1.2D + 1.5Lm_4 + 1.0Wm_210°	Yes	Y		DL	1.2	5	-.0...	21	-.0...	O...	1.5												
93	1.2D + 1.5Lm_4 + 1.0Wm_225°	Yes	Y		DL	1.2	6	-.0...	22	-.0...	O...	1.5												
94	1.2D + 1.5Lm_4 + 1.0Wm_240°	Yes	Y		DL	1.2	7	-.0...	23	-.0...	O...	1.5												
95	1.2D + 1.5Lm_4 + 1.0Wm_270°	Yes	Y		DL	1.2	8	-.0...	24	-.0...	O...	1.5												
96	1.2D + 1.5Lm_4 + 1.0Wm_300°	Yes	Y		DL	1.2	9	-.0...	25	-.0...	O...	1.5												
97	1.2D + 1.5Lm_4 + 1.0Wm_315°	Yes	Y		DL	1.2	10	-.0...	26	-.0...	O...	1.5												
98	1.2D + 1.5Lm_4 + 1.0Wm_330°	Yes	Y		DL	1.2	11	-.0...	27	-.0...	O...	1.5												

Hot Rolled Steel Properties

	Label	E [ksi]	G [ksi]	Nu	Therm (\1E5 F)	Density[k/ft^3]	Yield[ksi]	Ry	Fu[ksi]	Rt
1	A36 Gr.36	29000	11154	.3	.65	.49	36	1.5	58	1.2
2	A572 Gr.50	29000	11154	.3	.65	.49	50	1.1	65	1.1
3	A992	29000	11154	.3	.65	.49	50	1.1	65	1.1
4	A500 Gr.B RND	29000	11154	.3	.65	.527	42	1.4	58	1.3
5	A500 Gr.B Rect	29000	11154	.3	.65	.527	46	1.4	58	1.3
6	A53 Gr.B	29000	11154	.3	.65	.49	35	1.6	60	1.2
7	A1085	29000	11154	.3	.65	.49	50	1.4	65	1.3

Hot Rolled Steel Section Sets

	Label	Shape	Type	Design List	Material	Desig...	A [in2]	Iyy [i...	Izz [i...	J [in4]
1	Platform Horizontal Pipe	PIPE_3.0	Beam	None	A53 Gr.B	Typical	2.07	2.85	2.85	5.69
2	Offsett Tube	HSS5x3x3/8"	Beam	None	A500 Gr.B ...	Typical	5.43...	7.21...	16.8...	15.2...
3	Mount Pipe	PIPE_2.0	Beam	None	A53 Gr.B	Typical	1.02	.627	.627	1.25
4	Grating Angle 3	L2.375x1.25x0.25	Beam	None	A36 Gr.36	Typical	.844	.093	.479	.016
5	Grating Angle 4	L7.25x2.375x0.25	Beam	None	A36 Gr.36	Typical	2.344	.789	12.9...	.047
6	Grating Angle 1	L4.75x4.5x0.25	Beam	None	A36 Gr.36	Typical	2.25	4.44...	5.07...	.0452
7	Grating Angle 2	L6.4x4.750x0.25	Beam	None	A36 Gr.36	Typical	2.725	5.63...	11.7...	.0551
8	End Plate Angle	L5x4x0.25	Beam	None	A36 Gr.36	Typical	2.18...	3.248	5.63...	.0439
9	Grating PL 2	PL1.50x0.25	Beam	None	A36 Gr.36	Typical	.375	.002	.0703	.007
10	Support Rail	PIPE_2.0	Beam	None	A53 Gr.B	Typical	1.02	.627	.627	1.25
11	SR Conn Plate	PL5x0.1875	Beam	None	A36 Gr.36	Typical	.9375	.0027	1.95...	.0107
12	SR Conn Angle	L5.50X3.5625X3	Beam	None	A36 Gr.36	Typical	1.66...	1.848	5.36...	.019
13	MOD Stabilizer	L3X3X3	Beam	None	A36 Gr.36	Typical	1.09	.948	.948	.0136

Hot Rolled Steel Section Sets (Continued)

	Label	Shape	Type	Design List	Material	Desig..A [in2]	Iyy [i...	Izz [i...	J [in4]
14	Conn. PL	PL8.5x3/8	Beam	None	A36 Gr.36	Typical	3.18...	.0374	19.1...	.1453
15	Threaded Rod	TR1/2"	Beam	None	A36 Gr.36	Typical	.1963	.0031	.0031	.0061

Hot Rolled Steel Design Parameters

	Label	Shape	Length[in]	Lbyy[in]	Lbzz[in]	Lcomp top[in]	Lcomp bot[in]	L-torq...	Kyy	Kzz	Cb	Function
1	M1	Offsett Tube	79			Lbyy						Lateral
2	M8	End Plate A...	3.313			Lbyy			.65	.65		Lateral
3	M11	Grating Ang...	6.4063			Lbyy			.65	.65		Lateral
4	M13	Grating Ang...	4.375			Lbyy			.65	.65		Lateral
5	M14	Grating Ang...	4.375			Lbyy			.65	.65		Lateral
6	M22	Grating Ang...	32.414			Lbyy			.65	.65		Lateral
7	M23	Grating Ang...	32.414			Lbyy			.65	.65		Lateral
8	M29	End Plate A...	3.313			Lbyy			.65	.65		Lateral
9	M30	Grating PL 2	36.8278						.65	.65		Lateral
10	M31	Grating PL 2	24.5555						.65	.65		Lateral
11	M31A	Grating Ang...	17.5			Lbyy			.65	.65		Lateral
12	M32B	Grating Ang...	17.5			Lbyy			.65	.65		Lateral
13	M36A	Grating Ang...	6.4063			Lbyy			.65	.65		Lateral
14	M37	Grating Ang...	4.375			Lbyy			.65	.65		Lateral
15	M38	Grating Ang...	4.375			Lbyy			.65	.65		Lateral
16	M43	Grating Ang...	32.414			Lbyy			.65	.65		Lateral
17	M44	Grating Ang...	32.414			Lbyy			.65	.65		Lateral
18	M49	Grating Ang...	6.4063			Lbyy			.65	.65		Lateral
19	M50	Grating Ang...	4.375			Lbyy			.65	.65		Lateral
20	M51	Grating Ang...	4.375			Lbyy			.65	.65		Lateral
21	M53	Grating PL 2	36.8278						.65	.65		Lateral
22	M54	Grating PL 2	24.5555						.65	.65		Lateral
23	M59	Grating Ang...	17.5			Lbyy			.65	.65		Lateral
24	M60	Grating Ang...	17.5			Lbyy			.65	.65		Lateral
25	M66	Grating Ang...	6.4063			Lbyy			.65	.65		Lateral
26	M67	Grating Ang...	4.375			Lbyy			.65	.65		Lateral
27	M68	Grating Ang...	4.375			Lbyy			.65	.65		Lateral
28	M73	Grating Ang...	32.414			Lbyy			.65	.65		Lateral
29	M74	Grating Ang...	32.414			Lbyy			.65	.65		Lateral
30	M79	Grating Ang...	6.4062			Lbyy			.65	.65		Lateral
31	M80	Grating Ang...	4.375			Lbyy			.65	.65		Lateral
32	M81	Grating Ang...	4.375			Lbyy			.65	.65		Lateral
33	M82B	Grating Ang...	4.375			Lbyy			.65	.65		Lateral
34	M83	Grating PL 2	36.8278						.65	.65		Lateral
35	M83C	Grating Ang...	6.4062			Lbyy			.65	.65		Lateral
36	M83D	Grating Ang...	4.375			Lbyy			.65	.65		Lateral
37	M84	Grating PL 2	24.5555						.65	.65		Lateral
38	M89	Grating Ang...	17.5			Lbyy			.65	.65		Lateral
39	M90	Grating Ang...	17.5			Lbyy			.65	.65		Lateral
40	M104A	Platform Ho...	150	70.1	42	Lbyy						Lateral
41	M199	Mount Pipe	96			Lbyy						Lateral
42	M203	Mount Pipe	96			Lbyy						Lateral
43	M205	Mount Pipe	96			Lbyy						Lateral
44	M212A	MOD Stabili...	72.7173									Lateral
45	M213A	MOD Stabili...	72.7173									Lateral
46	M220	SR Conn Pl...	4									Lateral
47	M223	SR Conn Pl...	4									Lateral
48	M224A	Conn. PL	1			Lbyy			.65	.65		Lateral
49	M224B	Offsett Tube	79			Lbyy						Lateral
50	M225	Conn. PL	1			Lbyy			.65	.65		Lateral

