# STATE OF CONNECTICUT

*CONNECTICUT SITING COUNCIL*

Ten Franklin Square, New Britain, CT 06051
Phone: (860) 827-2935 Fax: (860) 827-2950
E-Mail: siting.council@ct.gov
www.ct.gov/csc


January 6, 2009

Steven L. Levine
Real Estate Consultant
New Cingular Wireless PCS, LLC
500 Enterprise Drive
Rocky Hill, CT 06067-3900

RE: **EM-CING-078-081204-** New Cingular Wireless PCS, LLC notice of intent to modify an existing telecommunications facility located at 111 Middle Turnpike, Mansfield, Connecticut.

Dear Mr. Levine:

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

The proposed modifications are to be implemented as specified here and in your notice dated December 4, 2008, including the placement of all necessary equipment and shelters within the tower compound. The modifications are in compliance with the exception criteria in Section 16-50j-72 (b) of the Regulations of Connecticut State Agencies as changes to an existing facility site that would not increase tower height, extend the boundaries of the tower site, increase noise levels at the tower site boundary by six decibels, and increase the total radio frequencies electromagnetic radiation power density measured at the tower site boundary to or above the standard adopted by the State Department of Environmental Protection pursuant to General Statutes § 22a-162. This facility has also been carefully modeled to ensure that radio frequency emissions are conservatively below State and federal standards applicable to the frequencies now used on this tower.

This decision is under the exclusive jurisdiction of the Council. Please be advised that the validity of this action shall expire one year from the date of this letter. Any additional change to this facility will require explicit notice to this agency pursuant to Regulations of Connecticut State Agencies Section 16-50j-73. Such notice shall include all relevant information regarding the proposed change with cumulative worst-case modeling of radio frequency exposure at the closest point of uncontrolled access to the tower base, consistent with Federal Communications Commission, Office of Engineering and Technology, Bulletin 65. Any deviation from this format may result in the Council implementing enforcement proceedings pursuant to General Statutes § 16-50u including, without limitation, imposition of expenses resulting from such failure and of civil penalties in an amount not less than one thousand dollars per day for each day of construction or operation in material violation.

Thank you for your attention and cooperation.

Very truly yours,

S. Derek Phelps
Executive Director

SDP/MP/laf

c: The Honorable Elizabeth Patterson, Mayor, Town of Mansfield
Matthew W. Hart, Town Manager, Town of Mansfield
Gregory Padick, Town Planner, Town of Mansfield
Christopher B. Fisher, Esq., Cuddy & Feder LLP

**EM-CING-078-081204**

The new at&t Your world. Delivered. cingular raising the bar

**New Cingular Wireless PCS, LLC**
500 Enterprise Drive
Rocky Hill, Connecticut 06067-3900
Phone: (860) 513-7636
Fax: (860) 513-7190

**Steven L. Levine**
Real Estate Consultant

ORIGINAL

RECEIVED
DEC 4 - 2008
CONNECTICUT
SITING COUNCIL

HAND DELIVERED

December 4, 2008

Honorable Daniel F. Caruso, Chairman,
and Members of the Connecticut Siting Council
Connecticut Siting Council
10 Franklin Square
New Britain, Connecticut 06051

Re: New Cingular Wireless PCS, LLC notice of intent to modify an existing tele-communications facility located at 111 Middle Turnpike, Mansfield (owner, CL&P)

Dear Chairman Caruso and Members of the Council:

In order to accommodate technological changes, implement Uniform Mobile Telecommunications System ("UMTS") capability, and enhance system performance in the State of Connecticut, New Cingular Wireless PCS, LLC ("AT&T") plans to modify the equipment configurations at many of its existing cell sites. Please accept this letter and attachments as notification, pursuant to R.C.S.A. Section 16-50j-73, of construction which constitutes an exempt modification pursuant to R.C.S.A. Section 16-50j-72(b)(2). In compliance with R.C.S.A. Section 16-50j-73, a copy of this letter and attachments is being sent to the chief elected official of the municipality in which the affected cell site is located.

UMTS technology offers services to mobile computer and phone users anywhere in the world. Based on the Global System for Mobile (GSM) communication standard, UMTS is the planned worldwide standard for mobile users. UMTS, fully implemented, gives computer and phone users high-speed access to the Internet as they travel. They have the same capabilities even when they roam, through both terrestrial wireless and satellite transmissions.

Attached is a summary of the planned modifications, including power density calculations reflecting the change in AT&T's operations at the site. Also included is documentation of the structural sufficiency of the tower to accommodate the revised antenna configuration.

The changes to the facility do not constitute modifications as defined in Connecticut General Statutes ("C.G.S.") Section 16-50i(d) because the general physical characteristics of the facility will not be significantly changed or altered. Rather, the planned changes to the facility fall

squarely within those activities explicitly provided for in R.C.S.A. Section 16-50j-72(b)(2).

