



Meeting of the Village of Buffalo Grove Planning and Zoning Commission

Regular Meeting
February 5, 2020 at 7:30 PM

Fifty Raupp Blvd
Buffalo Grove, IL 60089-2100
Phone: 847-459-2500

I. Call to Order

II. Public Hearings/Items For Consideration

1. Consider a Text Amendment for Special Use in I District and Approval of Special Use (Trustee Johnson) (Staff Contact: Nicole Woods)
2. Consider Height Variation for a Public Safety Communication Consider Antenna to Exceed the Maximum Permissible Height (Trustee Johnson) (Staff Contact: Nicole Woods)
3. Consider Special Use in the R District and Height Variation for a Public Safety Communication Antenna (Trustee Johnson) (Staff Contact: Nicole Woods)

III. Regular Meeting

- A. Other Matters for Discussion
- B. Approval of Minutes
- C. Chairman's Report
- D. Committee and Liaison Reports
- E. Staff Report/Future Agenda Schedule
- F. Public Comments and Questions

IV. Adjournment

The Planning and Zoning Commission will make every effort to accommodate all items on the agenda by 10:30 p.m. The Board, does, however, reserve the right to defer consideration of matters to another meeting should the discussion run past 10:30 p.m.

V. Action Items

The Village of Buffalo Grove, in compliance with the Americans with Disabilities Act, requests that persons with disabilities, who require certain accommodations to allow them to observe and/or participate in this meeting or have questions about the accessibility of the meeting or facilities, contact the ADA Coordinator at 459-2525 to allow the Village to make reasonable accommodations for those persons.



Action Item : Consider a Petition to the Village of Buffalo Grove for a Text Amendment to Section 17.48.020C (Special Uses) in the Industrial District, Which Adds Language Concerning Incidental Retail Uses and Approval of a Special Use for an Incidental Retail Use at an Existing Storage Facility in the Industrial District.

Recommendation of Action

Staff recommends approval, subject to the conditions in the attached staff report.

The property at 847 Deerfield Road is currently improved with a Metro Storage facility approved by Ordinance 2016-055. The petitioners, Bob Heilman on behalf Metro Storage LLC are requesting approval of a special use to sell packing and shipping materials at the existing storage facility at 847 Deerfield Road. The Zoning Code in the Industrial district does not list incidental retail uses to a storage facility as either a permitted or a special use. Hence, the Petitioner is seeking a request for both a text amendment to include the language which adds incidental retail uses, and approval of a special use for an incidental retail use at an existing storage facility in the Industrial District.

ATTACHMENTS:

- Staff Report (DOCX)
- Plan Set (PDF)

Trustee Liaison
Johnson

Staff Contact
Nicole Woods, Community Development

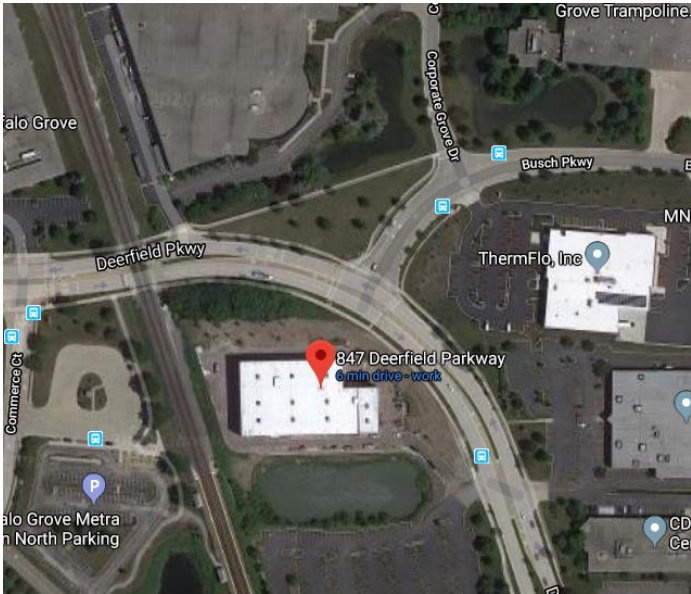
Wednesday, February 5, 2020	
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MEETING DATE:	February 5, 2020
SUBJECT PROPERTY LOCATION:	847 Deerfield Parkway
PETITIONER:	Bob Heilman on behalf of Metro Storage LLC
PREPARED BY:	Rati Akash, Village Planner
REQUEST:	Petition to the Village of Buffalo Grove for a text amendment to Section 17.48.020C (Special uses) in the Industrial District, which adds language concerning incidental retail uses and approval of a special use for an incidental retail use at an existing storage facility in the Industrial District.
EXSITING LAND USE AND ZONING:	The property is improved with the storage facility and is currently zoned Industrial (I).
COMPREHENSIVE PLAN:	The approved Village Comprehensive Plan calls for this property to be Industrial.

PROJECT OVERVIEW

The property at 847 Deerfield Road is currently improved with a Metro Storage facility approved by Ordinance 2016-055. The petitioners, Bob Heilman on behalf Metro Storage LLC are requesting approval of a special use to sell packing and shipping materials at the existing storage facility at 847 Deerfield Road. The 150 square foot retail space will be located within the existing 1,000 square foot office space.

The Zoning Code in the Industrial district does not list incidental retail uses to a storage facility as either a permitted or a special use. Hence, the Petitioner is seeking a request for both a text amendment to include the language which adds incidental retail uses, and approval of a special use for an incidental retail use at an existing storage facility in the Industrial District.



PLANNING AND ANALYSIS

Zoning History

- In October 2016, Metro Storage LLC received approval for a preliminary plan approval for a three story 117,612 square foot self-storage building at 847 Deerfield Parkway.
- Pursuant to the Village Code, self-storage facilities are a permitted use in the Industrial Zoning District.
- Metro Storage existing hours of operation are Monday to Sunday between 9:30 am – 6:00 pm.
- As per the site plan from 2016, the property has 12 designated parking spaces. The Petitioner has mentioned the retail component for packaging material is an ancillary use to the main self-storage facility, and hence will not drive additional customers to this location.

Proposed Text Amendment

- Pursuant to the Zoning Ordinance, the Industrial District does not allow incidental retail uses to a storage facility as either a permitted or a special use.
- The following includes the text for the special uses permitted in the Industrial District as detailed in Section 17.48.020C. (Industrial district) as well as the proposed text amendment that is in bold under Subsection C.14.a:

Subsection C. Special Uses. The following special uses may be permitted in specific situations in accordance with the procedures outlined in Chapter 17.28 of this Title, as appropriate:

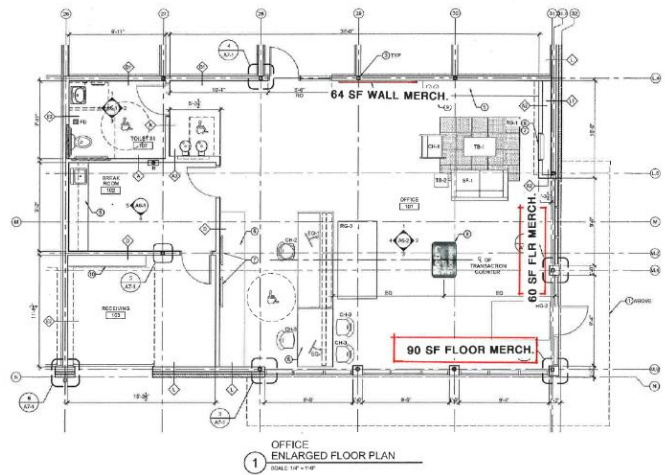
14. Retail uses, accessory to the primary use located on the premises, subject to the following conditions:

- a. Such retail use only sells products which are manufactured on the premises, **or are considered incidental to the primary use,***
 - b. Such retail use does not occupy more than five percent or one thousand square feet, whichever is less, of the floor area of the primary building or structure located on the lot or parcel involved,*
 - c. The retail use does not require outside signs or storage, other than an identification sign not exceeding ten square feet, and otherwise in accordance with the sign ordinance of the Village,*
 - d. An additional parking area is provided; the area to have such additional required space as if the retail use was in addition to the floor area of the primary use and as required by Chapter 17.36 for a comparable use,*
 - e. Such special access requirements as are deemed necessary by the Village so as not to interfere with established public street traffic to and from the primary use;*
- Based on the proposed language of the text amendment, the Village has the opportunity to review any future requests on a case by case basis as a special use.

Proposed Special Use

- The petitioner is proposing to have the ability to sell items such as cylinder locks for the self-storage units, and packaging material such as tape, bubble wrap and boxes.

- The floor plan shows items which will be displayed on 3 portions of the slat wall in the 1000 square feet office space.
- The retail space will occupy a total area of approximately 150 square feet.
- The 150 square foot retail space occupies less than the required 1,000 square feet of the Metro Storage building area of 117,612 square feet, as required by code.
- The retail space does not have any outside identification signs.
- Pursuant to the Zoning Code, 1 space is required for every 250 square feet of retail space. In this case, the 150 square foot space does not require any parking spaces. Additionally, The Petitioner has mentioned this is an ancillary use to the main self-storage facility and will not drive any more people.
- The Petitioner has mentioned that no additional Staff will be required for this retail space. Additionally, the office will not be remodeled or reconfigured.



STANDARDS

Pursuant to the Zoning Ordinance, the proposed use does require a Special Use in the "I" Industrial District. The following criteria shall be met:

1. *The special use will serve the public convenience at the location of the subject property; or the establishment, maintenance or operation of the special use will not be detrimental to or endanger the public health, safety, morals, comfort, or general welfare;*
2. *The location and size of the special use, the nature and intensity of the operation involved in or conducted in connection with said special use, the size of the subject property in relation to such special use, and the location of the site with respect to streets giving access to it shall be such that it will be in harmony with the appropriate, orderly development of the district in which it is located;*
3. *The special use will not be injurious to the use and enjoyment of other property in the immediate vicinity of the subject property for the purposes already permitted in such zoning district, nor substantially diminish and impair other property valuations with the neighborhood;*
4. *The nature, location and size of the buildings or structures involved with the establishment of the special use will not impede, substantially hinder or discourage the development and use of adjacent land and buildings in accord with the zoning district within which they lie;*
5. *Adequate utilities, access roads, drainage, and/or other necessary facilities have been or will be provided;*
6. *Parking areas shall be of adequate size for the particular special use, which areas shall be properly located and suitably screened from adjoining residential uses, and the entrance and exit driveways to and from these parking areas shall be designed so as to prevent traffic hazards, eliminate nuisance and minimize traffic congestion in the public streets.*

The petitioner's response to the standards are included with the packet.

PUBLIC COMMENTS

Pursuant to Village Code, the contiguous property owners were notified and a public hearing sign was posted on the subject property. The posting of the public hearing sign and the mailing of the notifications were both completed within the required timeframe. As of the date of this report, the Village has received one call inquiry from the public or adjacent property owners but no concerns have been expressed.

STAFF RECOMMENDATION

Staff recommends approval for a text amendment to Section 17.48.020C (Special uses) in the Industrial District, which adds language concerning incidental retail uses and approval of a special use for an incidental retail use at an existing storage facility in the Industrial District:

1. The special use is granted to Metro Storage LLC and said special use does not run with the land.
2. The special use granted may be assignable to subsequent petitioners seeking assignment of this special use as follows:
 - i. Upon application of a petition seeking assignment of this special use, the Village of Buffalo Grove, in their sole discretion, may approve the assignment administratively, or may refer it to the Planning & Zoning Commission and/or the Village Board for a public hearing.
 - ii. Such assignment shall be valid only upon the written approval of the Village of Buffalo Grove granting said assignment, which may be granted or denied for any reason.

ACTION REQUESTED

The Planning & Zoning Commission (PZC) shall open the public hearing and take public testimony and the PZC shall then make a recommendation to the Village Board.



November 21, 2019

Metro Storage – Request for Retail use in Existing Office Space

Metro Storage is requesting the ability to sell (retail) supplies to our customers consistent with packing and storing belongings. The items would be cylinder locks for the unit doors, tape, bubble wrap, and boxes. The items would be displayed on the existing slatwall in the office (approx. 5' x 8') and mobile cardboard box displays (2 or 3). Please see attached photos.

Sales would be transacted at the customer counter by the Property Manager. No additional staff or space is required for this additional service. Also, no remodeling or reconfiguration will be required.

Metro operates retail sales out of all 140+ other stores in the same manner we propose at this location. We feel it simply good business to provide our customers with supplies on site that they require for storing their property.

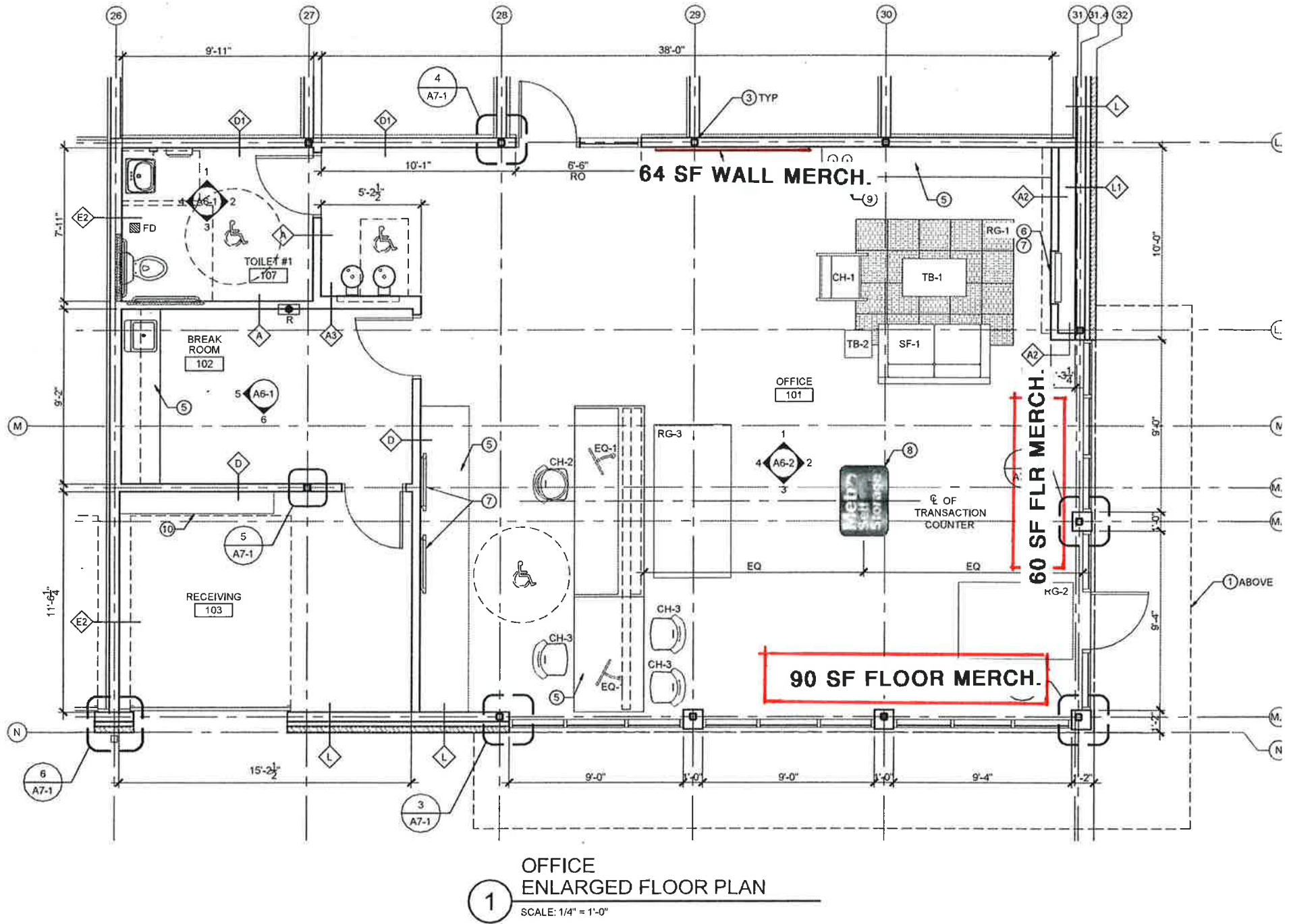
The office, as existing, is approx. 1,000 sqft and contains the customer service counter, breakroom, restroom, coffee station, merchandising wall and seating area. As in our other facilities, customers either park near the office or in the designated loading bays and make their way into the office. The existing entrances to the office and parking areas will not change.

Metro's existing hours of operation will remain as they are: Mon-Fri 9:30am – 6:00pm (Property Manager on Duty) with slightly shorter hours on the weekend. Customer access hours by proprietary PIN will stay unchanged at 6:00 am – 10:00 pm daily.

Please see the attached office floor plan as well as a site plan for the facility.

Robert M Heilman
VP of Development
Registered Architect

Attachment: Plan Set (Consider a Text Amendment for Special Use in I District and Approval of Special Use)



17.28.040 - Criteria for special use.

A. All special uses shall meet the following criteria:

1. The special use will serve the public convenience at the location of the subject property; or the establishment, maintenance or operation of the special use will not be detrimental to or endanger the public health, safety, morals, comfort, or general welfare;

Response: Metro Storage's retail sale of packing materials and storage supplies, made available to customers of the self-storage facility, is a convenience to the facilities' customers and is not detrimental to the public welfare. The sale of packing materials and storage supplies is complementary to the operation of a convenient, customer-friendly self storage business and does not alter the nature of the principal business being transacted on the property. The retail sales area is located within the existing 1,000 sq. ft. office/reception area, is an enhancement to the customer service provided by Metro Storage, and is comparable to an accessory use that is compatible with, and de minimis in proportion to, the principal use. The items for sale will be purchased by Metro Storage customers who are renting storage space at the facility. Based on its experience operating 100+ other self-storage locations which sell packing materials and storage supplies, Metro Storage anticipates only a small percentage of retail sales to non-customers.

2. The location and size of the special use, the nature and intensity of the operation involved in or conducted in connection with said special use, the size of the subject property in relation to such special use, and the location of the site with respect to streets giving access to it shall be such that it will be in harmony with the appropriate, orderly development of the district in which it is located;

Response: The modestly sized area for display and retail sale of packing materials and storage supplies is located within the existing 1,000 sq. ft. office/reception area. The items for retail sale will be displayed on the existing slatwall in the office and on 2 or 3 mobile cardboard box displays. The addition of retail sales of packing materials and storage supplies to the activities conducted within Metro Storage will be a convenience to customers and will enhance the customers' experience. The modest scale of the retail display area within the office/reception area, and the limited range of convenience items targeted for sale to self-storage customers, indicates that this special use is harmonious with the self-storage business and will have no adverse affects on other businesses in the vicinity.

3. The special use will not be injurious to the use and enjoyment of other property in the immediate vicinity of the subject property for the purposes already permitted in such zoning district, nor substantially diminish and impair other property valuations with the neighborhood;

Response: The retail sale of packing materials and storage supplies within the office/reception area is an complementary, accessory activity to the principal business being operated by Metro Storage. The modest retail sales area is a convenience and a benefit to the self-storage customers and will have no impact on the value of other properties and the businesses that operate in the neighborhood.

4. The nature, location and size of the buildings or structures involved with the establishment of the special use will not impede, substantially hinder or discourage the development and use of adjacent land and buildings in accord with the zoning district within which they lie;

Response: Metro Storage's self-storage facility is existing. The special use of retail sales of packing materials and office supplies will be conducted within the office of the existing building. The sale of packing materials and storage supplies is complementary to the operation of a convenient, customer-friendly self storage business and does not alter the nature of the principal business being transacted on the property. Accordingly, the special use consisting of a retail sales area for the sale of items which are used by customer of the storage facility, located within the office/reception area, will not impede, substantially hinder or discourage the development and use of adjacent land and buildings.

5. Adequate utilities, access roads, drainage, and/or other necessary facilities have been or will be provided;

Response: Not applicable.

6. Parking areas shall be of adequate size for the particular special use, which areas shall be properly located and suitably screened from adjoining residential uses, and the entrance and exit driveways to and from these parking areas shall be designed so as to prevent traffic hazards, eliminate nuisance and minimize traffic congestion in the public streets.

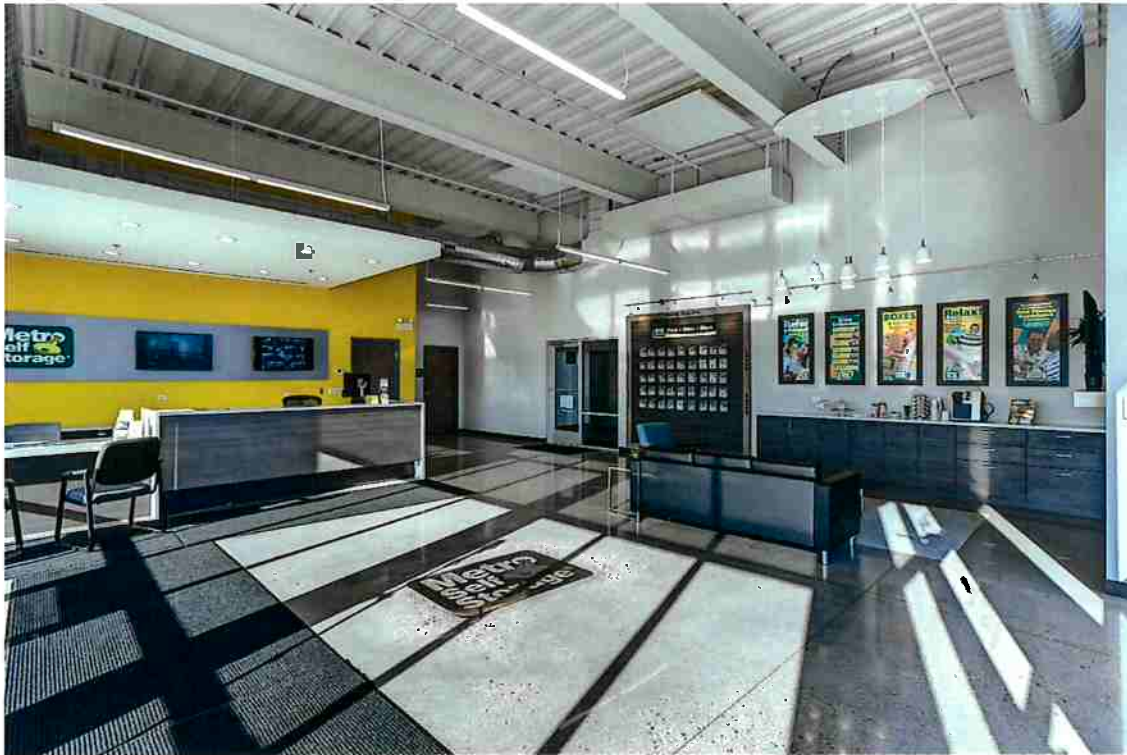
Response: The addition of retail sales of packing materials and storage supplies will be conducted within the office area and will have minimal impact, if any, on traffic or parking because the items for sale will be purchased by Metro Storage customers who are renting storage space at the facility. Based on its experience operating 140+ other self-storage locations which sell packing materials and storage supplies, Metro Storage anticipates only a small percentage of retail sales to non-customers.



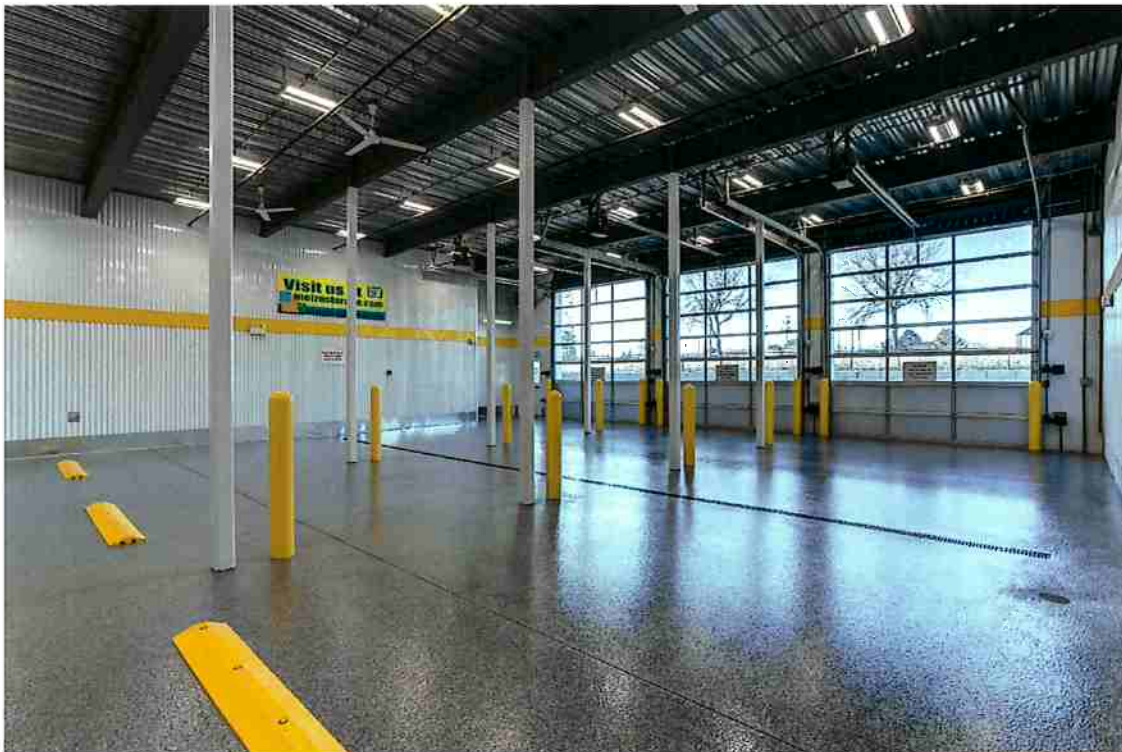
Metro Storage – Buffalo Grove IL – Elevator Bay and Typical Corridor



Metro Storage – Buffalo Grove IL – Office Exterior



Metro Storage - Buffalo Grove IL - Office



Metro Storage – Buffalo Grove IL – Loading Bays



Action Item : A Variation the Zoning Ordinance Section 17.32 to Allow for the Installation of a Public Utility Facility (Public Safety Communication Antenna) to Exceed the Maximum Permissible Height of 60'.

Recommendation of Action

Staff recommends approval, subject to the conditions in the attached staff report.

Village of Buffalo Grove is requesting to replace an existing ground mounted communication antenna located at Fire Station 27, located at 100 Half Day Road. The communication antenna will be used for emergency communications and for automated water meter reading at Public Works. The existing 80 foot tall ground mounted communication antenna on the north side of fire station 27 is in poor condition, and hence needs to be replaced. The proposed height of the communication tower measures 100 feet. Pursuant to the Municipal Code, Public Utility Facility (Public Safety Communication Antenna) must not exceed the maximum permissible height of 60 feet.

ATTACHMENTS:

- Staff Report (DOCX)
- Plan Set (PDF)

Trustee Liaison

Johnson

Staff Contact

Nicole Woods, Community Development

Wednesday, February 5, 2020	
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VILLAGE OF BUFFALO GROVE

PLANNING & ZONING COMMISSION

STAFF REPORT

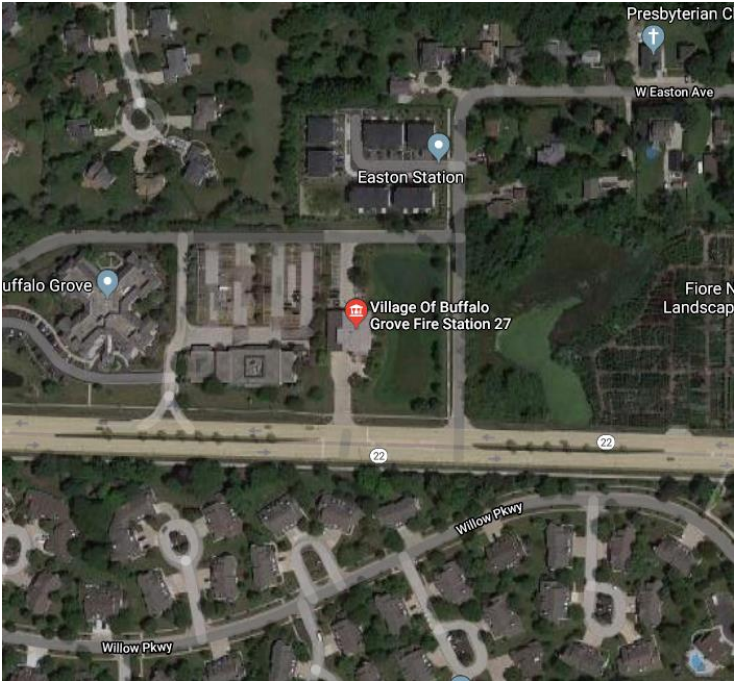
MEETING DATE:	February 5, 2020
SUBJECT PROPERTY LOCATION:	100 Half Day Road
PETITIONER:	Village of Buffalo Grove
PREPARED BY:	Rati Akash, Village Planner
REQUEST:	A variation the Zoning Ordinance Section 17.32 to allow for the installation of a Public Utility Facility (Public Safety Communication Antenna) to exceed the maximum permissible height of 60’.
EXSITING LAND USE AND ZONING:	The property is improved with a Fire Station building currently located in the Industrial District.
COMPREHENSIVE PLAN:	The approved Village Comprehensive Plan calls for this property and the immediate neighborhood to be Industrial.

PROJECT BACKGROUND

Village of Buffalo Grove is requesting to replace an existing ground mounted communication antenna located at Fire Station 27, located at 100 Half Day Road. The communication antenna will be used for emergency communications at the Fire Stations 26 and 27, and for automated water meter reading at Public Works.

The existing 80 foot tall ground mounted communication antenna on the north side of fire station 27 is in poor condition, and hence needs to be replaced.

The proposed height of the communication tower measures 100 feet. In contrast to Fire Station 26 which is located in a residential district; Fire Station 27 is located in the Industrial district and Public Utility Facility (Public Safety Communication Antenna) is a permitted use up to 60 feet in height. Pursuant to the Municipal Code, Public Utility Facility (Public Safety Communication Antenna) must not exceed the maximum permissible height of 60 feet.



Attachment: Staff Report (Consider Height Variation for a Public Safety Communication Antenna to Exceed the Maximum Height)

PLANNING & ZONING ANALYSIS

Communication Antenna Use

- The communication antennas will continue to be used for emergency communications at the Fire Station 26 and 27, as well as for automated water reading at Public Works.
- The communication antennas will not be used for any commercial use.
- Unlike the antenna at Fire Station 26 which is located in a residential district, Fire Station 27 is located in an Industrial district by which Public Utility Facility (Public Safety Communication Antenna) is a permitted use up to 60 feet in height.

Existing Communication Antenna

- The existing ground mounted communication antenna is located on the north side of Fire Station 27 building, and was constructed in 1991 as shown in a red dot in *Image A*.
- The communication antenna is 80 feet tall.
- This existing communication antenna is located approximately 200' from Easton Avenue.
- This existing communication antenna is presently in a poor structural condition and has to be replaced as it poses a safety concern.



Image A

Proposed Location and Height of communication tower

- The Village of Buffalo Grove is proposing to replace a communication antenna right behind the Fire Station 27 building on the North side, with a new communication antenna which will be offset by approximately 9 feet to the east of the existing communication antenna as shown in a blue dot in *Image A*.
- The proposed communication antenna will be setback approximately 191 feet from the Easton Avenue which the meets setback requirements.
- The communication antenna is proposed to be 100 feet for more reliable coverage, and to meet Buffalo Grove's growing tree canopy.



Photo-simulated Image

- The proposed height of the communication antenna will be 100 feet, and is 20 feet greater in height of the existing 80 foot tall communication antenna.

VARIATIONS REQUESTED

A height variation from the Zoning Ordinance Section 17.32 to allow for the installation of a Public Utility Facility (Public Safety Communication Antenna) to exceed the maximum permissible height of 60'.

DEPARTMENTAL REVIEWS

Village Department	Comments
Engineering	The Engineering Department has reviewed the proposed communication antenna and have no concerns with the proposed location of the communication antenna.

SURROUNDING PROPERTY OWNERS

Pursuant to Village Code, the contiguous property owners were notified and a public hearing sign was posted on the subject property. The posting of the public hearing sign and the mailed notifications were completed within the prescribed timeframe as required. As of the date of this Staff Report, the Village has received 5 calls inquiring about the proposed ground mounted communication tower at the subject property, however no concerns were raised.

STANDARDS

The Planning & Zoning Commission is authorized to grant variations on the following criteria:

1. The proposed variation will not alter the essential character of the neighborhood;
2. There are practical difficulties or particular hardships in carrying out the variation request;
3. The proposed variation will not be detrimental to public health safety and welfare.

The petitioner has provided a written response to the standards for a variation which are included in this packet.

STAFF RECOMMENDATION

Village staff recommends approval for the purpose of installation of a communication antenna to exceed 40 feet in height (maximum allowed 60 feet in height) from the ground level:

- 1) The proposed communication antenna shall be installed in accordance with the documents and plans submitted as part of this petition.

ACTION REQUESTED

The Planning & Zoning Commission (PZC) shall open the public hearing and take public testimony concerning the variation. The PZC shall make a final decision on whether or not to approve the variation.

MEMORANDUM

DATE: December 1, 2019

TO: Planning and Zoning Commission

FROM: Rati Akash, Village Planner
Mike Skibbe, Deputy Director of Public Works

SUBJECT: Village Antenna Towers at Fire Station 26 & 27

OVERVIEW

The Village of Buffalo Grove is seeking an amendment to the special use for the replacement of two existing antenna towers in Fire Station 26 and Fire Station 27 respectively. The two proposed towers would be 100 foot tall, self-supporting, ground mounted antennas. The communications devices mounted on the towers would only be Village specific devices, and no commercial use devices are proposed. The towers are critical to the connectivity of emergency communications at the Fire Stations, as well as for our automated water meter reading antenna in Public Works.

SITE SPECIFICS

Fire Station 27 – 100 Half Day Road

The existing tower at Fire Station 27 is a, 80 foot tall self-supporting tower mounted just North of the Fire Station itself. The tower was constructed with the new Fire Station in 1991. It is in poor overall condition, with deteriorating structural members and a leaning concrete foundation pad. This tower supports both the computer connection to Village Hall for onsite personnel, and emergency communication radio equipment.

The new tower would increase in height by 20 feet to clear the increase in height of the tree canopy throughout the Village. It would be constructed just north of the existing tower, both to limit the change in view as well as to allow the new tower to be built before the existing tower is removed. Please see the attached diagrams for specific measurements.

Fire Station 26 – 109 Deerfield Parkway

The existing tower at Fire Station 26 is an 80 foot tall, roof mounted antenna tower with guy wire support system. It is mounted on the roof of the station which was constructed in 1981, and last revised by increasing its height due to tree canopy in 2008. The guy wire anchor system to the roof deck no longer meets industry standard, and rather than try to modify an aged tower, we propose to move it to a more typical ground mounted, self-supporting tower design.

A similar roof mounted tower, at Village Hall, failed in 2009 by falling off the roof. The Village Hall tower was moved to the ground in a similar replacement project. We want to replace this tower and avoid any potential of a similar fate.

The proposed tower would be mounted on the ground just south of the Fire Station, as close as feasible to its current location. Since the 80 foot tall antenna tower was mounted to the top of the structure, the overall height at this location will be similar with the 100 foot tall ground mounted antenna. We believe the overall appearance will be similar, if not less impactful to the neighborhood. The new tower will not require the guy-wire support system which added to the overall appearance of the existing tower.

Please see the attached diagrams with specific dimensions.

REQUESTS

Fire Station 26

Petition for an amendment to the special use Ordinance No. 90-83 for the preliminary plan approval of fire station 26.

Petition for variation to Zoning Ordinance Section 17.32 allow for the installation of self-supporting communication antennas which exceeds the maximum permissible height of 60'.

Fire Station 27

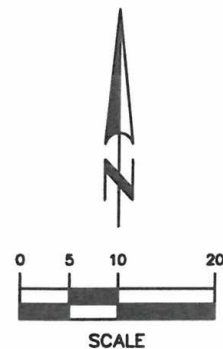
Petition for an amendment to the special use Ordinance No. 90-43 for the preliminary plan approval of fire station 27.

Petition for variation to Zoning Ordinance Section 17.32 allow for the installation of self-supporting communication antennas which exceeds the maximum permissible height of 60'.

The Village of Buffalo Grove is seeking to replace two existing antennas in both Fire Station 26 and Fire Station 27, with two new proposed self-supporting ground mounted antennas which would be 100 foot tall.