Hot Rolled Steel Design Parameters (Continued)

	Label	Shape	Length[in]	Lbyy[in]	Lbzz[in]	Lcomp top[in]	Lcomp bot[in]	L-torq...	Kyy	Kzz	Cb	Function
51	M226B	SR Conn Pl...	4									Lateral
52	M227A	Conn. PL	1			Lbyy			.65	.65		Lateral
53	M227E	End Plate A...	3.313			Lbyy			.65	.65		Lateral
54	M228	Conn. PL	1			Lbyy			.65	.65		Lateral
55	M228B	SR Conn A...	15.399									Lateral
56	M228D	End Plate A...	3.313			Lbyy			.65	.65		Lateral
57	M229B	SR Conn Pl...	4									Lateral
58	M231	Offsett Tube	79			Lbyy						Lateral
59	M231A	SR Conn A...	15.399									Lateral
60	M232A	SR Conn Pl...	4									Lateral
61	M233C	End Plate A...	3.313			Lbyy			.65	.65		Lateral
62	M234	Conn. PL	1			Lbyy			.65	.65		Lateral
63	M234C	End Plate A...	3.313			Lbyy			.65	.65		Lateral
64	M235	Conn. PL	1			Lbyy			.65	.65		Lateral
65	M237A	SR Conn A...	15.399									Lateral
66	M238	SR Conn Pl...	4									Lateral
67	M252	MOD Stabili...	77.2823									Lateral
68	M253	MOD Stabili...	77.2823									Lateral
69	M258	MOD Stabili...	77.2823									Lateral
70	M258A	Platform Ho...	150	70.1	42	Lbyy						Lateral
71	M259	MOD Stabili...	77.2823									Lateral
72	M259A	Platform Ho...	150	70.1	42	Lbyy						Lateral
73	M399	Mount Pipe	96			Lbyy						Lateral
74	M403	Mount Pipe	96			Lbyy						Lateral
75	M405A	Mount Pipe	96			Lbyy						Lateral
76	M418	Mount Pipe	96			Lbyy						Lateral
77	M441	Mount Pipe	96			Lbyy						Lateral
78	M448A	Threaded R...	3			Lbyy						Lateral
79	M449A	Threaded R...	3			Lbyy						Lateral
80	M450A	Mount Pipe	96			Lbyy						Lateral
81	M452	Threaded R...	3			Lbyy						Lateral
82	M453	Threaded R...	3			Lbyy						Lateral
83	M454	Mount Pipe	30			Lbyy						Lateral
84	M454A	Mount Pipe	96			Lbyy						Lateral
85	M456A	Mount Pipe	96			Lbyy						Lateral
86	M468	Mount Pipe	96			Lbyy						Lateral
87	SR1	Support Rail	150		42							Lateral
88	SR10	Support Rail	150		42							Lateral
89	SR19	Support Rail	150		42							Lateral

Envelope Joint Reactions

	Joint		X [lb]	LC	Y [lb]	LC	Z [lb]	LC	MX [lb-ft]	LC	MY [lb-ft]	LC	MZ [lb-ft]	LC
1	N326A	m...	265.1118	11	100.379	15	3248.6801	19	57.5784	7	913.6913	19	91.96	7
2		m...	-3463.8325	19	-100.2881	7	-252.4544	11	-74.6679	15	-71.0028	11	-110.6546	15
3	N338B	m...	1380.6879	16	2302.0763	16	872.7688	32	1140.6585	19	-61.826	5	947.2153	12
4		m...	-1960.7958	8	-3315.1325	8	150.9856	8	154.9774	10	-1204.9958	29	-949.6034	4
5	N344	m...	4004.1626	3	1124.5918	15	1044.1961	27	282.6717	7	1851.0425	27	2572.7298	7
6		m...	-2581.4526	11	-1134.3021	7	147.3798	3	-657.8927	31	278.9676	1	-2553.23	15
7	N354	m...	1583.9447	5	3513.0475	14	1156.3268	22	-246.0545	11	36.7804	16	2437.0161	18
8		m...	-2326.0833	13	-2240.8875	6	196.1504	14	-1838.4024	19	-1102.1485	24	-2439.70..	10
9	N386	m...	1417.2523	24	2455.6908	24	2435.7256	24	580.8489	24	54.181	15	40.2575	12
10		m...	-226.0273	16	-391.4484	16	-372.0152	16	-94.3169	17	-364.0359	24	-31.1427	4
11	N395	m...	1821.6757	30	296.2082	6	3088.2853	30	56.9347	6	60.4376	6	94.9616	18
12		m...	-170.5473	6	-3153.4562	30	-282.7582	6	-749.8895	30	-438.3137	30	-98.7301	10
13	Totals:	m...	4614.8334	3	4600.4021	15	10722.1349	27						

Envelope Joint Reactions (Continued)

	Joint		X [lb]	LC	Y [lb]	LC	Z [lb]	LC	MX [lb-ft]	LC	MY [lb-ft]	LC	MZ [lb-ft]	LC
14		m...	-4614.824	11	-4600.4738	7	2571.3348	1						