1. The height of the overall structure will be unaffected. Modifications to the existing site include all or some of the following as necessary to bring the site into conformance with the plan:

- Replacement of existing panel antennas with new antennas or, installation of additional antennas of a size required to accommodate UMTS.
- Installation of small tower mount amplifiers ("TMA's") and/or diplexers to the platform on which the panel antennas are mounted to enhance signal reception.
- Installation of additional or larger coaxial cables as required.
- Installation of an additional equipment cabinet in existing shelters, or on existing or enlarged concrete pads.
- Radome enlargement for flagpole and "stick" structures to accommodate larger antennas and additional associated equipment.

None of these modifications will extend the height of the tower.

2. The proposed changes will not extend the site boundaries. There will be no effect on the site compound other than some enlarged equipment pads as may be noted in the attachments.

3. The proposed changes will not increase the noise level at the existing facility by six decibels or more.

4. Radio frequency power density may increase due to use of one or more GSM channel for UMTS transmissions. However, the changes will not increase the calculated "worst case" power density for the combined operations at the site to a level at or above the applicable standard for uncontrolled environments as calculated for a mixed frequency site.

For the foregoing reasons, New Cingular Wireless respectfully submits that the proposed changes at the referenced site constitute exempt modifications under R.C.S.A. Section 16-50j-72(b)(2).

Please feel free to call me at (860) 513-7636 with questions concerning this matter. Thank you for your consideration.

Sincerely,

Steven L. Levine
Real Estate Consultant

Attachments

**NEW CINGULAR WIRELESS**
**Equipment Modification**

111 Middle Turnpike, Mansfield
Site Number 5821
Former AT&T cell site
Petition 626 approved 9/03

**Tower Owner/Manager:** CL&P

**Equipment Configuration:** Laminated Wood Monopole

**Current and/or Approved:** Three Allgon 7250 panel antennas @ 52.5 ft AGL
Six runs 7/8 inch coax cable
Concrete pad with outdoor equipment cabinets

**Planned Modifications:** Remove all existing antennas
Install three Powerwave 7770 antennas (or equivalent) @ 51 ft
Install six TMA's @ 51 ft
Remove one existing outdoor cabinet
Install one new outdoor cabinet for UMTS on existing pad

**Power Density:**

Worst-case calculations for existing wireless operations at the site indicate a radio frequency electromagnetic radiation power density, measured at ground level beside the tower, of approximately 13 % of the standard adopted by the FCC. As depicted in the second table below, the total radio frequency electromagnetic radiation power density following proposed modifications would be approximately 51.5 % of the standard.

**Existing**

| Company | Centerline Ht (feet) | Frequency (MHz) | Number of Channels | Power Per Channel (Watts) | Power Density ($mW/cm^2$) | Standard Limits ($mW/cm^2$) | Percent of Limit |
|---|---|---|---|---|---|---|---|
| Other Users * | | | | | | | 0.00 |
| AT&T GSM * | 52.5 | 1900 Band | 4 | 250 | 0.1305 | 1.0000 | 13.05 |
| Total | | | | | | | 13.0% |