CC: Chris Stilling, Deputy Village Manager
Rati Akash, Village Planner

H:\Agreements\Antenna Tower\2019-1201 PZC Antenna Tower Memo.docx



1. ELEVATIONS SHOWN ARE ON THE NORTH AMERICAN VERTICAL DATUM OF 1988.
2. BENCHMARK: CHISELED SQUARE ON LIGHT POLE BASE AS SHOWN:
ELEVATION: 691.78
3. AFFECTS PERMANENT TAX INDEX NUMBER: 15-27-123-002
4. SURFACE EVIDENCE OF UNDERGROUND IMPROVEMENTS, IF ANY, SHOWN HEREON IS BASED ON PHYSICAL OBSERVATIONS AND RECORDS, IF ANY, PROVIDED. NO DELINEATION REPORT OF UTILITY MARKERS OR UTILITY NOTATIONS BY A UTILITY MARKING SERVICE WAS PROVIDED FOR USE IN THE PREPARATION OF THIS SITE SURVEY. MARKERS SHOWN HEREON WERE AS FOUND ON SITE.
5. NO TITLE WORK WAS PROVIDED FOR USE IN THE PREPARATION OF THIS SITE SURVEY. FOR BUILDING LINES, EASEMENTS AND OTHER RESTRICTIONS NOT SHOWN HEREON, REFER TO DEEDS, ABSTRACTS, TITLE POLICIES, SEARCHES OR COMMITMENTS, CONTRACTS AND LOCAL BUILDING AND ZONING ORDINANCES.
6. PROPOSED 100' FREE STANDING TOWER LOCATION:
NAD 83
LATITUDE NORTH 42°11'48.10" (42.19669°)
LONGITUDE WEST 87°57'39.38" (87.96094°)
WITHIN TOLERANCES SET BY FAA IN 1A CERTIFICATE REQUIREMENTS.
7. A.M.S.L. HEIGHT OF GROUND ELEVATION: 692

WITHIN TOLERANCES SET BY FAA IN 1A CERTIFICATE REQUIREMENTS.
8. TOPOGRAPHICAL INFORMATION AND IMPROVEMENTS SHOWN HEREON ARE BASED ON FIELD OBSERVATIONS AND MEASUREMENTS PERFORMED OCTOBER 31, 2019. SOME GROUND IMPROVEMENTS MAY NOT BE SHOWN DUE TO SNOW COVER.
9. THIS SITE SURVEY DOES NOT REPRESENT A BOUNDARY SURVEY OF THE SUBJECT PROPERTY.

LEGEND	
—W—	WATER MARKINGS
—S—	SANITARY SEWER MARKINGS
—E—	ELECTRIC MARKINGS

DATED AT PALOS HILLS, ILLINOIS, THIS 7TH DAY OF NOVEMBER, A.D. 2020.




RICHARD P. URCHELL
IPLS No. 035-003183
LICENSE RENEWAL DATE: NOVEMBER 30, 2020

[illegible]

LANDMARK
ENGINEERING LLC
DESIGN FIRM REGISTRATION NO. 184-005577
7808 WEST 103RD STREET
PALOS HILLS, ILLINOIS 60465-1529
Phone (708) 599-3737
PROJECT No. 19-10-117

**BUFFALO GROVE
FIRE STATION 27**
100 HALF DAY ROAD
BUFFALO GROVE, IL
LAKE COUNTY

SHEET TITLE

SITE SURVEY

SHEET NUMBER

SS 1 OF 1

During your testimony at the Public Hearing you need to testify and present your case for the variance being requested. During your testimony you need to affirmatively address the three standards listed below

The Planning & Zoning Commission is authorized to grant variations to the regulations of the Municipal Code based upon findings of fact which are made based upon evidence presented at the hearing that:

1. The proposed variation will not alter the essential character of the neighborhood;

Your Evidentiary Statement:

The proposed variation will not alter the essential character of the neighborhood. The Village of Buffalo is proposing to replace the existing ground mounted communication antenna located on the Northside of Fire Station 26 with a ground mounted communication antenna offset by approximately 9 feet to the east of the existing communication antenna.

2. There are practical difficulties or particular hardships in carrying out the variation request;

Your Evidentiary Statement:

- The existing roof mounted communication tower on Fire Station 26 is presently in a poor structural condition and has to be replaced for safety concerns.
- The proposed communication antenna is required to be 100 feet in height to improve the reliability of services for emergency communications.

3. The proposed variation will not be detrimental to the public health safety and welfare.

Your Evidentiary Statement:

The proposed communication antenna will not be detrimental to the public health safety and welfare of the Community.







Attachment: Plan Set (Consider Height Variation for a Public Safety Communication Antenna to Exceed the Maximum Height)

EXCLUSION ANALYSIS

Fire Station 27

**100 Half Day Road
Buffalo Grove, Lake County, Illinois**

EBI Project No. 6119005810

December 10, 2019

Prepared for:

Fullerton Engineering Consultants, Inc.
1100 E. Woodfield Road, Suite 500
Schaumburg, Illinois 60173

Prepared by:



December 10, 2019

Ms. Sylvia Hultgren
 Fullerton Engineering Consultants, Inc.
 1100 E. Woodfield Road, Suite 500
 Schaumburg, Illinois 60173

Subject: Exclusion Analysis
 Site Identifier: Fire Station 27
 Site Address: 100 Half Day Road, Buffalo Grove, Lake County, Illinois 60089
 EBI Project #6119005810

Dear Ms. Hultgren:

EBI is pleased to provide this Exclusion Analysis letter report for the proposed communications installation at the address noted above (the Subject Property). The purpose of this Exclusion Analysis is to evaluate whether the proposed wireless communications installation meets the established regulatory criteria necessary to qualify for an exemption from the Section 106 review process.

PROJECT DESCRIPTION

The proposed wireless communications installation will consist of replacing an existing tower facility. The existing tower facility was constructed in 1991 and is located adjacent to the north of an existing building. Specifically, the existing 80-foot self-support tower will be replaced by a 100-foot self-support tower directly east of the existing tower to be removed. According to information provided by the Client, the existing 80-foot tower has one 15-foot antenna mounted on top for an overall height of 95 feet above ground level (AGL). The new tower will maintain the existing antenna at 95 feet and mount a new whip antenna at a top-height of 105 feet AGL. No new ground disturbance outside the existing lease area is planned for this tower replacement. Please refer to the attached plans for a full description of the proposed installation.

REGULATORY OVERVIEW

Pursuant to Federal Communications Commission (FCC) rules implementing the National Environmental Policy Act (NEPA; 47 CFR 1.1306, Note 1), the preparation of an Environmental Assessment (EA) is not required for the mounting of antenna(s) on an existing building or antenna tower, unless the proposed facility (i) may affect districts, sites, buildings, structures or objects, significant in American history, architecture, archaeology, engineering or culture, that are listed, or are eligible for listing, in the National Register of Historic Places, or (ii) would result in human exposure to radiofrequency radiation in excess of applicable health and safety guidelines.

Further, under FCC NEPA Rules (47 CFR §1.1320), the *Nationwide Programmatic Agreement for the Collocation of Wireless Antennas (Collocation Agreement; March 16, 2001 as amended 2016)*, and the *Nationwide Programmatic Agreement for Review of Effects on Historic Properties (NPA; September 2004)*, certain undertakings which meet applicable exclusionary criteria are exempted from the Section 106 review process.

SECTION 106 REVIEW EXEMPTIONS

Antenna Installation

Based on project details provided by the Client, EBI evaluated whether the proposed antenna installation qualifies for an exemption from Section 106 Review, by evaluating it against the criteria set forth under the following:

- **Exclusion B of the 2004 NPA**

Exemption from Section 106 review for construction of a replacement tower

Based on the results of EBI's analysis, the proposed installation **does meet** the applicable exclusionary criteria set forth under the above-referenced regulatory exemption(s). As such, Section 106 review **is not** required. Please refer to the attached checklist for a complete summary of EBI's analysis of the proposed installation against the specific criteria set forth under the above-referenced regulatory exemption.

RADIO FREQUENCY RADIATION

An evaluation to determine whether radiofrequency (RF) emissions standards are met was not included as part of this Report. EBI understands that the Client will evaluate the proposed installation to ensure it will not result in human exposure to RF emissions in excess of the applicable FCC standards, as outlined in 47 CFR §1.1307(b).

CONCLUSIONS

Based on the project details provided by the Client, and the research and analysis completed by EBI, the proposed installation **does meet** the exclusionary criteria set forth in one of the existing regulatory exemptions from Section 106 review. As such, the proposed installation is recognized to have minimal or no adverse effect on historic properties and Indian religious sites or culturally significant properties, and further consultation or review under Section 106 is **not required**.

LIMITATIONS

This letter report was prepared according to the terms and conditions authorized by you. There are no intended or unintended third party beneficiaries to the contents of this letter report, unless specifically named. EBI is an independent contractor, not an employee of either the property owner or the project proponent, and its compensation was not based on the findings or recommendations made in this letter report or on the closing of any business transaction. Note that the findings of this letter report are based on the project specifications provided to EBI and described in this letter report. In the event that the design or location of the installation changes, please contact EBI as additional review and/or consultation may be required.

Thank you for the opportunity to prepare this Exclusion Analysis, and assist you with this project. Please call us if you have any questions or if we may be of further assistance.

Respectfully Submitted,



Ms. Melissa Bauer
Author/Senior Scientist



Mr. Gregory McKee
Reviewer/Project Manager
Direct# (717) 903-5399



Mr. Robert Helfrich
Program Manager

Attachments: Section 106 Review Exemption Criteria Checklist
Figures & Drawings
Supporting Documentation
Resumes

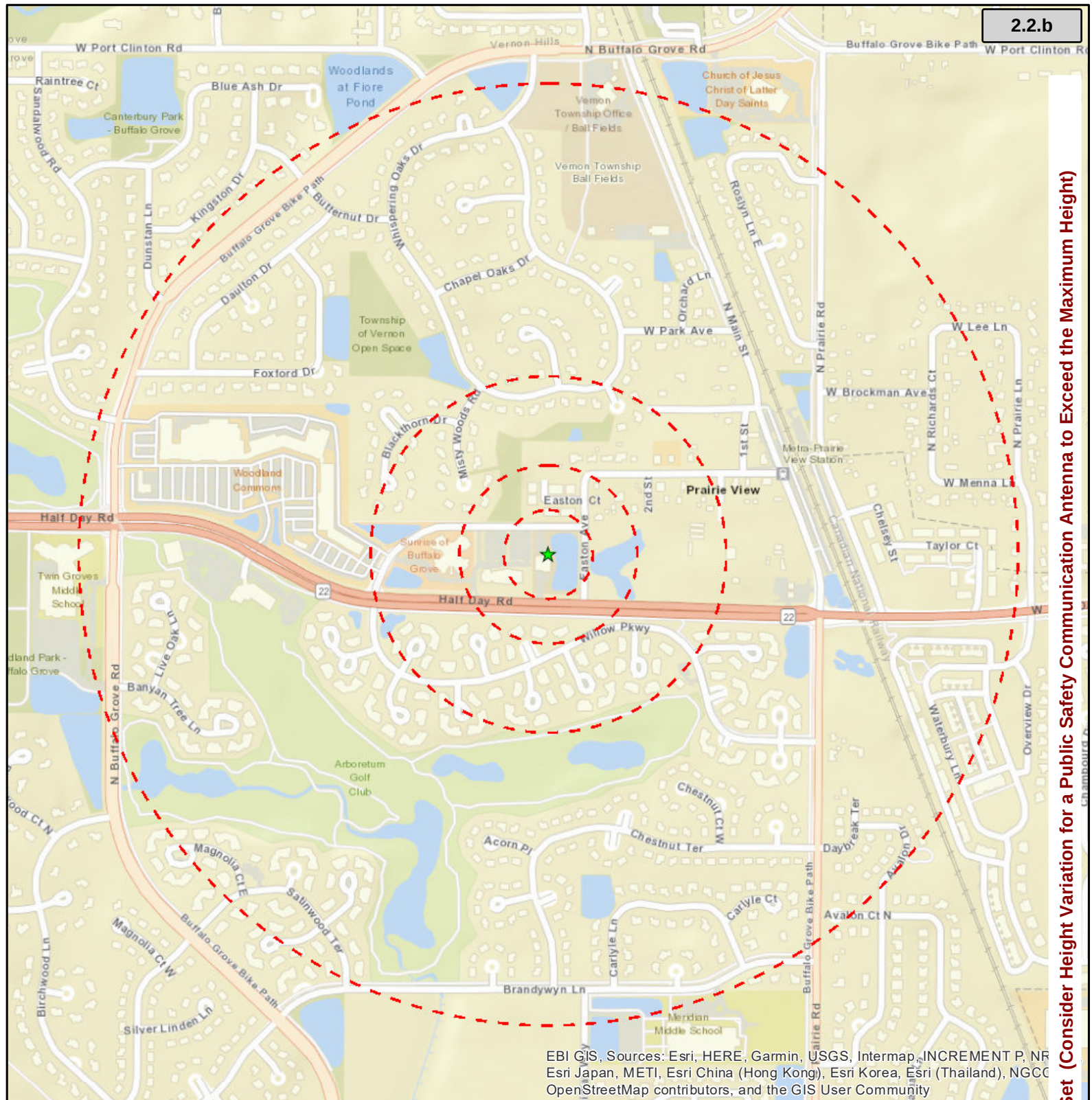
Attachment: Plan Set (Consider Height Variation for a Public Safety Communication Antenna to Exceed the Maximum Height)

**SECTION 106 REVIEW
EXEMPTION CRITERIA CHECKLISTS**

Attachment: Plan Set (Consider Height Variation for a Public Safety Communication Antenna to Exceed the Maximum Height)

EXCLUSIONS	CRITERIA		
2004 NPA EXCLUSION B	REPLACEMENT FACILITY	YES	NO
	<i>Note: All responses must be 'YES' to apply the exclusion</i>		
	The replacement tower and associated support equipment does NOT substantially increase the size of the existing tower under elements 1-3 of the definition as defined in the Collocation Agreement.	X	
	Replacement tower does not expand the boundaries of the existing leased or owned property surrounding the tower by more than 30 feet in any direction.	X	
	Replacement tower does not involve excavation outside these expended boundaries or outside any existing access or utility easement related to the site.	X	
	If the existing tower was constructed <u>after</u> March 16, 2001, a Section 106 Review and any associated environmental reviews required by the FCC's rules, have been completed.	X	

FIGURES & DRAWINGS



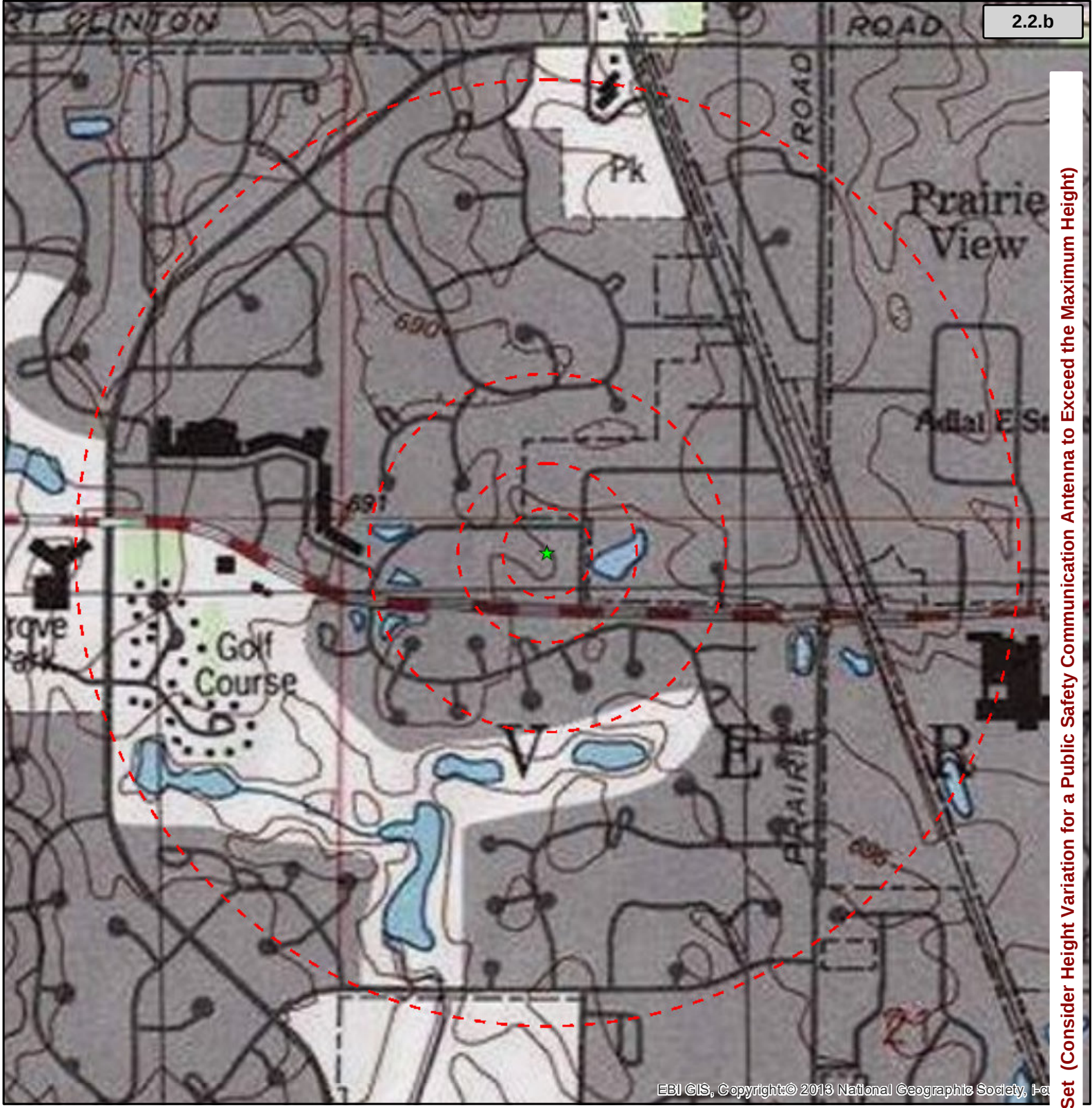
Legend

- ★ Project Site
- Site Radius at 250', 500', 1000' and 1/2 mile

Date: 12 19

Figure 1: Site Location Map

FIRE STATION 27
100 HALF DAY ROAD
BUFFALO GROVE, IL



Legend

- ★ Project Site
- Site Radius at 250', 500', 1000' and 1/2 mile

Date: 12/31/2013

Attachment: Plan Set (Consider Height Variation for a Public Safety Communication Antenna to Exceed the Maximum Height)

USGS 24K Quad: Wheeling, IL 1986

Figure 2 - Topographic Map

**FIRE STATION 27
100 HALF DAY ROAD
BUFFALO GROVE, IL**

PN: 6119005810

SUPPORTING DOCUMENTATION

(708) 526-6667 / 526-1990



E & E Systems, Inc.

26824 Legion Court
P.O. Box 159
Wauconda, IL 60084-0159

Joe Herreweyers

*Specialists in Satellite Communications,
Antenna Systems, Sound, Video & Security.*



Structural Design Report
 100' 3600 SRWD Freestanding Tower
 Site: FS27 Buffalo Grove, IL

Prepared for: URBAN COMMUNICATIONS, INC.
 by: Sabre Towers & Poles™

Job Number: 20-3050-TJH-R1

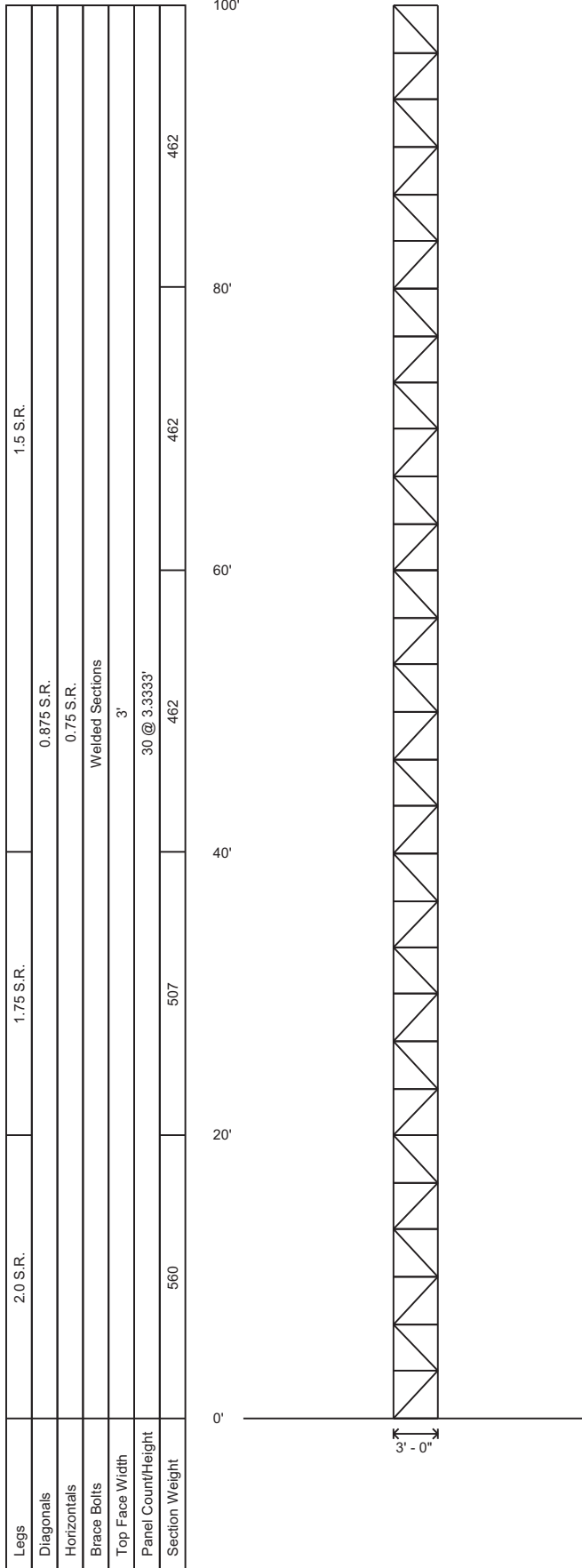
October 22, 2019

Tower Profile.....	1
Foundation Design Summary (Preliminary).....	2-3
Maximum Leg Loads.....	4
Maximum Diagonal Loads.....	5
Maximum Foundation Loads.....	6
Calculations.....	7-24



License Expires: 11-30-20

Attachment: Plan Set (Consider Height Variation for a Public Safety Communication Antenna to Exceed the Maximum Height)



Designed Appurtenance Loading

Elev	Description	Tx-Line
105	(1) 10' x 3in Whip	
100	3ft Sidearm	
100		(1) LMR-400
90	Flush Mount	
90	(1) 1' x 1' x 3in Panel	(1) CAT 6
80	Leg Dish Mount	
80	(1) 1' H.P. Dish	(1) CAT 6
53	(1) 10' x 3in Whip	
50	(2) 10' x 3in Whip	
48	3ft Sidearm	
48		(1) LMR-400
45	(2) 3ft Sidearms	
45		(2) LMR-400
26.5	(1) 3 sq. ft. EPA	(1) LMR-400
24.75	(1) 3 sq. ft. EPA	(1) LMR-400
23.583	(1) 3 sq. ft. EPA	(1) LMR-400

Design Criteria - ANSI/TIA-222-G

ASCE 7-16 Ultimate Wind Speed (No Ice)	114 mph
Wind Speed (Ice)	40 mph
Design Ice Thickness	1.50 in
Structure Class	III
Risk Category	III
Exposure Category	C
Topographic Category	1

Base Reactions

Total Foundation		Individual Footing	
Shear (kips)	4.31	Shear (kips)	2.75
Axial (kips)	15.57	Compression (kips)	81
Moment (ft-kips)	205	Uplift (kips)	77
Torsion (ft-kips)	-0.41		

Notes

- 1) All legs are A572 Grade 50.
- 2) All braces are A36
- 3) The tower model is 3600 SRWD Freestanding.
- 4) Azimuths are relative (not based on true north).
- 5) Foundation loads shown are maximums.
- 6) (4) 3/4" dia. x 39"-long F1554 grade 105 anchor bolts per leg.
- 7) Weights shown are estimates. Final weights may vary.
- 8) Tower Rating: 86.5%

Sabre Industries™
Towers and Poles

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

Information contained herein is the sole property of Sabre Communications Corporation, constitutes a trade secret as defined by Iowa Code Ch. 550 and shall not be reproduced, copied or used in whole or part for any purpose whatsoever without the prior written consent of Sabre Communications Corporation.

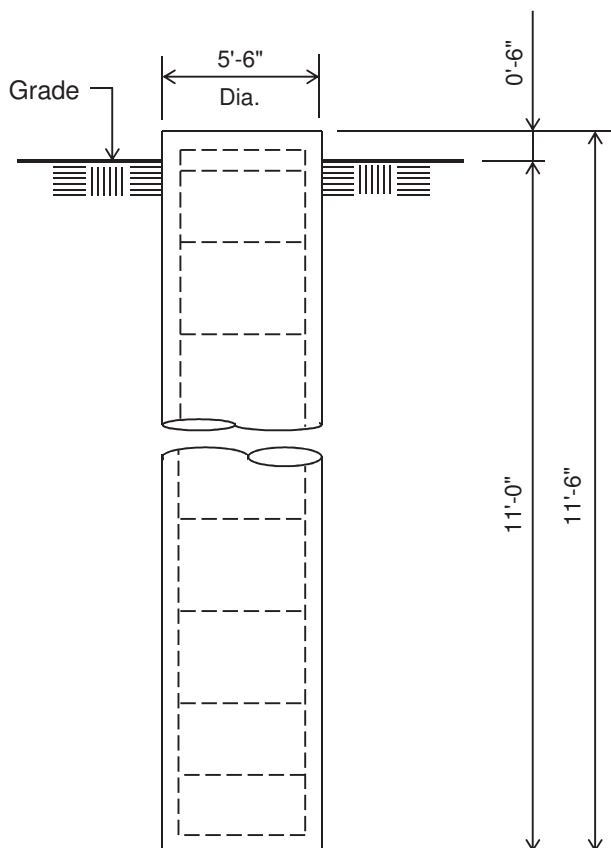
Job:	20-3050-TJH-R1
Customer:	URBAN COMMUNICATIONS, INC.
Site Name:	FS27 Buffalo Grove, IL
Description:	100' 3600SRWD Free-standing
Date:	10/22/2019
By:	REB

Customer: URBAN COMMUNICATIONS, INC.

Site: FS27 Buffalo Grove, IL

100' 3600 SRWD Freestanding

PRELIMINARY -NOT FOR CONSTRUCTION-



ELEVATION VIEW

(10.12 Cu. Yds.)

(1 REQUIRED; NOT TO SCALE)

Notes:

- 1) Concrete shall have a minimum 28-day compressive strength of 4,500 psi, in accordance with ACI 318-11.
- 2) Rebar to conform to ASTM specification A615 Grade 60.
- 3) All rebar to have a minimum of 3" concrete cover.
- 4) All exposed concrete corners to be chamfered 3/4".
- 5) The foundation design is based on presumptive clay soil as defined in ANSI/TIA-222-G-2005. It is recommended that a soil analysis of the site be performed to verify the soil parameters used in the design.
- 6) The foundation is based on the following factored loads:
Moment = 204.00 k-ft
Axial = 5.52 k
Shear = 3.78 k

Rebar Schedule for Pier

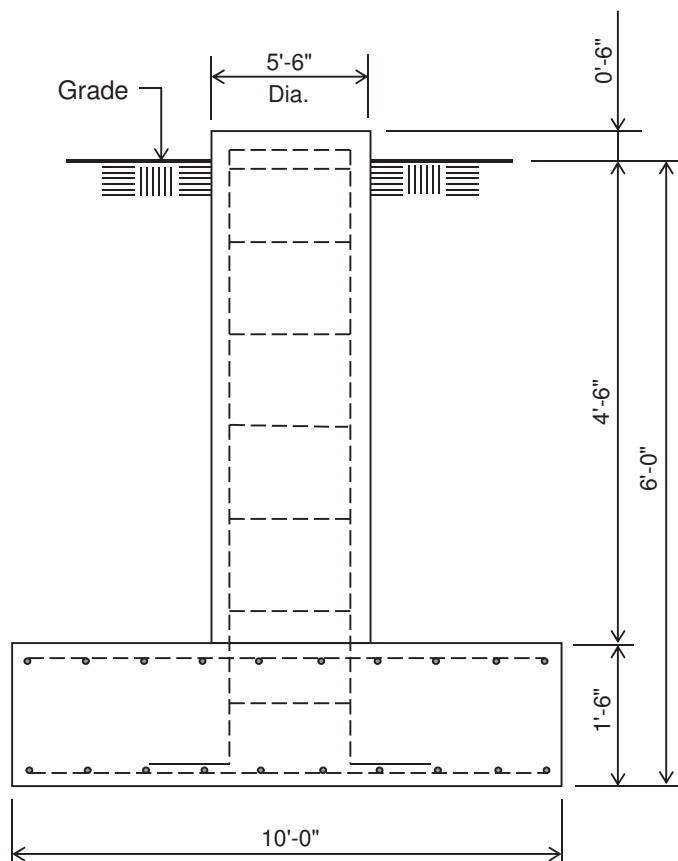
Pier	(30) #7 vertical rebar w/ #5 ties, (2) within top 5" of pier, then 12" C/C
------	--

Customer: URBAN COMMUNICATIONS, INC.

Site: FS27 Buffalo Grove, IL

100' 3600 SRWD Freestanding

PRELIMINARY -NOT FOR CONSTRUCTION-



ELEVATION VIEW

(9.96 Cu. Yds.)

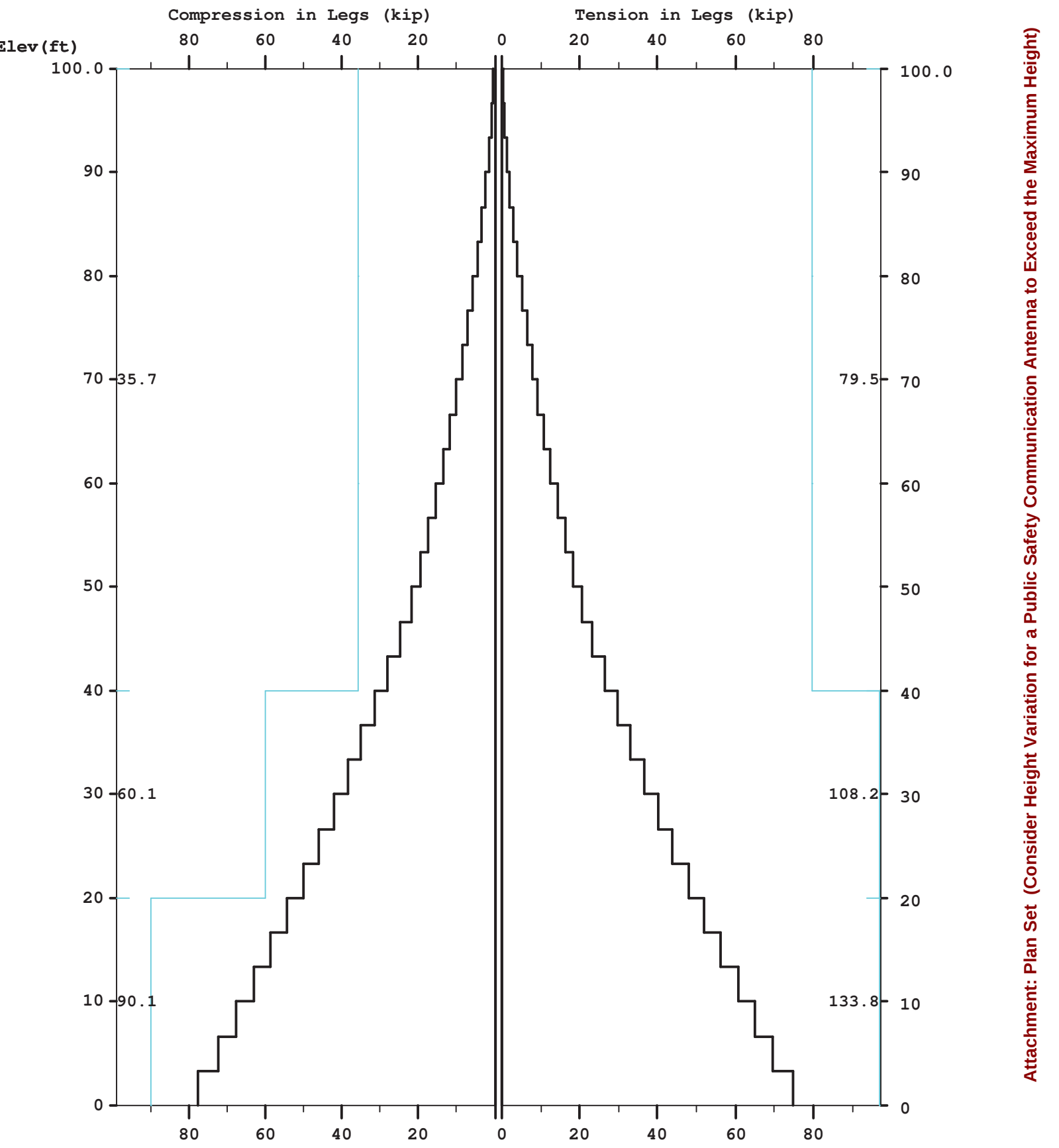
(1 REQUIRED; NOT TO SCALE)

Notes:

- 1) Concrete shall have a minimum 28-day compressive strength of 4,500 psi, in accordance with ACI 318-11.
- 2) Rebar to conform to ASTM specification A615 Grade 60.
- 3) All rebar to have a minimum of 3" concrete cover.
- 4) All exposed concrete corners to be chamfered 3/4".
- 5) The foundation design is based on presumptive clay soil as defined in ANSI/TIA-222-G-2005. It is recommended that a soil analysis of the site be performed to verify the soil parameters used in the design.
- 6) 4.5 ft of soil cover is required over the entire area of the foundation slab.
- 7) The foundation is based on the following factored loads:
Moment = 204.00 k-ft
Axial = 5.52 k
Shear = 3.78 k

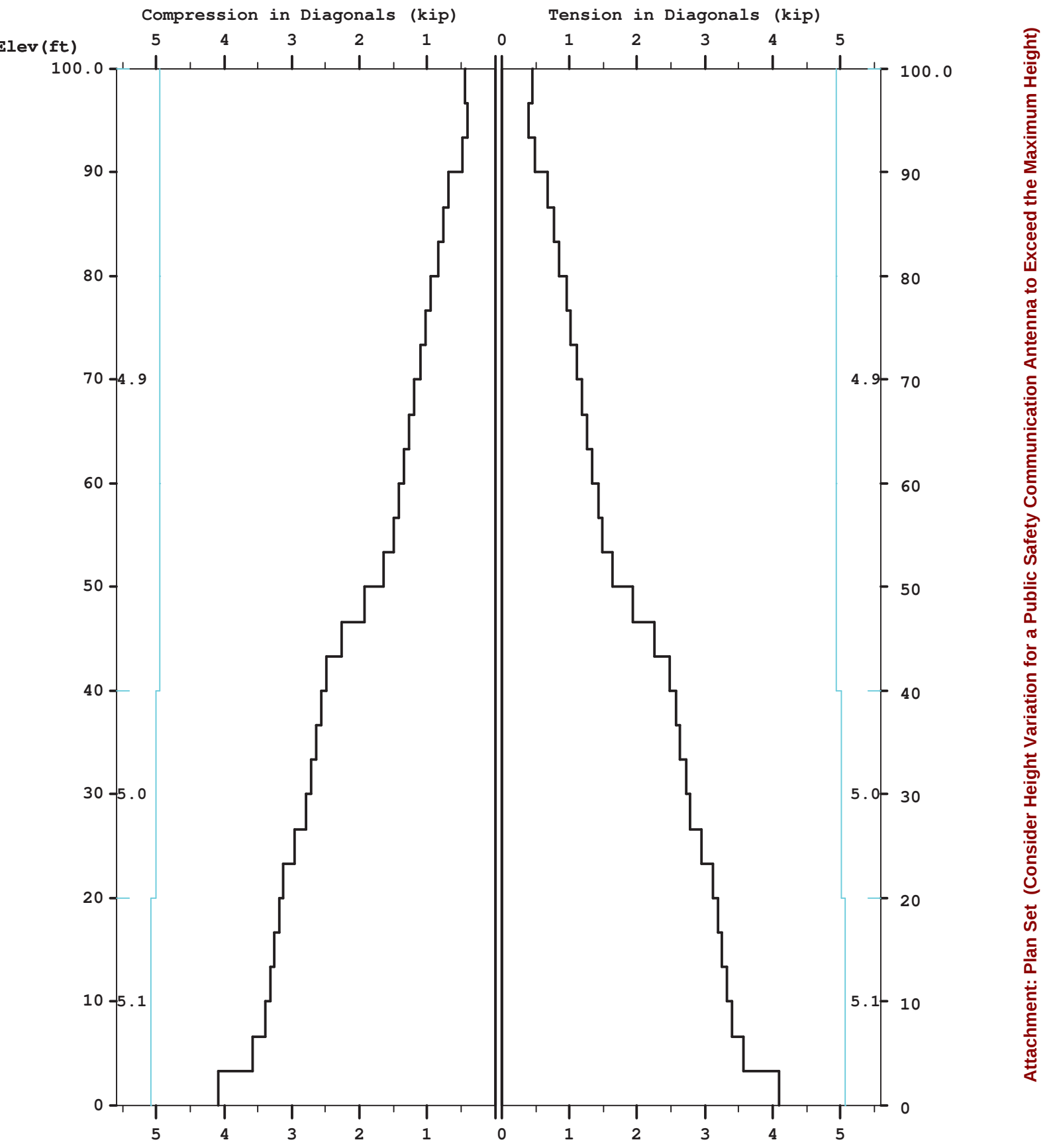
Rebar Schedule for Pad and Pier	
Pier	(30) #7 vertical rebar w/ hooks at bottom w/ #5 ties, (2) within top 5" of pier, then 12" C/C
Pad	(12) #8 horizontal rebar evenly spaced each way top and bottom (48 total)