Envelope AISC 14th(360-10): LRFD Steel Code Checks

	Member	Shape	Code C...	Loc[in]	LC	Shear C...	Loc[in]	Dir	LC	phi*Pnc [lb]	phi*Pnt [lb]	phi*...	phi*...	Cb	Eqn
1	SR19	PIPE_2.0	.719	146....	16	.205	142.1053		6	6295.4223	32130	1871...	1871...	3.33...	H1-...
2	SR10	PIPE_2.0	.608	3.9474	16	.228	7.8947		3	6295.4223	32130	1871...	1871...	3.70...	H1-...
3	M237A	L5.50X3.56...	.490	0	7	.115	7.6995	z	15	26491.25...	53915.64...	966....	2943...	1.68...	H2-1
4	M59	L4.75x4.5x0...	.483	0	19	.097	0	z	34	60192.80...	72900	4381...	8212...	1.43...	H2-1
5	SR1	PIPE_2.0	.478	146....	11	.291	7.8947		8	6295.4223	32130	1871...	1871...	3.47...	H1-...
6	M90	L4.75x4.5x0...	.471	17.5	30	.096	17.5	z	31	60192.80...	72900	4381...	8212...	1.45...	H2-1
7	M89	L4.75x4.5x0...	.465	0	30	.092	0	z	29	60192.80...	72900	4381...	8212...	1.43...	H2-1
8	M403	PIPE_2.0	.455	83.3...	12	.158	83.3684		15	14916.09...	32130	1871...	1871...	2.12...	H1-...
9	M418	PIPE_2.0	.422	83.3...	4	.152	83.3684		3	14916.09...	32130	1871...	1871...	1.90...	H1-...
10	M405A	PIPE_2.0	.414	83.3...	19	.242	42.9474		16	14916.09...	32130	1871...	1871...	1.98...	H1-...
11	M441	PIPE_2.0	.408	83.3...	16	.108	83.3684		13	14916.09...	32130	1871...	1871...	2.268	H1-...
12	M60	L4.75x4.5x0...	.408	17.5	19	.080	17.5	z	19	60192.80...	72900	4381...	8212...	1.45...	H2-1
13	M74	L2.375x1.2...	.406	0	32	.065	23.031	y	16	19702.49...	27345.6	330....	1354...	1.81...	H2-1
14	M454A	PIPE_2.0	.401	83.3...	17	.108	83.3684		3	14916.09...	32130	1871...	1871...	2.03...	H1-...
15	M203	PIPE_2.0	.398	83.3...	7	.133	83.3684		10	14916.09...	32130	1871...	1871...	1.94...	H1-...
16	M468	PIPE_2.0	.393	83.3...	10	.113	83.3684		7	14916.09...	32130	1871...	1871...	2.005	H1-...
17	M399	PIPE_2.0	.389	83.3...	14	.226	42.9474		16	14916.09...	32130	1871...	1871...	2.32...	H1-...
18	M32B	L4.75x4.5x0...	.369	17.5	24	.073	17.5	z	25	60192.80...	72900	4381...	8212...	1.45...	H2-1
19	M38	L7.25x2.37...	.369	0	31	.695	2.1875	z	16	38519.49...	75945.6	631....	5474...	1.69...	H2-1
20	M43	L2.375x1.2...	.366	0	32	.064	9.383	y	16	19702.49...	27345.6	330....	1316...	1.71...	H2-1
21	M73	L2.375x1.2...	.349	32.414	27	.059	22.178	y	11	19702.49...	27345.6	330....	1354...	1.72...	H2-1
22	M199	PIPE_2.0	.346	83.3...	8	.185	42.9474		11	14916.09...	32130	1871...	1871...	2.25...	H1-...
23	M205	PIPE_2.0	.346	83.3...	30	.187	42.9474		11	14916.09...	32130	1871...	1871...	2.25...	H1-...
24	M231A	L5.50X3.56...	.344	15.399	10	.108	0	z	18	26491.25...	53915.64...	966....	2943...	2.17...	H2-1
25	M456A	PIPE_2.0	.322	83.3...	9	.126	83.3684		12	14916.09...	32130	1871...	1871...	2.14...	H1-...
26	M23	L2.375x1.2...	.318	0	10	.055	23.031	z	11	19702.49...	27345.6	330....	1354...	2.09...	H2-1
27	M44	L2.375x1.2...	.315	0	5	.055	10.236	y	6	19702.49...	27345.6	330....	1354...	2.07...	H2-1
28	M54	PL1.50x0.25	.304	0	8	.044	12.2778	y	8	1731.8791	12150	63.2...	379....	2.05...	H1-...
29	M450A	PIPE_2.0	.302	83.3...	18	.170	65.6842		15	14916.09...	32130	1871...	1871...	2.22...	H1-...
30	M81	L7.25x2.37...	.295	4.375	34	.687	2.1875	z	16	38519.49...	75945.6	631....	5474...	2.66...	H2-1
31	M228B	L5.50X3.56...	.294	15.399	10	.078	15.399	z	11	26491.25...	53915.64...	2180...	2943...	1.08...	H2-1
32	M22	L2.375x1.2...	.293	32.414	7	.046	22.178	y	6	19702.49...	27345.6	330....	1344...	1.97...	H2-1
33	M31A	L4.75x4.5x0...	.288	0	24	.058	0	z	24	60192.80...	72900	4381...	8212...	1.43...	H2-1
34	M84	PL1.50x0.25	.286	24.5...	8	.043	12.2778	y	8	1731.8791	12150	63.2...	379....	2.10...	H1-...
35	M68	L7.25x2.37...	.282	0	26	.630	2.1875	z	11	38519.49...	75945.6	631....	5474...	1.90...	H2-1
36	M31	PL1.50x0.25	.276	24.5...	3	.038	12.2778	y	3	1731.8791	12150	63.2...	379....	2.11...	H1-...
37	M83D	L7.25x2.37...	.253	4.375	28	.576	2.1875	z	11	38519.49...	75945.6	631....	5474...	1.96...	H2-1
38	M259	L3X3X3	.246	38.6...	30	.006	77.2823	y	10	13975.40...	35316	1320...	2261...	1.13...	H2-1
39	M258	L3X3X3	.241	38.6...	32	.006	77.2823	z	10	13975.40...	35316	1320...	2261...	1.13...	H2-1
40	M51	L7.25x2.37...	.239	2.1875	10	.571	2.1875	z	6	38519.49...	75945.6	631....	5474...	1.34...	H2-1
41	M213A	L3X3X3	.238	36.3...	32	.007	72.7173	z	34	15380.65...	35316	1320...	2304...	1.13...	H2-1
42	M14	L7.25x2.37...	.231	2.1875	18	.479	2.1875	z	6	38519.49...	75945.6	631....	5474...	1.22...	H2-1
43	M229B	PL5x0.1875	.226	2.7368	8	.085	.8421	y	6	17775.92...	30375	118....	3164...	2.06...	H1-...
44	M252	L3X3X3	.224	38.6...	23	.007	0	z	12	13975.40...	35316	1320...	2261...	1.13...	H2-1
45	M37	L7.25x2.37...	.211	0	31	.549	0	z	14	38519.49...	75945.6	631....	5474...	1.16...	H2-1
46	M212A	L3X3X3	.194	36.3...	19	.007	72.7173	y	34	15380.65...	35316	1320...	2304...	1.13...	H2-1
47	M53	PL1.50x0.25	.189	18.4...	23	.040	18.4139	y	16	769.9524	12150	63.2...	379....	1.621	H1-...
48	M253	L3X3X3	.189	38.6...	25	.007	77.2823	y	12	13975.40...	35316	1320...	2261...	1.13...	H2-1
49	M50	L7.25x2.37...	.187	2.1875	33	.701	4.375	z	16	38519.49...	75945.6	1392...	1207...	1.10...	H2-1
50	M13	L7.25x2.37...	.177	0	19	.584	0	z	11	38519.49...	75945.6	631....	5474...	1.16...	H2-1
51	M67	L7.25x2.37...	.175	2.1875	32	.692	0	z	16	38519.49...	75945.6	1392...	1207...	1.10...	H2-1