* Per CSC records

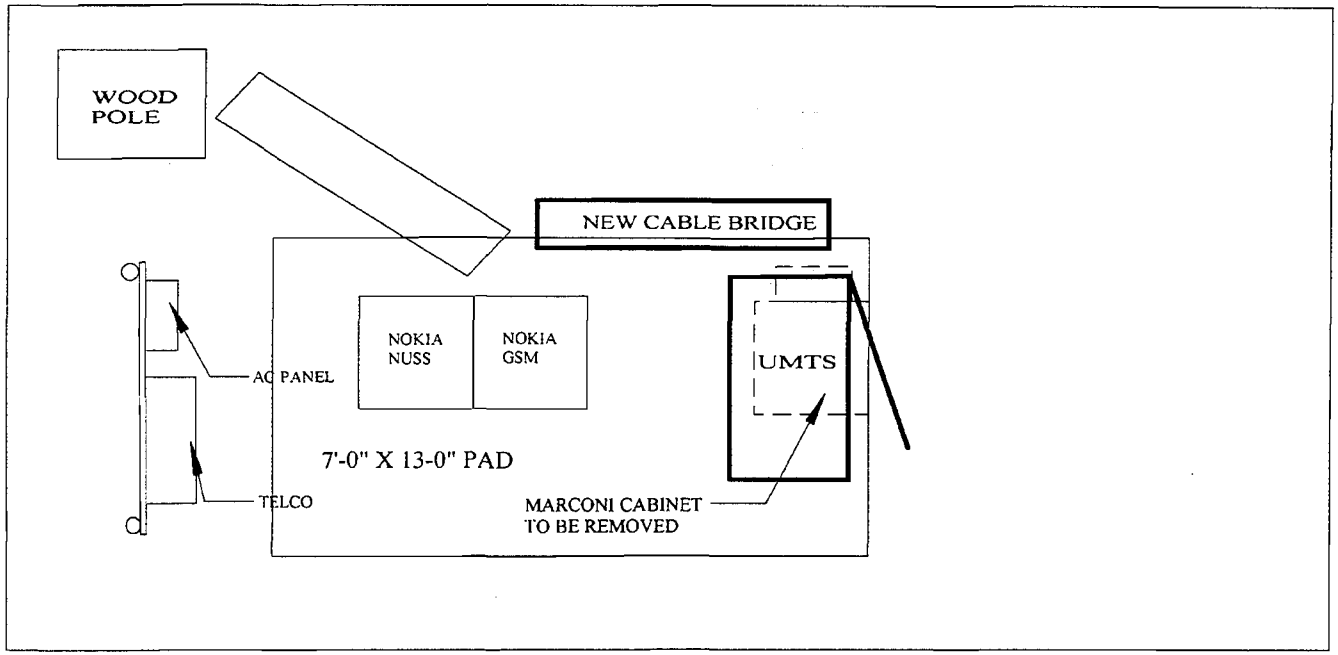
**Proposed**

| Company | Centerline Ht (feet) | Frequency (MHz) | Number of Channels | Power Per Channel (Watts) | Power Density ($mW/cm^2$) | Standard Limits ($mW/cm^2$) | Percent of Limit |
|---|---|---|---|---|---|---|---|
| Other Users * | | | | | | | 0.00 |
| AT&T UMTS | 51 | 880 - 894 | 1 | 500 | 0.0691 | 0.5867 | 11.78 |
| AT&T GSM | 51 | 1900 Band | 2 | 427 | 0.1181 | 1.0000 | 11.81 |
| AT&T GSM | 51 | 880 - 894 | 4 | 296 | 0.1637 | 0.5867 | 27.90 |
| Total | | | | | | | 51.6% |

* Per CSC records

**Structural information:**

The attached structural analysis demonstrates that the tower structure adequate structural capacity to accommodate the proposed equipment modifications. (GPD Associates, 11/26/08)




at&t

SAI communications

SITE NUMBER
5821
SITE NAME
Mansfield West

| | |
|---|---|
| TITLE: | EQUIPMENT PLAN |
| MISC. INFO: | |
| DWG. BY: | SGB |
| DATE: | 07/07/08 |
| SCALE: | N.T.S. |
| SHEET: | 1 OF 1 |

**New Cingular Wireless PCS, LLC**
500 Enterprise Drive
Rocky Hill, Connecticut 06067-3900
Phone: (860) 513-7636
Fax: (860) 513-7190

**Steven L. Levine**
Real Estate Consultant

December 4, 2008

Matthew W. Hart, Town Managaer
Town of Mansfield
Town Hall Four So. Eagleville Road
Storrs, CT 06268

Re: Telecommunications Facility – 111 Middle Turnpike

Dear Mr. Hart:

In order to accommodate technological changes, implement Uniform Mobile Telecommunications System ("UMTS") capability, and enhance system performance in the State of Connecticut, New Cingular Wireless PCS, LLC ("AT&T") will be changing its equipment configuration at certain cell sites.

As required by Regulations of Connecticut State Agencies ("R.C.S.A.") Section 16-50j-73, the Connecticut Siting Council has been notified of the changes and will review AT&T's proposal. Please accept this letter as notification under Section 16-50j-73 of construction which constitutes an exempt modification pursuant to R.C.S.A. Section 16-50j-72(b)(2).

The accompanying letter to the Siting Council fully describes AT&T's proposal for the referenced cell site. However, if you have any questions or require any further information on our plans or the Siting Council's procedures, please call me at (860) 513-7636 or Mr. Derek Phelps, Executive Director, Connecticut Siting Council at (860) 827-2935.

Sincerely,

Steven L. Levine
Real Estate Consultant

Enclosure

at&t
Mr. Mark Appleby
SAI Communications
500 Enterprise Drive, Suite 3A
Rocky Hill, CT 06467
860.513.7536

GPD ASSOCIATES
Kevin Clements
520 South Main St., Suite 2531
Akron, Ohio 44311
330.572.2195
kclements@gpdgroup.com