Maximum



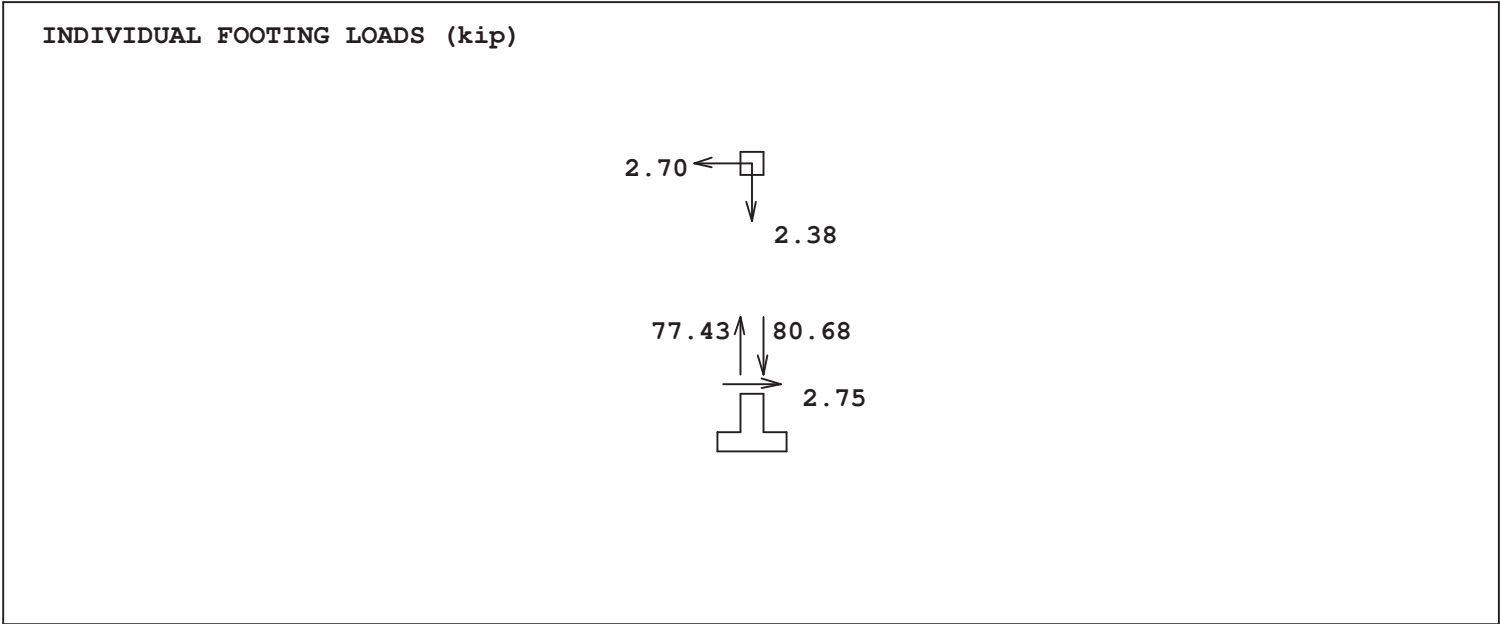
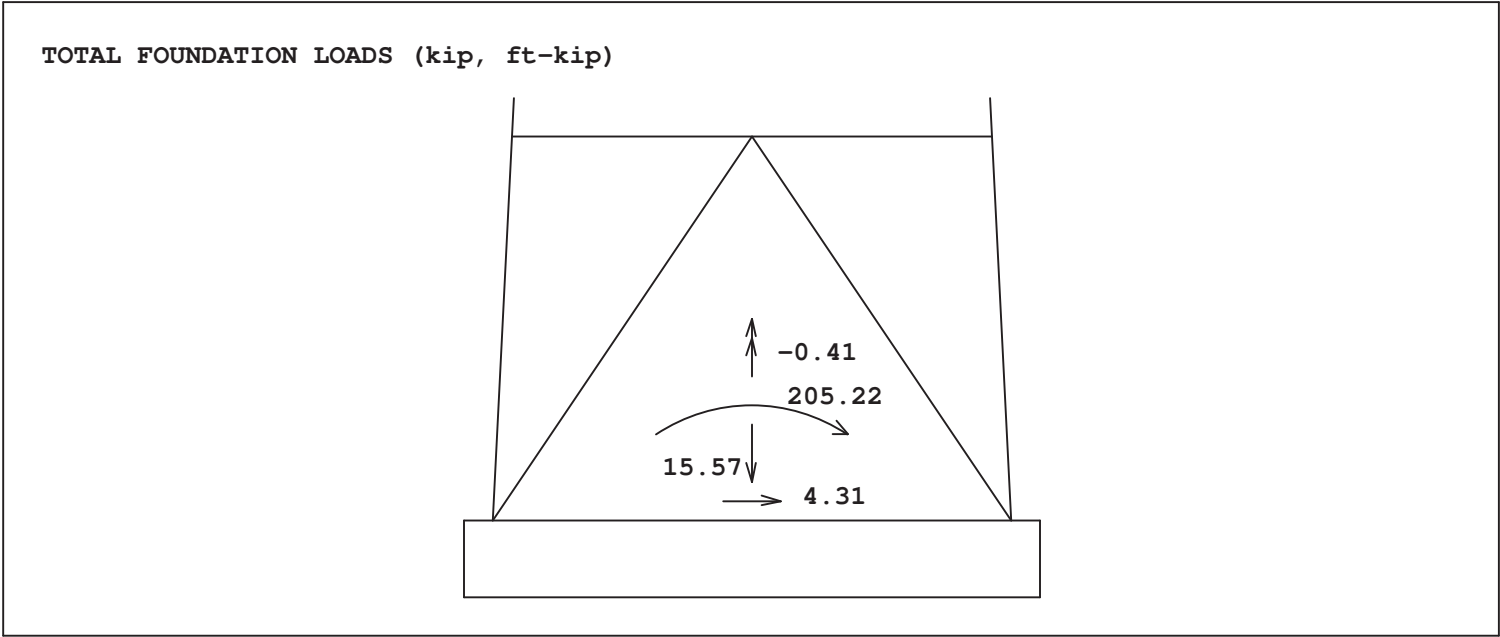
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Maximum



Attachment: Plan Set (Consider Height Variation for a Public Safety Communication Antenna to Exceed the Maximum Height)

Maximum



Attachment: Plan Set (Consider Height Variation for a Public Safety Communication Antenna to Exceed the Maximum Height)

20-3050-TJH-R1

Latticed Tower Analysis (Unguyed)
Processed under license at:

(c)2015 Guymast Inc. 416-736-7453

Sabre Towers and Poles

on: 22 oct 2019 at: 15:07:44

MAST GEOMETRY (ft)

PANEL TYPE	NO.OF LEGS	ELEV.AT BOTTOM	ELEV.AT TOP	F.W..AT BOTTOM	F.W..AT TOP	TYPICAL PANEL HEIGHT
D	3	80.00	100.00	3.00	3.00	3.33
D	3	60.00	80.00	3.00	3.00	3.33
D	3	40.00	60.00	3.00	3.00	3.33
D	3	20.00	40.00	3.00	3.00	3.33
D	3	0.00	20.00	3.00	3.00	3.33

MEMBER PROPERTIES

MEMBER TYPE	BOTTOM ELEV ft	TOP ELEV ft	X-SECTN AREA in.sq	RADIUS OF GYRAT in	ELASTIC MODULUS ksi	THERMAL EXPANSN /deg
LE	40.00	100.00	1.767	0.375	29000.	0.0000117
LE	20.00	40.00	2.405	0.375	29000.	0.0000117
LE	0.00	20.00	3.142	0.375	29000.	0.0000117
DI	0.00	100.00	0.601	0.219	29000.	0.0000117
HO	0.00	100.00	0.442	0.188	29000.	0.0000117

FACTORED MEMBER RESISTANCES

BOTTOM ELEV ft	TOP ELEV ft	LEGS		DIAGONALS		HORIZONTALS		INT COMP kip	BRACING TENS kip
		COMP kip	TENS kip	COMP kip	TENS kip	COMP kip	TENS kip		
80.0	100.0	35.70	79.52	4.94	4.94	6.02	6.02	0.00	0.00
60.0	80.0	35.70	79.52	4.94	4.94	6.02	6.02	0.00	0.00
40.0	60.0	35.70	79.52	4.94	4.94	6.02	6.02	0.00	0.00
20.0	40.0	60.09	108.24	5.01	5.01	6.10	6.10	0.00	0.00
0.0	20.0	90.09	133.78	5.08	5.08	6.19	6.19	0.00	0.00

* Only 3 condition(s) shown in full

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

LOADING CONDITION A

114 mph ultimate wind with no ice. Wind Azimuth: 0°

MAST LOADING

LOAD TYPE	ELEV ft	APPLY..LOAD..AT RADIUS ft	LOAD..AT AZI	LOAD AZI	FORCES.....		MOMENTS.....	
					HORIZ kip	DOWN kip	VERTICAL ft-kip	TORSNAL ft-kip
C	105.0	0.00	0.0	0.0	0.09	0.02	0.00	0.00
C	100.0	0.00	0.0	0.0	0.19	0.18	0.00	0.00
C	90.0	0.00	0.0	0.0	0.12	0.07	0.00	0.00
C	53.0	0.00	0.0	0.0	0.08	0.02	0.00	0.00
C	50.0	0.00	0.0	0.0	0.15	0.04	0.00	0.00
C	48.0	0.00	0.0	0.0	0.16	0.18	0.00	0.00
C	45.0	0.00	0.0	0.0	0.32	0.36	0.00	0.00
C	26.5	0.00	0.0	0.0	0.06	0.01	0.00	0.00
C	24.7	0.00	0.0	0.0	0.06	0.01	0.00	0.00
C	23.6	0.00	0.0	0.0	0.06	0.01	0.00	0.00

Attachment: Plan Set (Consider Height Variation for a Public Safety Communication Antenna to Exceed the Maximum Height)

20-3050-TJH-R1								
C	4.0	0.00	0.0	0.0	0.56	0.38	0.00	0.00
D	100.0	0.00	240.0	0.0	0.02	0.04	0.00	0.00
D	90.0	0.00	240.0	0.0	0.02	0.04	0.00	0.00
D	90.0	0.00	203.7	0.0	0.02	0.04	0.00	0.00
D	80.0	0.00	203.7	0.0	0.02	0.04	0.00	0.00
D	80.0	0.00	194.1	0.0	0.02	0.04	0.00	0.00
D	66.7	0.00	194.1	0.0	0.02	0.04	0.00	0.00
D	66.7	0.00	194.1	0.0	0.02	0.04	0.00	0.00
D	50.0	0.00	194.1	0.0	0.02	0.04	0.00	0.00
D	50.0	0.00	198.8	0.0	0.02	0.04	0.00	0.00
D	40.0	0.00	215.7	0.0	0.02	0.04	0.00	0.00
D	40.0	0.00	215.0	0.0	0.02	0.04	0.00	0.00
D	26.7	0.00	215.0	0.0	0.02	0.04	0.00	0.00
D	26.7	0.00	220.9	0.0	0.02	0.05	0.00	0.00
D	6.7	0.00	224.3	0.0	0.02	0.06	0.00	0.00
D	6.7	0.00	223.3	0.0	0.02	0.05	0.00	0.00
D	0.0	0.00	223.3	0.0	0.02	0.05	0.00	0.00

ANTENNA LOADING

=====

.....ANTENNA.....		ATTACHMENT		ANTENNA FORCES.....				
TYPE	ELEV ft	AZI	RAD ft	AZI	AXIAL kip	SHEAR kip	GRAVITY kip	TORSION ft-kip
HP	80.0	0.0	3.2	0.0	0.03	0.00	0.01	0.00

LOADING CONDITION M

114 mph ultimate wind with no ice. Wind Azimuth: 0

MAST LOADING

=====

LOAD TYPE	ELEV ft	APPLY... RADIUS ft	LOAD...AT AZI	LOAD AZI	FORCES.....		MOMENTS.....	
					HORIZ kip	DOWN kip	VERTICAL ft-kip	TORSNAL ft-kip
C	105.0	0.00	0.0	0.0	0.09	0.01	0.00	0.00
C	100.0	0.00	0.0	0.0	0.19	0.14	0.00	0.00
C	90.0	0.00	0.0	0.0	0.12	0.05	0.00	0.00
C	53.0	0.00	0.0	0.0	0.08	0.01	0.00	0.00
C	50.0	0.00	0.0	0.0	0.15	0.03	0.00	0.00
C	48.0	0.00	0.0	0.0	0.16	0.14	0.00	0.00
C	45.0	0.00	0.0	0.0	0.32	0.27	0.00	0.00
C	26.5	0.00	0.0	0.0	0.06	0.01	0.00	0.00
C	24.7	0.00	0.0	0.0	0.06	0.01	0.00	0.00
C	23.6	0.00	0.0	0.0	0.06	0.01	0.00	0.00
C	4.0	0.00	0.0	0.0	0.56	0.29	0.00	0.00
D	100.0	0.00	240.0	0.0	0.02	0.03	0.00	0.00
D	90.0	0.00	240.0	0.0	0.02	0.03	0.00	0.00
D	90.0	0.00	203.7	0.0	0.02	0.03	0.00	0.00
D	80.0	0.00	203.7	0.0	0.02	0.03	0.00	0.00
D	80.0	0.00	194.1	0.0	0.02	0.03	0.00	0.00
D	66.7	0.00	194.1	0.0	0.02	0.03	0.00	0.00
D	66.7	0.00	194.1	0.0	0.02	0.03	0.00	0.00
D	50.0	0.00	194.1	0.0	0.02	0.03	0.00	0.00
D	50.0	0.00	198.8	0.0	0.02	0.03	0.00	0.00
D	40.0	0.00	215.7	0.0	0.02	0.03	0.00	0.00
D	40.0	0.00	215.0	0.0	0.02	0.03	0.00	0.00
D	26.7	0.00	215.0	0.0	0.02	0.03	0.00	0.00
D	26.7	0.00	220.9	0.0	0.02	0.03	0.00	0.00
D	6.7	0.00	224.3	0.0	0.02	0.04	0.00	0.00
D	6.7	0.00	223.3	0.0	0.02	0.04	0.00	0.00
D	0.0	0.00	223.3	0.0	0.02	0.04	0.00	0.00

ANTENNA LOADING

=====

.....ANTENNA.....		ATTACHMENT		ANTENNA FORCES.....				
TYPE	ELEV ft	AZI	RAD ft	AZI	AXIAL kip	SHEAR kip	GRAVITY kip	TORSION ft-kip
HP	80.0	0.0	3.2	0.0	0.03	0.00	0.01	0.00

20-3050-TJH-R1

LOADING CONDITION Y

40 mph wind with 1.5 ice. Wind Azimuth: 0°

MAST LOADING

=====

LOAD TYPE	ELEV ft	APPLY... RADIUS ft	LOAD...AT AZI	LOAD AZI	FORCES.....		MOMENTS.....	
					HORIZ kip	DOWN kip	VERTICAL ft-kip	TORSNAL ft-kip
C	105.0	0.00	0.0	0.0	0.03	0.05	0.00	0.00
C	100.0	0.00	0.0	0.0	0.05	0.39	0.00	0.00
C	90.0	0.00	0.0	0.0	0.04	0.13	0.00	0.00
C	53.0	0.00	0.0	0.0	0.02	0.05	0.00	0.00
C	50.0	0.00	0.0	0.0	0.05	0.09	0.00	0.00
C	48.0	0.00	0.0	0.0	0.04	0.37	0.00	0.00
C	45.0	0.00	0.0	0.0	0.08	0.75	0.00	0.00
C	26.5	0.00	0.0	0.0	0.01	0.05	0.00	0.00
C	24.7	0.00	0.0	0.0	0.01	0.05	0.00	0.00
C	23.6	0.00	0.0	0.0	0.01	0.05	0.00	0.00
C	4.0	0.00	0.0	0.0	0.08	0.90	0.00	0.00
D	100.0	0.00	240.0	0.0	0.01	0.12	0.01	0.00
D	90.0	0.00	240.0	0.0	0.01	0.12	0.01	0.00
D	90.0	0.00	239.1	0.0	0.01	0.12	0.01	0.00
D	60.0	0.00	238.4	0.0	0.01	0.11	0.01	0.00
D	60.0	0.00	238.4	0.0	0.01	0.11	0.01	0.00
D	50.0	0.00	238.4	0.0	0.01	0.11	0.01	0.00
D	50.0	0.00	238.8	0.0	0.01	0.11	0.01	0.00
D	46.7	0.00	238.8	0.0	0.01	0.11	0.01	0.00
D	46.7	0.00	239.5	0.0	0.01	0.12	0.02	0.00
D	36.7	0.00	239.6	0.0	0.01	0.14	0.02	0.00
D	36.7	0.00	239.6	0.0	0.01	0.14	0.02	0.00
D	26.7	0.00	239.6	0.0	0.01	0.14	0.02	0.00
D	26.7	0.00	239.7	0.0	0.01	0.14	0.03	0.00
D	13.3	0.00	239.7	0.0	0.01	0.15	0.03	0.00
D	13.3	0.00	239.7	0.0	0.01	0.15	0.03	0.00
D	3.3	0.00	239.7	0.0	0.01	0.14	0.03	0.00
D	3.3	0.00	239.4	0.0	0.01	0.11	0.02	0.00
D	0.0	0.00	239.4	0.0	0.01	0.11	0.02	0.00

ANTENNA LOADING

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.....ANTENNA..... TYPE	ELEV ft	AZI	ATTACHMENT		ANTENNA FORCES.....			
			RAD ft	AZI	AXIAL kip	SHEAR kip	GRAVITY kip	TORSION ft-kip
HP	80.0	0.0	3.2	0.0	0.01	0.00	0.05	0.00

MAXIMUM ANTENNA AND REFLECTOR ROTATIONS:

=====

ELEV ft	AZI deg	TYPE *	BEAM DEFLECTIONS (deg).....			
			ROLL	YAW	PITCH	TOTAL
80.0	0.0	HP	1.199 M	0.103 D	-1.218 V	1.222 D

MAXIMUM TENSION IN MAST MEMBERS (kip)

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ELEV ft	LEGS	DIAG	HORIZ	BRACE
100.0	-----	-----	0.17 U	0.00 A
96.7	0.27 R	0.45 X	0.02 W	0.00 A
93.3	0.75 U	0.40 R	0.03 I	0.00 A
90.0	1.29 U	0.48 X	0.08 U	0.00 A
86.7	2.01 U	0.68 R	0.03 U	0.00 A
	2.93 U	0.76 X		

Attachment: Plan Set (Consider Height Variation for a Public Safety Communication Antenna to Exceed the Maximum Height)

20-3050-TJH-R1				
83.3	-----		0.03 U	0.00 A
	3.97 U	0.85 F		
80.0	-----		0.05 Q	0.00 A
	5.10 U	0.95 L		
76.7	-----		0.04 I	0.00 A
	6.40 U	1.02 R		
73.3	-----		0.03 I	0.00 A
	7.75 U	1.11 X		
70.0	-----		0.03 U	0.00 A
	9.26 U	1.18 R		
66.7	-----		0.03 I	0.00 A
	10.82 U	1.26 X		
63.3	-----		0.03 I	0.00 A
	12.54 U	1.34 R		
60.0	-----		0.03 I	0.00 A
	14.31 U	1.42 L		
56.7	-----		0.03 U	0.00 A
	16.24 U	1.49 R		
53.3	-----		0.06 U	0.00 A
	18.25 U	1.64 L		
50.0	-----		0.12 U	0.00 A
	20.59 U	1.93 R		
46.7	-----		0.13 I	0.00 A
	23.22 U	2.26 L		
43.3	-----		0.09 I	0.00 A
	26.31 U	2.49 R		
40.0	-----		0.03 Q	0.00 A
	29.58 U	2.56 L		
36.7	-----		0.03 A	0.00 A
	33.02 U	2.64 R		
33.3	-----		0.03 Q	0.00 A
	36.50 U	2.72 L		
30.0	-----		0.03 A	0.00 A
	40.14 U	2.79 R		
26.7	-----		0.07 E	0.00 A
	43.88 U	2.95 X		
23.3	-----		0.07 M	0.00 A
	47.90 U	3.12 R		
20.0	-----		0.03 E	0.00 A
	52.03 U	3.19 X		
16.7	-----		0.03 A	0.00 A
	56.32 U	3.26 F		
13.3	-----		0.03 Q	0.00 A
	60.64 U	3.33 X		
10.0	-----		0.03 A	0.00 A
	65.12 U	3.39 F		
6.7	-----		0.08 Q	0.00 A
	69.69 U	3.58 X		
3.3	-----		0.21 M	0.00 A
	74.73 U	4.09 N		
0.0	-----		0.00 A	0.00 A

MAXIMUM COMPRESSION IN MAST MEMBERS (kip)

ELEV ft	LEGS	DIAG	HORIZ	BRACE
100.0	-----		-0.17 C	0.00 A
	-0.42 L	-0.45 R		
96.7	-----		-0.02 E	0.00 A
	-0.97 C	-0.40 X		
93.3	-----		-0.03 C	0.00 A
	-1.59 C	-0.48 R		
90.0	-----		-0.08 C	0.00 A
	-2.42 C	-0.68 X		
86.7	-----		-0.03 C	0.00 A
	-3.41 C	-0.76 R		
83.3	-----		-0.03 O	0.00 A
	-4.52 C	-0.85 X		
80.0	-----		-0.06 K	0.00 A
	-5.73 C	-0.94 B		
76.7	-----		-0.03 W	0.00 A
	-7.10 C	-1.03 X		
73.3	-----		-0.03 O	0.00 A

Attachment: Plan Set (Consider Height Variation for a Public Safety Communication Antenna to Exceed the Maximum Height)

20-3050-TJH-R1					
70.0	-8.52 C	-1.10 R	-0.03 O	0.00 A	
66.7	-10.11 C	-1.19 X	-0.03 C	0.00 A	
63.3	-11.74 C	-1.26 F	-0.03 C	0.00 A	
60.0	-13.54 C	-1.34 X	-0.03 C	0.00 A	
56.7	-15.38 C	-1.42 R	-0.03 C	0.00 A	
53.3	-17.39 C	-1.50 L	-0.06 C	0.00 A	
50.0	-19.48 C	-1.63 R	-0.12 O	0.00 A	
46.7	-21.96 C	-1.93 L	-0.13 C	0.00 A	
43.3	-24.83 C	-2.26 R	-0.09 O	0.00 A	
40.0	-28.10 C	-2.49 L	-0.03 K	0.00 A	
36.7	-31.46 C	-2.56 R	-0.03 G	0.00 A	
33.3	-34.99 C	-2.64 L	-0.03 K	0.00 A	
30.0	-38.55 C	-2.71 R	-0.03 G	0.00 A	
26.7	-42.29 C	-2.79 L	-0.07 K	0.00 A	
23.3	-46.12 C	-2.95 R	-0.07 S	0.00 A	
20.0	-50.25 C	-3.12 X	-0.03 W	0.00 A	
16.7	-54.47 C	-3.19 R	-0.03 G	0.00 A	
13.3	-58.86 C	-3.26 X	-0.03 K	0.00 A	
10.0	-63.29 C	-3.32 F	-0.03 G	0.00 A	
6.7	-67.88 C	-3.40 X	-0.08 K	0.00 A	
3.3	-72.60 C	-3.57 F	-0.21 G	0.00 A	
0.0	-77.93 C	-4.09 X	0.00 A	0.00 A	

FORCE/RESISTANCE RATIO IN LEGS

MAST ELEV ft	-- LEG COMPRESSION --			---- LEG TENSION ----		
	MAX COMP	COMP RESIST	FORCE/ RESIST RATIO	MAX TENS	TENS RESIST	FORCE/ RESIST RATIO
100.00	0.42	35.70	0.01	0.27	79.52	0.00
96.67	0.97	35.70	0.03	0.75	79.52	0.01
93.33	1.59	35.70	0.04	1.29	79.52	0.02
90.00	2.42	35.70	0.07	2.01	79.52	0.03
86.67	3.41	35.70	0.10	2.93	79.52	0.04
83.33	4.52	35.70	0.13	3.97	79.52	0.05
80.00	5.73	35.70	0.16	5.10	79.52	0.06
76.67	7.10	35.70	0.20	6.40	79.52	0.08
73.33	8.52	35.70	0.24	7.75	79.52	0.10
70.00	10.11	35.70	0.28	9.26	79.52	0.12
66.67	11.74	35.70	0.33	10.82	79.52	0.14
63.33	13.54	35.70	0.38	12.54	79.52	0.16
60.00	15.38	35.70	0.43	14.31	79.52	0.18

20-3050-TJH-R1

56.67	17.39	35.70	0.49	16.24	79.52	0.20
53.33	19.48	35.70	0.55	18.25	79.52	0.23
50.00	21.96	35.70	0.62	20.59	79.52	0.26
46.67	24.83	35.70	0.70	23.22	79.52	0.29
43.33	28.10	35.70	0.79	26.31	79.52	0.33
40.00	31.46	60.09	0.52	29.58	108.24	0.27
36.67	34.99	60.09	0.58	33.02	108.24	0.31
33.33	38.55	60.09	0.64	36.50	108.24	0.34
30.00	42.29	60.09	0.70	40.14	108.24	0.37
26.67	46.12	60.09	0.77	43.88	108.24	0.41
23.33	50.25	60.09	0.84	47.90	108.24	0.44
20.00	54.47	90.09	0.60	52.03	133.78	0.39
16.67	58.86	90.09	0.65	56.32	133.78	0.42
13.33	63.29	90.09	0.70	60.64	133.78	0.45
10.00	67.88	90.09	0.75	65.12	133.78	0.49
6.67	72.60	90.09	0.81	69.69	133.78	0.52
3.33	77.93	90.09	0.87	74.73	133.78	0.56
0.00						

FORCE/RESISTANCE RATIO IN DIAGONALS

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MAST ELEV ft	- DIAG COMPRESSION -			--- DIAG TENSION ---		
	MAX COMP	COMP RESIST	FORCE/ RESIST RATIO	MAX TENS	TENS RESIST	FORCE/ RESIST RATIO
100.00	0.45	4.94	0.09	0.45	4.94	0.09
96.67	0.40	4.94	0.08	0.40	4.94	0.08
93.33	0.48	4.94	0.10	0.48	4.94	0.10
90.00	0.68	4.94	0.14	0.68	4.94	0.14
86.67	0.76	4.94	0.15	0.76	4.94	0.15
83.33	0.85	4.94	0.17	0.85	4.94	0.17
80.00	0.94	4.94	0.19	0.95	4.94	0.19
76.67	1.03	4.94	0.21	1.02	4.94	0.21
73.33	1.10	4.94	0.22	1.11	4.94	0.22
70.00	1.19	4.94	0.24	1.18	4.94	0.24
66.67	1.26	4.94	0.26	1.26	4.94	0.26
63.33	1.34	4.94	0.27	1.34	4.94	0.27
60.00	1.42	4.94	0.29	1.42	4.94	0.29
56.67	1.50	4.94	0.30	1.49	4.94	0.30
53.33	1.63	4.94	0.33	1.64	4.94	0.33
50.00	1.93	4.94	0.39	1.93	4.94	0.39
46.67	2.26	4.94	0.46	2.26	4.94	0.46
43.33	2.49	4.94	0.50	2.49	4.94	0.50

20-3050-TJH-R1						
40.00	2.56	5.01	0.51	2.56	5.01	0.51
36.67	2.64	5.01	0.53	2.64	5.01	0.53
33.33	2.71	5.01	0.54	2.72	5.01	0.54
30.00	2.79	5.01	0.56	2.79	5.01	0.56
26.67	2.95	5.01	0.59	2.95	5.01	0.59
23.33	3.12	5.01	0.62	3.12	5.01	0.62
20.00	3.19	5.08	0.63	3.19	5.08	0.63
16.67	3.26	5.08	0.64	3.26	5.08	0.64
13.33	3.32	5.08	0.65	3.33	5.08	0.66
10.00	3.40	5.08	0.67	3.39	5.08	0.67
6.67	3.57	5.08	0.70	3.58	5.08	0.70
3.33	4.09	5.08	0.81	4.09	5.08	0.81
0.00						

MAXIMUM INDIVIDUAL FOUNDATION LOADS: (kip)

NORTH	LOAD EAST	COMPONENTS DOWN	UPLIFT	TOTAL SHEAR
-2.38 X	-2.70 D	80.68 C	-77.43 U	2.75 X

MAXIMUM TOTAL LOADS ON FOUNDATION : (kip & kip-ft)

HORIZONTAL			DOWN	OVERTURNING			TORSION
NORTH	EAST	TOTAL @ 209.8		NORTH	EAST	TOTAL @ 209.7	
-4.3 M	-4.3 D	4.3 N	15.6 f	-201.7 M	-204.5 D	205.2 N	-0.4 J

Latticed Tower Analysis (Unguyed)
Processed under license at:

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Sabre Towers and Poles

on: 22 oct 2019 at: 15:08:02

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

* Only 1 condition(s) shown in full
* Some wind loads may have been derived from full-scale wind tunnel testing

LOADING CONDITION A

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

MAST LOADING

LOAD	ELEV	APPLY..LOAD..AT	LOAD	FORCES.....	MOMENTS.....
------	------	-----------------	------	------------------	-------------------

20-3050-TJH-R1								
TYPE	ft	RADIUS ft	AZI	AZI	HORIZ kip	DOWN kip	VERTICAL ft-kip	TORSNAL ft-kip
C	105.0	0.00	0.0	0.0	0.03	0.01	0.00	0.00
C	100.0	0.00	0.0	0.0	0.06	0.15	0.00	0.00
C	90.0	0.00	0.0	0.0	0.04	0.06	0.00	0.00
C	53.0	0.00	0.0	0.0	0.02	0.01	0.00	0.00
C	50.0	0.00	0.0	0.0	0.04	0.03	0.00	0.00
C	48.0	0.00	0.0	0.0	0.05	0.15	0.00	0.00
C	45.0	0.00	0.0	0.0	0.09	0.30	0.00	0.00
C	26.5	0.00	0.0	0.0	0.02	0.01	0.00	0.00
C	24.7	0.00	0.0	0.0	0.02	0.01	0.00	0.00
C	23.6	0.00	0.0	0.0	0.02	0.01	0.00	0.00
C	4.0	0.00	0.0	0.0	0.16	0.32	0.00	0.00
D	100.0	0.00	240.0	0.0	0.01	0.03	0.00	0.00
D	90.0	0.00	240.0	0.0	0.01	0.03	0.00	0.00
D	90.0	0.00	203.7	0.0	0.01	0.03	0.00	0.00
D	80.0	0.00	203.7	0.0	0.01	0.03	0.00	0.00
D	80.0	0.00	194.1	0.0	0.01	0.03	0.00	0.00
D	66.7	0.00	194.1	0.0	0.01	0.03	0.00	0.00
D	66.7	0.00	194.1	0.0	0.01	0.03	0.00	0.00
D	50.0	0.00	194.1	0.0	0.01	0.03	0.00	0.00
D	50.0	0.00	198.8	0.0	0.01	0.03	0.00	0.00
D	40.0	0.00	215.7	0.0	0.01	0.03	0.00	0.00
D	40.0	0.00	215.0	0.0	0.01	0.04	0.00	0.00
D	26.7	0.00	215.0	0.0	0.01	0.04	0.00	0.00
D	26.7	0.00	220.9	0.0	0.01	0.04	0.00	0.00
D	6.7	0.00	224.3	0.0	0.01	0.05	0.00	0.00
D	6.7	0.00	223.3	0.0	0.01	0.05	0.00	0.00
D	0.0	0.00	223.3	0.0	0.01	0.05	0.00	0.00

ANTENNA LOADING

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.....ANTENNA.....		ATTACHMENT		ANTENNA FORCES.....				
TYPE	ELEV ft	AZI	RAD ft	AZI	AXIAL kip	SHEAR kip	GRAVITY kip	TORSION ft-kip
HP	80.0	0.0	3.2	0.0	0.01	0.00	0.01	0.00

MAXIMUM MAST DISPLACEMENTS:

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ELEV ft	-----DEFLECTIONS (ft)-----			--TILTS (DEG)---		TWIST DEG
	NORTH	EAST	DOWN	NORTH	EAST	
100.0	-0.448 A	0.442 J	0.002 A	-0.364 A	0.360 J	0.003 D
96.7	-0.427 A	0.421 J	0.002 A	-0.364 A	0.360 J	0.003 D
93.3	-0.405 A	0.400 J	0.002 A	-0.364 A	0.359 J	0.003 D
90.0	-0.384 A	0.379 J	0.002 A	-0.363 A	0.358 J	0.004 D
86.7	-0.363 A	0.358 J	0.002 A	-0.361 A	0.357 J	0.003 D
83.3	-0.342 A	0.338 J	0.002 A	-0.360 A	0.355 J	0.004 D
80.0	-0.321 A	0.317 J	0.002 A	-0.357 A	0.352 J	0.002 D
76.7	-0.300 A	0.296 J	0.002 A	-0.353 A	0.349 J	0.004 D
73.3	-0.280 A	0.276 J	0.002 A	-0.349 A	0.345 J	0.002 D
70.0	-0.259 A	0.256 J	0.001 A	-0.344 A	0.340 J	0.004 D
66.7	-0.239 A	0.236 J	0.001 A	-0.338 A	0.334 J	0.002 D
63.3	-0.220 A	0.217 J	0.001 A	-0.331 A	0.327 J	0.004 D
60.0	-0.201 A	0.198 J	0.001 A	-0.323 A	0.319 J	0.002 D
56.7	-0.182 A	0.180 J	0.001 A	-0.314 A	0.310 J	0.004 D
53.3	-0.164 A	0.162 J	0.001 A	-0.303 A	0.299 J	0.002 D
50.0	-0.146 A	0.145 J	0.001 A	-0.291 A	0.288 J	0.005 D
46.7	-0.129 A	0.128 J	0.001 A	-0.278 A	0.274 J	0.002 C
43.3	-0.113 A	0.112 J	0.001 A	-0.263 A	0.260 J	0.005 D
40.0	-0.098 A	0.097 J	0.001 A	-0.246 A	0.243 J	0.001 D
36.7	-0.084 A	0.083 J	0.001 A	-0.232 A	0.229 J	0.004 D
33.3	-0.071 A	0.070 J	0.001 A	-0.216 A	0.213 J	0.001 D
30.0	-0.058 A	0.058 J	0.000 A	-0.199 A	0.196 J	0.004 D
26.7	-0.047 A	0.047 J	0.000 A	-0.180 A	0.178 J	0.001 D
23.3	-0.037 A	0.037 J	0.000 A	-0.159 A	0.157 J	0.005 D
20.0	-0.028 A	0.028 J	0.000 A	-0.136 A	0.135 J	0.001 D
16.7	-0.020 A	0.020 J	0.000 A	-0.118 A	0.116 J	0.004 D
13.3	-0.014 A	0.013 J	0.000 I	-0.097 A	0.096 J	0.001 D
10.0	-0.008 A	-0.008 D	0.000 I	-0.075 A	0.075 J	0.004 D
6.7	-0.004 A	0.004 J	0.000 I	-0.052 A	0.051 J	0.000 D
3.3	-0.001 B	0.001 K	0.000 E	-0.027 A	0.027 J	0.004 D
0.0	0.000 A	0.000 A	0.000 A	0.000 A	0.000 A	0.000 A

20-3050-TJH-R1

MAXIMUM ANTENNA AND REFLECTOR ROTATIONS:

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ELEV ft	AZI deg	TYPE *	BEAM DEFLECTIONS (deg).....
			ROLL YAW PITCH TOTAL
80.0	0.0	HP	0.357 A 0.003 C -0.352 J 0.352 J

MAXIMUM TENSION IN MAST MEMBERS (kip)

=====

ELEV ft	LEGS	DIAG	HORIZ	BRACE
100.0	-----		0.05 A	0.00 A
	0.03 B	0.13 L		
96.7	-----		0.01 K	0.00 A
	0.14 A	0.12 B		
93.3	-----		0.01 E	0.00 A
	0.27 A	0.14 H		
90.0	-----		0.02 A	0.00 A
	0.44 A	0.20 B		
86.7	-----		0.01 A	0.00 A
	0.69 A	0.23 H		
83.3	-----		0.01 A	0.00 A
	0.96 A	0.25 B		
80.0	-----		0.01 I	0.00 A
	1.27 I	0.29 L		
76.7	-----		0.01 I	0.00 A
	1.62 A	0.31 B		
73.3	-----		0.01 I	0.00 A
	2.00 A	0.33 L		
70.0	-----		0.01 I	0.00 A
	2.41 A	0.36 B		
66.7	-----		0.01 I	0.00 A
	2.85 A	0.38 L		
63.3	-----		0.01 I	0.00 A
	3.32 A	0.40 B		
60.0	-----		0.01 I	0.00 A
	3.83 A	0.43 L		
56.7	-----		0.01 E	0.00 A
	4.36 A	0.45 B		
53.3	-----		0.02 E	0.00 A
	4.93 A	0.49 L		
50.0	-----		0.03 E	0.00 A
	5.56 A	0.58 B		
46.7	-----		0.04 E	0.00 A
	6.25 A	0.68 L		
43.3	-----		0.03 I	0.00 A
	7.08 A	0.75 B		
40.0	-----		0.01 A	0.00 A
	8.02 A	0.77 H		
36.7	-----		0.01 I	0.00 A
	8.99 A	0.79 B		
33.3	-----		0.01 E	0.00 A
	9.98 A	0.81 H		
30.0	-----		0.01 I	0.00 A
	11.01 A	0.84 B		
26.7	-----		0.02 E	0.00 A
	12.07 A	0.89 H		
23.3	-----		0.02 A	0.00 A
	13.20 A	0.94 B		
20.0	-----		0.01 E	0.00 A
	14.38 A	0.96 H		
16.7	-----		0.01 A	0.00 A
	15.59 A	0.99 B		
13.3	-----		0.01 A	0.00 A
	16.83 A	1.01 H		
10.0	-----		0.01 A	0.00 A
	18.09 A	1.03 B		
6.7	-----		0.02 I	0.00 A
	19.38 A	1.08 H		
3.3	-----		0.06 A	0.00 A
	20.75 A	1.24 B		
0.0	-----		0.00 A	0.00 A

Attachment: Plan Set (Consider Height Variation for a Public Safety Communication Antenna to Exceed the Maximum Height)

20-3050-TJH-R1

MAXIMUM COMPRESSION IN MAST MEMBERS (kip)

ELEV ft	LEGS	DIAG	HORIZ	BRACE
100.0	-----	-----	-0.05 K	0.00 A
	-0.17 H	-0.13 F		
96.7	-----	-----	-0.01 E	0.00 A
	-0.35 G	-0.12 H		
93.3	-----	-----	-0.01 K	0.00 A
	-0.55 G	-0.14 F		
90.0	-----	-----	-0.02 C	0.00 A
	-0.83 G	-0.20 H		
86.7	-----	-----	-0.01 G	0.00 A
	-1.14 G	-0.23 B		
83.3	-----	-----	-0.01 C	0.00 A
	-1.48 G	-0.25 H		
80.0	-----	-----	-0.02 K	0.00 A
	-1.87 G	-0.29 B		
76.7	-----	-----	-0.01 K	0.00 A
	-2.28 G	-0.31 L		
73.3	-----	-----	-0.01 K	0.00 A
	-2.73 G	-0.33 B		
70.0	-----	-----	-0.01 C	0.00 A
	-3.20 G	-0.36 L		
66.7	-----	-----	-0.01 K	0.00 A
	-3.71 G	-0.38 B		
63.3	-----	-----	-0.01 G	0.00 A
	-4.25 G	-0.40 L		
60.0	-----	-----	-0.01 G	0.00 A
	-4.82 G	-0.43 B		
56.7	-----	-----	-0.01 C	0.00 A
	-5.41 G	-0.45 L		
53.3	-----	-----	-0.02 K	0.00 A
	-6.06 G	-0.49 B		
50.0	-----	-----	-0.03 C	0.00 A
	-6.81 G	-0.58 L		
46.7	-----	-----	-0.04 K	0.00 A
	-7.73 G	-0.68 B		
43.3	-----	-----	-0.03 C	0.00 A
	-8.73 G	-0.74 H		
40.0	-----	-----	-0.01 G	0.00 A
	-9.74 G	-0.77 B		
36.7	-----	-----	-0.01 C	0.00 A
	-10.79 G	-0.79 H		
33.3	-----	-----	-0.01 K	0.00 A
	-11.86 G	-0.82 B		
30.0	-----	-----	-0.01 C	0.00 A
	-12.97 G	-0.84 H		
26.7	-----	-----	-0.02 K	0.00 A
	-14.13 G	-0.89 B		
23.3	-----	-----	-0.02 C	0.00 A
	-15.35 G	-0.94 H		
20.0	-----	-----	-0.01 K	0.00 A
	-16.62 G	-0.96 B		
16.7	-----	-----	-0.01 G	0.00 A
	-17.92 G	-0.98 H		
13.3	-----	-----	-0.01 G	0.00 A
	-19.25 G	-1.01 B		
10.0	-----	-----	-0.01 G	0.00 A
	-20.62 G	-1.03 H		
6.7	-----	-----	-0.02 G	0.00 A
	-22.05 G	-1.09 B		
3.3	-----	-----	-0.06 G	0.00 A
	-23.68 G	-1.24 H		
0.0	-----	-----	0.00 A	0.00 A

MAXIMUM INDIVIDUAL FOUNDATION LOADS: (kip)

NORTH	LOAD EAST	COMPONENTS DOWN	UPLIFT	TOTAL SHEAR
-0.72 B	0.83 J	24.50 G	-21.52 A	0.83 B

Attachment: Plan Set (Consider Height Variation for a Public Safety Communication Antenna to Exceed the Maximum Height)

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MAXIMUM TOTAL LOADS ON FOUNDATION : (kip & kip-ft)

-----HORIZONTAL-----			DOWN	-----OVERTURNING-----			TORSION
NORTH	EAST	TOTAL @ 180.0		NORTH	EAST	TOTAL @ 180.0	
-1.3 A	1.2 J	1.3 A	4.6 I	-59.9 A	59.2 J	59.9 A	0.0 D

Attachment: Plan Set (Consider Height Variation for a Public Safety Communication Antenna to Exceed the Maximum Height)

20-3050-TJH

LPILE for windows(Beta), Version 2018-10.009

Analysis of Individual Piles and Drilled Shafts
 Subjected to Lateral Loading Using the p-y Method
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Files Used for Analysis

Path to file locations:
 \Program Files (x86)\Ensoft\Lpile2018\files\

Name of input data file:
 20-3050-TJH.lp10

Name of output report file:
 20-3050-TJH.lp10

Name of plot output file:
 20-3050-TJH.lp10

Name of runtime message file:
 20-3050-TJH.lp10

Date and Time of Analysis

Date: October 22, 2019

Time: 15:09:25

Problem Title

Site : FS27 Buffalo Grove, IL

Tower : 100' 3600 SRWD Freestanding

Prepared for : URBAN COMMUNICATIONS, INC.