Envelope AISC 14th(360-10): LRFD Steel Code Checks (Continued)

	Member	Shape	Code C...	Loc[in]	LC	Shear C...	Loc[in]	Dir	LC	phi*Pnc [lb]	phi*Pnt [lb]	phi*...	phi*...	Cb	Eqn
52	M83	PL1.50x0.25	.172	18.4...	19	.039	18.4139	y	16	769.9524	12150	63.2...	379....	1.43...	H1-...
53	M227E	L5x4x0.25	.172	0	31	.110	0	y	22	57000.73...	70875	2842...	6820...	1.42...	H2-1
54	M226B	PL5x0.1875	.167	.8421	8	.096	2.7368	y	3	17775.92...	30375	118....	3164...	2.20...	H1-...
55	M80	L7.25x2.37...	.162	2.1875	27	.622	4.375	z	11	38519.49...	75945.6	1392...	1207...	1.10...	H2-1
56	M30	PL1.50x0.25	.161	18.4...	19	.033	18.4139	y	11	769.9524	12150	63.2...	379....	1.66...	H1-...
57	M258A	PIPE_3.0	.156	55.2...	28	.123	43.4211		8	54318.28...	65205	5748...	5748...	1	H1-...
58	M224B	HSS5x3x3/8"	.153	0	7	.064	0	z	15	153973.7...	205537.5	1849...	2705...	2.07...	H1-...
59	M223	PL5x0.1875	.151	.8421	3	.057	2.7368	y	13	17775.92...	30375	118....	3164...	2.35...	H1-...
60	M82B	L7.25x2.37...	.150	4.375	28	.465	4.375	z	6	38519.49...	75945.6	631....	5474...	1.15...	H2-1
61	M231	HSS5x3x3/8"	.147	0	10	.056	0	z	10	153973.7...	205537.5	1849...	2705...	2.06...	H1-...
62	M49	L6.4x4.750x...	.144	6.4063	32	.063	0	z	23	57754.37...	88290	2962...	7667...	1.67...	H2-1
63	M234C	L5x4x0.25	.141	3.313	17	.091	3.313	z	11	57000.73...	70875	2842...	6820...	1.26...	H2-1
64	M66	L6.4x4.750x...	.140	0	32	.062	0	z	26	57754.37...	88290	2962...	7667...	1.62...	H2-1
65	M233C	L5x4x0.25	.138	0	10	.098	0	z	32	57000.73...	70875	2842...	6820...	1.24...	H2-1
66	M238	PL5x0.1875	.130	.8421	3	.099	.8421	y	17	17775.92...	30375	118....	3164...	1.98...	H1-...
67	M79	L6.4x4.750x...	.127	6.4062	27	.063	0	z	34	57754.37...	88290	2962...	7667...	1.691	H2-1
68	M228D	L5x4x0.25	.123	3.313	3	.096	3.313	z	33	57000.73...	70875	3500...	6820...	1.38...	H2-1
69	M232A	PL5x0.1875	.120	.8421	13	.120	2.7368	y	7	17775.92...	30375	118....	3164...	2.12...	H1-...
70	M104A	PIPE_3.0	.117	94.7...	31	.106	106.5789		3	54318.28...	65205	5748...	5748...	1	H1-...
71	M8	L5x4x0.25	.117	0	8	.083	0	z	15	57000.73...	70875	3500...	6820...	1.37...	H2-1
72	M29	L5x4x0.25	.114	3.313	28	.088	3.313	y	37	57000.73...	70875	2842...	6820...	1.43...	H2-1
73	M227A	PL8.5x3/8	.109	0	15	.083	0	y	31	84967.83...	103275	806....	1828...	1.24...	H1-...
74	M228	PL8.5x3/8	.108	0	7	.059	1	y	31	84967.83...	103275	806....	1828...	1.14...	H1-...
75	M11	L6.4x4.750x...	.105	0	27	.047	0	y	20	57754.37...	88290	2962...	7667...	1.642	H2-1
76	M234	PL8.5x3/8	.105	0	10	.062	0	y	73	84967.83...	103275	806....	1828...	1.18...	H1-...
77	M220	PL5x0.1875	.104	.8421	15	.086	2.7368	y	3	17775.92...	30375	118....	3164...	1.72...	H1-...
78	M235	PL8.5x3/8	.104	0	18	.048	1	y	74	84967.83...	103275	806....	1828...	1.16...	H1-...
79	M36A	L6.4x4.750x...	.104	0	22	.057	0	z	31	57754.37...	88290	2962...	7667...	1.67...	H2-1
80	M259A	PIPE_3.0	.100	94.7...	10	.082	43.4211		14	54318.28...	65205	5748...	5748...	1	H1-...
81	M448A	TR1/2"	.089	0	29	.021	0		12	6171.7127	6361.7251	53.0...	53.0...	2.25...	H1-...
82	M449A	TR1/2"	.089	0	19	.021	0		4	6171.7127	6361.7251	53.0...	53.0...	2.25...	H1-...
83	M83C	L6.4x4.750x...	.086	6.4062	6	.042	0	z	28	57754.37...	88290	2962...	7667...	1.187	H2-1
84	M453	TR1/2"	.085	0	6	.031	0		5	6171.7127	6361.7251	53.0...	53.0...	2.25...	H1-...
85	M452	TR1/2"	.085	0	11	.031	3		12	6171.7127	6361.7251	53.0...	53.0...	2.25...	H1-...
86	M1	HSS5x3x3/8"	.076	41.5...	3	.043	0	y	28	153973.7...	205537.5	1849...	2705...	1.525	H1-...
87	M225	PL8.5x3/8	.058	0	20	.067	0	y	28	84967.83...	103275	806....	1828...	1.07...	H1-...
88	M224A	PL8.5x3/8	.055	1	28	.053	1	y	60	84967.83...	103275	806....	1828...	1.073	H1-...
89	M454	PIPE_2.0	.018	23.6...	16	.010	24.4737		7	29810.29...	32130	1871...	1871...	1.58	H1-...