**GPD# 2008013.20**
November 26, 2008

## STRUCTURAL ANALYSIS REPORT

| | | |
|---|---|---|
| AT&T DESIGNATION: | Site USID: | 36326 |
| | Site FA: | 10071109 |
| | Site Name: | MANSFIELD WEST |
| **SAI DESIGNATION:** | **Site Number:** | **CT5821** |
| **ANALYSIS CRITERIA:** | **Codes:** | **ANSI/AF&PA NDS 2005**<br>**ASCE 7-05, Wind Loading** |
| **SITE DATA:** | | **111 Middle Turnpike, Storrs Mansfield, CT 06268,**<br>**Tolland County**<br>**Latitude 41° 48' 14.004" N, Longitude 72° 18' 18.000" W**<br>**55' Laminated Wood Monopole** |

Mr. Appleby,

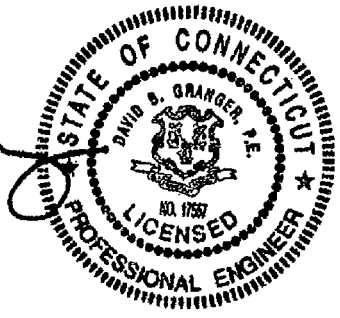
GPD is pleased to submit this Structural Analysis Report to determine the structural integrity of the aforementioned tower. The purpose of the analysis is to determine the suitability of the tower with the addition of the following proposed loading configuration:

Elev. 52.5' (3) Powerwave 7770.00 Antennas Pipe Mounted, w/ (6) existing 7/8" external coax
(6) Powerwave LGP 21401 Tower Mounted Amplifiers mounted behind the antennas

Based on our analysis we have determined the **tower is sufficient** for the proposed, existing, and reserved loadings as referenced in Appendix A. However, the foundation could not be verified based on the information provided.

We at GPD appreciate the opportunity of providing our continuing professional services to you and SAI. If you have any questions please do not hesitate to call.

Respectfully submitted,




David B. Granger, P.E.
Connecticut #: 17557

## SUMMARY & RESULTS

The purpose of this analysis was to verify whether the existing structure is capable of carrying the proposed loading configuration as specified by AT&T to SAI. This report was commissioned by Mr. Mark Appleby of SAI.

No foundation or geotechnical information was available or provided for this report. Therefore, the in place capacity of the existing foundation could not be verified. A geotechnical investigation and foundation exploration are recommended to verify the capacity of the foundation with the proposed loading.

**TOWER SUMMARY AND RESULTS**

| Member | Capacity | Results |
|---|---|---|
| Monopole | 58.4% | Pass |
| | | |
| Foundation | Not Verified | |

## ANALYSIS METHOD

STAAD Pro (Release 2006), a commercially available software program, was used to create a three dimensional model of the tower and calculate primary member stresses for various dead and wind load cases. Selected output from the analysis is included in Appendix B. the following table details the information provided to complete this structural analysis. This analysis is solely based on this information and is being provided without the benefit of a site visit.

**DOCUMENTS PROVIDED**

| Document | Remarks | Source |
|---|---|---|
| Previous Structural Analysis | URS Corp, Project No. 36912910, dated 10/08/2003 | GPD |
| AT&T UMTS Document | AT&T Mobility TB 2009 UMTS Scope Meeting Notes | M. Appleby |

## ASSUMPTIONS

This structural analysis is based on the theoretical capacity of the members and is not a condition assessment of the monopole. This analysis is from information supplied, and therefore, its results are based on and are as accurate as that supplied data. GPD has made no independent determination, nor is it required to, of its accuracy. The following assumptions were made for this structural analysis.

1. The wood monopole properties are considered accurate as supplied. The material grade is as per data supplied and/or as assumed and as stated in the materials section.
2. The antenna configuration is as supplied and/or as modeled in the analysis. It is assumed to be complete and accurate. All antennas, mounts, coax and waveguides are assumed to be properly installed and supported as per manufacturer requirements
3. Some assumptions are made regarding antennas and mount sizes and their projected areas based on best interpretation of data supplied and of best knowledge of antenna type and industry practice.
4. All mounts, if applicable, are considered adequate to support the loading. No actual analysis of the mount(s) is performed. This analysis is limited to analyzing the tower only.
5. The soil parameters are as per data supplied or as assumed and stated in the calculations. If no data is available, the foundation system is not verified. In the case of absent foundation data, it is the tower owner's responsibility to insure that the foundation system is adequate to support the structure with its new reactions.
6. The tower and structures have been properly maintained in accordance with TIA Standards and/or with manufacturer's specifications.
7. Tower Mounted Amplifiers are assumed to be installed behind antennas.
8. All existing loading was obtained from the provided UMTS Document and site photos and is assumed to be accurate.

If any of these assumptions are not valid or have been made in error, this analysis may be affected, and GPD Associates should be allowed to review any new information to determine its effect on the structural integrity of the tower.

## DISCLAIMER OF WARRANTIES

GPD ASSOCIATES has not performed a site visit to verify the tower member sizes or antenna/coax loading. If the existing conditions are not as represented on these drawings, we should be contacted immediately to evaluate the significance of the deviation. This is not a condition assessment of the tower or foundation. This report does not replace a full tower inspection. The tower and foundations are assumed to have been properly maintained, in good condition, plumb and twist free.