Job Number : 20-3050-TJH

Engineer : NM

Program Options and Settings

Attachment: Plan Set (Consider Height Variation for a Public Safety Communication Antenna to Exceed the Maximum Height)

20-3050-TJH

Computational Options:

- Use unfactored loads in computations (conventional analysis)

Engineering Units Used for Data Input and Computations:

- US Customary System Units (pounds, feet, inches)

Analysis Control Options:

- Maximum number of iterations allowed = 999
- Deflection tolerance for convergence = 1.0000E-05 in
- Maximum allowable deflection = 100.0000 in
- Number of pile increments = 100

Loading Type and Number of Cycles of Loading:

- Static loading specified
- Use of p-y modification factors for p-y curves not selected
- Analysis uses layering correction (Method of Georgiadis)
- No distributed lateral loads are entered
- Loading by lateral soil movements acting on pile not selected
- Input of shear resistance at the pile tip not selected
- Input of moment resistance at the pile tip not selected
- Computation of pile-head foundation stiffness matrix not selected
- Push-over analysis of pile not selected
- Buckling analysis of pile not selected

Output Options:

- Output files use decimal points to denote decimal symbols.
- Report only summary tables of pile-head deflection, maximum bending moment, and maximum shear force in output report file.
- No p-y curves to be computed and reported for user-specified depths
- Print using wide report formats

 Pile Structural Properties and Geometry

Number of pile sections defined = 1
 Total length of pile = 11.500 ft
 Depth of ground surface below top of pile = 0.5000 ft

Pile diameters used for p-y curve computations are defined using 2 points.

p-y curves are computed using pile diameter values interpolated with depth over the length of the pile. A summary of values of pile diameter vs. depth follows.

Point No.	Depth Below Pile Head feet	Pile Diameter inches
1	0.000	66.0000
2	11.500	66.0000

Input Structural Properties for Pile Sections:

Pile Section No. 1:

Section 1 is a round drilled shaft, bored pile, or CIDH pile
 Length of section = 11.500000 ft
 Shaft Diameter = 66.000000 in
 Shear capacity of section = 0.0000 lbs

 Ground Slope and Pile Batter Angles

Ground Slope Angle = 0.000 degrees
 = 0.000 radians
 Pile Batter Angle = 0.000 degrees
 = 0.000 radians

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Soil and Rock Layering Information

The soil profile is modelled using 1 layers

Layer 1 is stiff clay without free water

Distance from top of pile to top of layer	=	0.500000	ft
Distance from top of pile to bottom of layer	=	60.500000	ft
Effective unit weight at top of layer	=	110.000000	pcf
Effective unit weight at bottom of layer	=	110.000000	pcf
Undrained cohesion at top of layer	=	1000.000000	psf
Undrained cohesion at bottom of layer	=	1000.000000	psf
Epsilon-50 at top of layer	=	0.010000	
Epsilon-50 at bottom of layer	=	0.010000	

(Depth of the lowest soil layer extends 49.000 ft below the pile tip)

Summary of Input Soil Properties

Layer Layer Num.	Soil Type Name (p-y Curve Type)	Layer Depth ft	Effective Unit Wt. pcf	Undrained Cohesion psf	E50 or krm
1	Stiff Clay w/o Free Water	0.5000 60.5000	110.0000 110.0000	1000.0000 1000.0000	0.01000 0.01000

Static Loading Type

Static loading criteria were used when computing p-y curves for all analyses.

Pile-head Loading and Pile-head Fixity Conditions

Number of loads specified = 2

Load No.	Load Type	Condition 1	Condition 2	Axial Thrust Force, lbs	Compute Top y vs. Pile Length
1	1	V = 5040. lbs	M = 3264000. in-lbs	7360.	No
2	1	V = 1686. lbs	M = 819155. in-lbs	2463.	No

V = shear force applied normal to pile axis
M = bending moment applied to pile head
y = lateral deflection normal to pile axis
S = pile slope relative to original pile batter angle
R = rotational stiffness applied to pile head
Values of top y vs. pile lengths can be computed only for load types with
specified shear loading (Load Types 1, 2, and 3).
Thrust force is assumed to be acting axially for all pile batter angles.

Computations of Nominal Moment Capacity and Nonlinear Bending Stiffness

Axial thrust force values were determined from pile-head loading conditions

Number of Pile Sections Analyzed = 1

Pile Section No. 1:

Dimensions and Properties of Drilled Shaft (Bored Pile):

Length of Section	=	11.500000	ft
Shaft Diameter	=	66.000000	in

	20-3050-TJH	
Concrete Cover Thickness (to edge of long. rebar)	=	3.625000 in
Number of Reinforcing Bars	=	30 bars
Yield Stress of Reinforcing Bars	=	60000. psi
Modulus of Elasticity of Reinforcing Bars	=	29000000. psi
Gross Area of Shaft	=	3421. sq. in.
Total Area of Reinforcing Steel	=	18.039614 sq. in.
Area Ratio of Steel Reinforcement	=	0.53 percent
Edge-to-Edge Bar Spacing	=	5.174585 in
Maximum Concrete Aggregate Size	=	0.750000 in
Ratio of Bar Spacing to Aggregate Size	=	6.90
Offset of Center of Rebar Cage from Center of Pile	=	0.0000 in

Axial Structural Capacities:

Nom. Axial Structural Capacity = $0.85 F_c A_c + F_y A_s$	=	14099.444 kips
Tensile Load for Cracking of Concrete	=	-1558.721 kips
Nominal Axial Tensile Capacity	=	-1082.377 kips

Reinforcing Bar Dimensions and Positions Used in Computations:

Bar Number	Bar Diam. inches	Bar Area sq. in.	X inches	Y inches
1	0.875000	0.601320	28.937500	0.00000
2	0.875000	0.601320	28.305146	6.016445
3	0.875000	0.601320	26.435722	11.769942
4	0.875000	0.601320	23.410929	17.009036
5	0.875000	0.601320	19.362967	21.504753
6	0.875000	0.601320	14.468750	25.060610
7	0.875000	0.601320	8.942179	27.521198
8	0.875000	0.601320	3.024792	28.778977
9	0.875000	0.601320	-3.024792	28.778977
10	0.875000	0.601320	-8.942179	27.521198
11	0.875000	0.601320	-14.468750	25.060610
12	0.875000	0.601320	-19.362967	21.504753
13	0.875000	0.601320	-23.410929	17.009036
14	0.875000	0.601320	-26.435722	11.769942
15	0.875000	0.601320	-28.305146	6.016445
16	0.875000	0.601320	-28.937500	0.00000
17	0.875000	0.601320	-28.305146	-6.016445
18	0.875000	0.601320	-26.435722	-11.769942
19	0.875000	0.601320	-23.410929	-17.009036
20	0.875000	0.601320	-19.362967	-21.504753
21	0.875000	0.601320	-14.468750	-25.060610
22	0.875000	0.601320	-8.942179	-27.521198
23	0.875000	0.601320	-3.024792	-28.778977
24	0.875000	0.601320	3.024792	-28.778977
25	0.875000	0.601320	8.942179	-27.521198
26	0.875000	0.601320	14.468750	-25.060610
27	0.875000	0.601320	19.362967	-21.504753
28	0.875000	0.601320	23.410929	-17.009036
29	0.875000	0.601320	26.435722	-11.769942
30	0.875000	0.601320	28.305146	-6.016445

NOTE: The positions of the above rebars were computed by LPile

Minimum spacing between any two bars not equal to zero = 5.175 inches
between bars 25 and 26.

Ratio of bar spacing to maximum aggregate size = 6.90

Concrete Properties:

Compressive Strength of Concrete	=	4500. psi
Modulus of Elasticity of Concrete	=	3823676. psi
Modulus of Rupture of Concrete	=	-503.115295 psi
Compression Strain at Peak Stress	=	0.002001
Tensile Strain at Fracture of Concrete	=	-0.0001152
Maximum Coarse Aggregate Size	=	0.750000 in

Number of Axial Thrust Force Values Determined from Pile-head Loadings = 2

Number	Axial Thrust Force kips
--------	----------------------------

Attachment: Plan Set (Consider Height Variation for a Public Safety Communication Antenna to Exceed the Maximum Height)

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1	2.463
2	7.360

Summary of Results for Nominal (Unfactored) Moment Capacity for Section 1

Moment values interpolated at maximum compressive strain = 0.003
or maximum developed moment if pile fails at smaller strains.

Load No.	Axial Thrust kips	Nominal Mom. Cap. in-kip	Max. Comp. Strain
1	2.463	30755.793	0.00300000
2	7.360	30882.864	0.00300000

Note that the values of moment capacity in the table above are not factored by a strength reduction factor (phi-factor).

In ACI 318, the value of the strength reduction factor depends on whether the transverse reinforcing steel bars are tied hoops (0.65) or spirals (0.70).

The above values should be multiplied by the appropriate strength reduction factor to compute ultimate moment capacity according to ACI 318, Section 9.3.2.2 or the value required by the design standard being followed.

The following table presents factored moment capacities and corresponding bending stiffnesses computed for common resistance factor values used for reinforced concrete sections.

Axial Load No.	Resist. Factor for Moment	Nominal Moment Cap in-kips	Ult. (Fac) Ax. Thrust kips	Ult. (Fac) Moment Cap in-kips	Bend. Stiff. at Ult Mom kip-in^2
1	0.65	30756.	1.600833	19991.	506913268.
2	0.65	30883.	4.784000	20074.	509359412.
1	0.70	30756.	1.723974	21529.	505675967.
2	0.70	30883.	5.152000	21618.	508003117.
1	0.75	30756.	1.847115	23067.	488673073.
2	0.75	30883.	5.520000	23162.	491113851.

Summary of Pile-head Responses for Conventional Analyses

Definitions of Pile-head Loading Conditions:

Load Type 1: Load 1 = Shear, V, lbs, and Load 2 = Moment, M, in-lbs
Load Type 2: Load 1 = Shear, V, lbs, and Load 2 = Slope, S, radians
Load Type 3: Load 1 = Shear, V, lbs, and Load 2 = Rot. Stiffness, R, in-lbs/rad.
Load Type 4: Load 1 = Top Deflection, y, inches, and Load 2 = Moment, M, in-lbs
Load Type 5: Load 1 = Top Deflection, y, inches, and Load 2 = Slope, S, radians

Load Case No.	Load Type 1	Pile-head Load 1	Load Type 2	Pile-head Load 2	Axial Loading lbs	Pile-head Deflection inches	Pile-head Rotation radians	Max Shear in Pile lbs	Max Moment in Pile in-lbs
1	V, lb	5040.	M, in-lb	3264000.	7360.	2.4123	-0.02928	-48533.	3315209.
2	V, lb	1686.	M, in-lb	819155.	2463.	0.01131	-1.44E-04	-11920.	836951.

Maximum pile-head deflection = 2.4122938332 inches
Maximum pile-head rotation = -0.0292800568 radians = -1.677624 deg.

The analysis ended normally.

MAT FOUNDATION DESIGN BY SABRE TOWERS & POLES

100' 3600 SRWD Freestanding URBAN COMMUNICATIONS, INC. FS27 Buffalo Grove, IL (20-3050-TJH) 1

Overall Loads:

Factored Moment (ft-kips)	204
Factored Axial (kips)	5.52
Factored Shear (kips)	3.78
Bearing Design Strength (ksf)	3.75
Water Table Below Grade (ft)	999
Width of Mat (ft)	10
Thickness of Mat (ft)	1.5
Depth to Bottom of Slab (ft)	6
Quantity of Bolts in Bolt Circle	12
Bolt Circle Diameter (in)	50
Top of Concrete to Top of Bottom Threads (in)	60
Diameter of Pier (ft)	5.5
Ht. of Pier Above Ground (ft)	0.5
Ht. of Pier Below Ground (ft)	4.5
Quantity of Bars in Mat	12
Bar Diameter in Mat (in)	1
Area of Bars in Mat (in ²)	9.42
Spacing of Bars in Mat (in)	10.27
Quantity of Bars Pier	30
Bar Diameter in Pier (in)	0.875
Tie Bar Diameter in Pier (in)	0.625
Spacing of Ties (in)	12
Area of Bars in Pier (in ²)	18.04
Spacing of Bars in Pier (in)	6.06
f'c (ksi)	4.5
fy (ksi)	60
Unit Wt. of Soil (kcf)	0.11
Unit Wt. of Concrete (kcf)	0.15

Volume of Concrete (yd³)

9.96

Two-Way Shear Action:

Average d (in)	14
ϕv_c (ksi)	0.228
$\phi v_c = \phi(2 + 4/\beta_c)f'_c{}^{1/2}$	0.342
$\phi v_c = \phi(\alpha_s d/b_o + 2)f'_c{}^{1/2}$	0.241
$\phi v_c = \phi 4f'_c{}^{1/2}$	0.228
Shear perimeter, b_o (in)	251.33
β_c	1

One-Way Shear:

ϕV_c (kips)	191.6
-------------------	-------

Stability:

Overturning Design Strength (ft-k)	372.0
------------------------------------	-------

Max. Net Bearing Press. (ksf)	1.98
-------------------------------	------

Allowable Bearing Pressure (ksf)	2.50
Safety Factor	2.00
Ultimate Bearing Pressure (ksf)	5.00
Bearing Φ_s	0.75

Minimum Pier Diameter (ft)	5.50
Equivalent Square b (ft)	4.87
Square Pier? (Y/N)	N

Recommended Spacing (in)	5 to 12
--------------------------	---------

Minimum Pier A_s (in ²)	17.11
Recommended Spacing (in)	5 to 12

v_u (ksi)	0.017
-------------	-------

V_u (kips)	17.7
--------------	------

Total Applied M (ft-k)	228.6
------------------------	-------

Attachment: Plan Set (Consider Height Variation for a Public Safety Communication Antenna to Exceed the Maximum Height)

Pier Design:

ϕV_n (kips)	397.7	V_u (kips)	3.8
$\phi V_c = \phi 2(1 + N_u / (2000 A_g)) f'_c{}^{1/2} b_w d$	397.7		
V_s (kips)	0.0	*** $V_s \text{ max} = 4 f'_c{}^{1/2} b_w d$ (kips)	935.1
Maximum Spacing (in)	11.09	(Only if Shear Ties are Required)	
Actual Hook Development (in)	13.00	Req'd Hook Development l_{dh} (in)	10.96
		*** Ref. To Spacing Requirements ACI 11.5.4.3	

Flexure in Slab:

ϕM_n (ft-kips)	567.6	M_u (ft-kips)	38.9
a (in)	1.23		
Steel Ratio	0.00561		
β_1	0.825		
Maximum Steel Ratio (ρ_t)	0.0197		
Minimum Steel Ratio	0.0018		
Rebar Development in Pad (in)	27.75	Required Development in Pad (in)	26.83

Condition	1 is OK, 0 Fails
Maximum Soil Bearing Pressure	1
Pier Area of Steel	1
Pier Shear	1
Interaction Diagram	1
Two-Way Shear Action	1
One-Way Shear Action	1
Overtaking	1
Flexure	1
Steel Ratio	1
Length of Development in Pad	1
Hook Development	1

RESUMES

Summary of Experience

Melissa Bauer, Senior Scientist has had extensive experience in the environmental field since 1999. Her experience includes conducting environmental site assessments, property condition assessments, asbestos surveys, lead-based paint surveys, limited indoor air quality evaluations, visual mold inspections, hazardous materials inspections, abatement/remediation project oversight and monitoring, clearance inspections and sampling, data management, watershed studies, and ecological projects as well as preparing reports and project documents. She has been assigned to projects involving remedial investigations with tasks including groundwater and soil vapor sampling, monitoring well installations and development of wells.

At EBI Consulting, Ms. Bauer serves as a Senior Scientist within the West Telecom Environmental group. Her primary responsibilities in this role include conducting Phase I ESAs and NEPA Compliance Reviews. Additionally, Ms. Bauer serves as the Phase I ESA Mentor for the West Telecom Environmental group. In this role Ms. Bauer is responsible for training and mentoring regional Scientists in conducting Phase I ESAs.

Relevant Project Experience

Ms. Bauer has prepared Phase I ESA Reports for a wide range of properties and clients. These assessments focused on evaluating site conditions, potential off-site liabilities, and environmental control systems in order to advise prospective buyers, operators, and owners of potential and existing environmental concerns. Her assessment experience includes industrial, commercial, utility, and telecommunications developments.

In addition to environmental assessments, Ms. Bauer has extensive experience completing NEPA Compliance Reviews, asbestos and lead surveys, Phase II ESAs (subsurface investigations), and limited microbial surveys.

Education

BS, Environmental Science, University of Maryland - Baltimore County

Professional Registrations

OSHA 40-Hour Hazardous Materials Training

OSHA 30-Hour Construction Class

EPA AHERA Certified Building Inspector/Contractor Supervisor/Management Planner/Project Designer

California Certified Asbestos Consultant (CAC)

Asbestos Abatement Consultant – State of Nevada

Asbestos Inspector – State of Utah

EPA Certified Lead Inspector/Risk Assessor – States of Arizona, Nevada, New Mexico, and Region 9 Tribal Lands

Niton Certificate of Achievement

8-Hour Current Understanding and Advances in Mold Assessment, Sampling and Analysis

20-Hour Microbial Investigator/Consultant Training

OSHA RF Site Safety Awareness Trained



Gregory McKee

Scientist II

1108 Columbia Road NW, #106

Mobile: 717.903.5399

SUMMARY OF EXPERIENCE

Mr. Gregory McKee, Scientist II, has extensive experience in environmental investigations, site assessments and National Environmental Policy Act (NEPA) reports for the real estate and telecommunications industries since 2012.

Relevant Project Experience

Environmental Site Assessments: Mr. McKee has conducted ASTM and Client-specific Phase I Environmental Site Assessment, Preliminary Environmental Site Screenings, and soil samplings for various clients at a variety of properties throughout the United States. These properties have included industrial, manufacturing, commercial, retail, telecommunications facility and undeveloped land. Mr. McKee has also performed asbestos surveys and conducted bulk lead-based paint sampling.

NEPA Screening Reports: Mr. McKee has prepared NEPA Screening Reports for telecommunication sites throughout the United States. These reports ensure compliance with Federal Communications Commission (FCC) requirements under NEPA and include an analysis of historic properties, wetlands, endangered species habitats, floodplains, and other sensitive areas of environmental concern where there is the potential for impact from the installation of telecommunications equipment.

Radio Frequency Electromagnetic Energy Compliance: Mr. McKee has conducted electromagnetic energy surveys at telecommunication sites to determine the levels of radiation being emitted from antennas and associated equipment. As a result of these surveys, his work has included preparing compliance report for telecommunication sites and deploying appropriate notification at the sites to meet OSHA, FCC and local requirements.

Education

B.A., Environmental Studies – University of Pittsburgh

Professional Registrations

EPA/AHERA Certified Asbestos Inspector in Pennsylvania, Maryland, Virginia, Alabama and Mississippi

Attachment: Plan Set (Consider Height Variation for a Public Safety Communication Antenna to Exceed the Maximum Height)

SUMMARY OF EXPERIENCE

Robert Helfrich, Program Manager has extensive experience specializing in conducting and managing environmental pre-acquisition assessments/due diligence assignments throughout the United States since 1997. He has successfully completed and managed thousands of project assignments including National Environmental Policy Act (NEPA) screenings for telecommunications carriers, Phase I, Phase II and Phase III Environmental Site Assessments as well as remedial projects performed in accordance with the Connecticut Department of Energy and Environmental Protection (CTDEEP) Remediation Standard Regulations (RSRS).

Prior to joining EBI, Mr. Helfrich was Supervisor of the Site Assessment and Investigation Group and Manager of the Telecommunications Sector with a firm in Connecticut. In these positions he was primarily responsible for coordination and oversight of environmental site assessments, subsurface investigations and remediation programs. Mr. Helfrich also implemented and provided oversight for FCC NEPA compliance reporting and archaeological assessment programs with his previous firm. In addition, Mr. Helfrich frequently deals with environmental transactions that involve the Connecticut Transfer Act and works closely with clients, attorneys and CTDEP personnel to satisfy the requirements of those regulations.

RELEVANT PROJECT EXPERIENCE

MULTIPLE PROJECTS IN CONNECTICUT: Mr. Helfrich oversaw environmental site assessments and NEPA evaluations for approximately one-hundred telecommunications towers in Connecticut as part of a large compliance campaign by one wireless carrier. In addition to conducting field work and report writing, Mr. Helfrich assisted and managed other scientists in order to complete the project under a short time frame.

VERIZON WIRELESS CLIENT MANAGEMENT: Mr. Helfrich first began performing Phase I Environmental Site Assessments for proposed telecommunications towers and collocation facilities in 1998. Mr. Helfrich has completed and managed thousands of environmental assessments of proposed sites across Connecticut, Massachusetts, Rhode Island, Vermont, New Hampshire, Maine and New York. He has also performed and coordinated hundreds of NEPA Assessments, numerous Phase II investigations and has overseen remedial efforts at several sites.

MULTI-PHASE ENVIRONMENTAL SITE ASSESSMENT, SOIL REMEDIATION AND CTDEEP TRANSFER ACT VERIFICATION. Project Manager for Phase I site assessment, Phase II subsurface investigation, and subsequent additional investigation to determine the extent and degree of pesticide contamination on a former gasoline filling station and auto body repair facility. Remediation involved the removal of impacted soil for off-site disposal followed by post-remediation groundwater monitoring. A Discontinuance of Groundwater Monitoring Application and Verification report were submitted to the CTDEP and were approved.

EDUCATION

B.S. Civil Engineering, Lafayette College

PROFESSIONAL REGISTRATIONS

TSCA Title II 40 CFR Part 763 Asbestos Site Inspector Training and annual refresher training

OSHA 29 CFR 1910.120 40-Hazardous Waste Site Operations (HAZWOPER) training and annual HAZWOPER refresher training

OSHA 29 CFR 1910.132 (f)(1) and 1910.268 (p)(3) RF Site Safety Awareness

U.S. Department of Housing and Urban Development Visual Assessment Course 24 CFR Part 35

2005 "Processes and Contaminants of the Metal Finishing, Surface Coating, and Dry Cleaning Industries", Southbury Environmental

2004, "Current Understanding and Advances in Mold Assessment, Sampling and Analysis", Severn Trent Laboratories

2002, "Expedited Site Assessment" presented by the University of Connecticut

2000 "Introduction to Conceptual Site Modeling," SWEP

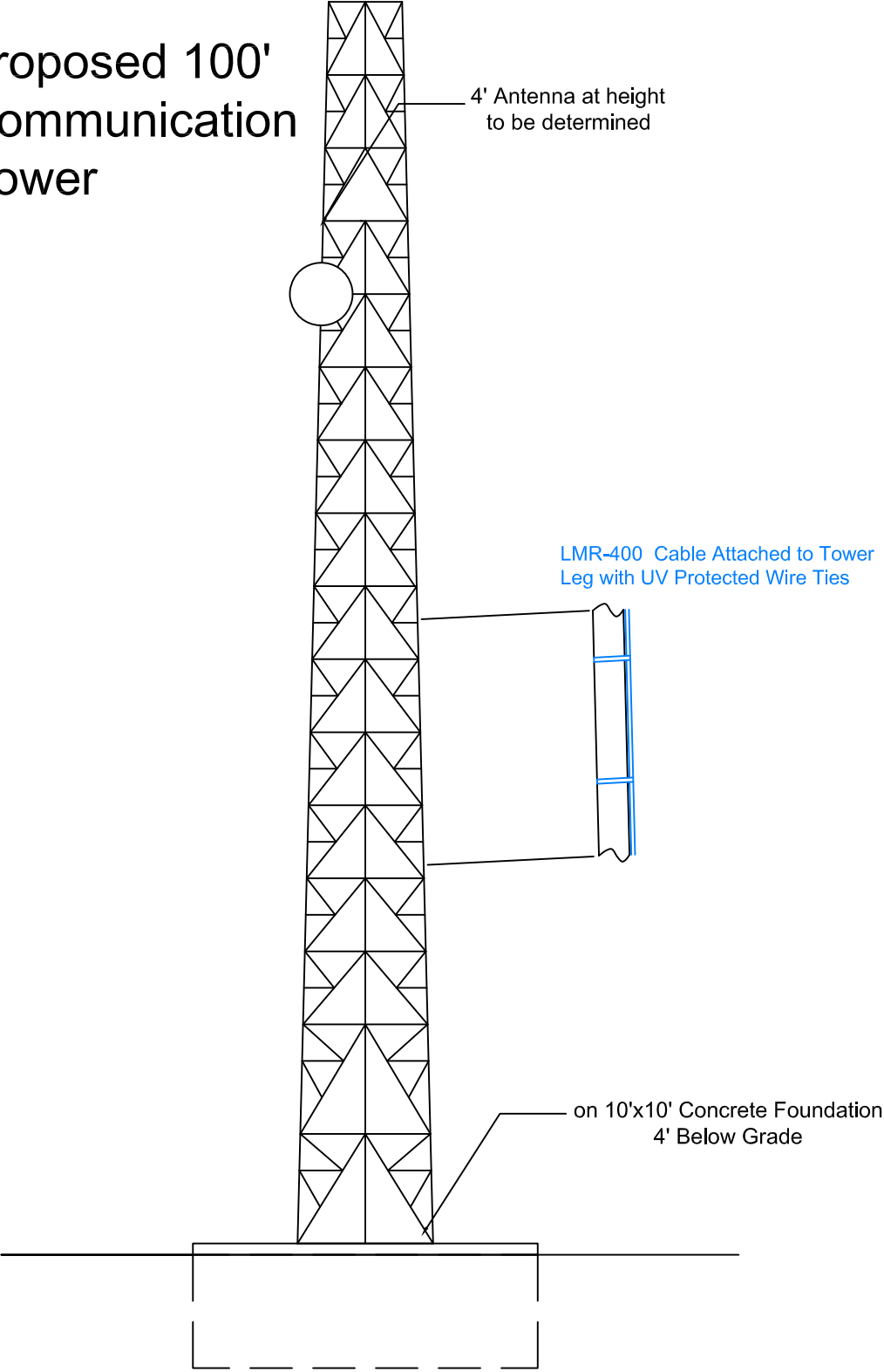
1999, "Successful Project Management" presented by Zweig White & Associates

1999, "Remediation Standard Regulations Fundamental Review" by Environmental Professionals' Organization of Connecticut (EPOC)

1998, "Geoprobe Days" presented by Geoprobe Systems

1998, "Remediation Technologies for Volatile Organic Compounds in Soil & Groundwater including Soil Vapor Extraction, Air Sparging, Bioremediation and Natural Attenuation" by EPOC

Proposed 100' Communication Tower

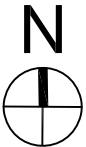
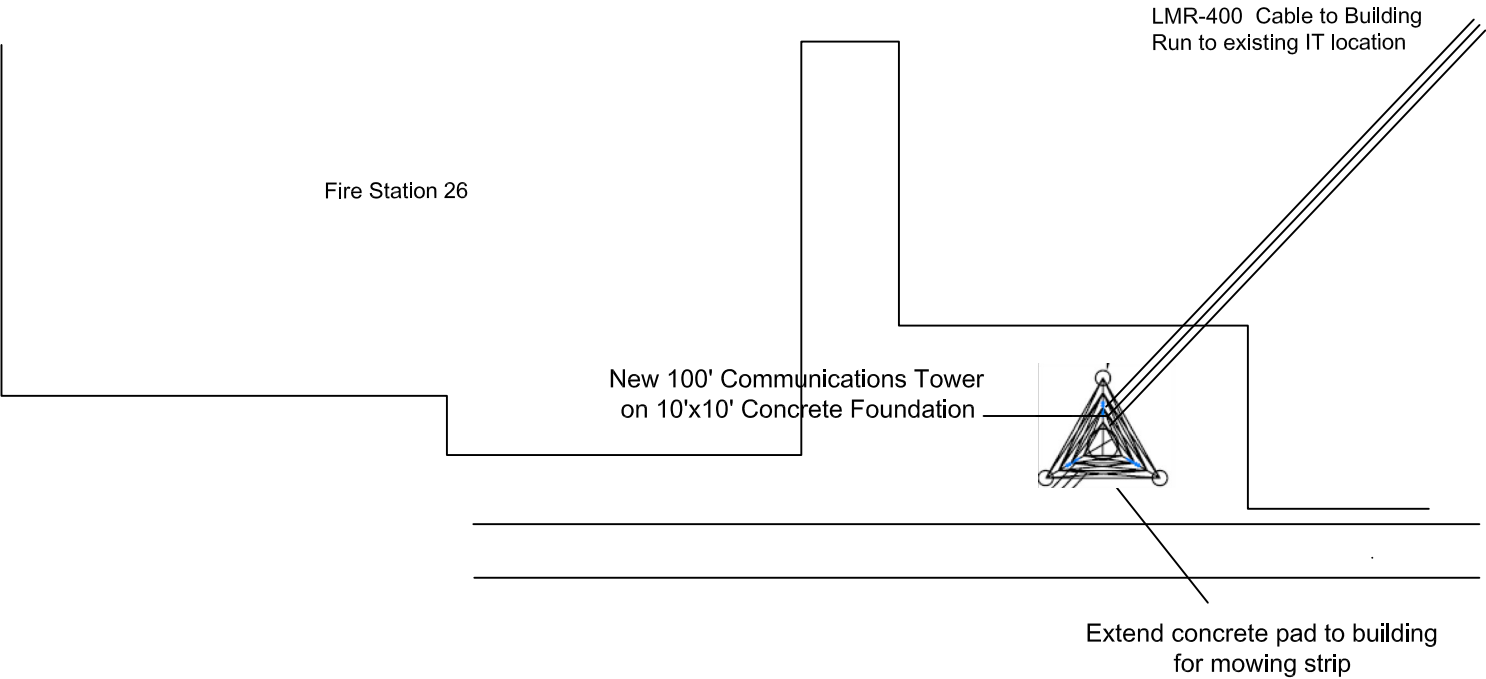


Tower Elevation
NTS

Equipment Specifications

Owner to provide space required for iFiber Equipment at their existing IT closet, including one 110V Quad Receptacle wired to separate 20A grounded circuit.