APPENDIX D

ADDITIONAL CALCULATIONS

CLSGroup

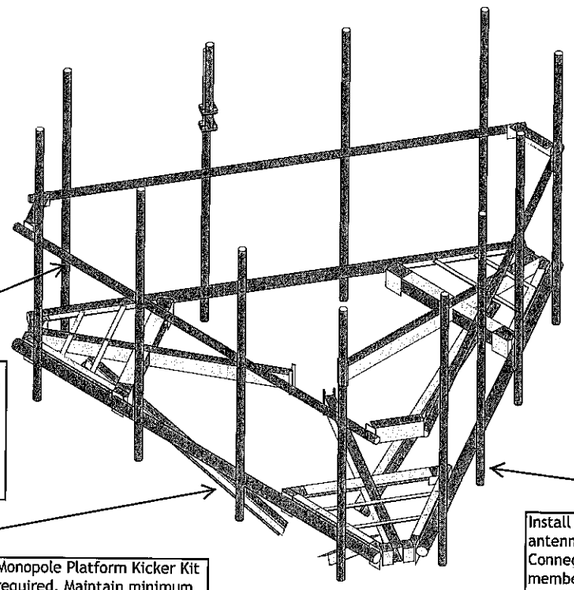
Bolted Connection Checks
AISC 14th Edition (360-10)

Member/ Node Number	Load Comb.	Tensile Load, T_u (kips)	Shear Load, V_u (kips)	Bolt Diameter (in)	Number of Bolts	Shear Planes per Bolt	Bolt Tensile Strength, F_{nt} (ksi)	Bolt Shear Strength, F_{nv} (ksi)	Connected Member Thickness (in)	Connected Member Edge Clear Distance (in)	Connected Member Ultimate Strength, F_u (ksi)	Bolt Tensile Usage	Bolt Shear Usage	Member Bearing Usage
N338B	ENV	2.337	1.345	0.625	1	1	90	54	0.5	0.75	58	11%	11%	7%
N344	ENV	-4.792	0.543	0.625	1	1	90	54	0.5	0.75	58	23%	4%	3%
N354	ENV	3.617	1.984	0.625	1	1	90	54	0.5	0.75	58	17%	16%	10%

APPENDIX E

INSTALLATION SKETCHES AND MOUNT ASSEMBLY DRAWINGS

Install (1) new PerfectVison PV-LPP12M-HR-B Platform Mount.



Install support rails 3'-6" above the platform base. Connect to all mount pipes using PerfectVision PV-XP-2020 crossover plates in lieu of the crossover angles included in proposed platform kit.

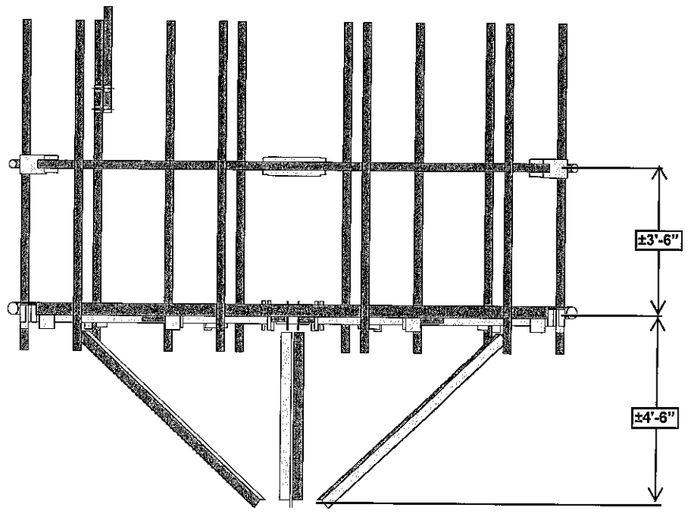
Install (1) PerfectVision PV-PKBK-M Monopole Platform Kicker Kit as shown. Field-cut kicker angle as required. Maintain minimum bolt edge distance. Connect kicker kit to (1) proposed PerfectVision PV-RM1240 Monopole Collar included in kit.

Install (4) PerfectVision PIPE-238X96 antenna mount pipes per sector (12 total). Connect to platform base horizontal member using (12) PerfectVision PV-XP-2030-HD crossover brackets such that they are equidistant from each other as shown in the assembly drawings.

Envelope Only Solution

CLS	42284-NG1924-HRT 096 943227	IN - 1
JSS		July 23, 2019 at 2:11 PM
42284-NG1924-02-MR	Proposed Platform Mount - Rendered	42284-NG1924-02-MR.r3d

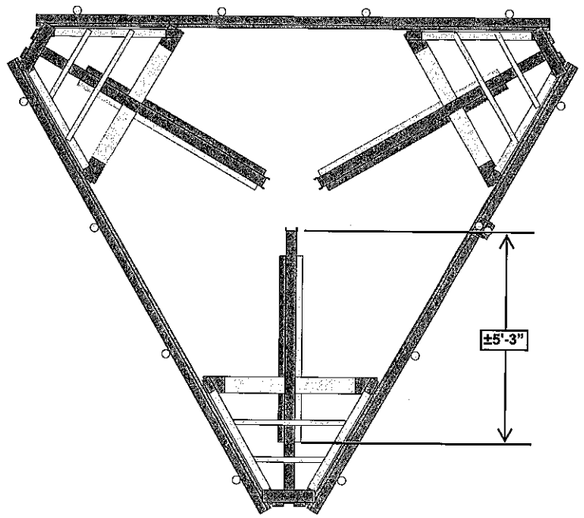
Install (1) new PerfectVison PV-LPP12M-HR-B Platform Mount.



Envelope Only Solution

CLS	42284-NG1924-HRT 096 943227	IN - 2
JSS		July 23, 2019 at 2:11 PM
42284-NG1924-02-MR	Proposed Platform Mount - Rendered	42284-NG1924-02-MR.r3d

Install (1) new PerfectVison PV-LPP12M-HR-B Platform Mount.



CLS	42284-NG1924-HRT 096 943227	IN - 3
JSS		July 23, 2019 at 2:19 PM
42284-NG1924-02-MR	Proposed Platform Mount - Rendered	42284-NG1924-02-MR.r3d

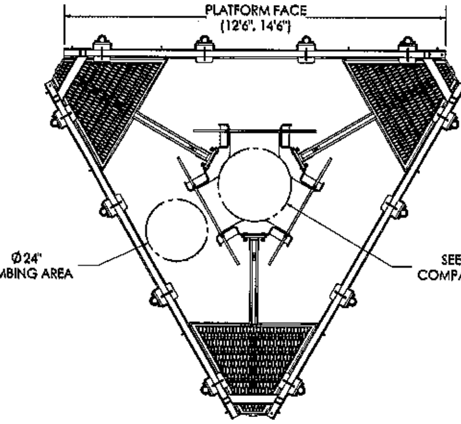
PV-LPP
L.I.F.E. MOUNT™ LOW PROFILE PLATFORM