The engineering services rendered by GPD ASSOCIATES in connection with this Structural Analysis are limited to a computer analysis of the tower structure, size, and theoretical capacity of its members. All tower components have been assumed to only resist dead loads when no other loads are applied. No allowance was made for any damaged, missing, loose, or rusted members (above and below ground). No allowance was made for loose bolts or cracked welds. The analysis of this tower assumes that no physical deterioration has occurred in any of the structural components.

GPD ASSOCIATES does not analyze the fabrication, including welding. It is not possible to have all the very detailed information to perform a very thorough analysis of every structural sub-component and connection on an existing tower. The structural analysis by GPD ASSOCIATES verifies the adequacy of the main structural members of the tower. GPD ASSOCIATES provides a limited scope of service in that we cannot verify the adequacy of every weld, plate connection detail, etc. The purpose of this report is to assess the feasibility of adding appurtenances usually accompanied by transmission lines to the structure.

The attached sketches are a schematic representation of the tower that we have analyzed. If any material is fabricated from these sketches, the contractor shall be responsible for field verifying the existing conditions and proper fit and clearance in the field. Any mentions of structural modifications are reasonable estimates and should not be used as a precise construction document. Precise modification drawings are obtainable from GPD ASSOCIATES, but are beyond the scope of this report.

Miscellaneous items such as antenna mounts, etc., have not been designed or detailed as a part of our work. We recommend that material of adequate size and strength be purchased from a reputable tower manufacturer.

GPD ASSOCIATES makes no warranties, expressed or implied, in connection with this report and disclaims any liability arising from material, fabrication, and erection of this tower. GPD ASSOCIATES will not be responsible whatsoever for, or on account of, consequential or incidental damages sustained by any person, firm, or organization as a result of any data or conclusions contained in this report. The maximum liability of GPD ASSOCIATES pursuant to this report will be limited to the total fee received for preparation of this report.

# APPENDIX A

## Tower Analysis Summary Form

# Tower Analysis Summary Form

**General Info**

| | |
|---|---|
| Site Name | MANSFIELD WEST |
| Site Number | 36326 |
| Site FA | 10071109 |
| Date of Analysis | 11/26/2008 |
| Company Performing Analysis | GPD |

**The information contained in this summary report is not to be used independently from the PE stamped tower analysis.**

| Tower Info | Description | Date |
|---|---|---|
| Tower Type (G, SST, MP) | Laminated Wood Pole | |
| Tower Height (top of steel AGL) | 95 | |
| Tower Design | Laminated Wood Systems | 10/2/2003 |
| Tower Model | n/a | |
| Manufacturer Design | n/a | |
| Foundation Design | Laminated Wood Systems | 10/2/2003 |
| Geotech Report | VN Engineering | 9/26/2003 |
| Tower Mapping | n/a | |
| Foundation Mapping | n/a | |
| Previous Structural | URS Corp | 10/8/2003 |

**Design Parameters**

| | |
|---|---|
| Design Code Used | ASCE 7-05 & ANSI/A NDS 2005 |
| Location of Tower (County, State) | Tolland, Connecticut |
| Basic Wind Speed (mph) | 90 - 3-second gust |
| Ice Thickness (in) | n/a |
| Structure Classification (I, II, III) | |
| Exposure Category (B, C, D) | |
| Topographic Category (1 to 5) | |

**Analysis Results (% Maximum Usage)**

| *Existing Condition* | |
|---|---|
| Tower | 40.2% |
| Foundation | n/a |
| Guy Wire | n/a |

| *Proposed Condition* | |
|---|---|
| Tower | 58.4% |
| Foundation | n/a |
| Guy Wire | n/a |

**Steel Yield Strength (ksi)**

| | |
|---|---|
| Pole | n/a |
| Base Plate | n/a |
| Anchor Rods | n/a |

**Existing/Reserved**

| Antenna | | | | | | | Mount | | | | Transmission Line | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Antenna Owner | Attachment Height (ft) | Quantity | Type | Model | EPA (ft²) each | Azimuth | Quantity | Type | Model | EPA (ft²) total | Quantity | Size | Attachment Leg/Face |
| AT&T Mobility | 62.5 | 3 | Panel | Allgon 7250.02 | 3.66 | | 3 | Pipe Mount | | shielded | 6 | 7/8" | External |
| | | | | | | | | | | | | | |