- 100' Self Supported Tower with Foundation, U-4.5
- Horizon Quantum 400 11Ghz, Dual Channel, Single Radio w/Adv
- Antenna, 11Ghz, 4' Antenna
- Grounding Kit and Cable Ties
- Anti-Climb Shields
- APC Full Sine Wave UPS RT2200VA RM 120V w/SNMP Card
- UPS Configuration
- Indoor Open Rack



Partial Site Plan
NTS

General Notes

Tower Elevation and Site Plan

No.	Revision/Issue	Date

Firm Name and Address
Urban Communications, Inc.
5320 W 159th Street
Suite 503
Oak Forest, IL 60452
ph. 708-687-2090

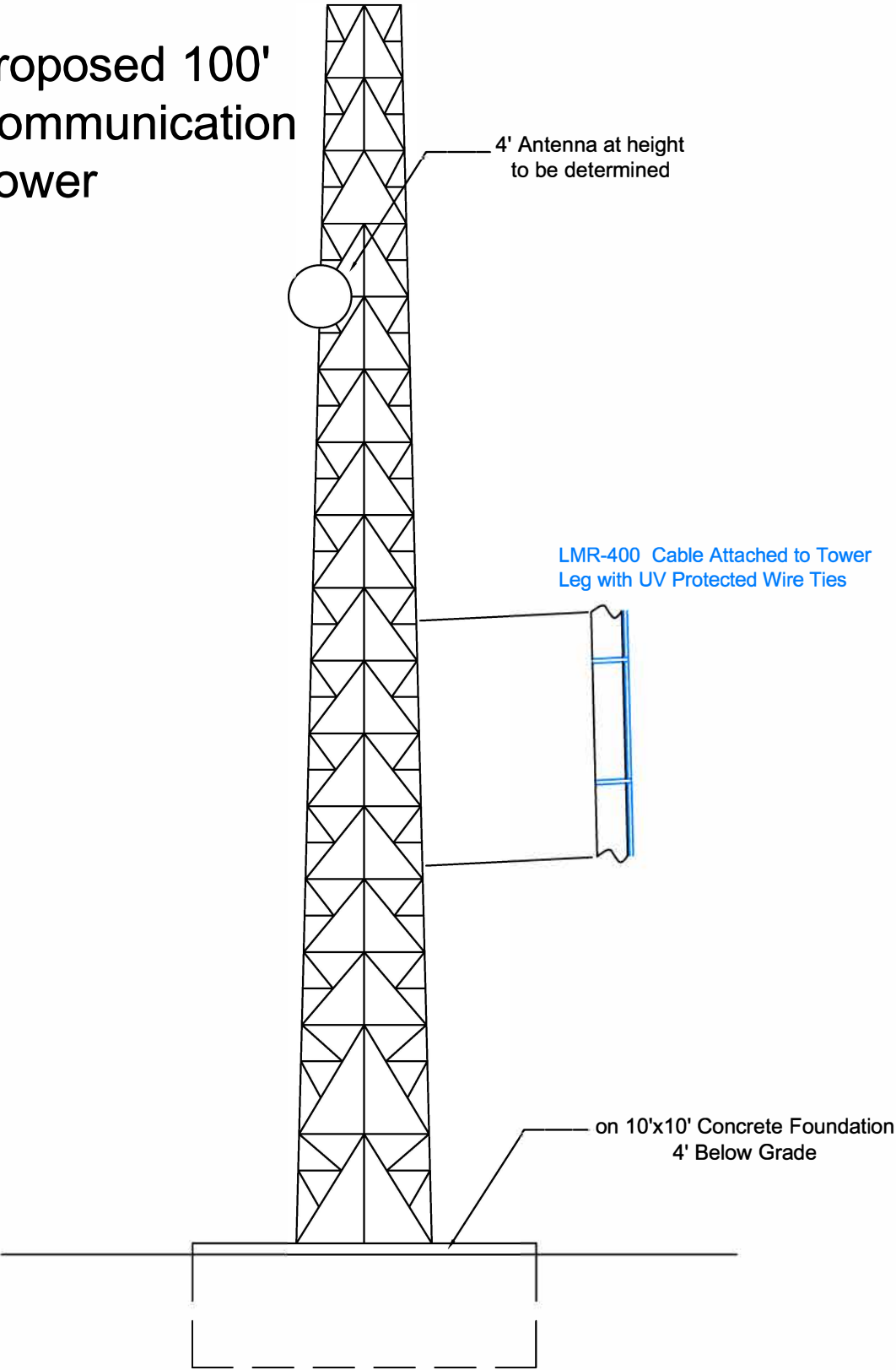
Project Name and Address
Buffalo Grove Fire Station 26
1051 Highland Grove Dr.
Buffalo Grove, Illinois

Latitude (Datum NAD 83) : N41.650596d
Longitude (Datum NAD 83) : W-90.078786d

Project	iFiber - Erie, Illinois
Date	April 28, 2012 Rev. July 27, 2012
Scale	

Sheet	1
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Proposed 100' Communication Tower

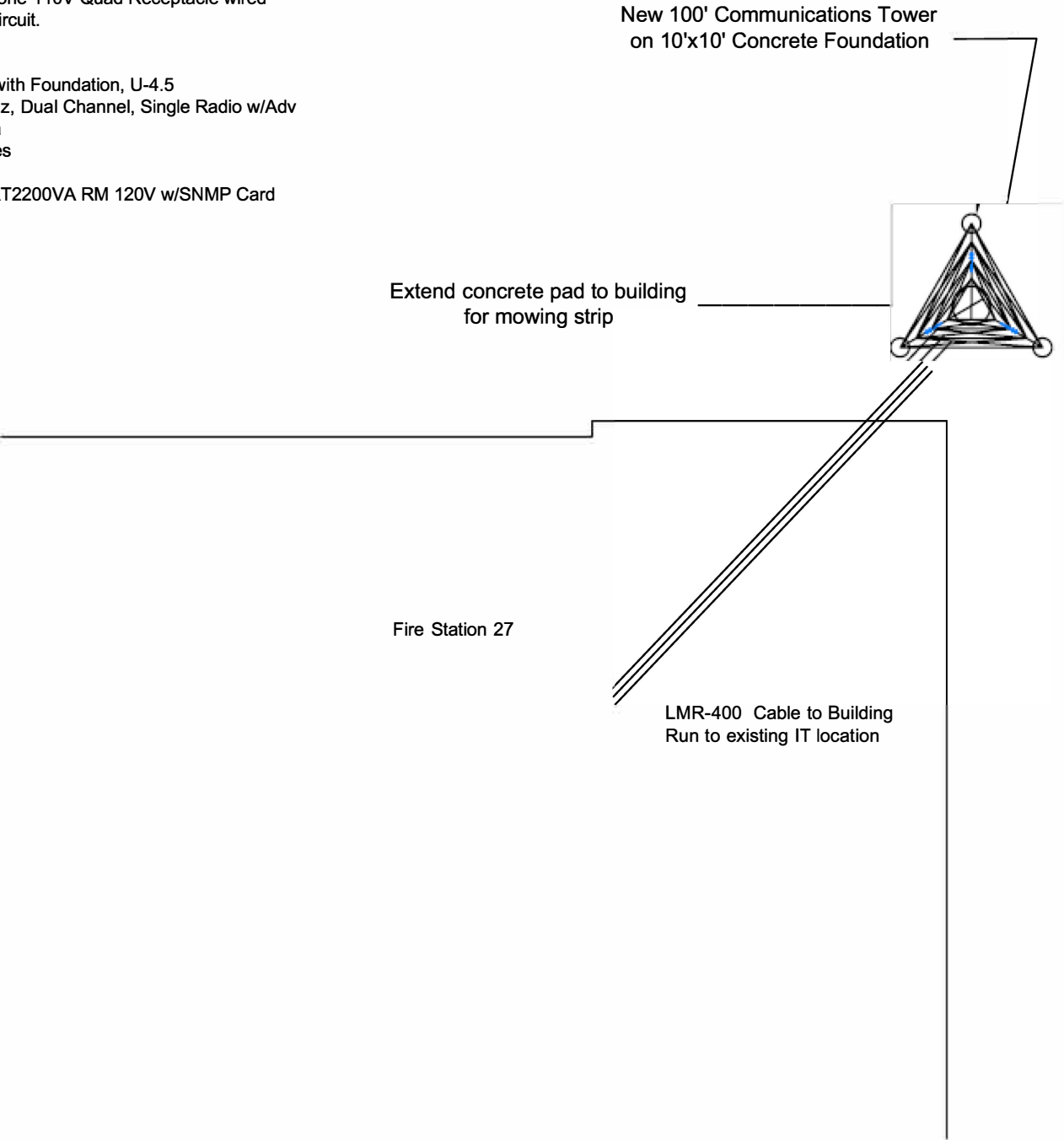


Tower Elevation
NTS

Equipment Specifications

Owner to provide space required for iFiber Equipment at their existing IT closet, including one 110V Quad Receptacle wired to separate 20A grounded circuit.

100' Self Supported Tower with Foundation, U-4.5
 Horizon Quantum 400 11Ghz, Dual Channel, Single Radio w/Adv Antenna, 11Ghz, 4' Antenna
 Grounding Kit and Cable Ties
 Anti-Climb Shields
 APC Full Sine Wave UPS RT2200VA RM 120V w/SNMP Card
 UPS Configuration
 Indoor Open Rack



Partial Site Plan
NTS

General Notes

Tower Elevation and Site Plan

No.	Revision/Issue	Date

Firm Name and Address

Urban Communications, Inc.
 5320 W 159th Street
 Suite 503
 Oak Forest, IL 60452
 ph. 708-687-2090

Project Name and Address

Buffalo Grove Fire Station 27
 w 60089, 100 W Half Day Rd
 Buffalo Grove, Illinois

Latitude (Datum NAD 83) : N41.650556d
 Longitude (Datum NAD 83) : W-90.078786d

Project	Sheet
iFiber - Erie, Illinois	
Date	
Rev. April 28, 2012	
Rev. July 27, 2012	
Scale	

A-1

LANDMARK

ENGINEERING LLC

DATE: NOVEMBER 8, 2019
 SUBJECT: BUFFALO GROVE FIRE STATION #26 – 109 DEERFIELD RD. BUFFALO GROVE, IL

The following is the 1A FAA certificate for the above listed site.

GEOGRAPHIC COORDINATES
CENTER OF PROPOSED FREE STANDING TOWER

	DEGREES	MINUTES	SECONDS	
LATITUDE	N 42°	10'	15.91"	NAD 83
LONGITUDE	W 87°	57'	21.05"	NAD 83

Latitude N 42.17109 NAD 83
 Longitude W 87.95585 NAD 83

ELEVATION OF GROUND 684 (NAVD 88) 0 (AGL)

FIELD DATE: OCTOBER 31, 2019

RE: BUFFALO GROVE FIRE STATION #26
 (SITE NAME) (SITE NO.)

LOCATION: BUFFALO GROVE ILLINOIS
 (CITY) (STATE)

I CERTIFY THAT THE LATITUDE OF NORTH 42 DEGREES 10 MINUTES 15.91 SECONDS (42.17109°) AND THE LONGITUDE OF WEST 87 DEGREES 57 MINUTES 21.05 SECONDS (87.95585°) (NAD 83) ARE ACCURATE TO WITHIN PLUS OR MINUS 15 FEET HORIZONTALLY; AND THAT THE GROUND ELEVATION OF 684 FEET AMSL IS ACCURATE TO WITHIN PLUS OR MINUS 3 FEET VERTICALLY. THE HORIZONTAL DATUM (COORDINATES) ARE IN TERMS OF THE NORTH AMERICAN DATUM OF 1983 (NAD 83) AND ARE EXPRESSED AS DEGREES TO THE NEAREST 0.00001 AND AS DEGREES AND MINUTES AND SECONDS TO THE NEAREST HUNDREDTH OF A SECOND. THE VERTICAL DATUM (HEIGHTS) ARE IN TERMS OF THE NORTH AMERICAN VERTICAL DATUM OF 1988 (NAVD 88) AND ARE DETERMINED TO THE NEAREST FOOT.



RICHARD P. URCELL
 P.L.S.



19-10-116

Attachment: Plan Set (Consider Height Variation for a Public Safety Communication Antenna to Exceed the Maximum Height)

LANDMARK

ENGINEERING LLC

DATE: NOVEMBER 8, 2019

SUBJECT: BUFFALO GROVE FIRE STATION #27 – 100 HALF DAY ROAD BUFFALO GROVE, IL

The following is the 1A FAA certificate for the above listed site.

GEOGRAPHIC COORDINATES
CENTER OF PROPOSED FREE STANDING TOWER

	DEGREES	MINUTES	SECONDS	
LATITUDE	N 42°	11'	48.10"	NAD 83
LONGITUDE	W 87°	57'	39.38"	NAD 83

Latitude N 42.19669 NAD 83
Longitude W 87.96094 NAD 83

ELEVATION OF GROUND 692 (NAVD 88) 0 (AGL)

FIELD DATE: OCTOBER 31, 2019

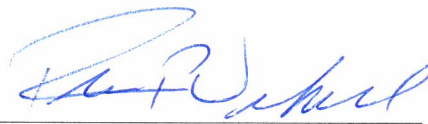
RE: BUFFALO GROVE FIRE STATION #27
(SITE NAME)

(SITE NO.)

LOCATION: BUFFALO GROVE
(CITY)

ILLINOIS
(STATE)

I CERTIFY THAT THE LATITUDE OF NORTH 42 DEGREES 11 MINUTES 48.10 SECONDS (42.19669°) AND THE LONGITUDE OF WEST 87 DEGREES 57 MINUTES 39.38 SECONDS (87.96094°) (NAD 83) ARE ACCURATE TO WITHIN PLUS OR MINUS 15 FEET HORIZONTALLY; AND THAT THE GROUND ELEVATION OF 692 FEET AMSL IS ACCURATE TO WITHIN PLUS OR MINUS 3 FEET VERTICALLY. THE HORIZONTAL DATUM (COORDINATES) ARE IN TERMS OF THE NORTH AMERICAN DATUM OF 1983 (NAD 83) AND ARE EXPRESSED AS DEGREES TO THE NEAREST 0.00001 AND AS DEGREES AND MINUTES AND SECONDS TO THE NEAREST HUNDREDTH OF A SECOND. THE VERTICAL DATUM (HEIGHTS) ARE IN TERMS OF THE NORTH AMERICAN VERTICAL DATUM OF 1988 (NAVD 88) AND ARE DETERMINED TO THE NEAREST FOOT.



RICHARD P. URCELL
P.L.S.

19-10-117



Attachment: Plan Set (Consider Height Variation for a Public Safety Communication Antenna to Exceed the Maximum Height)

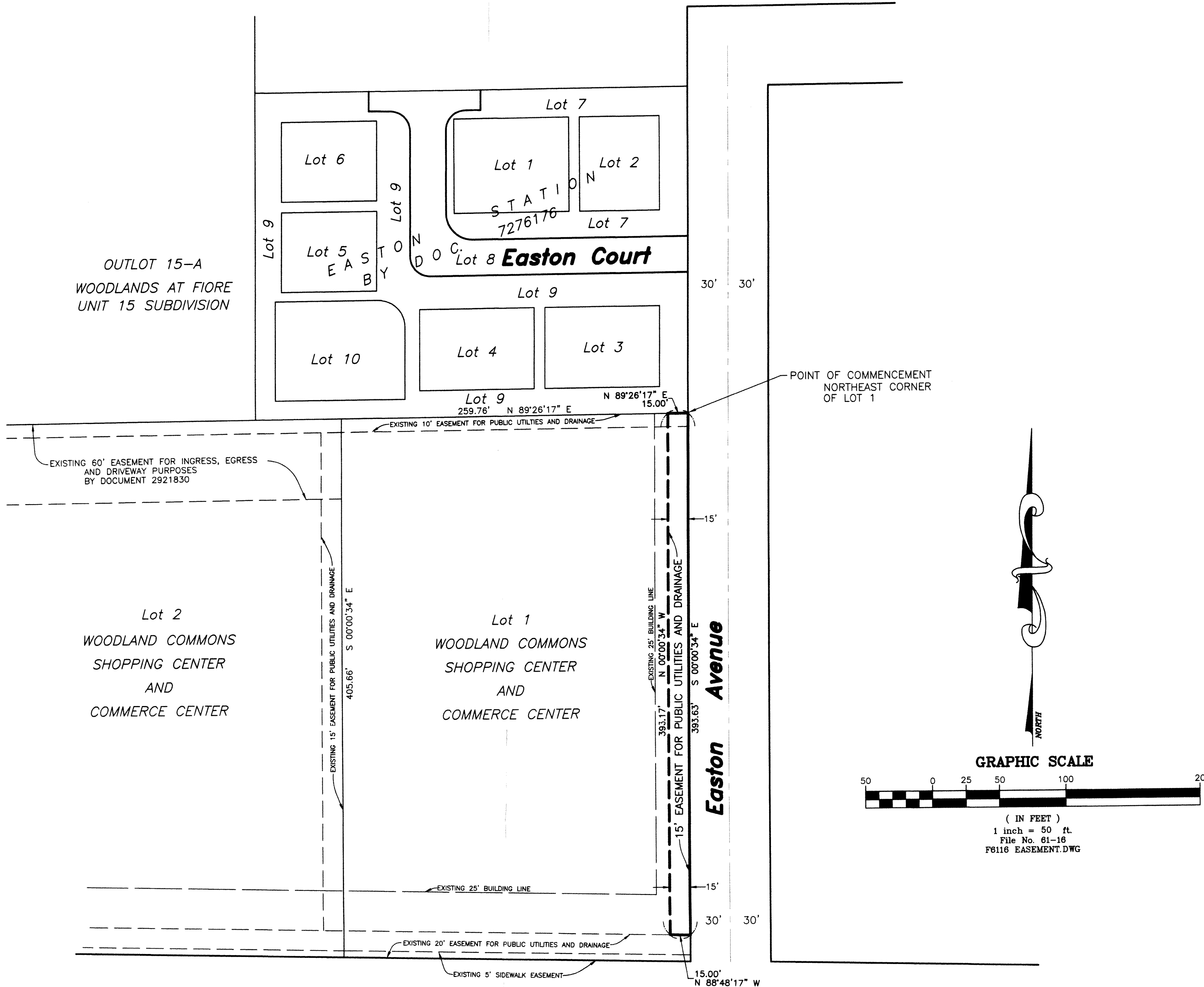
PLAT OF EASEMENT

7377958

3/8/2017

image# Up6059480002 Type: PLE
Recorded: 03/08/2017 at 10:02:34 AM
Receipt#: 2017-00014102
Page: 1 of 2
Fees: \$25.00
IL Rental Housing Fund: \$0.00
Lake County, IL Recorder
Mary Ellen Vanderventer Recorder
File #7377958

THAT PART OF LOT 1 IN WOODLAND COMMONS SHOPPING CENTER AND COMMERCE CENTER; BEING A SUBDIVISION OF PART OF THE SOUTH HALF OF THE SOUTHEAST QUARTER OF SECTION 17 AND THE NORTH HALF OF THE NORTHEAST QUARTER OF SECTION 21, TOWNSHIP 43 NORTH, RANGE 11, EAST OF THE THE THIRD PRINCIPAL MERIDIAN, ACCORDING TO THE PLAT THEREOF RECORDED JULY 5, 1990 AS DOCUMENT 2921830, DESCRIBED AS FOLLOWS: COMMENCING AT THE NORTHEAST CORNER OF SAID LOT 1; THENCE SOUTH 00 DEGREES 00 MINUTES 34 SECONDS EAST, ALONG THE EAST LINE OF SAID LOT 1, A DISTANCE OF 393.63 FEET; THENCE NORTH 88 DEGREES 48 MINUTES 17 SECONDS WEST, A DISTANCE OF 15.00 FEET; THENCE NORTH 00 DEGREES 00 MINUTES 34 SECONDS WEST, PARALLEL WITH AND 15 FEET WESTERLY OF, AS MEASURED PERPENDICULAR TO THE EAST LINE OF SAID LOT 1, A DISTANCE OF 393.17 FEET TO A POINT ON THE NORTH LINE OF SAID LOT 1; THENCE NORTH 89 DEGREES 26 MINUTES 17 SECONDS EAST, ALONG THE NORTH LINE OF SAID LOT 1, A DISTANCE OF 15.00 FEET TO THE POINT OF BEGINNING, IN LAKE COUNTY, ILLINOIS.



OWNERS CERTIFICATE

STATE OF ILLINOIS)
COUNT OF LAKE)

THIS IS TO CERTIFY THAT THE VILLAGE OF BUFFALO GROVE IS THE OWNER OF THE PROPERTY DESCRIBED ON THE PLAT OF EASEMENT AND HAS CAUSED THE SAME TO BE SURVEYED AS INDICATED THEREON, FOR THE USES AND PURPOSES THEREIN SET FORTH, AND DOES HEREBY ACKNOWLEDGE AND ADOPT THE SAME UNDER THE STYLE AND TITLE HEREON INDICATED.

THE UNDERSIGNED HEREBY GRANTS THE EASEMENTS SHOWN AND DESCRIBED ON THIS PLAT.

DATED THIS 25th DAY OF January, A.D. 20 17.

VILLAGE PRESIDENT: Beverly Sussman
BEVERLY SUSSMAN

ATTEST: Janet M. Sirabian
VILLAGE CLERK: JANET SIRABIAN

NOTARY CERTIFICATE

STATE OF ILLINOIS)
COUNTY OF LAKE) S.S.

I, Julie Kamka, A NOTARY PUBLIC IN AND FOR A SAID COUNTY IN THE AFORESAID STATE, DOES HEREBY CERTIFY THAT BEVERLY SUSSMAN AND JANET SIRABIAN, PERSONALLY KNOWN TO ME TO BE THE VILLAGE PRESIDENT AND VILLAGE CLERK OF THE VILLAGE OF BUFFALO GROVE AND PERSONALLY KNOWN TO ME TO BE SAME PERSONS WHOSE NAMES ARE SUBSCRIBED TO THE AFORESAID INSTRUMENT, APPEARED BEFORE ME THIS DAY IN PERSON AND SEVERALLY ACKNOWLEDGED THAT THEY SIGNED AND DELIVERED THE PLAT OF EASEMENT AND CAUSED THE SEAL OF THE VILLAGE OF BUFFALO GROVE TO BE AFFIXED THERETO, PURSUANT TO AUTHORITY GIVEN BY THE VILLAGE PRESIDENT OF SAID VILLAGE OF BUFFALO GROVE AS THEIR FREE AND VOLUNTARY ACT, AND AS THE FREE AND VOLUNTARY ACT AND DEED OF SAID VILLAGE CLERK FOR THE USES AND PURPOSES THEREIN SET FORTH.

GIVEN UNDER MY HAND AND NOTARIAL SEAL THIS 25th DAY OF January, A.D. 20 17.

NOTARY PUBLIC: Julie Kamka

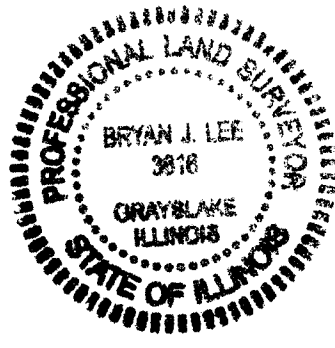


CORPORATE AUTHORITY'S CERTIFICATE
APPROVED AND ACCEPTED BY THE PRESIDENT AND BOARD OF TRUSTEES OF THE VILLAGE OF BUFFALO GROVE, COOK AND LAKE COUNTIES, ILLINOIS, AT A MEETING HELD THIS 23rd DAY OF January, A.D. 20 17.

VILLAGE PRESIDENT: Beverly Sussman
ATTEST: Janet M. Sirabian
VILLAGE CLERK

STATE OF ILLINOIS)
COUNTY OF LAKE) S.S.
DATE: DECEMBER 27, 2016
PREPARED BY:

Bryan J. Lee
ILLINOIS PROFESSIONAL LAND SURVEYOR 35-3616
MY LICENSE EXPIRES 11-30-18
PROFESSIONAL DESIGN FIRM NO. 184-002732



MAIL TO AFTER RECORDING:
VILLAGE OF BUFFALO GROVE
50 RAUPP BOULEVARD
BUFFALO GROVE, IL 60089

VILLAGE COLLECTOR'S CERTIFICATE

I HEREBY CERTIFY THAT I FIND NO DEFERRED INSTALLMENTS OF OUTSTANDING UNPAID SPECIAL ASSESSMENTS DUE AGAINST THE PROPERTY DESCRIBED IN THE PLAT HEREON DRAWN. BUFFALO GROVE, COOK AND LAKE COUNTIES, ILLINOIS, DATED THIS 24th DAY OF January, A.D. 20 17.

VILLAGE COLLECTOR

VILLAGE ENGINEER'S CERTIFICATE

APPROVED BY THE VILLAGE ENGINEER OF THE VILLAGE OF BUFFALO GROVE, COOK AND LAKE COUNTIES, ILLINOIS, DATED THIS 24th DAY OF January, A.D. 20 17.

VILLAGE ENGINEER

GENERAL VILLAGE EASEMENT PROVISIONS

AN EASEMENT FOR PURPOSES INCLUDING, BUT NOT LIMITED TO, WATER SUPPLY AND DISTRIBUTION, SEWERAGE, STORM SEWER AND DRAINAGE, AND STREET LIGHTING, IS HEREBY RESERVED FOR AND GRANTED TO

VILLAGE OF BUFFALO GROVE

ITS SUCCESSORS AND ASSIGNS TO INSTALL, OPERATE, MAINTAIN, AND REMOVE, FROM TIME TO TIME, FACILITIES USED FOR PURPOSES INCLUDING, BUT NOT LIMITED TO, WATER SUPPLY AND DISTRIBUTION, SEWERAGE, STORM SEWER AND DRAINAGE, AND STREET LIGHTING IN, UNDER, ACROSS, ALONG AND UPON THE SURFACE OF THE PROPERTY SHOWN WITHIN THE DOTTED LINES ON THE PLAT AND MARKED "PUBLIC UTILITIES AND DRAINAGE EASEMENT." ALSO GRANTED HERewith IS THE RIGHT TO CUT, TRIM OR REMOVE TREES, BUSHES AND ROOTS AS MAY BE REASONABLY REQUIRED INCIDENT TO THE RIGHTS HEREIN GIVEN, AND THE RIGHT TO ENTER UPON THE SUBDIVIDED PROPERTY FOR ALL SUCH PURPOSES. OBSTRUCTIONS SHALL NOT BE PLACED OVER GRANTEE'S FACILITIES OR IN, UPON OR OVER THE PROPERTY WITHIN THE EASEMENTS WITHOUT THE PRIOR WRITTEN CONSENT OF GRANTEE. AFTER INSTALLATION OF ANY SUCH FACILITIES, THE GRADE OF THE SUBDIVIDED PROPERTY SHALL NOT BE ALTERED IN A MANNER SO AS TO INTERFERE WITH THE PROPER OPERATION AND MAINTENANCE THEREOF.

FIELDWORK COMPLETED:
CLIENT NAME: Village of Buffalo Grove
ADDRESS: 50 Raupp Boulevard
Buffalo Grove, IL

NOTES:
PLAT IS VOID if the Impressed Surveyors Seal does not appear.
Only those Building Lines or Easements shown on a Recorded Subdivision Plat or from a Recorded Document are shown hereon; check local ordinances before building.
Compare your description and site markings with this plat and AT ONCE report any discrepancies which you may find.

R.E. ALLEN AND ASSOCIATES, LTD.
PROFESSIONAL LAND SURVEYORS
1015 N. CORPORATE CIRCLE, SUITE C
GRAYSLAKE, ILLINOIS 60030
PHONE: 847-223-0914 FAX: 847-223-0980



Action Item : A Special Use for a Public Utility Facility (Public Safety Communication Antenna) in a Residential District and a Variation to the Zoning Ordinance Section 17.32 to Allow for the Installation of a Communication Antenna to Exceed the Maximum Permissible Height of 60'.

Recommendation of Action

Staff recommends approval, subject to the conditions in the attached staff report.

Village of Buffalo Grove is requesting to replace an existing roof mounted communication antenna located at Fire Station 26, located at 1051 Highland Grove Drive & 109 Deerfield Parkway. The communication antenna will be used for emergency communications and for automated water meter reading at Public Works. The existing 80 foot tall roof mounted communication antenna on fire station 26 is in poor condition, and hence needs to be replaced.

The proposed height of the communication tower measures 100 feet. Pursuant to the Municipal Code, Public Utility Facility (Public Safety Communication Antenna) requires a Special Use for a Public Utility Facility (Public Safety Communication Antenna) in the R6 Residential District and a Variation to the Zoning Ordinance Section 17.32 to allow for the installation of a communication antenna to exceed the maximum permissible height of 60 feet.

ATTACHMENTS:

- Staff Report (DOCX)
- Plan Set (PDF)

Trustee Liaison
Johnson

Staff Contact
Nicole Woods, Community Development

Wednesday, February 5, 2020	
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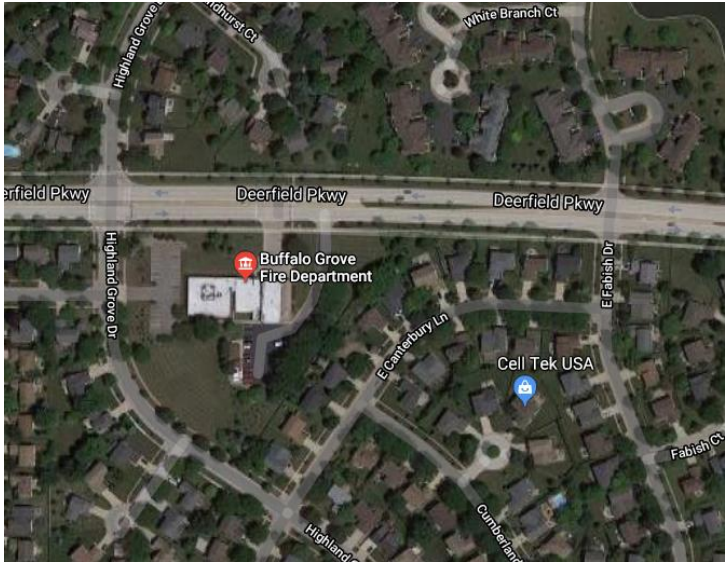
MEETING DATE:	February 5, 2020
SUBJECT PROPERTY LOCATION:	1051 Highland Grove Drive & 109 Deerfield Parkway
PETITIONER:	Village of Buffalo Grove
PREPARED BY:	Rati Akash, Village Planner
REQUEST:	A Special Use for a Public Utility Facility (Public Safety Communication Antenna) in a Residential District and a Variation to the Zoning Ordinance Section 17.32 to allow for the installation of a communication antenna to exceed the maximum permissible height of 60’.
EXSITING LAND USE AND ZONING:	The property is improved with a Fire Station building currently located in the Residential District.
COMPREHENSIVE PLAN:	The approved Village Comprehensive Plan calls for this property and the immediate neighborhood to be Residential.

PROJECT BACKGROUND

Village of Buffalo Grove is requesting to replace an existing roof mounted communication antenna located at Fire Station 26, located at 1051 Highland Grove Drive & 109 Deerfield Parkway. The communication antenna will be used for emergency communications at the fire stations 26 and 27, and for automated water meter reading at Public Works.

The existing 80 foot tall roof mounted communication antenna on fire station 26 is in poor condition, and hence needs to be replaced.

The proposed height of the communication tower measures 100 feet. Pursuant to the Municipal Code, Public Utility Facility (Public Safety Communication Antenna) requires a Special Use for a Public Utility Facility (Public Safety Communication Antenna) in the R6 Residential District and a Variation to the Zoning Ordinance Section 17.32 to allow for the installation of a communication antenna to exceed the maximum permissible height of 60 feet.



PLANNING & ZONING ANALYSIS

Proposed Communication Antenna Use

- The proposed communication antennas will continue to be used for emergency communications at the Fire Station 26 and 27, as well as for automated water reading at Public Works.
- The communication antennas will not be used for any commercial use.

Existing Communication Antenna

- The existing roof mounted communication antenna is located on the Fire Station 26 building, and was constructed in 1991 as shown in a red dot in *Image A*.
- The communication antenna is 80 feet tall. The building height is approximately 20 feet. The total height of the tower from the ground level measures 100 feet.
- This existing communication antenna is located approximately 130 feet from Deerfield Parkway and 175 feet from Highland Grove Drive.
- This existing communication antenna is presently in a poor structural condition and has to be replaced as it poses a safety concern.



Proposed Location and Height of communication tower

- The Village of Buffalo Grove is proposing to replace a roof mounted communication antenna on Fire Station 26 building, with a new communication antenna which will be located on the North side of the building as shown in a blue dot in *Image A*.
- The proposed communication antenna will be setback approximately 195 feet from the Highland Grove Drive and meets the setback requirements.
- The communication antenna is proposed to be 100 feet for more reliable coverage, and to meet Buffalo Grove's growing tree canopy.



- The proposed height of the communication antenna will be 100 feet, and will be the same height as the existing roof mounted communication tower which is 100 feet from ground level.

SPECIAL USE

- Village of Buffalo Grove is proposing to replace a communication tower in the Fire Station 26 location. The subject property is zoned R6 Residential District and requires a Special Use for a Public Utility Facility in Residential Districts.
- The Public Utility Facility (Communication Antenna) meets all the special use standards.

Standards

Pursuant to the Zoning Ordinance, the proposed use does require a Special Use in the “R6” Residential District. The following criteria shall be met:

1. *The special use will serve the public convenience at the location of the subject property; or the establishment, maintenance or operation of the special use will not be detrimental to or endanger the public health, safety, morals, comfort, or general welfare;*
2. *The location and size of the special use, the nature and intensity of the operation involved in or conducted in connection with said special use, the size of the subject property in relation to such special use, and the location of the site with respect to streets giving access to it shall be such that it will be in harmony with the appropriate, orderly development of the district in which it is located;*
3. *The special use will not be injurious to the use and enjoyment of other property in the immediate vicinity of the subject property for the purposes already permitted in such zoning district, nor substantially diminish and impair other property valuations with the neighborhood;*
4. *The nature, location and size of the buildings or structures involved with the establishment of the special use will not impede, substantially hinder or discourage the development and use of adjacent land and buildings in accord with the zoning district within which they lie;*
5. *Adequate utilities, access roads, drainage, and/or other necessary facilities have been or will be provided;*
6. *Parking areas shall be of adequate size for the particular special use, which areas shall be properly located and suitably screened from adjoining residential uses, and the entrance and exit driveways to and from these parking areas shall be designed so as to prevent traffic hazards, eliminate nuisance and minimize traffic congestion in the public streets.*

The Village of Buffalo Grove has provided a response to the standards and they are included with the packet.

VARIATIONS REQUESTED

A height variation from the Zoning Ordinance Section 17.32 to allow for the installation of a Public Utility Facility (Public Safety Communication Antenna) to exceed the maximum permissible height of 60’.

Standards

The Planning & Zoning Commission is authorized to grant variations on the following criteria:

1. The proposed variation will not alter the essential character of the neighborhood;
2. There are practical difficulties or particular hardships in carrying out the variation request;

3. The proposed variation will not be detrimental to public health safety and welfare.

The Village of Buffalo Grove has provided a response to the standards are included with the packet.

DEPARTMENTAL REVIEWS

Village Department	Comments
Engineering	The Engineering Department has reviewed the proposed communication antenna and has no concerns with the proposed location of the communication antenna.

SURROUNDING PROPERTY OWNERS

Pursuant to Village Code, the contiguous property owners were notified and a public hearing sign was posted on the subject property. The posting of the public hearing sign and the mailed notifications were completed within the prescribed timeframe as required. As of the date of this Staff Report, the Village has received 9 calls inquiring about the proposed ground mounted communication tower at the subject property, however no concerns were raised.

STAFF RECOMMENDATION

Village staff recommends approval for the purpose of installation of a communication antenna to exceed 40 feet in height (maximum allowed 60 feet in height) from the ground level, and Special Use for a Public Utility Facility (Public Safety Communication Antenna) in the R6 Residential District:

- 1) The special use is granted to the Village of Buffalo Grove and said special use does not run with the land.
- 2) The special use granted may be assignable to subsequent petitioners seeking assignment of this special use as follows:
 - i. Upon application of a petition seeking assignment of this special use, the Village of Buffalo Grove, in their sole discretion, may approve the assignment administratively, or may refer it to the Planning & Zoning Commission and/or the Village Board for a public hearing.
 - ii. Such assignment shall be valid only upon the written approval of the Village of Buffalo Grove granting said assignment, which may be granted or denied for any reason.
- 3) The proposed communication antenna shall be installed in accordance with the documents and plans submitted as part of this petition.

ACTION REQUESTED

The Planning & Zoning Commission (PZC) shall open the public hearing and take public testimony concerning the variation. The PZC shall make a final decision on whether or not to approve the special use and variation.

MEMORANDUM

DATE: December 1, 2019

TO: Planning and Zoning Commission

FROM: Rati Akash, Village Planner
Mike Skibbe, Deputy Director of Public Works

SUBJECT: Village Antenna Towers at Fire Station 26 & 27

OVERVIEW

The Village of Buffalo Grove is seeking an amendment to the special use for the replacement of two existing antenna towers in Fire Station 26 and Fire Station 27 respectively. The two proposed towers would be 100 foot tall, self-supporting, ground mounted antennas. The communications devices mounted on the towers would only be Village specific devices, and no commercial use devices are proposed. The towers are critical to the connectivity of emergency communications at the Fire Stations, as well as for our automated water meter reading antenna in Public Works.

SITE SPECIFICS

Fire Station 27 – 100 Half Day Road

The existing tower at Fire Station 27 is a, 80 foot tall self-supporting tower mounted just North of the Fire Station itself. The tower was constructed with the new Fire Station in 1991. It is in poor overall condition, with deteriorating structural members and a leaning concrete foundation pad. This tower supports both the computer connection to Village Hall for onsite personnel, and emergency communication radio equipment.

The new tower would increase in height by 20 feet to clear the increase in height of the tree canopy throughout the Village. It would be constructed just north of the existing tower, both to limit the change in view as well as to allow the new tower to be built before the existing tower is removed. Please see the attached diagrams for specific measurements.

Fire Station 26 – 109 Deerfield Parkway

The existing tower at Fire Station 26 is an 80 foot tall, roof mounted antenna tower with guy wire support system. It is mounted on the roof of the station which was constructed in 1981, and last revised by increasing its height due to tree canopy in 2008. The guy wire anchor system to the roof deck no longer meets industry standard, and rather than try to modify an aged tower, we propose to move it to a more typical ground mounted, self-supporting tower design.

A similar roof mounted tower, at Village Hall, failed in 2009 by falling off the roof. The Village Hall tower was moved to the ground in a similar replacement project. We want to replace this tower and avoid any potential of a similar fate.

The proposed tower would be mounted on the ground just south of the Fire Station, as close as feasible to its current location. Since the 80 foot tall antenna tower was mounted to the top of the structure, the overall height at this location will be similar with the 100 foot tall ground mounted antenna. We believe the overall appearance will be similar, if not less impactful to the neighborhood. The new tower will not require the guy-wire support system which added to the overall appearance of the existing tower.

Please see the attached diagrams with specific dimensions.

REQUESTS

Fire Station 26

Petition for an amendment to the special use Ordinance No. 90-83 for the preliminary plan approval of fire station 26.

Petition for variation to Zoning Ordinance Section 17.32 allow for the installation of self-supporting communication antennas which exceeds the maximum permissible height of 60'.

Fire Station 27

Petition for an amendment to the special use Ordinance No. 90-43 for the preliminary plan approval of fire station 27.

Petition for variation to Zoning Ordinance Section 17.32 allow for the installation of self-supporting communication antennas which exceeds the maximum permissible height of 60'.

The Village of Buffalo Grove is seeking to replace two existing antennas in both Fire Station 26 and Fire Station 27, with two new proposed self-supporting ground mounted antennas which would be 100 foot tall.

CC: Chris Stilling, Deputy Village Manager
Rati Akash, Village Planner

H:\Agreements\Antenna Tower\2019-1201 PZC Antenna Tower Memo.docx



17.28.040 – Criteria to Special Use

1. *The special use will serve the public convenience at the location of the subject property; or the establishment, maintenance or operation of the special use will not be detrimental to or endanger the public health, safety, morals, comfort, or general welfare;*

The Village of Buffalo is proposing to replace an existing communication antenna with another communication antenna. The proposed communication antenna will not be detrimental or endanger the public health, safety, morals, comfort, or general welfare.