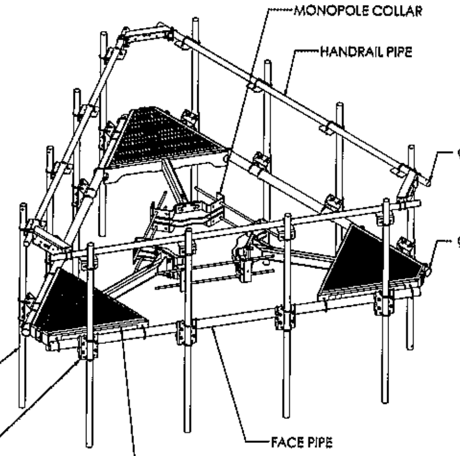
TABLE 1: PLATFORM CONFIGURATIONS														
					INCLUDED PARTS									
PART NUMBER	DESCRIPTION	MIN POLE OD	MAX POLE OD	WEIGHT (LBS)	PIPE-312X150	PIPE-312X174	PIPE-238X150	PIPE-238X174	PV-RM1045	PV-RM3060	PV-LPP12-01	PV-LPP14-01	PV-LPPH	PV-PHK12-8
PV-LPP12M-B	12'6" FACE PLATFORM	10"	34"	1267	3	-	-	-	1	-	3	-	1	0
PV-LPP14M-B	14'6" FACE PLATFORM	10"	35"	1365	-	3	-	-	1	-	-	3	1	0
PV-LPP14L-B	14'6" FACE PLATFORM, LARGE POLE	33"	60"	1370	-	3	-	-	-	1	3	-	1	0
PV-LPP12M-HR-B	12'6" FACE PLATFORM W/ HANDRAIL	10"	34"	1522	3	-	3	-	1	-	3	-	1	1
PV-LPP14M-HR-B	14'6" FACE PLATFORM W/ HANDRAIL	10"	35"	1641	-	3	-	3	1	-	-	3	1	1
PV-LPP14L-HR-B	14'6" FACE PLATFORM W/ HANDRAIL, LARGE POLE	33"	60"	1647	-	3	-	3	-	1	3	-	1	1

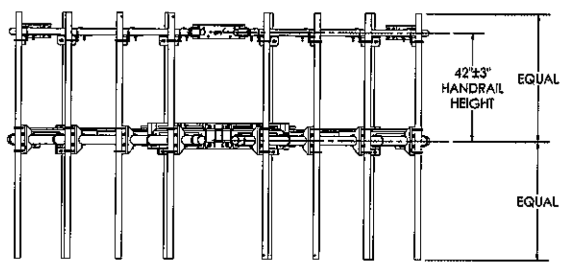
TABLE 2: ANTENNA PIPE OPTIONS***			
OD	LENGTH	ANTENNA PIPE	WEIGHT (LBS)
2-3/8"	72"	PIPE-238X72	22
	96"	PIPE-238X96	29
	126"	PIPE-238X126	38
2-7/8"	84"	PIPE-278X84	41
	96"	PIPE-278X96	46.5
	126"	PIPE-278X126	61
3-1/2"	72"	PIPE-312X72	46
	96"	PIPE-312X96	61
	126"	PIPE-312X126	80

***PLATFORM WITH HANDRAIL KITS ARE COMPATIBLE WITH 2-3/8" OD HANDRAIL PIPE ONLY

TABLE 3: CROSSOVER BRACKETS		
PART NUMBER	COMPATIBLE ANTENNA PIPE	WEIGHT (LBS)
PV-XP-2030-HD	2-3/8" OD	12.5
PV-XP-2530-HD	2-7/8" OD	12.75
PV-XP-3030-HD	3-1/2" OD	13







SHEET 1 OF 4	THIRD ANGLE PROJECTION	CATEGORY 02_Monopole	7	UPDATED LOADING, TEMPLATE	1/16/18
		SERIES 01_Triangular	6	VIEW LOADING	1/19/17
3/13/2018	SCALE 1:36	TYPE PV-LPP_LIFE Mount	5	HEAVY-$ LOADING	6/13/16
DIMENSIONS ARE IN INCHES TOLERANCES U.N.O. HOLES: +1/16", -1/32" ANGULAR: PROFILE±1/4", BEND±2° ALL OTHERS: ±1/16"		BY DJN	4	L.I.F.E. MOUNT™ UPDATE	2/22/16
		CHECKED SJS	3	REDESIGNED COLLAR	12/30/15
		STATUS APPROVED	REV	DESCRIPTION	DATE

FALL-SAFE L.I.F.E. MOUNTS™

PERFECTVISION® MANUFACTURING

L.I.F.E. MOUNT™ LOW PROFILE PLATFORM

DOCUMENT NUMBER LPP-ENG-01-R7 REV 7

MOUNT CLASSIFICATIONS:

REFERENCE STRUCTURAL LETTER (LPP-STL-01-R1) FOR ADDITIONAL LOADING REQUIREMENTS

MOUNT CLASSIFICATION INFORMATION:
- MAX STRUCTURE HEIGHT: 400ft
- STRUCTURE CLASS: I OR II
- EXPOSURE CATEGORY: B OR C
- TOPOGRAPHIC CATEGORY: 1
- DESIGN WIND PRESSURE (NO ICE): 135psf
- DESIGN WIND PRESSURE (ICED): 15psf
- DESIGN ICE THICKNESS: 2.75in Radial

APPROVED MOUNT CLASSIFICATIONS*

APPROVED MOUNT CLASSIFICATIONS (4 PIPE)						
		REQUIRED EXTREME WIND LOAD (LBS)				
		700	750	1150	1550	1800
REQUIRED EXTREME ICE LOAD (LBS)	0	M750R(0)-4(6)	M750R(0)-4(6)	M1150R(0)-4(6)	M1550R(0)-4(6)	M1800R(0)-4(6)
	600	M750R(600)-4(6)	M750R(600)-4(6)	M1150R(600)-4(6)	M1550R(600)-4(6)	M1800R(600)-4(6)
	800	M750R(800)-4(6)	M750R(800)-4(6)	M1150R(800)-4(6)	M1550R(800)-4(6)	M1800R(800)-4(6)
	1100	M750R(1100)-4(6)	M750R(1100)-4(6)	M1150R(1100)-4(6)	M1550R(1100)-4(6)	M1800R(1100)-4(6)
	1250	M750R(1250)-4(6)	M750R(1250)-4(6)	M1150R(1250)-4(6)	M1550R(1250)-4(6)	M1800R(1250)-4(6)

- HEAVY-5

APPLIES TO ALL PV-LPP12M, PV-LPP14M, AND PV-LPP14L SERIES PLATFORMS WITH ANTENNAS AND APPURTENANCES SYMMETRICALLY MOUNTED ABOUT THE PLATFORM CENTERLINE.

POLE THICKNESS LIMITATIONS:
ON POLES WITH WALL THICKNESS EQUAL TO OR GREATER THAN THE VALUES LISTED BELOW, THE PERFECT VISION PV-LPP MOUNT SERIES IS STRUCTURALLY CAPABLE OF SUPPORTING THE ABOVE LOADING SCENARIOS WITHOUT THE NEED FOR AN ADDITIONAL KICKER BRACE.

FOR THIN WALL POLES, USE PV-PKBK PLATFORM KICKER BRACE TO AVOID POLE CRIMPING FAILURES. KICKER BRACE CAN BE INSTALLED ABOVE OR BELOW PLATFORM.