**Proposed**

| Antenna | | | | | | | Mount | | | | Transmission Line | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Antenna Owner | Attachment Height (ft) | Quantity | Type | Model | EPA (ft²) each | Azimuth | Quantity | Type | Model | EPA (ft²) total | Quantity | Size | Attachment Leg/Face |
| AT&T Mobility | 52.5 | 3 | Panel | Powerwave 7770.00 | 5.88 | | 3 | Pipe Mount | | shielded | | | |
| AT&T Mobility | 52.5 | 6 | TMA | LGP17201 | shielded | | | | | | | | |
| | | | | | | | | | | | | | |

Revision:1.2
Date: 12/15/06

# APPENDIX B

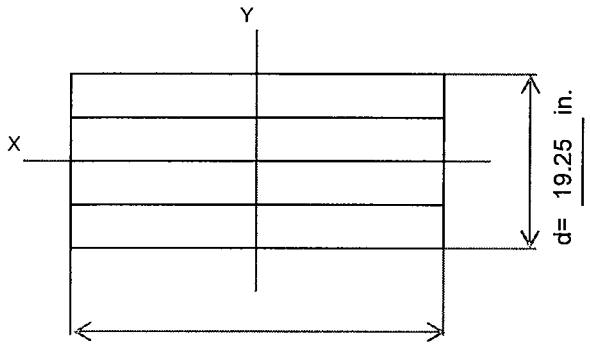
## Tower Calculations

# GPD ASSOCIATES - COMPUTATION SHEET

JOB NO. 2008013.20 JOB NAME CT5821 - Mansfield West - AT&T SHEET 1 OF 2 SHEETS

SUBJECT Structural Analysis - Wood Monopole PREPARED BY M. Moellendick DATE 26-Nov-08

Pole Data and Wood Factors CHECKED BY DATE




Does Pole Taper on One Side? Yes

What is Top Width, d' 12.00 in.

## Tower Data

| | | |
|---|---|---|
| Tower Height | 55 | ft |
| Unsupported Length, $L_U$ | 55 | ft |

## Structural Glued Laminated Timber Data

| | | |
|---|---|---|
| Species: | Southern Yellow Pine | |
| Combination Symbol: | 24F-V5 | |
| $Fb_1$ | 2400 | psi {Table 5A} |
| $Fb_2$ | 1200 | psi {Table 5A} |
| Fc | 1450 | psi {Table 5A} |
| Fc' | 1856.00 | psi |

## X-X

| | | |
|---|---|---|
| Load Duration Factor, $C_D$ | 1.60 | {5.3.2} |
| Wet Service Factor, $C_M$ | 0.80 | {5.3.3} |
| $E_X$ min | 8.80E+05 | psi {Table 5A} |
| Temperature Factor, $C_T$ | 1.00 | {2.3.3} |
| Beam Stabilty Factor, $C_L$ | 1.00 | {3.3-6} |
| $C_P$ | 0.98 | |
| $L_u/d$ | 36.16 | {Table 3.3.3} |
| $S_X$ | 1068.58 | $in^3$ |
| $E'_{MIN1}$ | 7.04E+05 | psi {Table 5.3.1} |
| Effective Length, $L_e$ | 115.50 | ft {Table 3.3.3} |
| Slenderness Ratio, $R_B$ | 8.26 | |
| $F_{b1}$ | 3060.26 | psi |
| $F_{b1}'$ | 3048.56 | psi |
| $F_{cE1}$ | 16074.67 | psi |
| $F_{cE}$ | 12806.14 | psi |

## Y-Y

| | | |
|---|---|---|
| Load Duration Factor, $C_D$ | 1.60 | {5.3.2} |
| Wet Service Factor, $C_M$ | 0.80 | {5.3.3} |
| $E_Y$ min | 7.80E+05 | psi {Table 5A} |
| Temperature Factor, $C_T$ | 1.00 | {2.3.3} |
| Beam Stabilty Factor, $C_L$ | 1.00 | {3.3-6} |
| $C_P$ | 0.98 | |
| $L_u/d$ | 34.29 | |
| $S_Y$ | 1127.13 | $in^3$ |
| $E'_{MIN2}$ | 6.24E+05 | psi {Table 5.3.1} |
| Effective Length, $L_e$ | 115.50 | ft |
| Slenderness Ratio, $R_B$ | 8.95 | |
| $F_{bE}$ | 9347.55 | psi {3.3-6} |
| $F_{b2}$ | 1529.60 | psi |
| $F_{b2}'$ | 1523.24 | psi |
| $F_c'$ | 1825.65 | psi |
| $F_{cE2}$ | 12806.14 | psi |