2. *The location and size of the special use, the nature and intensity of the operation involved in or conducted in connection with said special use, the size of the subject property in relation to such special use, and the location of the site with respect to streets giving access to it shall be such that it will be in harmony with the appropriate, orderly development of the district in which it is located;*

The proposed communication antenna will be located behind the Fire Station 26 building on the north side. The proposed communication antenna will be setback 195' from Highland Grove Drive and 175' from Deerfield Parkway. The proposed communication antenna is 100' in height, and will be replacing an existing roof mounted communication antenna of 100' in height from ground level. The proposed communication tower location and size, and will be harmonious with the surroundings for both the location and size.

3. *The special use will not be injurious to the use and enjoyment of other property in the immediate vicinity of the subject property for the purposes already permitted in such zoning district, nor substantially diminish and impair other property valuations with the neighborhood;*

The proposed communication antenna is replacing an existing communication antenna, and will not diminish and impair property valuation with the neighborhood.

4. *The nature, location and size of the buildings or structures involved with the establishment of the special use will not impede, substantially hinder or discourage the development and use of adjacent land and buildings in accord with the zoning district within which they lie;*

The existing communication antenna has not hindered or discouraged the development and use of the adjacent land buildings. The proposed communication antenna replacing the existing antenna will have the same functionality, which will be used for emergency communications at the Fire Station 26 & 27, and automated water reading at Public Works. The proposed communication antennas serves the same purpose, and will not hinder or discourage the development of its surroundings.

5. *Adequate utilities, access roads, drainage, and/or other necessary facilities have been or will be provided;*

N/A

6. *Parking areas shall be of adequate size for the particular special use, which areas shall be properly located and suitably screened from adjoining residential uses, and the entrance and exit driveways to and from these parking areas shall be designed so as to prevent traffic hazards, eliminate nuisance and minimize traffic congestion in the public streets.*

The location of the proposed communication antenna towers will not occupy any parking space or impede any traffic flow.

During your testimony at the Public Hearing you need to testify and present your case for the variance being requested. During your testimony you need to affirmatively address the three standards listed below

The Planning & Zoning Commission is authorized to grant variations to the regulations of the Municipal Code based upon findings of fact which are made based upon evidence presented at the hearing that:

1. The proposed variation will not alter the essential character of the neighborhood;

Your Evidentiary Statement:

The proposed variation will not alter the essential character of the neighborhood. The Village of Buffalo is proposing to replace the existing roof mounted communication antenna on Fire Station 26 with a ground mounted communication antenna.

2. There are practical difficulties or particular hardships in carrying out the variation request;

Your Evidentiary Statement:

- The existing roof mounted communication tower on Fire Station 26 is presently in a poor structural condition and has to be replaced for safety concerns.
- The proposed communication antenna is required to be 100 feet in height to improve the reliability of services for emergency communications.

3. The proposed variation will not be detrimental to the public health safety and welfare.

Your Evidentiary Statement:

The proposed communication antenna will not be detrimental to the public health safety and welfare of the Community.

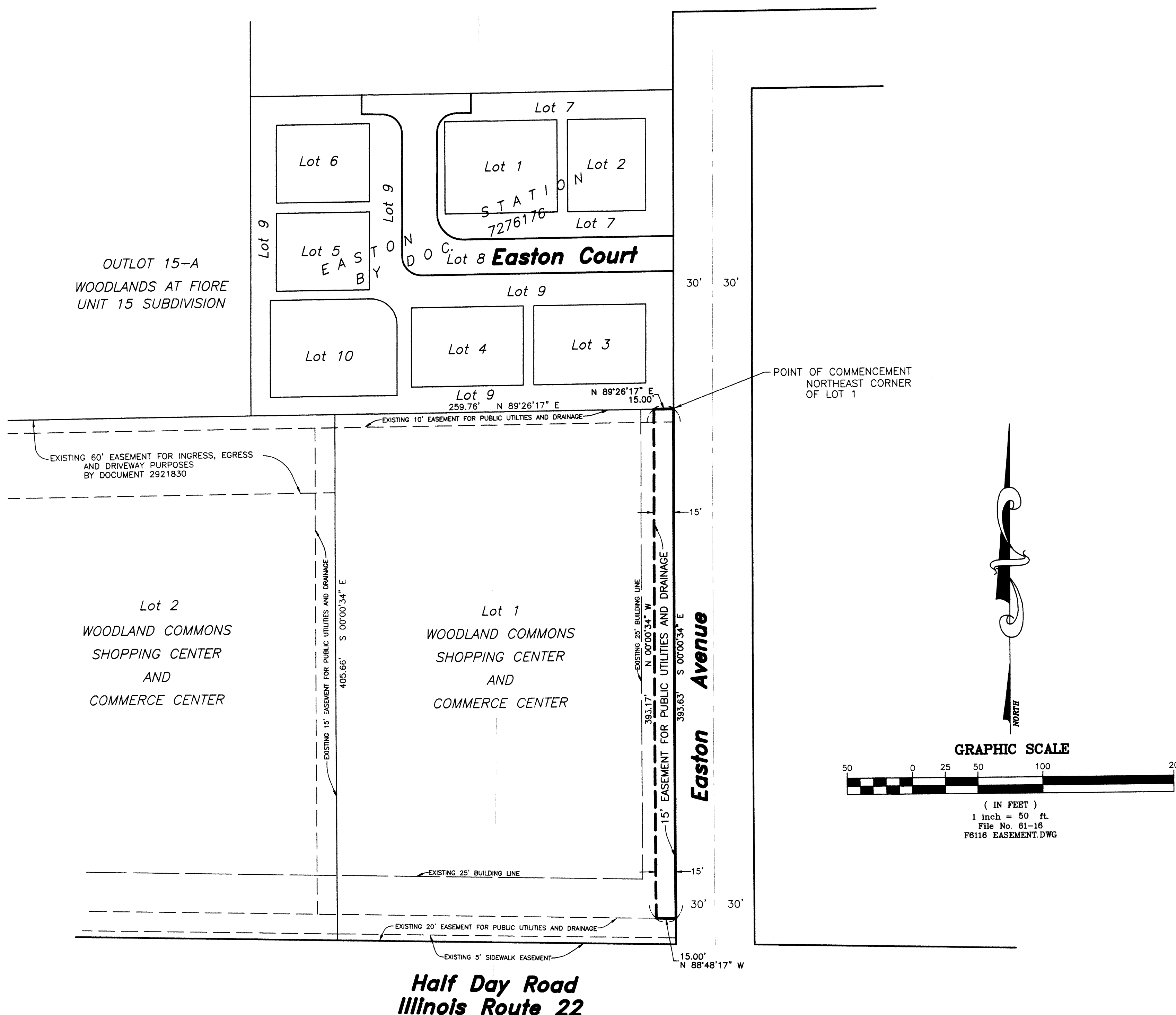
PLAT OF EASEMENT

7377958

3/8/2017

image# Up6059480002 Type: PLE
Recorded: 03/08/2017 at 10:02:34 AM
Receipt#: 2017-00014102
Page 1 of 2
Fees: \$25.00
IL Rental Housing Fund: \$0.00
Lake County, IL Recorder
Mary Ellen Vanderventer Recorder
File #7377958

THAT PART OF LOT 1 IN WOODLAND COMMONS SHOPPING CENTER AND COMMERCE CENTER; BEING A SUBDIVISION OF PART OF THE SOUTH HALF OF THE SOUTHEAST QUARTER OF SECTION 17 AND THE NORTH HALF OF THE NORTHEAST QUARTER OF SECTION 21, TOWNSHIP 43 NORTH, RANGE 11, EAST OF THE THE THIRD PRINCIPAL MERIDIAN, ACCORDING TO THE PLAT THEREOF RECORDED JULY 5, 1990 AS DOCUMENT 2921830, DESCRIBED AS FOLLOWS: COMMENCING AT THE NORTHEAST CORNER OF SAID LOT 1; THENCE SOUTH 00 DEGREES 00 MINUTES 34 SECONDS EAST, ALONG THE EAST LINE OF SAID LOT 1, A DISTANCE OF 393.63 FEET; THENCE NORTH 88 DEGREES 48 MINUTES 17 SECONDS WEST, A DISTANCE OF 15.00 FEET; THENCE NORTH 00 DEGREES 00 MINUTES 34 SECONDS WEST, PARALLEL WITH AND 15 FEET WESTERLY OF, AS MEASURED PERPENDICULAR TO THE EAST LINE OF SAID LOT 1, A DISTANCE OF 393.17 FEET TO A POINT ON THE NORTH LINE OF SAID LOT 1; THENCE NORTH 89 DEGREES 26 MINUTES 17 SECONDS EAST, ALONG THE NORTH LINE OF SAID LOT 1, A DISTANCE OF 15.00 FEET TO THE POINT OF BEGINNING, IN LAKE COUNTY, ILLINOIS.



OWNERS CERTIFICATE

STATE OF ILLINOIS)

COUNT OF LAKE)

THIS IS TO CERTIFY THAT THE VILLAGE OF BUFFALO GROVE IS THE OWNER OF THE PROPERTY DESCRIBED ON THE PLAT OF EASEMENT AND HAS CAUSED THE SAME TO BE SURVEYED AS INDICATED THEREON, FOR THE USES AND PURPOSES THEREIN SET FORTH, AND DOES HEREBY ACKNOWLEDGE AND ADOPT THE SAME UNDER THE STYLE AND TITLE HEREON INDICATED.

THE UNDERSIGNED HEREBY GRANTS THE EASEMENTS SHOWN AND DESCRIBED ON THIS PLAT.

DATED THIS 25th DAY OF January, A.D. 20 17.

VILLAGE PRESIDENT: Beverly Sussman
BEVERLY SUSSMAN

ATTEST: Janet M. Sirabian
VILLAGE CLERK: JANET SIRABIAN

NOTARY CERTIFICATE

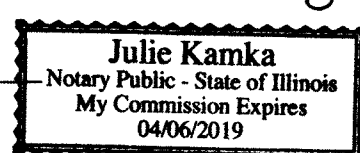
STATE OF ILLINOIS)

COUNT OF LAKE) S.S.

I, Julie Kamka, A NOTARY PUBLIC IN AND FOR A SAID COUNTY IN THE AFORESAID STATE, DOES HEREBY CERTIFY THAT BEVERLY SUSSMAN AND JANET SIRABIAN, PERSONALLY KNOWN TO ME TO BE THE VILLAGE PRESIDENT AND VILLAGE CLERK OF THE VILLAGE OF BUFFALO GROVE AND PERSONALLY KNOWN TO ME TO BE SAME PERSONS WHOSE NAMES ARE SUBSCRIBED TO THE AFORESAID INSTRUMENT, APPEARED BEFORE ME THIS DAY IN PERSON AND SEVERALLY ACKNOWLEDGED THAT THEY SIGNED AND DELIVERED THE PLAT OF EASEMENT AND CAUSED THE SEAL OF THE VILLAGE OF BUFFALO GROVE TO BE AFFIXED THERETO, PURSUANT TO AUTHORITY GIVEN BY THE VILLAGE PRESIDENT OF SAID VILLAGE OF BUFFALO GROVE AS THEIR FREE AND VOLUNTARY ACT, AND AS THE FREE AND VOLUNTARY ACT AND DEED OF SAID VILLAGE CLERK FOR THE USES AND PURPOSES THEREIN SET FORTH.

GIVEN UNDER MY HAND AND NOTARIAL SEAL THIS 25th DAY OF January, A.D. 20 17.

NOTARY PUBLIC: Julie Kamka

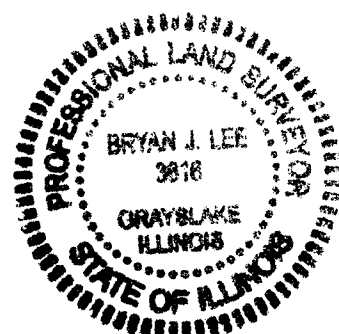


CORPORATE AUTHORITY'S CERTIFICATE
APPROVED AND ACCEPTED BY THE PRESIDENT AND BOARD OF TRUSTEES OF THE VILLAGE OF BUFFALO GROVE, COOK AND LAKE COUNTIES, ILLINOIS, AT A MEETING HELD THIS 23rd DAY OF January, A.D. 20 17.

VILLAGE PRESIDENT: Beverly Sussman
ATTEST: Janet M. Sirabian
VILLAGE CLERK

STATE OF ILLINOIS)
COUNT OF LAKE) S.S.
DATE: DECEMBER 27, 2016
PREPARED BY:

Bryan J. Lee
ILLINOIS PROFESSIONAL LAND SURVEYOR 35-3616
MY LICENSE EXPIRES 11-30-18
PROFESSIONAL DESIGN FIRM NO. 184-002732



MAIL TO AFTER RECORDING:
VILLAGE OF BUFFALO GROVE
50 RAUPP BOULEVARD
BUFFALO GROVE, IL 60089

VILLAGE COLLECTOR'S CERTIFICATE

I HEREBY CERTIFY THAT I FIND NO DEFERRED INSTALLMENTS OF OUTSTANDING UNPAID SPECIAL ASSESSMENTS DUE AGAINST THE PROPERTY DESCRIBED IN THE PLAT HEREON DRAWN. BUFFALO GROVE, COOK AND LAKE COUNTIES, ILLINOIS, DATED THIS 24th DAY OF January, A.D. 20 17.

[Signature]
VILLAGE COLLECTOR

VILLAGE ENGINEER'S CERTIFICATE

APPROVED BY THE VILLAGE ENGINEER OF THE VILLAGE OF BUFFALO GROVE, COOK AND LAKE COUNTIES, ILLINOIS, DATED THIS 24th DAY OF January, A.D. 20 17.

[Signature]
VILLAGE ENGINEER

GENERAL VILLAGE EASEMENT PROVISIONS

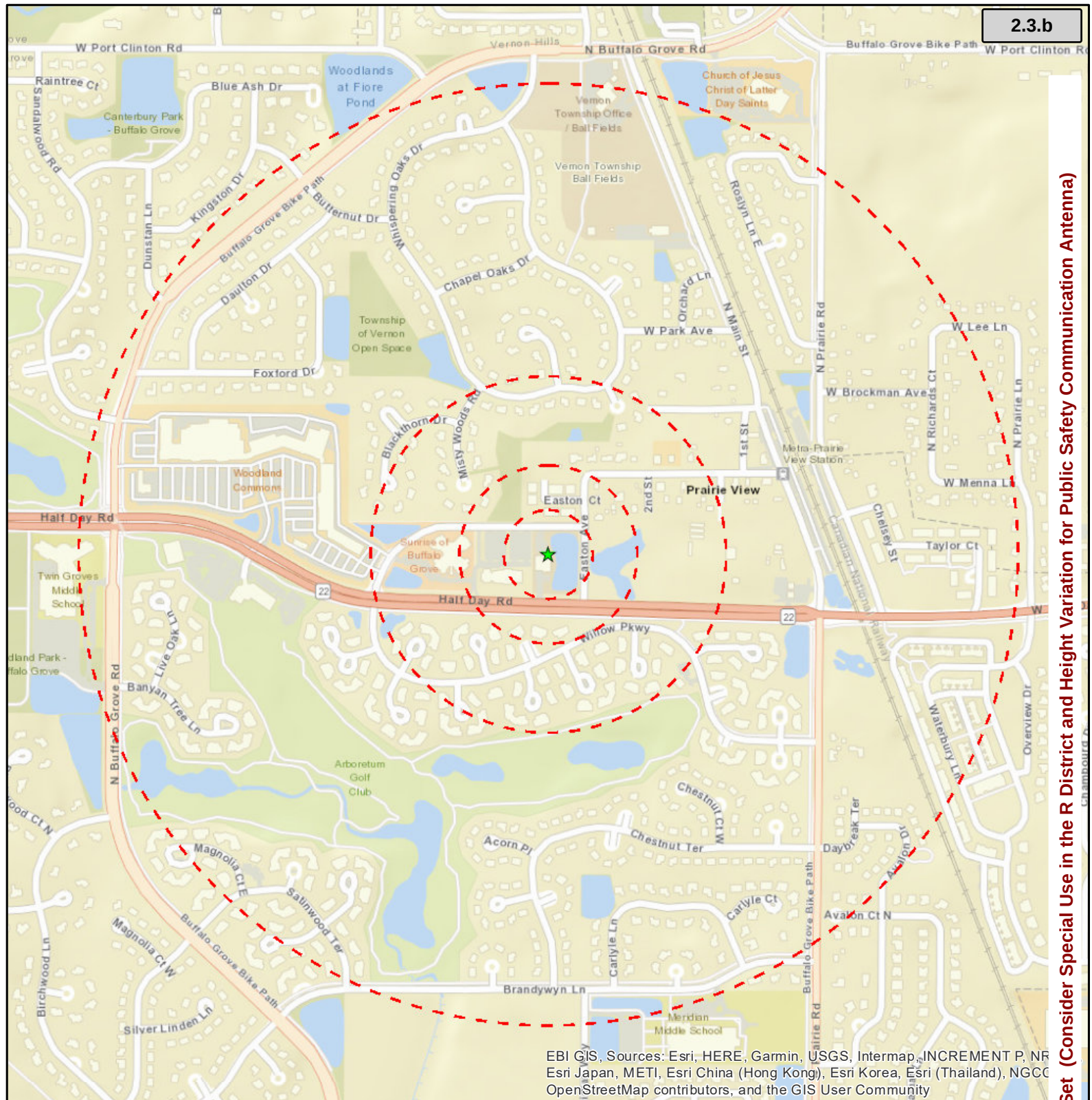
AN EASEMENT FOR PURPOSES INCLUDING, BUT NOT LIMITED TO, WATER SUPPLY AND DISTRIBUTION, SEWERAGE, STORM SEWER AND DRAINAGE, AND STREET LIGHTING, IS HEREBY RESERVED FOR AND GRANTED TO

VILLAGE OF BUFFALO GROVE
ITS SUCCESSORS AND ASSIGNS TO INSTALL, OPERATE, MAINTAIN, AND REMOVE, FROM TIME TO TIME, FACILITIES USED FOR PURPOSES INCLUDING, BUT NOT LIMITED TO, WATER SUPPLY AND DISTRIBUTION, SEWERAGE, STORM SEWER AND DRAINAGE, AND STREET LIGHTING IN, UNDER, ACROSS, ALONG AND UPON THE SURFACE OF THE PROPERTY SHOWN WITHIN THE DOTTED LINES ON THE PLAT AND MARKED "PUBLIC UTILITIES AND DRAINAGE EASEMENT." ALSO GRANTED HERewith IS THE RIGHT TO CUT, TRIM OR REMOVE TREES, BUSHES AND ROOTS AS MAY BE REASONABLY REQUIRED INCIDENT TO THE RIGHTS HEREIN GIVEN, AND THE RIGHT TO ENTER UPON THE SUBDIVIDED PROPERTY FOR ALL SUCH PURPOSES. OBSTRUCTIONS SHALL NOT BE PLACED OVER GRANTEE'S FACILITIES OR IN, UPON OR OVER THE PROPERTY WITHIN THE EASEMENTS WITHOUT THE PRIOR WRITTEN CONSENT OF GRANTEE. AFTER INSTALLATION OF ANY SUCH FACILITIES, THE GRADE OF THE SUBDIVIDED PROPERTY SHALL NOT BE ALTERED IN A MANNER SO AS TO INTERFERE WITH THE PROPER OPERATION AND MAINTENANCE THEREOF.

FIELDWORK COMPLETED: _____
CLIENT NAME: Village of Buffalo Grove
ADDRESS: 50 Raupp Boulevard
Buffalo Grove, IL

NOTES:
PLAT IS VOID if the Impressed Surveyors Seal does not appear.
Only those Building Lines or Easements shown on a Recorded Subdivision Plat or from a Recorded Document are shown hereon; check local ordinances before building.
Compare your description and site markings with this plat and AT ONCE report any discrepancies which you may find.

R.E. ALLEN AND ASSOCIATES, LTD.
PROFESSIONAL LAND SURVEYORS
1015 N. CORPORATE CIRCLE, SUITE C
GRAYSLAKE, ILLINOIS 60030
PHONE: 847-223-0914 FAX: 847-223-0980



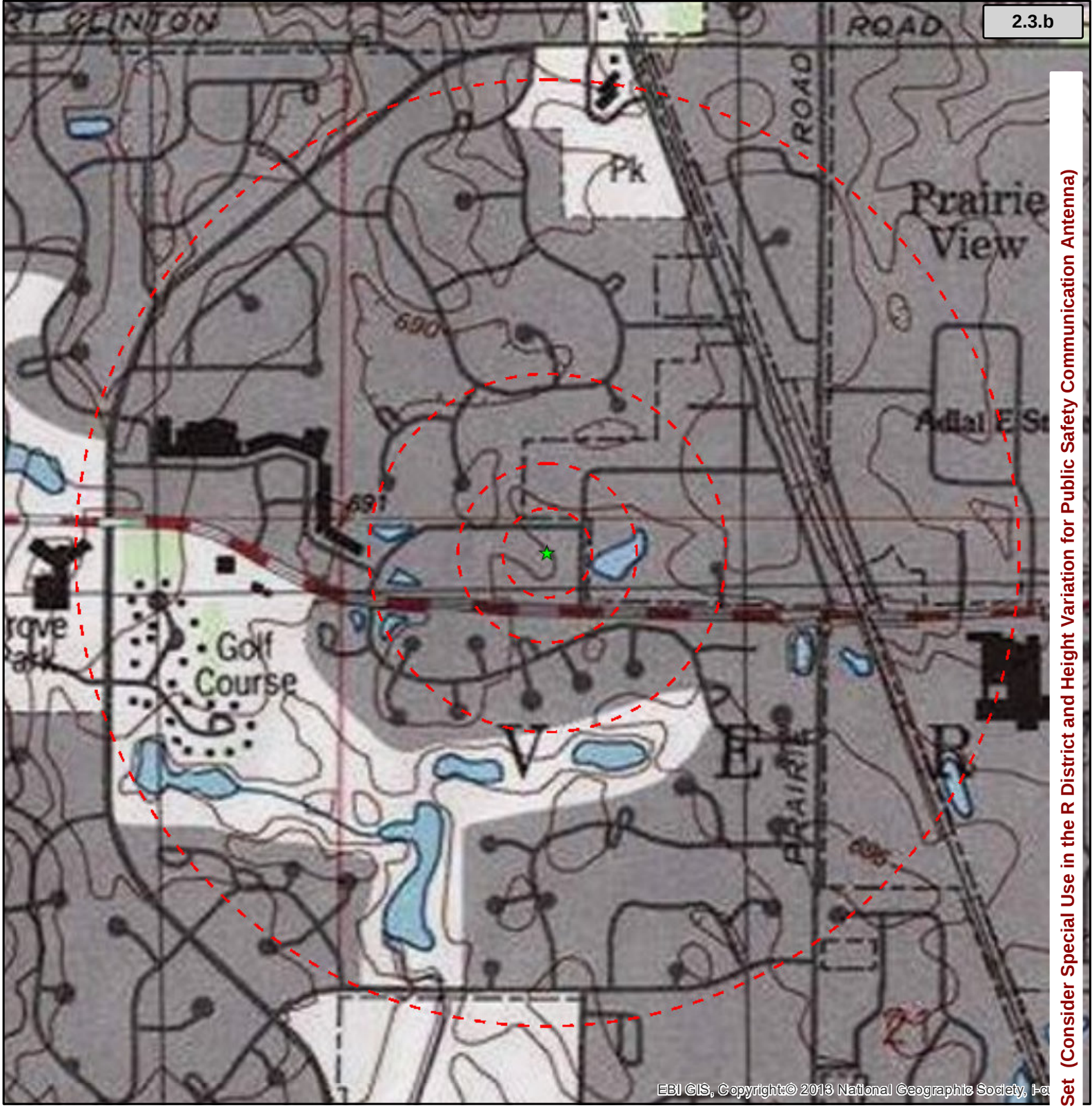
Legend

- ★ Project Site
- Site Radius at 250', 500', 1000' and 1/2 mile

Date: 12 19

Figure 1: Site Location Map

FIRE STATION 27
100 HALF DAY ROAD
BUFFALO GROVE, IL



Legend

- ★ Project Site
- Site Radius at 250', 500', 1000' and 1/2 mile

USGS 24K Quad: Wheeling, IL 1986 Date: 12/31/2013

Figure 2 - Topographic Map

**FIRE STATION 27
100 HALF DAY ROAD
BUFFALO GROVE, IL**

Attachment: Plan Set (Consider Special Use in the R District and Height Variation for Public Safety Communication Antenna)

SUPPORTING DOCUMENTATION

(708) 526-6667 / 526-1990



E & E Systems, Inc.

26824 Legion Court
P.O. Box 159
Wauconda, IL 60084-0159

Joe Herreweyers

*Specialists in Satellite Communications,
Antenna Systems, Sound, Video & Security.*



Structural Design Report
 100' 3600 SRWD Freestanding Tower
 Site: FS27 Buffalo Grove, IL

Prepared for: URBAN COMMUNICATIONS, INC.
 by: Sabre Towers & Poles™

Job Number: 20-3050-TJH-R1

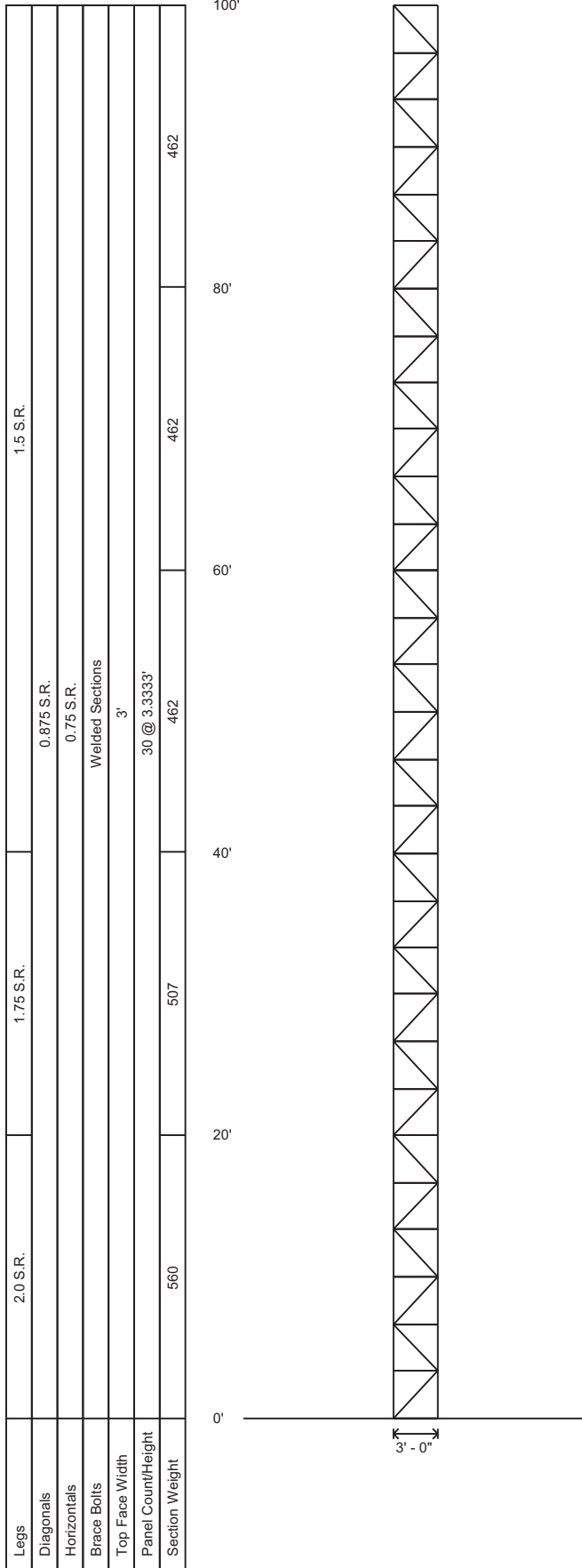
October 22, 2019

Tower Profile.....	1
Foundation Design Summary (Preliminary).....	2-3
Maximum Leg Loads.....	4
Maximum Diagonal Loads.....	5
Maximum Foundation Loads.....	6
Calculations.....	7-24



License Expires: 11-30-20

Attachment: Plan Set (Consider Special Use in the R District and Height Variation for Public Safety Communication Antenna)



Designed Appurtenance Loading

Elev	Description	Tx-Line
105	(1) 10' x 3in Whip	
100	3ft Sidearm	
100		(1) LMR-400
90	Flush Mount	
90	(1) 1' x 1' x 3in Panel	(1) CAT 6
80	Leg Dish Mount	
80	(1) 1' H.P. Dish	(1) CAT 6
53	(1) 10' x 3in Whip	
50	(2) 10' x 3in Whip	
48	3ft Sidearm	
48		(1) LMR-400
45	(2) 3ft Sidearms	
45		(2) LMR-400
26.5	(1) 3 sq. ft. EPA	(1) LMR-400
24.75	(1) 3 sq. ft. EPA	(1) LMR-400
23.583	(1) 3 sq. ft. EPA	(1) LMR-400

Design Criteria - ANSI/TIA-222-G

ASCE 7-16 Ultimate Wind Speed (No Ice)	114 mph
Wind Speed (Ice)	40 mph
Design Ice Thickness	1.50 in
Structure Class	III
Risk Category	III
Exposure Category	C
Topographic Category	1

Base Reactions

Total Foundation		Individual Footing	
Shear (kips)	4.31	Shear (kips)	2.75
Axial (kips)	15.57	Compression (kips)	81
Moment (ft-kips)	205	Uplift (kips)	77
Torsion (ft-kips)	-0.41		

Notes

- 1) All legs are A572 Grade 50.
- 2) All braces are A36
- 3) The tower model is 3600 SRWD Freestanding.
- 4) Azimuths are relative (not based on true north).
- 5) Foundation loads shown are maximums.
- 6) (4) 3/4" dia. x 39"-long F1554 grade 105 anchor bolts per leg.
- 7) Weights shown are estimates. Final weights may vary.
- 8) Tower Rating: 86.5%

Sabre Industries™
Towers and Poles

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

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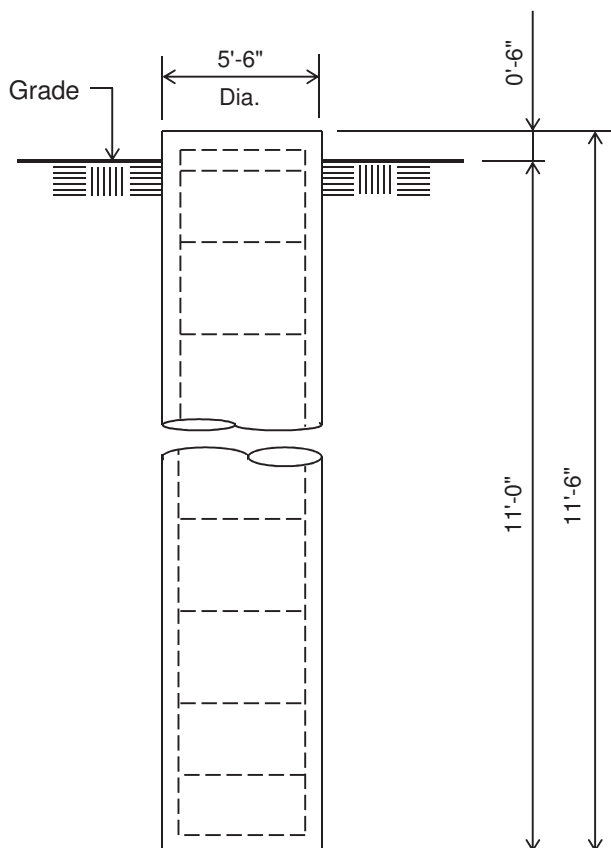
Job:	20-3050-TJH-R1
Customer:	URBAN COMMUNICATIONS, INC.
Site Name:	FS27 Buffalo Grove, IL
Description:	100' 3600SRWD Free-standing
Date:	10/22/2019
By:	REB

Customer: URBAN COMMUNICATIONS, INC.

Site: FS27 Buffalo Grove, IL

100' 3600 SRWD Freestanding

PRELIMINARY -NOT FOR CONSTRUCTION-



ELEVATION VIEW

(10.12 Cu. Yds.)

(1 REQUIRED; NOT TO SCALE)

Notes:

- 1) Concrete shall have a minimum 28-day compressive strength of 4,500 psi, in accordance with ACI 318-11.
- 2) Rebar to conform to ASTM specification A615 Grade 60.
- 3) All rebar to have a minimum of 3" concrete cover.
- 4) All exposed concrete corners to be chamfered 3/4".
- 5) The foundation design is based on presumptive clay soil as defined in ANSI/TIA-222-G-2005. It is recommended that a soil analysis of the site be performed to verify the soil parameters used in the design.
- 6) The foundation is based on the following factored loads:
Moment = 204.00 k-ft
Axial = 5.52 k
Shear = 3.78 k

Rebar Schedule for Pier

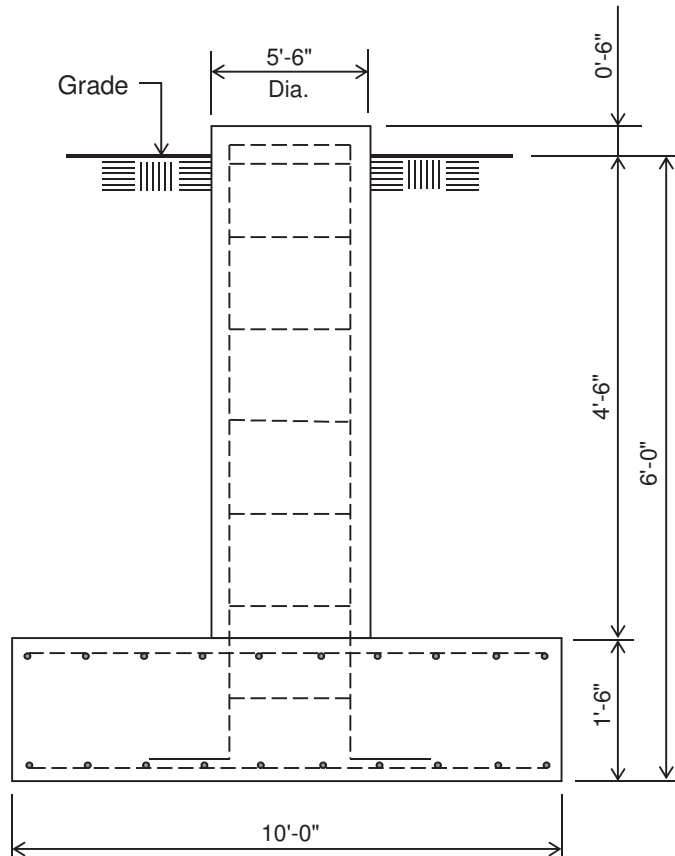
Pier	(30) #7 vertical rebar w/ #5 ties, (2) within top 5" of pier, then 12" C/C
------	--

Customer: URBAN COMMUNICATIONS, INC.

Site: FS27 Buffalo Grove, IL

100' 3600 SRWD Freestanding

PRELIMINARY -NOT FOR CONSTRUCTION-



ELEVATION VIEW

(9.96 Cu. Yds.)