POLE THICKNESS LIMITATIONS	
MOUNT CLASSIFICATION	MINIMUM POLE THICKNESS
M750R-4(6)	1/4"
M800R-4(6)	1/4"
M900R-4(6)	1/4"
M950R-4(6)	1/4"
M1000R-4(6)	5/16"
M1400R-4(6)	5/16"
M1000R(I)-4(6)	5/16"
M1150R(I)-4(6)	5/16"

PLATFORM EPA:

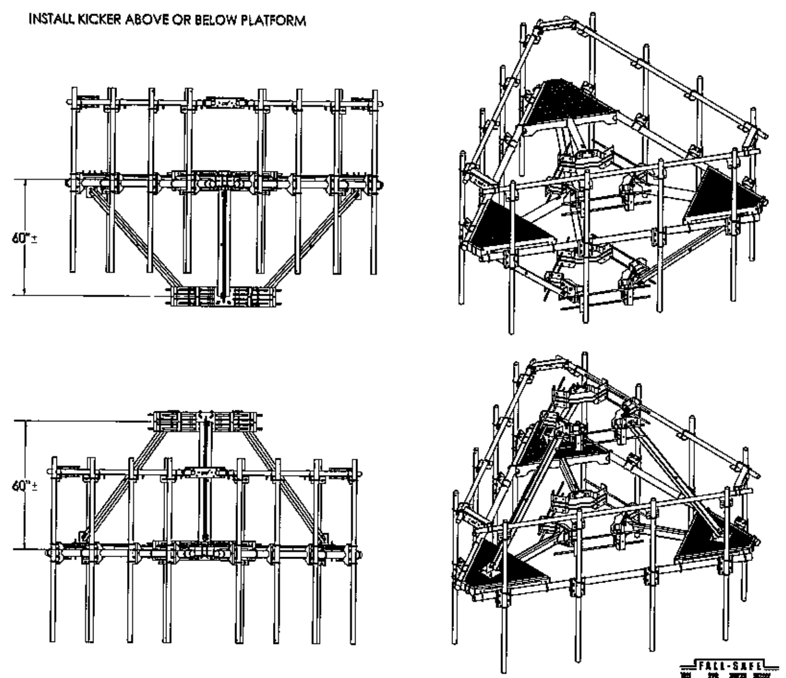
PLATFORM EPA		
PLATFORM TYPE	NO ICE (FT^2)	1/2" RADIAL ICE (FT^2)
12'6" FACE	20.3*	25.8*
12'6" FACE WITH HANDRAIL	34.4**	43.0**
14'6" FACE	22.1*	28.1*
14'6" FACE WITH HANDRAIL	36.8**	46.2**

*DOES NOT INCLUDE CROSSOVER PLATES OR ANTENNA PIPES
**DOES NOT INCLUDE ANTENNA PIPES

KICKER ATTACHMENT:

SEE CLASSIFICATIONS SECTION FOR KICKER REQUIREMENT DETAILS.

INSTALL KICKER ABOVE OR BELOW PLATFORM

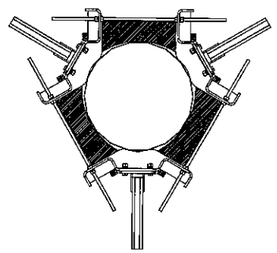


FALL-SAFE L.I.F.E. MOUNTS™

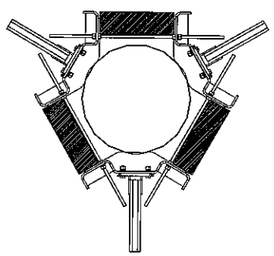
SHEET 2 OF 4	THIRD ANGLE PROJECTION	CATEGORY 02_Monopole	7	UPDATED LOADING, TEMPLATE	1/16/18	PERFECTVISION MANUFACTURING
3/13/2018	SCALE 1:48	SERIES 01_Triangular	6	VEW LOADING	1/19/17	
DIMENSIONS ARE IN INCHES TOLERANCES U.N.O. HOLES: +1/16", -1/32" ANGULAR: PROFILE± 1/4", BEND±2" ALL OTHERS: ±1/16"		TYPE PV-LPP_LIFE Mount	5	HEAVY-5 LOADING	6/13/16	
		BY DJN	4	L.I.F.E. MOUNT™ UPDATE	2/22/16	L.I.F.E. MOUNT™ LOW PROFILE PLATFORM
		CHECKED SJS	3	REDESIGNED COLLAR	12/30/15	DOCUMENT NUMBER LPP-ENG-01-R7
		STATUS APPROVED	REV	DESCRIPTION	DATE	REV 7

SAFETY CLIMB ROUTING:

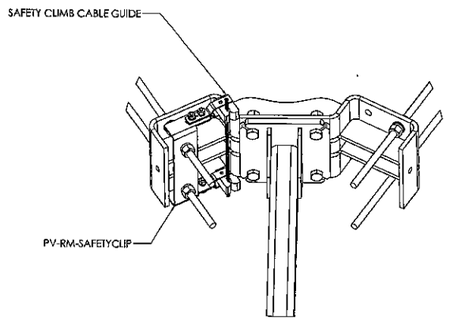
CABLE GUIDES AND PV-RM-SAFETYCLIP SOLD SEPARATELY.



SAFETY CLIMB CABLE RECOMMENDED ROUTING (ALL THREAD IN EXTERIOR HOLES)



SAFETY CLIMB CABLE RECOMMENDED ROUTING (ALL THREAD IN INTERIOR HOLES)



SAFETY CLIMB CABLE GUIDE ATTACHMENT
IF RING MOUNT IS TO BE INSTALLED ON THE SAFETY CLIMB FACE, USE THE RECOMMENDED ROUTING AS SHOWN

FAIL-SAFE LIFE MOUNTS™

SHEET: 3 OF 4	ISSO-FACILE PROJECTION	CATEGORY: 02_Monopole	7	UPDATED LOADING, TEMPLATE	1/16/18
		SERIES: 01_Triangular	6	VZM LOADING	1/19/17
3/13/2018	SCALE: NTS	TYPE: PV-LPP_LIFE Mount	5	HEAVY-S LOADING	6/17/16
DIMENSIONS ARE IN INCHES TOLERANCES U.N.O. HOLES: +1/16", -1/32" ANGULAR: PROFILE± 1/4", BEND± 2° ALL OTHERS: ±1/16"		BY: DJN	4	LIFE MOUNT™ UPDATE	2/23/16
		CHECKED: SJS	3	REDESIGNED COLLAR	10/26/15
		STATUS: APPROVED	REV	DESCRIPTION	DATE