*Reference: ANSI/AF&PA NDS - 2005*

## Combined Bending and Axial Loading Values

| | Values From STAAD | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | Fx | Fy | Fz | Mx | My | Mz | b | d | Area | S |
| Load Case 1 | 0.000 | -2.544 | 3.465 | 909.405 | 0.000 | 0.000 | 18.25 | 19.25 | 351.31 | 1127.1 |
| Load Case 2 | -2.400 | 0.000 | 3.465 | 0.000 | -803.615 | 0.000 | 19.25 | 18.25 | 351.31 | 1068.6 |
| Load Case 3 | 0.000 | -1.900 | 3.465 | 662.306 | 0.000 | 0.000 | 18.25 | 19.25 | 351.31 | 1127.1 |
| Load Case 3 | -1.840 | 0.000 | 3.465 | 0.000 | -626.305 | 0.000 | 19.25 | 18.25 | 351.31 | 1068.6 |

| | | | | |
|---|---|---|---|---|
| | fc | fb | FbE | Capacity |
| Load Case 1 | 9.863 | 806.83 | 9347.55 | 27.023% |
| Load Case 2 | 9.863 | 752.04 | 9347.55 | 39.398% |
| Load Case 3 | 9.863 | 587.61 | 9347.55 | 58.488% |
| Load Case 3 | | 586.11 | 9347.55 | |

*Reference: ANSI/AF&PA NDS - 2005*

# APPENDIX C

## STAAD OUTPUT

# STAAD.Pro Report

To: From:

Copy to: Date: 11/26/2008 Ref: ca/ Document1

## Job Information

| | Engineer | Checked | Approved |
|---|---|---|---|
| **Name:** | mbm | | |
| **Date:** | 11/25/2008 | | |

**Structure Type** SPACE FRAME

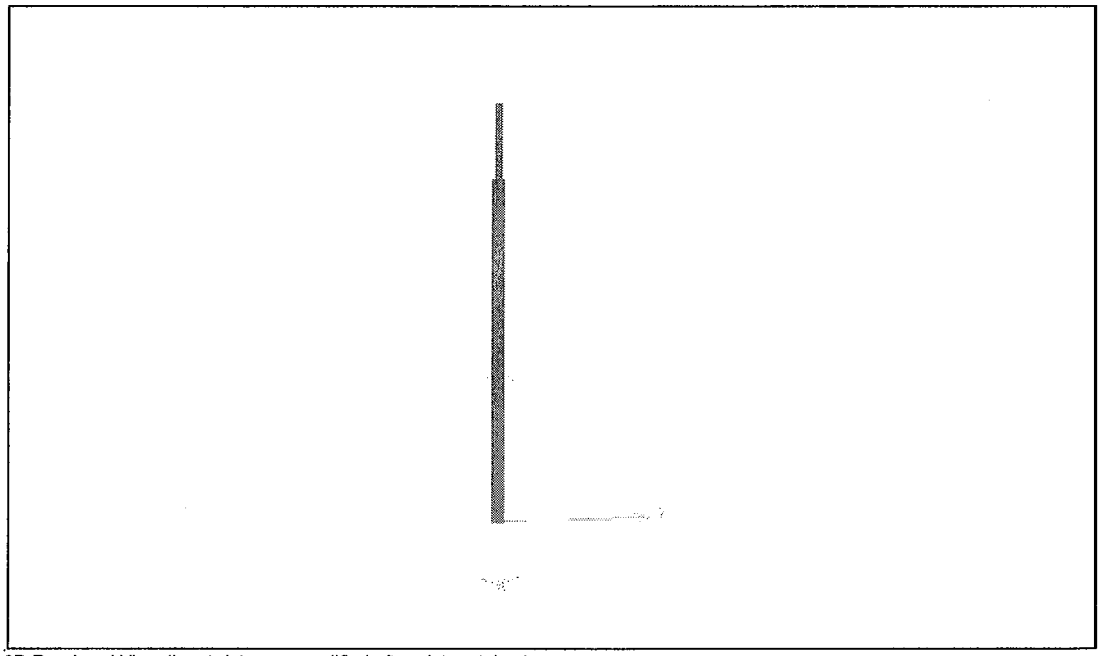
| | | | |
|---|---|---|---|
| Number of Nodes | 3 | Highest Node | 3 |
| Number of Elements | 2 | Highest Beam | 2 |

| | |
|---|---|
| Number of Basic Load Cases | 4 |
| Number of Combination Load Cases | 0 |

*Included in this printout are data for:*
**All** The Whole Structure

*Included in this printout are results for load cases:*

| Type | L/C | Name |
|---|---|---|
| Primary | 1 | LOAD CASE 1 |
| Primary | 2 | LOAD CASE 2 |
| Primary | 3 | LOAD CASE 3 |
| Primary | 4 | LOAD CASE 4 |



3D Rendered View (Input data was modified after picture taken)