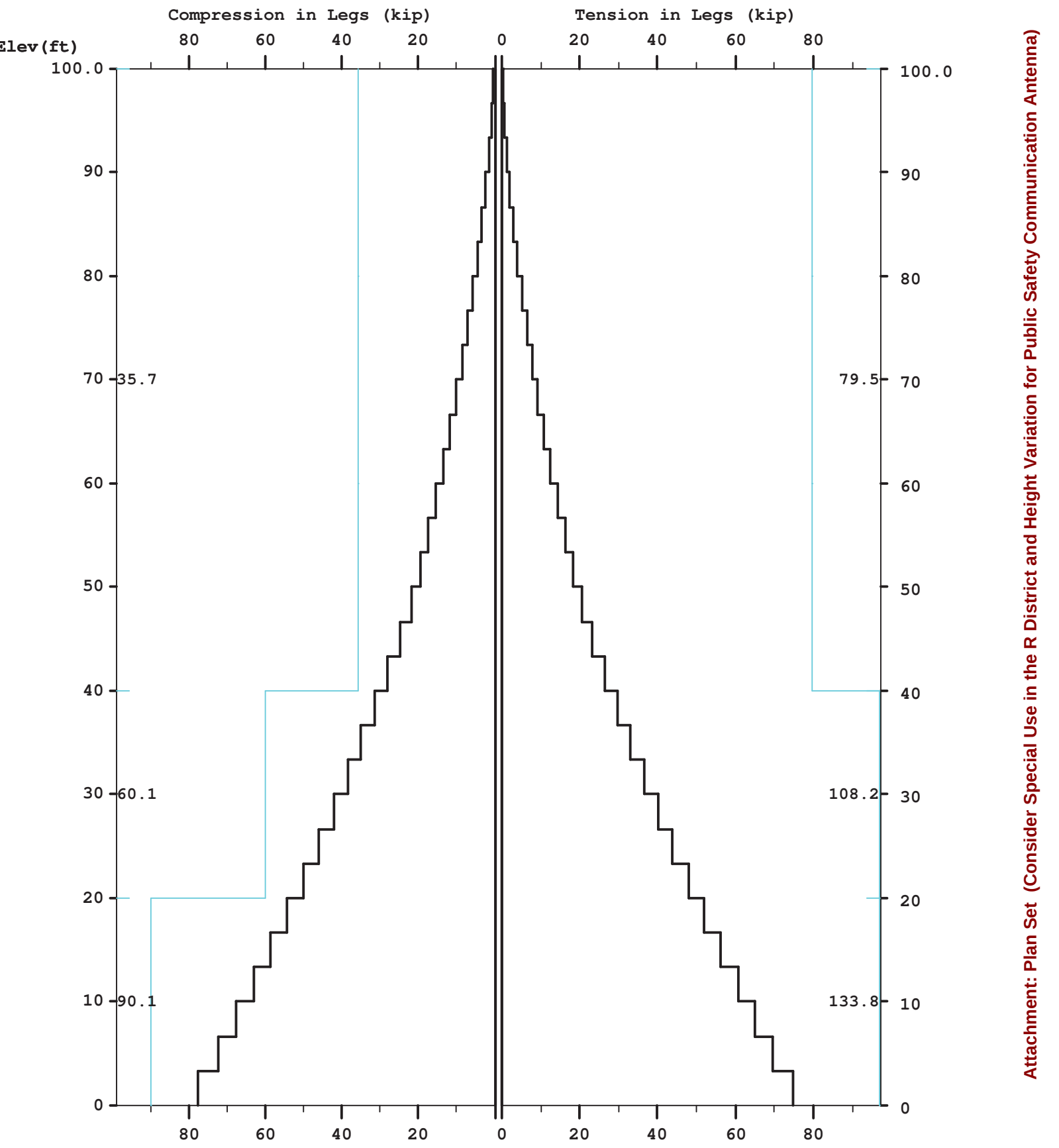
(1 REQUIRED; NOT TO SCALE)

Notes:

- 1) Concrete shall have a minimum 28-day compressive strength of 4,500 psi, in accordance with ACI 318-11.
- 2) Rebar to conform to ASTM specification A615 Grade 60.
- 3) All rebar to have a minimum of 3" concrete cover.
- 4) All exposed concrete corners to be chamfered 3/4".
- 5) The foundation design is based on presumptive clay soil as defined in ANSI/TIA-222-G-2005. It is recommended that a soil analysis of the site be performed to verify the soil parameters used in the design.
- 6) 4.5 ft of soil cover is required over the entire area of the foundation slab.
- 7) The foundation is based on the following factored loads:
Moment = 204.00 k-ft
Axial = 5.52 k
Shear = 3.78 k

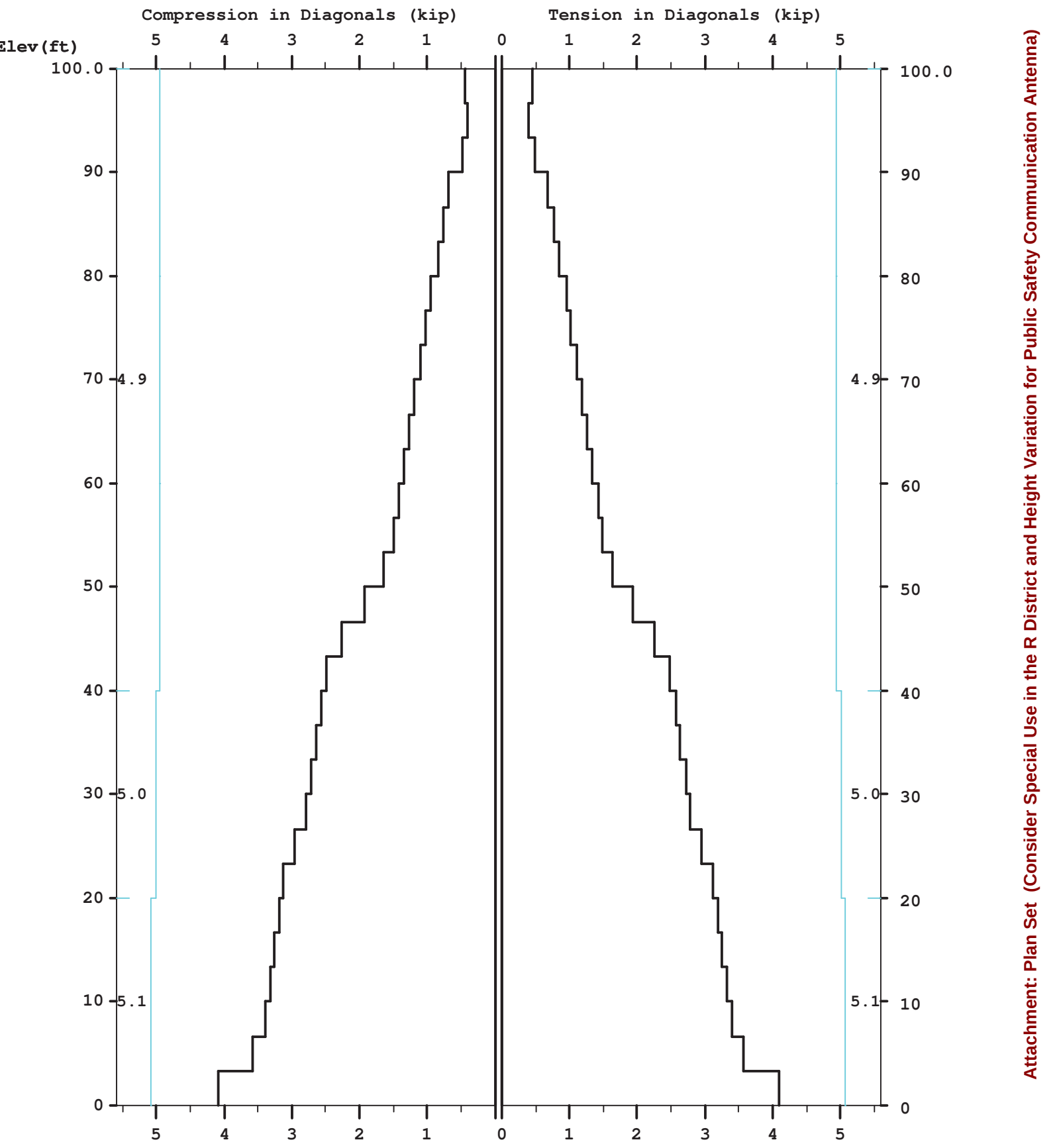
Rebar Schedule for Pad and Pier	
Pier	(30) #7 vertical rebar w/ hooks at bottom w/ #5 ties, (2) within top 5" of pier, then 12" C/C
Pad	(12) #8 horizontal rebar evenly spaced each way top and bottom (48 total)

Maximum



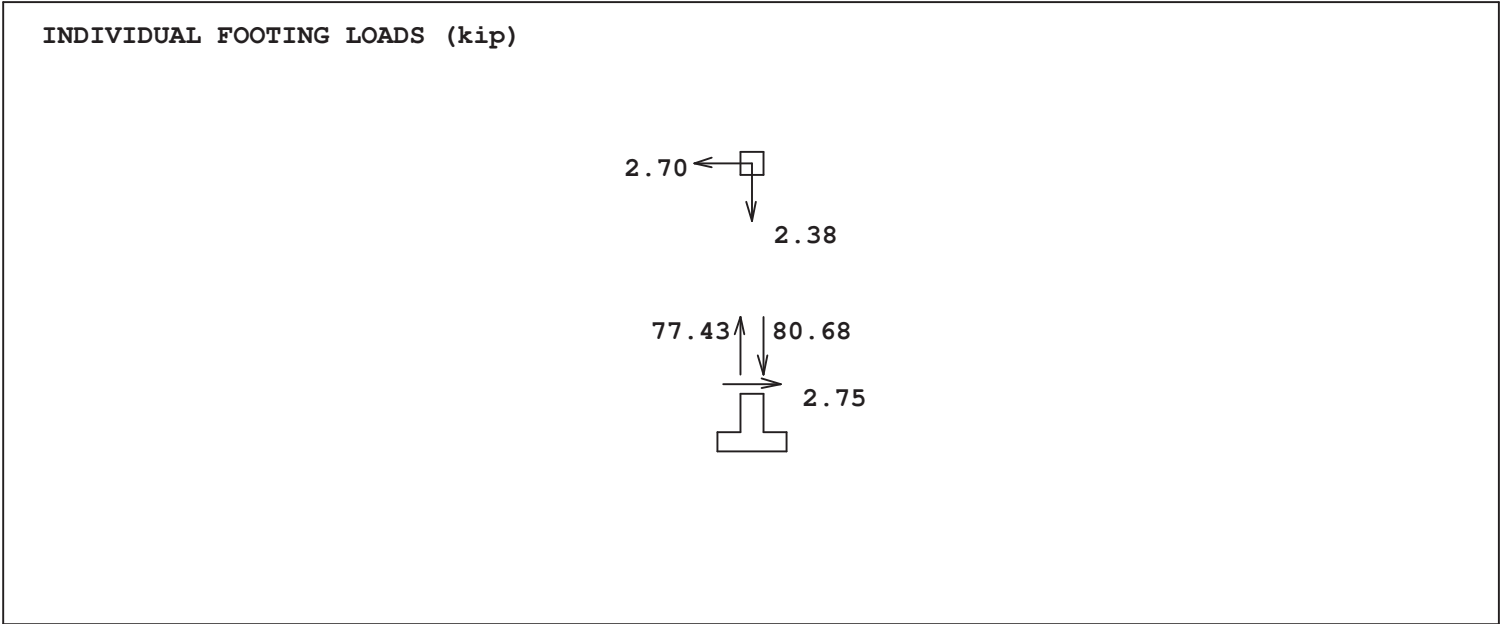
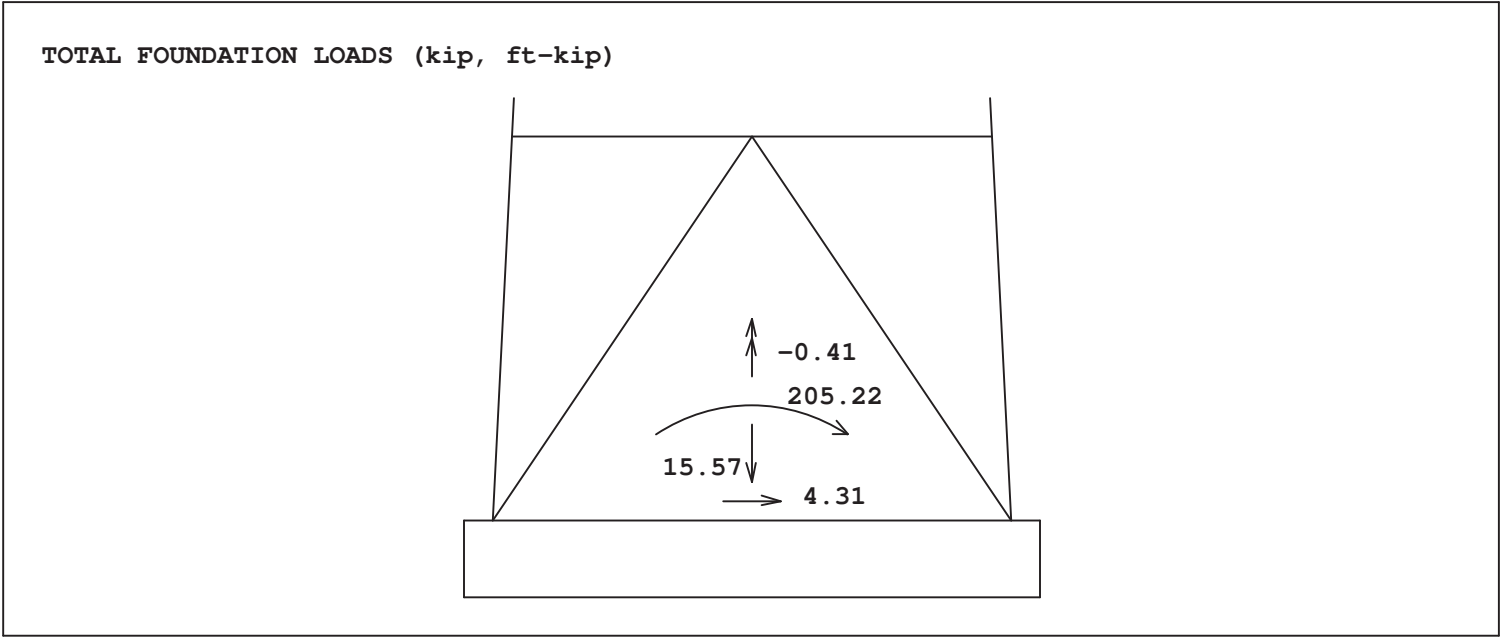
Attachment: Plan Set (Consider Special Use in the R District and Height Variation for Public Safety Communication Antenna)

Maximum



Attachment: Plan Set (Consider Special Use in the R District and Height Variation for Public Safety Communication Antenna)

Maximum



Attachment: Plan Set (Consider Special Use in the R District and Height Variation for Public Safety Communication Antenna)

20-3050-TJH-R1

Latticed Tower Analysis (Unguyed)
Processed under license at:

(c)2015 Guymast Inc. 416-736-7453

Sabre Towers and Poles

on: 22 oct 2019 at: 15:07:44

MAST GEOMETRY (ft)

=====

PANEL TYPE	NO.OF LEGS	ELEV.AT BOTTOM	ELEV.AT TOP	F.W..AT BOTTOM	F.W..AT TOP	TYPICAL PANEL HEIGHT
D	3	80.00	100.00	3.00	3.00	3.33
D	3	60.00	80.00	3.00	3.00	3.33
D	3	40.00	60.00	3.00	3.00	3.33
D	3	20.00	40.00	3.00	3.00	3.33
D	3	0.00	20.00	3.00	3.00	3.33

MEMBER PROPERTIES

=====

MEMBER TYPE	BOTTOM ELEV ft	TOP ELEV ft	X-SECTN AREA in.sq	RADIUS OF GYRAT in	ELASTIC MODULUS ksi	THERMAL EXPANSN /deg
LE	40.00	100.00	1.767	0.375	29000.	0.0000117
LE	20.00	40.00	2.405	0.375	29000.	0.0000117
LE	0.00	20.00	3.142	0.375	29000.	0.0000117
DI	0.00	100.00	0.601	0.219	29000.	0.0000117
HO	0.00	100.00	0.442	0.188	29000.	0.0000117

FACTORED MEMBER RESISTANCES

=====

BOTTOM ELEV ft	TOP ELEV ft	LEGS		DIAGONALS		HORIZONTALS		INT COMP kip	BRACING TENS kip
		COMP kip	TENS kip	COMP kip	TENS kip	COMP kip	TENS kip		
80.0	100.0	35.70	79.52	4.94	4.94	6.02	6.02	0.00	0.00
60.0	80.0	35.70	79.52	4.94	4.94	6.02	6.02	0.00	0.00
40.0	60.0	35.70	79.52	4.94	4.94	6.02	6.02	0.00	0.00
20.0	40.0	60.09	108.24	5.01	5.01	6.10	6.10	0.00	0.00
0.0	20.0	90.09	133.78	5.08	5.08	6.19	6.19	0.00	0.00

* Only 3 condition(s) shown in full

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

LOADING CONDITION A

114 mph ultimate wind with no ice. Wind Azimuth: 0°

MAST LOADING

=====

LOAD TYPE	ELEV ft	APPLY..LOAD..AT RADIUS ft	LOAD..AT AZI	LOAD AZI	FORCES.....		MOMENTS.....	
					HORIZ kip	DOWN kip	VERTICAL ft-kip	TORSNAL ft-kip
C	105.0	0.00	0.0	0.0	0.09	0.02	0.00	0.00
C	100.0	0.00	0.0	0.0	0.19	0.18	0.00	0.00
C	90.0	0.00	0.0	0.0	0.12	0.07	0.00	0.00
C	53.0	0.00	0.0	0.0	0.08	0.02	0.00	0.00
C	50.0	0.00	0.0	0.0	0.15	0.04	0.00	0.00
C	48.0	0.00	0.0	0.0	0.16	0.18	0.00	0.00
C	45.0	0.00	0.0	0.0	0.32	0.36	0.00	0.00
C	26.5	0.00	0.0	0.0	0.06	0.01	0.00	0.00
C	24.7	0.00	0.0	0.0	0.06	0.01	0.00	0.00
C	23.6	0.00	0.0	0.0	0.06	0.01	0.00	0.00

20-3050-TJH-R1								
C	4.0	0.00	0.0	0.0	0.56	0.38	0.00	0.00
D	100.0	0.00	240.0	0.0	0.02	0.04	0.00	0.00
D	90.0	0.00	240.0	0.0	0.02	0.04	0.00	0.00
D	90.0	0.00	203.7	0.0	0.02	0.04	0.00	0.00
D	80.0	0.00	203.7	0.0	0.02	0.04	0.00	0.00
D	80.0	0.00	194.1	0.0	0.02	0.04	0.00	0.00
D	66.7	0.00	194.1	0.0	0.02	0.04	0.00	0.00
D	66.7	0.00	194.1	0.0	0.02	0.04	0.00	0.00
D	50.0	0.00	194.1	0.0	0.02	0.04	0.00	0.00
D	50.0	0.00	198.8	0.0	0.02	0.04	0.00	0.00
D	40.0	0.00	215.7	0.0	0.02	0.04	0.00	0.00
D	40.0	0.00	215.0	0.0	0.02	0.04	0.00	0.00
D	26.7	0.00	215.0	0.0	0.02	0.04	0.00	0.00
D	26.7	0.00	220.9	0.0	0.02	0.05	0.00	0.00
D	6.7	0.00	224.3	0.0	0.02	0.06	0.00	0.00
D	6.7	0.00	223.3	0.0	0.02	0.05	0.00	0.00
D	0.0	0.00	223.3	0.0	0.02	0.05	0.00	0.00

ANTENNA LOADING

=====

.....ANTENNA.....		ATTACHMENT		ANTENNA FORCES.....				
TYPE	ELEV ft	AZI	RAD ft	AZI	AXIAL kip	SHEAR kip	GRAVITY kip	TORSION ft-kip
HP	80.0	0.0	3.2	0.0	0.03	0.00	0.01	0.00

LOADING CONDITION M

=====

114 mph ultimate wind with no ice. Wind Azimuth: 0°

MAST LOADING

=====

LOAD TYPE	ELEV ft	APPLY... RADIUS ft	LOAD...AT AZI	LOAD AZI	FORCES.....		MOMENTS.....	
					HORIZ kip	DOWN kip	VERTICAL ft-kip	TORSNAL ft-kip
C	105.0	0.00	0.0	0.0	0.09	0.01	0.00	0.00
C	100.0	0.00	0.0	0.0	0.19	0.14	0.00	0.00
C	90.0	0.00	0.0	0.0	0.12	0.05	0.00	0.00
C	53.0	0.00	0.0	0.0	0.08	0.01	0.00	0.00
C	50.0	0.00	0.0	0.0	0.15	0.03	0.00	0.00
C	48.0	0.00	0.0	0.0	0.16	0.14	0.00	0.00
C	45.0	0.00	0.0	0.0	0.32	0.27	0.00	0.00
C	26.5	0.00	0.0	0.0	0.06	0.01	0.00	0.00
C	24.7	0.00	0.0	0.0	0.06	0.01	0.00	0.00
C	23.6	0.00	0.0	0.0	0.06	0.01	0.00	0.00
C	4.0	0.00	0.0	0.0	0.56	0.29	0.00	0.00
D	100.0	0.00	240.0	0.0	0.02	0.03	0.00	0.00
D	90.0	0.00	240.0	0.0	0.02	0.03	0.00	0.00
D	90.0	0.00	203.7	0.0	0.02	0.03	0.00	0.00
D	80.0	0.00	203.7	0.0	0.02	0.03	0.00	0.00
D	80.0	0.00	194.1	0.0	0.02	0.03	0.00	0.00
D	66.7	0.00	194.1	0.0	0.02	0.03	0.00	0.00
D	66.7	0.00	194.1	0.0	0.02	0.03	0.00	0.00
D	50.0	0.00	194.1	0.0	0.02	0.03	0.00	0.00
D	50.0	0.00	198.8	0.0	0.02	0.03	0.00	0.00
D	40.0	0.00	215.7	0.0	0.02	0.03	0.00	0.00
D	40.0	0.00	215.0	0.0	0.02	0.03	0.00	0.00
D	26.7	0.00	215.0	0.0	0.02	0.03	0.00	0.00
D	26.7	0.00	220.9	0.0	0.02	0.03	0.00	0.00
D	6.7	0.00	224.3	0.0	0.02	0.04	0.00	0.00
D	6.7	0.00	223.3	0.0	0.02	0.04	0.00	0.00
D	0.0	0.00	223.3	0.0	0.02	0.04	0.00	0.00

ANTENNA LOADING

=====

.....ANTENNA.....		ATTACHMENT		ANTENNA FORCES.....				
TYPE	ELEV ft	AZI	RAD ft	AZI	AXIAL kip	SHEAR kip	GRAVITY kip	TORSION ft-kip
HP	80.0	0.0	3.2	0.0	0.03	0.00	0.01	0.00

20-3050-TJH-R1

LOADING CONDITION Y

40 mph wind with 1.5 ice. Wind Azimuth: 0°

MAST LOADING

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LOAD TYPE	ELEV ft	APPLY... RADIUS ft	LOAD...AT AZI	LOAD AZI	FORCES.....		MOMENTS.....	
					HORIZ kip	DOWN kip	VERTICAL ft-kip	TORSNAL ft-kip
C	105.0	0.00	0.0	0.0	0.03	0.05	0.00	0.00
C	100.0	0.00	0.0	0.0	0.05	0.39	0.00	0.00
C	90.0	0.00	0.0	0.0	0.04	0.13	0.00	0.00
C	53.0	0.00	0.0	0.0	0.02	0.05	0.00	0.00
C	50.0	0.00	0.0	0.0	0.05	0.09	0.00	0.00
C	48.0	0.00	0.0	0.0	0.04	0.37	0.00	0.00
C	45.0	0.00	0.0	0.0	0.08	0.75	0.00	0.00
C	26.5	0.00	0.0	0.0	0.01	0.05	0.00	0.00
C	24.7	0.00	0.0	0.0	0.01	0.05	0.00	0.00
C	23.6	0.00	0.0	0.0	0.01	0.05	0.00	0.00
C	4.0	0.00	0.0	0.0	0.08	0.90	0.00	0.00
D	100.0	0.00	240.0	0.0	0.01	0.12	0.01	0.00
D	90.0	0.00	240.0	0.0	0.01	0.12	0.01	0.00
D	90.0	0.00	239.1	0.0	0.01	0.12	0.01	0.00
D	60.0	0.00	238.4	0.0	0.01	0.11	0.01	0.00
D	60.0	0.00	238.4	0.0	0.01	0.11	0.01	0.00
D	50.0	0.00	238.4	0.0	0.01	0.11	0.01	0.00
D	50.0	0.00	238.8	0.0	0.01	0.11	0.01	0.00
D	46.7	0.00	238.8	0.0	0.01	0.11	0.01	0.00
D	46.7	0.00	239.5	0.0	0.01	0.12	0.02	0.00
D	36.7	0.00	239.6	0.0	0.01	0.14	0.02	0.00
D	36.7	0.00	239.6	0.0	0.01	0.14	0.02	0.00
D	26.7	0.00	239.6	0.0	0.01	0.14	0.02	0.00
D	26.7	0.00	239.7	0.0	0.01	0.14	0.03	0.00
D	13.3	0.00	239.7	0.0	0.01	0.15	0.03	0.00
D	13.3	0.00	239.7	0.0	0.01	0.15	0.03	0.00
D	3.3	0.00	239.7	0.0	0.01	0.14	0.03	0.00
D	3.3	0.00	239.4	0.0	0.01	0.11	0.02	0.00
D	0.0	0.00	239.4	0.0	0.01	0.11	0.02	0.00

ANTENNA LOADING

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.....ANTENNA..... TYPE	ELEV ft	AZI	ATTACHMENT		ANTENNA FORCES.....			
			RAD ft	AZI	AXIAL kip	SHEAR kip	GRAVITY kip	TORSION ft-kip
HP	80.0	0.0	3.2	0.0	0.01	0.00	0.05	0.00

MAXIMUM ANTENNA AND REFLECTOR ROTATIONS:

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ELEV ft	AZI deg	TYPE *	BEAM DEFLECTIONS (deg).....			
			ROLL	YAW	PITCH	TOTAL
80.0	0.0	HP	1.199 M	0.103 D	-1.218 V	1.222 D

MAXIMUM TENSION IN MAST MEMBERS (kip)

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ELEV ft	LEGS	DIAG	HORIZ	BRACE
100.0	-----	-----	0.17 U	0.00 A
96.7	0.27 R	0.45 X	0.02 W	0.00 A
93.3	0.75 U	0.40 R	0.03 I	0.00 A
90.0	1.29 U	0.48 X	0.08 U	0.00 A
86.7	2.01 U	0.68 R	0.03 U	0.00 A
	2.93 U	0.76 X		

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83.3	-----		0.03 U	0.00 A
	3.97 U	0.85 F		
80.0	-----		0.05 Q	0.00 A
	5.10 U	0.95 L		
76.7	-----		0.04 I	0.00 A
	6.40 U	1.02 R		
73.3	-----		0.03 I	0.00 A
	7.75 U	1.11 X		
70.0	-----		0.03 U	0.00 A
	9.26 U	1.18 R		
66.7	-----		0.03 I	0.00 A
	10.82 U	1.26 X		
63.3	-----		0.03 I	0.00 A
	12.54 U	1.34 R		
60.0	-----		0.03 I	0.00 A
	14.31 U	1.42 L		
56.7	-----		0.03 U	0.00 A
	16.24 U	1.49 R		
53.3	-----		0.06 U	0.00 A
	18.25 U	1.64 L		
50.0	-----		0.12 U	0.00 A
	20.59 U	1.93 R		
46.7	-----		0.13 I	0.00 A
	23.22 U	2.26 L		
43.3	-----		0.09 I	0.00 A
	26.31 U	2.49 R		
40.0	-----		0.03 Q	0.00 A
	29.58 U	2.56 L		
36.7	-----		0.03 A	0.00 A
	33.02 U	2.64 R		
33.3	-----		0.03 Q	0.00 A
	36.50 U	2.72 L		
30.0	-----		0.03 A	0.00 A
	40.14 U	2.79 R		
26.7	-----		0.07 E	0.00 A
	43.88 U	2.95 X		
23.3	-----		0.07 M	0.00 A
	47.90 U	3.12 R		
20.0	-----		0.03 E	0.00 A
	52.03 U	3.19 X		
16.7	-----		0.03 A	0.00 A
	56.32 U	3.26 F		
13.3	-----		0.03 Q	0.00 A
	60.64 U	3.33 X		
10.0	-----		0.03 A	0.00 A
	65.12 U	3.39 F		
6.7	-----		0.08 Q	0.00 A
	69.69 U	3.58 X		
3.3	-----		0.21 M	0.00 A
	74.73 U	4.09 N		
0.0	-----		0.00 A	0.00 A

MAXIMUM COMPRESSION IN MAST MEMBERS (kip)

ELEV ft	LEGS	DIAG	HORIZ	BRACE
100.0	-----		-0.17 C	0.00 A
	-0.42 L	-0.45 R		
96.7	-----		-0.02 E	0.00 A
	-0.97 C	-0.40 X		
93.3	-----		-0.03 C	0.00 A
	-1.59 C	-0.48 R		
90.0	-----		-0.08 C	0.00 A
	-2.42 C	-0.68 X		
86.7	-----		-0.03 C	0.00 A
	-3.41 C	-0.76 R		
83.3	-----		-0.03 O	0.00 A
	-4.52 C	-0.85 X		
80.0	-----		-0.06 K	0.00 A
	-5.73 C	-0.94 B		
76.7	-----		-0.03 W	0.00 A
	-7.10 C	-1.03 X		
73.3	-----		-0.03 O	0.00 A

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70.0	-8.52 C	-1.10 R	-0.03 O	0.00 A	
66.7	-10.11 C	-1.19 X	-0.03 C	0.00 A	
63.3	-11.74 C	-1.26 F	-0.03 C	0.00 A	
60.0	-13.54 C	-1.34 X	-0.03 C	0.00 A	
56.7	-15.38 C	-1.42 R	-0.03 C	0.00 A	
53.3	-17.39 C	-1.50 L	-0.06 C	0.00 A	
50.0	-19.48 C	-1.63 R	-0.12 O	0.00 A	
46.7	-21.96 C	-1.93 L	-0.13 C	0.00 A	
43.3	-24.83 C	-2.26 R	-0.09 O	0.00 A	
40.0	-28.10 C	-2.49 L	-0.03 K	0.00 A	
36.7	-31.46 C	-2.56 R	-0.03 G	0.00 A	
33.3	-34.99 C	-2.64 L	-0.03 K	0.00 A	
30.0	-38.55 C	-2.71 R	-0.03 G	0.00 A	
26.7	-42.29 C	-2.79 L	-0.07 K	0.00 A	
23.3	-46.12 C	-2.95 R	-0.07 S	0.00 A	
20.0	-50.25 C	-3.12 X	-0.03 W	0.00 A	
16.7	-54.47 C	-3.19 R	-0.03 G	0.00 A	
13.3	-58.86 C	-3.26 X	-0.03 K	0.00 A	
10.0	-63.29 C	-3.32 F	-0.03 G	0.00 A	
6.7	-67.88 C	-3.40 X	-0.08 K	0.00 A	
3.3	-72.60 C	-3.57 F	-0.21 G	0.00 A	
0.0	-77.93 C	-4.09 X	0.00 A	0.00 A	

FORCE/RESISTANCE RATIO IN LEGS

MAST ELEV ft	-- LEG COMPRESSION --			---- LEG TENSION ----		
	MAX COMP	COMP RESIST	FORCE/ RESIST RATIO	MAX TENS	TENS RESIST	FORCE/ RESIST RATIO
100.00	0.42	35.70	0.01	0.27	79.52	0.00
96.67	0.97	35.70	0.03	0.75	79.52	0.01
93.33	1.59	35.70	0.04	1.29	79.52	0.02
90.00	2.42	35.70	0.07	2.01	79.52	0.03
86.67	3.41	35.70	0.10	2.93	79.52	0.04
83.33	4.52	35.70	0.13	3.97	79.52	0.05
80.00	5.73	35.70	0.16	5.10	79.52	0.06
76.67	7.10	35.70	0.20	6.40	79.52	0.08
73.33	8.52	35.70	0.24	7.75	79.52	0.10
70.00	10.11	35.70	0.28	9.26	79.52	0.12
66.67	11.74	35.70	0.33	10.82	79.52	0.14
63.33	13.54	35.70	0.38	12.54	79.52	0.16
60.00	15.38	35.70	0.43	14.31	79.52	0.18

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56.67	17.39	35.70	0.49	16.24	79.52	0.20
53.33	19.48	35.70	0.55	18.25	79.52	0.23
50.00	21.96	35.70	0.62	20.59	79.52	0.26
46.67	24.83	35.70	0.70	23.22	79.52	0.29
43.33	28.10	35.70	0.79	26.31	79.52	0.33
40.00	31.46	60.09	0.52	29.58	108.24	0.27
36.67	34.99	60.09	0.58	33.02	108.24	0.31
33.33	38.55	60.09	0.64	36.50	108.24	0.34
30.00	42.29	60.09	0.70	40.14	108.24	0.37
26.67	46.12	60.09	0.77	43.88	108.24	0.41
23.33	50.25	60.09	0.84	47.90	108.24	0.44
20.00	54.47	90.09	0.60	52.03	133.78	0.39
16.67	58.86	90.09	0.65	56.32	133.78	0.42
13.33	63.29	90.09	0.70	60.64	133.78	0.45
10.00	67.88	90.09	0.75	65.12	133.78	0.49
6.67	72.60	90.09	0.81	69.69	133.78	0.52
3.33	77.93	90.09	0.87	74.73	133.78	0.56
0.00						

FORCE/RESISTANCE RATIO IN DIAGONALS

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MAST ELEV ft	- DIAG COMPRESSION -			--- DIAG TENSION ---		
	MAX COMP	COMP RESIST	FORCE/ RESIST RATIO	MAX TENS	TENS RESIST	FORCE/ RESIST RATIO
100.00	0.45	4.94	0.09	0.45	4.94	0.09
96.67	0.40	4.94	0.08	0.40	4.94	0.08
93.33	0.48	4.94	0.10	0.48	4.94	0.10
90.00	0.68	4.94	0.14	0.68	4.94	0.14
86.67	0.76	4.94	0.15	0.76	4.94	0.15
83.33	0.85	4.94	0.17	0.85	4.94	0.17
80.00	0.94	4.94	0.19	0.95	4.94	0.19
76.67	1.03	4.94	0.21	1.02	4.94	0.21
73.33	1.10	4.94	0.22	1.11	4.94	0.22
70.00	1.19	4.94	0.24	1.18	4.94	0.24
66.67	1.26	4.94	0.26	1.26	4.94	0.26
63.33	1.34	4.94	0.27	1.34	4.94	0.27
60.00	1.42	4.94	0.29	1.42	4.94	0.29
56.67	1.50	4.94	0.30	1.49	4.94	0.30
53.33	1.63	4.94	0.33	1.64	4.94	0.33
50.00	1.93	4.94	0.39	1.93	4.94	0.39
46.67	2.26	4.94	0.46	2.26	4.94	0.46
43.33	2.49	4.94	0.50	2.49	4.94	0.50

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40.00	2.56	5.01	0.51	2.56	5.01	0.51
36.67	2.64	5.01	0.53	2.64	5.01	0.53
33.33	2.71	5.01	0.54	2.72	5.01	0.54
30.00	2.79	5.01	0.56	2.79	5.01	0.56
26.67	2.95	5.01	0.59	2.95	5.01	0.59
23.33	3.12	5.01	0.62	3.12	5.01	0.62
20.00	3.19	5.08	0.63	3.19	5.08	0.63
16.67	3.26	5.08	0.64	3.26	5.08	0.64
13.33	3.32	5.08	0.65	3.33	5.08	0.66
10.00	3.40	5.08	0.67	3.39	5.08	0.67
6.67	3.57	5.08	0.70	3.58	5.08	0.70
3.33	4.09	5.08	0.81	4.09	5.08	0.81
0.00						

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MAXIMUM INDIVIDUAL FOUNDATION LOADS: (kip)

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NORTH	LOAD EAST	COMPONENTS DOWN	UPLIFT	TOTAL SHEAR
-2.38 X	-2.70 D	80.68 C	-77.43 U	2.75 X

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MAXIMUM TOTAL LOADS ON FOUNDATION : (kip & kip-ft)

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HORIZONTAL			DOWN	OVERTURNING			TORSION
NORTH	EAST	TOTAL @ 209.8		NORTH	EAST	TOTAL @ 209.7	
-4.3 M	-4.3 D	4.3 N	15.6 f	-201.7 M	-204.5 D	205.2 N	-0.4 J

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Latticed Tower Analysis (Unguyed) (c)2015 Guymast Inc. 416-736-7453
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 Sabre Towers and Poles on: 22 oct 2019 at: 15:08:02

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

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* Only 1 condition(s) shown in full
 * Some wind loads may have been derived from full-scale wind tunnel testing

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LOADING CONDITION A =====

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

MAST LOADING

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LOAD	ELEV	APPLY..LOAD..AT	LOAD	FORCES.....	MOMENTS.....
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20-3050-TJH-R1								
TYPE	ft	RADIUS ft	AZI	AZI	HORIZ kip	DOWN kip	VERTICAL ft-kip	TORSNAL ft-kip
C	105.0	0.00	0.0	0.0	0.03	0.01	0.00	0.00
C	100.0	0.00	0.0	0.0	0.06	0.15	0.00	0.00
C	90.0	0.00	0.0	0.0	0.04	0.06	0.00	0.00
C	53.0	0.00	0.0	0.0	0.02	0.01	0.00	0.00
C	50.0	0.00	0.0	0.0	0.04	0.03	0.00	0.00
C	48.0	0.00	0.0	0.0	0.05	0.15	0.00	0.00
C	45.0	0.00	0.0	0.0	0.09	0.30	0.00	0.00
C	26.5	0.00	0.0	0.0	0.02	0.01	0.00	0.00
C	24.7	0.00	0.0	0.0	0.02	0.01	0.00	0.00
C	23.6	0.00	0.0	0.0	0.02	0.01	0.00	0.00
C	4.0	0.00	0.0	0.0	0.16	0.32	0.00	0.00
D	100.0	0.00	240.0	0.0	0.01	0.03	0.00	0.00
D	90.0	0.00	240.0	0.0	0.01	0.03	0.00	0.00
D	90.0	0.00	203.7	0.0	0.01	0.03	0.00	0.00
D	80.0	0.00	203.7	0.0	0.01	0.03	0.00	0.00
D	80.0	0.00	194.1	0.0	0.01	0.03	0.00	0.00
D	66.7	0.00	194.1	0.0	0.01	0.03	0.00	0.00
D	66.7	0.00	194.1	0.0	0.01	0.03	0.00	0.00
D	50.0	0.00	194.1	0.0	0.01	0.03	0.00	0.00
D	50.0	0.00	198.8	0.0	0.01	0.03	0.00	0.00
D	40.0	0.00	215.7	0.0	0.01	0.03	0.00	0.00
D	40.0	0.00	215.0	0.0	0.01	0.04	0.00	0.00
D	26.7	0.00	215.0	0.0	0.01	0.04	0.00	0.00
D	26.7	0.00	220.9	0.0	0.01	0.04	0.00	0.00
D	6.7	0.00	224.3	0.0	0.01	0.05	0.00	0.00
D	6.7	0.00	223.3	0.0	0.01	0.05	0.00	0.00
D	0.0	0.00	223.3	0.0	0.01	0.05	0.00	0.00