PERFECT VISION MANUFACTURING

LIFE MOUNT™ LOW PROFILE PLATFORM

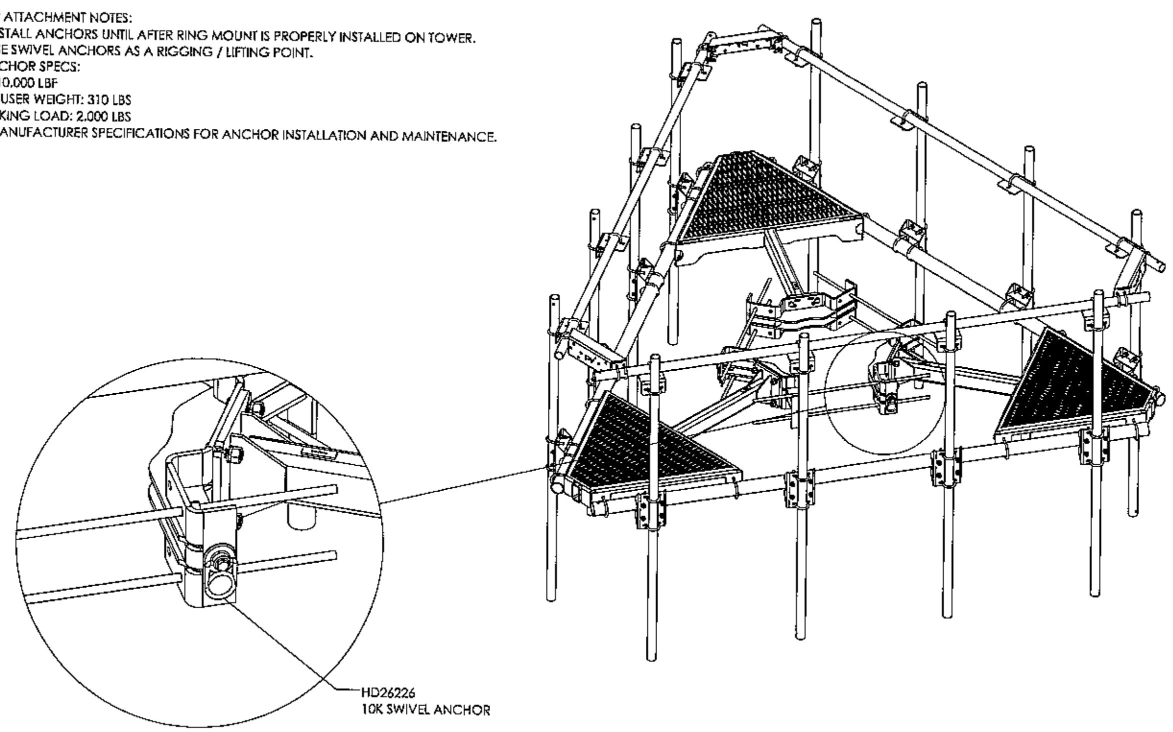
DOCUMENT NUMBER: LPP-ENG-01-R7 REV: 7

C:\Users\Drawings\Documents\PerfectVision\Safety Cabling\Drawings from Engineering\Safety

10K SWIVEL ANCHOR

SWIVEL ANCHOR ATTACHMENT NOTES:

- DO NOT INSTALL ANCHORS UNTIL AFTER RING MOUNT IS PROPERLY INSTALLED ON TOWER.
- DO NOT USE SWIVEL ANCHORS AS A RIGGING / LIFTING POINT.
- SWIVEL ANCHOR SPECS:
  - UTS: 10,000 LBF
  - MAX USER WEIGHT: 310 LBS
  - WORKING LOAD: 2,000 LBS
- FOLLOW MANUFACTURER SPECIFICATIONS FOR ANCHOR INSTALLATION AND MAINTENANCE.



DETAIL A
SCALE 1 : 8

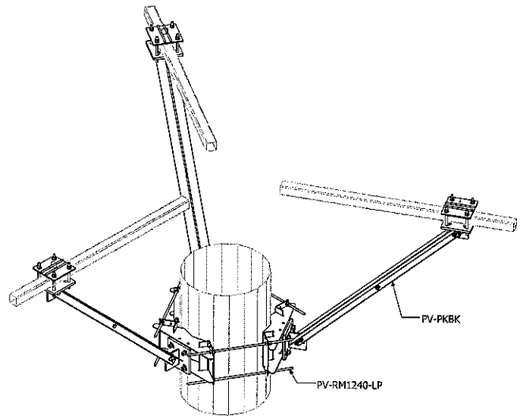
SHEET 4 OF 4	THIRD ANGLE PROJECTION	CATEGORY 02_Monopole	7	UPDATED LOADING, TEMPLATE	1/16/18
3/13/2018	SCALE 1:24	SERIES 01_Triangular	6	VZW LOADING	1/19/17
DIMENSIONS ARE IN INCHES TOLERANCES U.N.O. HOLES: +1/16", -1/32" ANGULAR: PROFILE±1/4", BEND±2" ALL OTHERS: ±1/16"		TYPE PV-LPP_LIFE Mount	5	HEAVY-5 LOADING	6/13/16
		BY DJN	4	L.I.F.E. MOUNT™ UPDATE	2/22/16
		CHECKED SJS	3	REDESIGNED COLLAR	12/30/15
		STATUS APPROVED	REV	DESCRIPTION	DATE

FALL-SAFE L.I.F.E. MOUNTS™

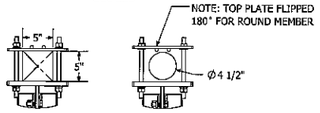
PERFECTVISION® MANUFACTURING

L.I.F.E. MOUNT™ LOW PROFILE PLATFORM

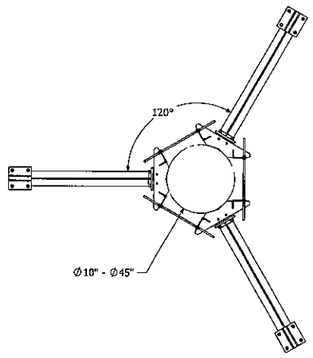
DOCUMENT NUMBER LPP-ENG-01-R7 REV 7

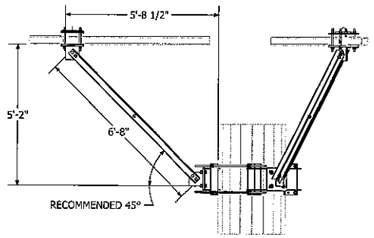


PV-PKBK-M
(INCLUDES (1) PV-RM1240-LP AND (1) PV-PKBK)
KICKER BRACE
510 LBS



ARM ATTACHMENT
CLAMPS TO RECT HSS UP TO 5"X5" AND ROUND PIPE UP TO 4-1/2" OD





PERFECT VISION MANUFACTURING
16101 La Grande Dr.
Little Rock, AR 72223
1-800-205-8620

STAMP:

REVISIONS:

NO.	DATE	DESCRIPTION	BY	CHK	APD
6	4/11/17	INITIAL RELEASE	DAM	LL	SS
5					
4					
3					
2					
1					

JOB INFORMATION

DESIGN TITLE
MONOPOLE KICKER BRACE KIT

SHEET TITLE
ENGINEERING DETAIL

SHEET NO.: E-1

REVISION: 0