## Basic Load Cases

| Number | Name |
|---|---|
| 1 | LOAD CASE 1 |
| 2 | LOAD CASE 2 |
| 3 | LOAD CASE 3 |
| 4 | LOAD CASE 4 |

## Beam Loads : 1 LOAD CASE 1

| Beam | Type | Direction | Fa | Da (in) | Fb | Db | Ecc. (in) |
|---|---|---|---|---|---|---|---|
| 1 | UNI lbf/ft | GY | 42.000 | - | - | - | - |
| 2 | UNI lbf/ft | GY | 42.000 | - | - | - | - |
| | CON kip | GY | 0.234 | 90.000 | - | - | - |
| | CON kip | GZ | -0.590 | 90.000 | - | - | - |

## Selfweight : 1 LOAD CASE 1

| Direction | Factor |
|---|---|
| Z | -1.000 |

## Beam Loads : 2 LOAD CASE 2

| Beam | Type | Direction | Fa | Da (in) | Fb | Db | Ecc. (in) |
|---|---|---|---|---|---|---|---|
| 1 | UNI lbf/ft | GX | 43.200 | - | - | - | - |

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| 2 | UNI lbf/ft | GX | 27.600 | - | - | - | - |
| | CON kip | GZ | -0.590 | 90.000 | - | - | - |
| | CON kip | GX | 0.180 | 90.000 | - | - | - |

## Selfweight : 2 LOAD CASE 2

| Direction | Factor |
|---|---|
| Z | -1.000 |

## Beam Loads : 3 LOAD CASE 3

| Beam | Type | Direction | Fa | Da (in) | Fb | Db | Ecc. (in) |
|---|---|---|---|---|---|---|---|
| 1 | UNI lbf/ft | GY | 32.400 | - | - | - | - |
| 2 | UNI lbf/ft | GY | 32.400 | - | - | - | - |
| | CON kip | GY | 0.118 | 90.000 | - | - | - |
| | CON kip | GZ | -0.590 | 90.000 | - | - | - |

## Selfweight : 3 LOAD CASE 3

| Direction | Factor |
|---|---|
| Z | -1.000 |

## Beam Loads : 4 LOAD CASE 4

| Beam | Type | Direction | Fa | Da (in) | Fb | Db | Ecc. (in) |
|---|---|---|---|---|---|---|---|
| 1 | UNI lbf/ft | GX | 32.400 | - | - | - | - |
| 2 | UNI lbf/ft | GX | 26.400 | - | - | - | - |
| | CON kip | GZ | -0.590 | 90.000 | - | - | - |
| | CON kip | GX | 0.118 | 90.000 | - | - | - |

## Selfweight : 4 LOAD CASE 4

| Direction | Factor |
|---|---|
| Z | -1.000 |

## Beam Force Detail Summary

*Sign convention as diagrams:- positive above line, negative below line except Fx where positive is compression. Distance d is given from beam end A.*

| | | | | Axial | Shear | | Torsion | | Be |
|---|---|---|---|---|---|---|---|---|---|
| | Beam | L/C | d (in) | Fx (kip) | Fy (kip) | Fz (kip) | Mx (kip·in) | My (kip·in) | |
| Max Fx | 1 | 1:LOAD CASE 1 | 0.000 | **3.465** | -2.544 | 0.000 | 0.000 | 0.000 | |
| Min Fx | 2 | 1:LOAD CASE 1 | 120.000 | **-0.000** | 0.000 | 0.000 | 0.000 | 0.000 | |

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| Max Fy | 2 | 3:LOAD CASE 3 | 120.000 | -0.000 | **0.000** | 0.000 | 0.000 | 0.000 |
| Min Fy | 1 | 1:LOAD CASE 1 | 0.000 | 3.465 | **-2.544** | 0.000 | 0.000 | 0.000 |
| Max Fz | 1 | 2:LOAD CASE 2 | 0.000 | 3.465 | 0.000 | **2.400** | 0.000 | -803.615 |
| Min Fz | 2 | 2:LOAD CASE 2 | 120.000 | -0.000 | 0.000 | **-0.000** | 0.000 | -0.000 |
| Max Mx | 1 | 1:LOAD CASE 1 | 0.000 | 3.465 | -2.544 | 0.000 | **0.000** | 0.000 |
| Min Mx | 1 | 1:LOAD CASE 1 | 0.000 | 3.465 | -2.544 | 0.000 | **0.000** | 0.000 |
| Max My | 2 | 4:LOAD CASE 4 | 120.000 | -0.000 | 0.000 | -0.000 | 0.000 | **0.000** |
| Min My | 1 | 2:LOAD CASE 2 | 0.000 | 3.465 | 0.000 | 2.400 | 0.000 | **-803.615** |
| Max Mz | 1 | 2:LOAD CASE 2 | 0.000 | 3.465 | 0.000 | 2.400 | 0.000 | -803.615 |
| Min Mz | 1 | 1:LOAD CASE 1 | 0.000 | 3.465 | -2.544 | 0.000 | 0.000 | 0.000 |