ANTENNA LOADING

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.....ANTENNA.....		ATTACHMENT		ANTENNA FORCES.....				
TYPE	ELEV ft	AZI	RAD ft	AZI	AXIAL kip	SHEAR kip	GRAVITY kip	TORSION ft-kip
HP	80.0	0.0	3.2	0.0	0.01	0.00	0.01	0.00

MAXIMUM MAST DISPLACEMENTS:

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ELEV ft	-----DEFLECTIONS (ft)-----			--TILTS (DEG)---		TWIST DEG
	NORTH	EAST	DOWN	NORTH	EAST	
100.0	-0.448 A	0.442 J	0.002 A	-0.364 A	0.360 J	0.003 D
96.7	-0.427 A	0.421 J	0.002 A	-0.364 A	0.360 J	0.003 D
93.3	-0.405 A	0.400 J	0.002 A	-0.364 A	0.359 J	0.003 D
90.0	-0.384 A	0.379 J	0.002 A	-0.363 A	0.358 J	0.004 D
86.7	-0.363 A	0.358 J	0.002 A	-0.361 A	0.357 J	0.003 D
83.3	-0.342 A	0.338 J	0.002 A	-0.360 A	0.355 J	0.004 D
80.0	-0.321 A	0.317 J	0.002 A	-0.357 A	0.352 J	0.002 D
76.7	-0.300 A	0.296 J	0.002 A	-0.353 A	0.349 J	0.004 D
73.3	-0.280 A	0.276 J	0.002 A	-0.349 A	0.345 J	0.002 D
70.0	-0.259 A	0.256 J	0.001 A	-0.344 A	0.340 J	0.004 D
66.7	-0.239 A	0.236 J	0.001 A	-0.338 A	0.334 J	0.002 D
63.3	-0.220 A	0.217 J	0.001 A	-0.331 A	0.327 J	0.004 D
60.0	-0.201 A	0.198 J	0.001 A	-0.323 A	0.319 J	0.002 D
56.7	-0.182 A	0.180 J	0.001 A	-0.314 A	0.310 J	0.004 D
53.3	-0.164 A	0.162 J	0.001 A	-0.303 A	0.299 J	0.002 D
50.0	-0.146 A	0.145 J	0.001 A	-0.291 A	0.288 J	0.005 D
46.7	-0.129 A	0.128 J	0.001 A	-0.278 A	0.274 J	0.002 C
43.3	-0.113 A	0.112 J	0.001 A	-0.263 A	0.260 J	0.005 D
40.0	-0.098 A	0.097 J	0.001 A	-0.246 A	0.243 J	0.001 D
36.7	-0.084 A	0.083 J	0.001 A	-0.232 A	0.229 J	0.004 D
33.3	-0.071 A	0.070 J	0.001 A	-0.216 A	0.213 J	0.001 D
30.0	-0.058 A	0.058 J	0.000 A	-0.199 A	0.196 J	0.004 D
26.7	-0.047 A	0.047 J	0.000 A	-0.180 A	0.178 J	0.001 D
23.3	-0.037 A	0.037 J	0.000 A	-0.159 A	0.157 J	0.005 D
20.0	-0.028 A	0.028 J	0.000 A	-0.136 A	0.135 J	0.001 D
16.7	-0.020 A	0.020 J	0.000 A	-0.118 A	0.116 J	0.004 D
13.3	-0.014 A	0.013 J	0.000 I	-0.097 A	0.096 J	0.001 D
10.0	-0.008 A	-0.008 D	0.000 I	-0.075 A	0.075 J	0.004 D
6.7	-0.004 A	0.004 J	0.000 I	-0.052 A	0.051 J	0.000 D
3.3	-0.001 B	0.001 K	0.000 E	-0.027 A	0.027 J	0.004 D
0.0	0.000 A	0.000 A	0.000 A	0.000 A	0.000 A	0.000 A

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MAXIMUM ANTENNA AND REFLECTOR ROTATIONS:

=====

ELEV ft	AZI deg	TYPE *	BEAM DEFLECTIONS (deg).....
			ROLL YAW PITCH TOTAL
80.0	0.0	HP	0.357 A 0.003 C -0.352 J 0.352 J

MAXIMUM TENSION IN MAST MEMBERS (kip)

=====

ELEV ft	LEGS	DIAG	HORIZ	BRACE
100.0	-----	-----	0.05 A	0.00 A
	0.03 B	0.13 L		
96.7	-----	-----	0.01 K	0.00 A
	0.14 A	0.12 B		
93.3	-----	-----	0.01 E	0.00 A
	0.27 A	0.14 H		
90.0	-----	-----	0.02 A	0.00 A
	0.44 A	0.20 B		
86.7	-----	-----	0.01 A	0.00 A
	0.69 A	0.23 H		
83.3	-----	-----	0.01 A	0.00 A
	0.96 A	0.25 B		
80.0	-----	-----	0.01 I	0.00 A
	1.27 I	0.29 L		
76.7	-----	-----	0.01 I	0.00 A
	1.62 A	0.31 B		
73.3	-----	-----	0.01 I	0.00 A
	2.00 A	0.33 L		
70.0	-----	-----	0.01 I	0.00 A
	2.41 A	0.36 B		
66.7	-----	-----	0.01 I	0.00 A
	2.85 A	0.38 L		
63.3	-----	-----	0.01 I	0.00 A
	3.32 A	0.40 B		
60.0	-----	-----	0.01 I	0.00 A
	3.83 A	0.43 L		
56.7	-----	-----	0.01 E	0.00 A
	4.36 A	0.45 B		
53.3	-----	-----	0.02 E	0.00 A
	4.93 A	0.49 L		
50.0	-----	-----	0.03 E	0.00 A
	5.56 A	0.58 B		
46.7	-----	-----	0.04 E	0.00 A
	6.25 A	0.68 L		
43.3	-----	-----	0.03 I	0.00 A
	7.08 A	0.75 B		
40.0	-----	-----	0.01 A	0.00 A
	8.02 A	0.77 H		
36.7	-----	-----	0.01 I	0.00 A
	8.99 A	0.79 B		
33.3	-----	-----	0.01 E	0.00 A
	9.98 A	0.81 H		
30.0	-----	-----	0.01 I	0.00 A
	11.01 A	0.84 B		
26.7	-----	-----	0.02 E	0.00 A
	12.07 A	0.89 H		
23.3	-----	-----	0.02 A	0.00 A
	13.20 A	0.94 B		
20.0	-----	-----	0.01 E	0.00 A
	14.38 A	0.96 H		
16.7	-----	-----	0.01 A	0.00 A
	15.59 A	0.99 B		
13.3	-----	-----	0.01 A	0.00 A
	16.83 A	1.01 H		
10.0	-----	-----	0.01 A	0.00 A
	18.09 A	1.03 B		
6.7	-----	-----	0.02 I	0.00 A
	19.38 A	1.08 H		
3.3	-----	-----	0.06 A	0.00 A
	20.75 A	1.24 B		
0.0	-----	-----	0.00 A	0.00 A

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MAXIMUM COMPRESSION IN MAST MEMBERS (kip)

ELEV ft	LEGS	DIAG	HORIZ	BRACE
100.0	-----	-----	-0.05 K	0.00 A
	-0.17 H	-0.13 F		
96.7	-----	-----	-0.01 E	0.00 A
	-0.35 G	-0.12 H		
93.3	-----	-----	-0.01 K	0.00 A
	-0.55 G	-0.14 F		
90.0	-----	-----	-0.02 C	0.00 A
	-0.83 G	-0.20 H		
86.7	-----	-----	-0.01 G	0.00 A
	-1.14 G	-0.23 B		
83.3	-----	-----	-0.01 C	0.00 A
	-1.48 G	-0.25 H		
80.0	-----	-----	-0.02 K	0.00 A
	-1.87 G	-0.29 B		
76.7	-----	-----	-0.01 K	0.00 A
	-2.28 G	-0.31 L		
73.3	-----	-----	-0.01 K	0.00 A
	-2.73 G	-0.33 B		
70.0	-----	-----	-0.01 C	0.00 A
	-3.20 G	-0.36 L		
66.7	-----	-----	-0.01 K	0.00 A
	-3.71 G	-0.38 B		
63.3	-----	-----	-0.01 G	0.00 A
	-4.25 G	-0.40 L		
60.0	-----	-----	-0.01 G	0.00 A
	-4.82 G	-0.43 B		
56.7	-----	-----	-0.01 C	0.00 A
	-5.41 G	-0.45 L		
53.3	-----	-----	-0.02 K	0.00 A
	-6.06 G	-0.49 B		
50.0	-----	-----	-0.03 C	0.00 A
	-6.81 G	-0.58 L		
46.7	-----	-----	-0.04 K	0.00 A
	-7.73 G	-0.68 B		
43.3	-----	-----	-0.03 C	0.00 A
	-8.73 G	-0.74 H		
40.0	-----	-----	-0.01 G	0.00 A
	-9.74 G	-0.77 B		
36.7	-----	-----	-0.01 C	0.00 A
	-10.79 G	-0.79 H		
33.3	-----	-----	-0.01 K	0.00 A
	-11.86 G	-0.82 B		
30.0	-----	-----	-0.01 C	0.00 A
	-12.97 G	-0.84 H		
26.7	-----	-----	-0.02 K	0.00 A
	-14.13 G	-0.89 B		
23.3	-----	-----	-0.02 C	0.00 A
	-15.35 G	-0.94 H		
20.0	-----	-----	-0.01 K	0.00 A
	-16.62 G	-0.96 B		
16.7	-----	-----	-0.01 G	0.00 A
	-17.92 G	-0.98 H		
13.3	-----	-----	-0.01 G	0.00 A
	-19.25 G	-1.01 B		
10.0	-----	-----	-0.01 G	0.00 A
	-20.62 G	-1.03 H		
6.7	-----	-----	-0.02 G	0.00 A
	-22.05 G	-1.09 B		
3.3	-----	-----	-0.06 G	0.00 A
	-23.68 G	-1.24 H		
0.0	-----	-----	0.00 A	0.00 A

MAXIMUM INDIVIDUAL FOUNDATION LOADS: (kip)

NORTH	LOAD EAST	COMPONENTS DOWN	UPLIFT	TOTAL SHEAR
-0.72 B	0.83 J	24.50 G	-21.52 A	0.83 B

Attachment: Plan Set (Consider Special Use in the R District and Height Variation for Public Safety Communication Antenna)

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MAXIMUM TOTAL LOADS ON FOUNDATION : (kip & kip-ft)

-----HORIZONTAL-----			DOWN	-----OVERTURNING-----			TORSION
NORTH	EAST	TOTAL @ 180.0		NORTH	EAST	TOTAL @ 180.0	
-1.3 A	1.2 J	1.3 A	4.6 I	-59.9 A	59.2 J	59.9 A	0.0 D

20-3050-TJH

LPILE for windows(Beta), Version 2018-10.009

Analysis of Individual Piles and Drilled Shafts
 Subjected to Lateral Loading Using the p-y Method
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Files Used for Analysis

Path to file locations:
 \Program Files (x86)\Ensoft\Lpile2018\files\

Name of input data file:
 20-3050-TJH.lp10

Name of output report file:
 20-3050-TJH.lp10

Name of plot output file:
 20-3050-TJH.lp10

Name of runtime message file:
 20-3050-TJH.lp10

Date and Time of Analysis

Date: October 22, 2019

Time: 15:09:25

Problem Title

Site : FS27 Buffalo Grove, IL

Tower : 100' 3600 SRWD Freestanding

Prepared for : URBAN COMMUNICATIONS, INC.

Job Number : 20-3050-TJH

Engineer : NM

Program Options and Settings

Attachment: Plan Set (Consider Special Use in the R District and Height Variation for Public Safety Communication Antenna)

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Computational Options:

- Use unfactored loads in computations (conventional analysis)

Engineering Units Used for Data Input and Computations:

- US Customary System Units (pounds, feet, inches)

Analysis Control Options:

- Maximum number of iterations allowed = 999
- Deflection tolerance for convergence = 1.0000E-05 in
- Maximum allowable deflection = 100.0000 in
- Number of pile increments = 100

Loading Type and Number of Cycles of Loading:

- Static loading specified
- Use of p-y modification factors for p-y curves not selected
- Analysis uses layering correction (Method of Georgiadis)
- No distributed lateral loads are entered
- Loading by lateral soil movements acting on pile not selected
- Input of shear resistance at the pile tip not selected
- Input of moment resistance at the pile tip not selected
- Computation of pile-head foundation stiffness matrix not selected
- Push-over analysis of pile not selected
- Buckling analysis of pile not selected

Output Options:

- Output files use decimal points to denote decimal symbols.
- Report only summary tables of pile-head deflection, maximum bending moment, and maximum shear force in output report file.
- No p-y curves to be computed and reported for user-specified depths
- Print using wide report formats

 Pile Structural Properties and Geometry

Number of pile sections defined = 1
 Total length of pile = 11.500 ft
 Depth of ground surface below top of pile = 0.5000 ft

Pile diameters used for p-y curve computations are defined using 2 points.

p-y curves are computed using pile diameter values interpolated with depth over the length of the pile. A summary of values of pile diameter vs. depth follows.

Point No.	Depth Below Pile Head feet	Pile Diameter inches
1	0.000	66.0000
2	11.500	66.0000

Input Structural Properties for Pile Sections:

Pile Section No. 1:

Section 1 is a round drilled shaft, bored pile, or CIDH pile
 Length of section = 11.500000 ft
 Shaft Diameter = 66.000000 in
 Shear capacity of section = 0.0000 lbs

 Ground Slope and Pile Batter Angles

Ground Slope Angle = 0.000 degrees
 = 0.000 radians
 Pile Batter Angle = 0.000 degrees
 = 0.000 radians

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Soil and Rock Layering Information

The soil profile is modelled using 1 layers

Layer 1 is stiff clay without free water

Distance from top of pile to top of layer	=	0.500000	ft
Distance from top of pile to bottom of layer	=	60.500000	ft
Effective unit weight at top of layer	=	110.000000	pcf
Effective unit weight at bottom of layer	=	110.000000	pcf
Undrained cohesion at top of layer	=	1000.000000	psf
Undrained cohesion at bottom of layer	=	1000.000000	psf
Epsilon-50 at top of layer	=	0.010000	
Epsilon-50 at bottom of layer	=	0.010000	

(Depth of the lowest soil layer extends 49.000 ft below the pile tip)

Summary of Input Soil Properties

Layer Layer Num.	Soil Type Name (p-y Curve Type)	Layer Depth ft	Effective Unit Wt. pcf	Undrained Cohesion psf	E50 or krm
1	Stiff Clay w/o Free Water	0.5000 60.5000	110.0000 110.0000	1000.0000 1000.0000	0.01000 0.01000

Static Loading Type

Static loading criteria were used when computing p-y curves for all analyses.

Pile-head Loading and Pile-head Fixity Conditions

Number of loads specified = 2

Load No.	Load Type	Condition 1	Condition 2	Axial Thrust Force, lbs	Compute Top y vs. Pile Length
1	1	V = 5040. lbs	M = 3264000. in-lbs	7360.	No
2	1	V = 1686. lbs	M = 819155. in-lbs	2463.	No

V = shear force applied normal to pile axis

M = bending moment applied to pile head

y = lateral deflection normal to pile axis

S = pile slope relative to original pile batter angle

R = rotational stiffness applied to pile head

Values of top y vs. pile lengths can be computed only for load types with specified shear loading (Load Types 1, 2, and 3).

Thrust force is assumed to be acting axially for all pile batter angles.

Computations of Nominal Moment Capacity and Nonlinear Bending Stiffness

Axial thrust force values were determined from pile-head loading conditions

Number of Pile Sections Analyzed = 1

Pile Section No. 1:

Dimensions and Properties of Drilled Shaft (Bored Pile):

Length of Section	=	11.500000	ft
Shaft Diameter	=	66.000000	in

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Concrete Cover Thickness (to edge of long. rebar)	=	3.625000 in
Number of Reinforcing Bars	=	30 bars
Yield Stress of Reinforcing Bars	=	60000. psi
Modulus of Elasticity of Reinforcing Bars	=	29000000. psi
Gross Area of Shaft	=	3421. sq. in.
Total Area of Reinforcing Steel	=	18.039614 sq. in.
Area Ratio of Steel Reinforcement	=	0.53 percent
Edge-to-Edge Bar Spacing	=	5.174585 in
Maximum Concrete Aggregate Size	=	0.750000 in
Ratio of Bar Spacing to Aggregate Size	=	6.90
Offset of Center of Rebar Cage from Center of Pile	=	0.0000 in

Axial Structural Capacities:

Nom. Axial Structural Capacity = $0.85 F_c A_c + F_y A_s$	=	14099.444 kips
Tensile Load for Cracking of Concrete	=	-1558.721 kips
Nominal Axial Tensile Capacity	=	-1082.377 kips

Reinforcing Bar Dimensions and Positions Used in Computations:

Bar Number	Bar Diam. inches	Bar Area sq. in.	X inches	Y inches
1	0.875000	0.601320	28.937500	0.00000
2	0.875000	0.601320	28.305146	6.016445
3	0.875000	0.601320	26.435722	11.769942
4	0.875000	0.601320	23.410929	17.009036
5	0.875000	0.601320	19.362967	21.504753
6	0.875000	0.601320	14.468750	25.060610
7	0.875000	0.601320	8.942179	27.521198
8	0.875000	0.601320	3.024792	28.778977
9	0.875000	0.601320	-3.024792	28.778977
10	0.875000	0.601320	-8.942179	27.521198
11	0.875000	0.601320	-14.468750	25.060610
12	0.875000	0.601320	-19.362967	21.504753
13	0.875000	0.601320	-23.410929	17.009036
14	0.875000	0.601320	-26.435722	11.769942
15	0.875000	0.601320	-28.305146	6.016445
16	0.875000	0.601320	-28.937500	0.00000
17	0.875000	0.601320	-28.305146	-6.016445
18	0.875000	0.601320	-26.435722	-11.769942
19	0.875000	0.601320	-23.410929	-17.009036
20	0.875000	0.601320	-19.362967	-21.504753
21	0.875000	0.601320	-14.468750	-25.060610
22	0.875000	0.601320	-8.942179	-27.521198
23	0.875000	0.601320	-3.024792	-28.778977
24	0.875000	0.601320	3.024792	-28.778977
25	0.875000	0.601320	8.942179	-27.521198
26	0.875000	0.601320	14.468750	-25.060610
27	0.875000	0.601320	19.362967	-21.504753
28	0.875000	0.601320	23.410929	-17.009036
29	0.875000	0.601320	26.435722	-11.769942
30	0.875000	0.601320	28.305146	-6.016445

NOTE: The positions of the above rebars were computed by LPile

Minimum spacing between any two bars not equal to zero = 5.175 inches
between bars 25 and 26.

Ratio of bar spacing to maximum aggregate size = 6.90

Concrete Properties:

Compressive Strength of Concrete	=	4500. psi
Modulus of Elasticity of Concrete	=	3823676. psi
Modulus of Rupture of Concrete	=	-503.115295 psi
Compression Strain at Peak Stress	=	0.002001
Tensile Strain at Fracture of Concrete	=	-0.0001152
Maximum Coarse Aggregate Size	=	0.750000 in

Number of Axial Thrust Force Values Determined from Pile-head Loadings = 2

Number	Axial Thrust Force
	kips

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1	2.463
2	7.360

Summary of Results for Nominal (Unfactored) Moment Capacity for Section 1

Moment values interpolated at maximum compressive strain = 0.003
or maximum developed moment if pile fails at smaller strains.

Load No.	Axial Thrust kips	Nominal Mom. Cap. in-kip	Max. Comp. Strain
1	2.463	30755.793	0.00300000
2	7.360	30882.864	0.00300000

Note that the values of moment capacity in the table above are not factored by a strength reduction factor (phi-factor).

In ACI 318, the value of the strength reduction factor depends on whether the transverse reinforcing steel bars are tied hoops (0.65) or spirals (0.70).

The above values should be multiplied by the appropriate strength reduction factor to compute ultimate moment capacity according to ACI 318, Section 9.3.2.2 or the value required by the design standard being followed.

The following table presents factored moment capacities and corresponding bending stiffnesses computed for common resistance factor values used for reinforced concrete sections.

Axial Load No.	Resist. Factor for Moment	Nominal Moment Cap in-kips	Ult. (Fac) Ax. Thrust kips	Ult. (Fac) Moment Cap in-kips	Bend. Stiff. at Ult Mom kip-in^2
1	0.65	30756.	1.600833	19991.	506913268.
2	0.65	30883.	4.784000	20074.	509359412.
1	0.70	30756.	1.723974	21529.	505675967.
2	0.70	30883.	5.152000	21618.	508003117.
1	0.75	30756.	1.847115	23067.	488673073.
2	0.75	30883.	5.520000	23162.	491113851.

Summary of Pile-head Responses for Conventional Analyses

Definitions of Pile-head Loading Conditions:

Load Type 1: Load 1 = Shear, V, lbs, and Load 2 = Moment, M, in-lbs
Load Type 2: Load 1 = Shear, V, lbs, and Load 2 = Slope, S, radians
Load Type 3: Load 1 = Shear, V, lbs, and Load 2 = Rot. Stiffness, R, in-lbs/rad.
Load Type 4: Load 1 = Top Deflection, y, inches, and Load 2 = Moment, M, in-lbs
Load Type 5: Load 1 = Top Deflection, y, inches, and Load 2 = Slope, S, radians

Load Case No.	Load Type 1	Pile-head Load 1	Load Type 2	Pile-head Load 2	Axial Loading lbs	Pile-head Deflection inches	Pile-head Rotation radians	Max Shear in Pile lbs	Max Moment in Pile in-lbs
1	V, lb	5040.	M, in-lb	3264000.	7360.	2.4123	-0.02928	-48533.	3315209.
2	V, lb	1686.	M, in-lb	819155.	2463.	0.01131	-1.44E-04	-11920.	836951.

Maximum pile-head deflection = 2.4122938332 inches
Maximum pile-head rotation = -0.0292800568 radians = -1.677624 deg.

The analysis ended normally.

MAT FOUNDATION DESIGN BY SABRE TOWERS & POLES

100' 3600 SRWD Freestanding URBAN COMMUNICATIONS, INC. FS27 Buffalo Grove, IL (20-3050-TJH) 1

Overall Loads:

Factored Moment (ft-kips)	204
Factored Axial (kips)	5.52
Factored Shear (kips)	3.78
Bearing Design Strength (ksf)	3.75
Water Table Below Grade (ft)	999
Width of Mat (ft)	10
Thickness of Mat (ft)	1.5
Depth to Bottom of Slab (ft)	6
Quantity of Bolts in Bolt Circle	12
Bolt Circle Diameter (in)	50
Top of Concrete to Top of Bottom Threads (in)	60
Diameter of Pier (ft)	5.5
Ht. of Pier Above Ground (ft)	0.5
Ht. of Pier Below Ground (ft)	4.5
Quantity of Bars in Mat	12
Bar Diameter in Mat (in)	1
Area of Bars in Mat (in ²)	9.42
Spacing of Bars in Mat (in)	10.27
Quantity of Bars Pier	30
Bar Diameter in Pier (in)	0.875
Tie Bar Diameter in Pier (in)	0.625
Spacing of Ties (in)	12
Area of Bars in Pier (in ²)	18.04
Spacing of Bars in Pier (in)	6.06
f' _c (ksi)	4.5
f _y (ksi)	60
Unit Wt. of Soil (kcf)	0.11
Unit Wt. of Concrete (kcf)	0.15

Volume of Concrete (yd³)

9.96

Two-Way Shear Action:

Average d (in)	14
ϕv_c (ksi)	0.228
$\phi v_c = \phi(2 + 4/\beta_c)f'_c{}^{1/2}$	0.342
$\phi v_c = \phi(\alpha_s d/b_o + 2)f'_c{}^{1/2}$	0.241
$\phi v_c = \phi 4f'_c{}^{1/2}$	0.228
Shear perimeter, b _o (in)	251.33
β_c	1

One-Way Shear:

ϕV_c (kips)	191.6
-------------------	-------

Stability:

Overturning Design Strength (ft-k)	372.0
------------------------------------	-------

Max. Net Bearing Press. (ksf)	1.98
-------------------------------	------

Allowable Bearing Pressure (ksf)	2.50
Safety Factor	2.00
Ultimate Bearing Pressure (ksf)	5.00
Bearing Φ_s	0.75

Minimum Pier Diameter (ft)	5.50
Equivalent Square b (ft)	4.87
Square Pier? (Y/N)	N

Recommended Spacing (in)	5 to 12
--------------------------	---------

Minimum Pier A _s (in ²)	17.11
Recommended Spacing (in)	5 to 12

v _u (ksi)	0.017
----------------------	-------

V _u (kips)	17.7
-----------------------	------

Total Applied M (ft-k)	228.6
------------------------	-------

Attachment: Plan Set (Consider Special Use in the R District and Height Variation for Public Safety Communication Antenna)

Pier Design:

ϕV_n (kips)	397.7	V_u (kips)	3.8
$\phi V_c = \phi 2(1 + N_u / (2000 A_g)) f'_c{}^{1/2} b_w d$	397.7		
V_s (kips)	0.0	*** $V_s \text{ max} = 4 f'_c{}^{1/2} b_w d$ (kips)	935.1
Maximum Spacing (in)	11.09	(Only if Shear Ties are Required)	
Actual Hook Development (in)	13.00	Req'd Hook Development l_{dh} (in)	10.96
		*** Ref. To Spacing Requirements ACI 11.5.4.3	

Flexure in Slab:

ϕM_n (ft-kips)	567.6	M_u (ft-kips)	38.9
a (in)	1.23		
Steel Ratio	0.00561		
β_1	0.825		
Maximum Steel Ratio (ρ_t)	0.0197		
Minimum Steel Ratio	0.0018		
Rebar Development in Pad (in)	27.75	Required Development in Pad (in)	26.83

Condition	1 is OK, 0 Fails
Maximum Soil Bearing Pressure	1
Pier Area of Steel	1
Pier Shear	1
Interaction Diagram	1
Two-Way Shear Action	1
One-Way Shear Action	1
Overtaking	1
Flexure	1
Steel Ratio	1
Length of Development in Pad	1
Hook Development	1

RESUMES


Melissa Bauer

Senior Scientist
21 B Street
Burlington, MA 01803
Office: 602.463.1698

Summary of Experience

Melissa Bauer, Senior Scientist has had extensive experience in the environmental field since 1999. Her experience includes conducting environmental site assessments, property condition assessments, asbestos surveys, lead-based paint surveys, limited indoor air quality evaluations, visual mold inspections, hazardous materials inspections, abatement/remediation project oversight and monitoring, clearance inspections and sampling, data management, watershed studies, and ecological projects as well as preparing reports and project documents. She has been assigned to projects involving remedial investigations with tasks including groundwater and soil vapor sampling, monitoring well installations and development of wells.

At EBI Consulting, Ms. Bauer serves as a Senior Scientist within the West Telecom Environmental group. Her primary responsibilities in this role include conducting Phase I ESAs and NEPA Compliance Reviews. Additionally, Ms. Bauer serves as the Phase I ESA Mentor for the West Telecom Environmental group. In this role Ms. Bauer is responsible for training and mentoring regional Scientists in conducting Phase I ESAs.

Relevant Project Experience

Ms. Bauer has prepared Phase I ESA Reports for a wide range of properties and clients. These assessments focused on evaluating site conditions, potential off-site liabilities, and environmental control systems in order to advise prospective buyers, operators, and owners of potential and existing environmental concerns. Her assessment experience includes industrial, commercial, utility, and telecommunications developments.

In addition to environmental assessments, Ms. Bauer has extensive experience completing NEPA Compliance Reviews, asbestos and lead surveys, Phase II ESAs (subsurface investigations), and limited microbial surveys.

Education

BS, Environmental Science, University of Maryland - Baltimore County

Professional Registrations

OSHA 40-Hour Hazardous Materials Training

OSHA 30-Hour Construction Class

EPA AHERA Certified Building Inspector/Contractor Supervisor/Management Planner/Project Designer

California Certified Asbestos Consultant (CAC)

Asbestos Abatement Consultant – State of Nevada

Asbestos Inspector – State of Utah

EPA Certified Lead Inspector/Risk Assessor – States of Arizona, Nevada, New Mexico, and Region 9 Tribal Lands

Niton Certificate of Achievement

8-Hour Current Understanding and Advances in Mold Assessment, Sampling and Analysis

20-Hour Microbial Investigator/Consultant Training

OSHA RF Site Safety Awareness Trained



Gregory McKee

Scientist II

1108 Columbia Road NW, #106

Mobile: 717.903.5399

SUMMARY OF EXPERIENCE

Mr. Gregory McKee, Scientist II, has extensive experience in environmental investigations, site assessments and National Environmental Policy Act (NEPA) reports for the real estate and telecommunications industries since 2012.

Relevant Project Experience

Environmental Site Assessments: Mr. McKee has conducted ASTM and Client-specific Phase I Environmental Site Assessment, Preliminary Environmental Site Screenings, and soil samplings for various clients at a variety of properties throughout the United States. These properties have included industrial, manufacturing, commercial, retail, telecommunications facility and undeveloped land. Mr. McKee has also performed asbestos surveys and conducted bulk lead-based paint sampling.

NEPA Screening Reports: Mr. McKee has prepared NEPA Screening Reports for telecommunication sites throughout the United States. These reports ensure compliance with Federal Communications Commission (FCC) requirements under NEPA and include an analysis of historic properties, wetlands, endangered species habitats, floodplains, and other sensitive areas of environmental concern where there is the potential for impact from the installation of telecommunications equipment.

Radio Frequency Electromagnetic Energy Compliance: Mr. McKee has conducted electromagnetic energy surveys at telecommunication sites to determine the levels of radiation being emitted from antennas and associated equipment. As a result of these surveys, his work has included preparing compliance report for telecommunication sites and deploying appropriate notification at the sites to meet OSHA, FCC and local requirements.

Education

B.A., Environmental Studies – University of Pittsburgh

Professional Registrations

EPA/AHERA Certified Asbestos Inspector in Pennsylvania, Maryland, Virginia, Alabama and Mississippi

SUMMARY OF EXPERIENCE

Robert Helfrich, Program Manager has extensive experience specializing in conducting and managing environmental pre-acquisition assessments/due diligence assignments throughout the United States since 1997. He has successfully completed and managed thousands of project assignments including National Environmental Policy Act (NEPA) screenings for telecommunications carriers, Phase I, Phase II and Phase III Environmental Site Assessments as well as remedial projects performed in accordance with the Connecticut Department of Energy and Environmental Protection (CTDEEP) Remediation Standard Regulations (RSRS).

Prior to joining EBI, Mr. Helfrich was Supervisor of the Site Assessment and Investigation Group and Manager of the Telecommunications Sector with a firm in Connecticut. In these positions he was primarily responsible for coordination and oversight of environmental site assessments, subsurface investigations and remediation programs. Mr. Helfrich also implemented and provided oversight for FCC NEPA compliance reporting and archaeological assessment programs with his previous firm. In addition, Mr. Helfrich frequently deals with environmental transactions that involve the Connecticut Transfer Act and works closely with clients, attorneys and CTDEP personnel to satisfy the requirements of those regulations.

RELEVANT PROJECT EXPERIENCE

MULTIPLE PROJECTS IN CONNECTICUT: Mr. Helfrich oversaw environmental site assessments and NEPA evaluations for approximately one-hundred telecommunications towers in Connecticut as part of a large compliance campaign by one wireless carrier. In addition to conducting field work and report writing, Mr. Helfrich assisted and managed other scientists in order to complete the project under a short time frame.

VERIZON WIRELESS CLIENT MANAGEMENT: Mr. Helfrich first began performing Phase I Environmental Site Assessments for proposed telecommunications towers and collocation facilities in 1998. Mr. Helfrich has completed and managed thousands of environmental assessments of proposed sites across Connecticut, Massachusetts, Rhode Island, Vermont, New Hampshire, Maine and New York. He has also performed and coordinated hundreds of NEPA Assessments, numerous Phase II investigations and has overseen remedial efforts at several sites.

MULTI-PHASE ENVIRONMENTAL SITE ASSESSMENT, SOIL REMEDIATION AND CTDEEP TRANSFER ACT VERIFICATION. Project Manager for Phase I site assessment, Phase II subsurface investigation, and subsequent additional investigation to determine the extent and degree of pesticide contamination on a former gasoline filling station and auto body repair facility. Remediation involved the removal of impacted soil for off-site disposal followed by post-remediation groundwater monitoring. A Discontinuance of Groundwater Monitoring Application and Verification report were submitted to the CTDEP and were approved.

EDUCATION

B.S. Civil Engineering, Lafayette College

PROFESSIONAL REGISTRATIONS

TSCA Title II 40 CFR Part 763 Asbestos Site Inspector Training and annual refresher training

OSHA 29 CFR 1910.120 40-Hazardous Waste Site Operations (HAZWOPER) training and annual HAZWOPER refresher training

OSHA 29 CFR 1910.132 (f)(1) and 1910.268 (p)(3) RF Site Safety Awareness

U.S. Department of Housing and Urban Development Visual Assessment Course 24 CFR Part 35

2005 "Processes and Contaminants of the Metal Finishing, Surface Coating, and Dry Cleaning Industries", Southbury Environmental

2004, "Current Understanding and Advances in Mold Assessment, Sampling and Analysis", Severn Trent Laboratories

2002, "Expedited Site Assessment" presented by the University of Connecticut

2000 "Introduction to Conceptual Site Modeling," SWEP

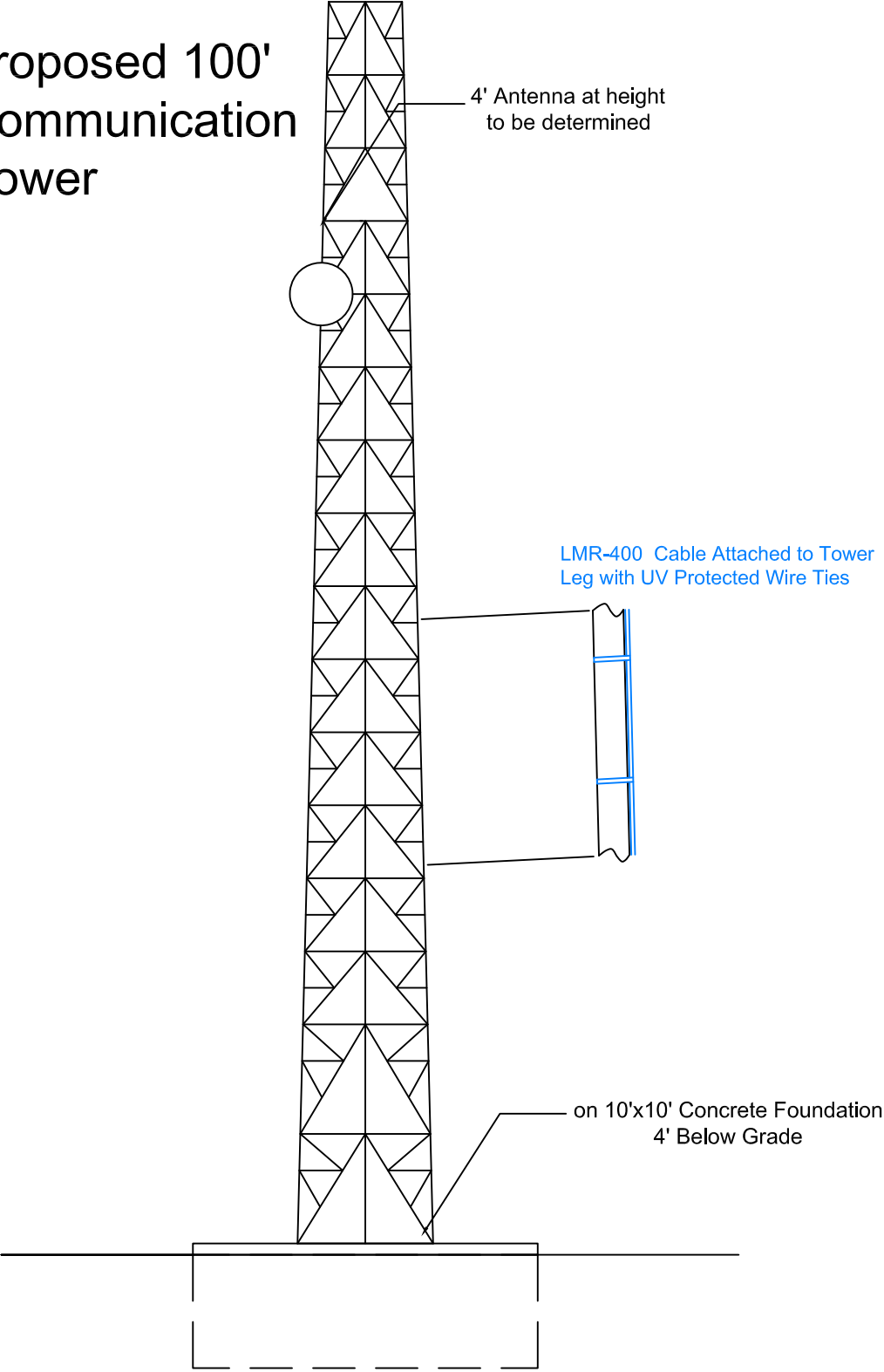
1999, "Successful Project Management" presented by Zweig White & Associates

1999, "Remediation Standard Regulations Fundamental Review" by Environmental Professionals' Organization of Connecticut (EPOC)

1998, "Geoprobe Days" presented by Geoprobe Systems

1998, "Remediation Technologies for Volatile Organic Compounds in Soil & Groundwater including Soil Vapor Extraction, Air Sparging, Bioremediation and Natural Attenuation" by EPOC

Proposed 100'
Communication
Tower

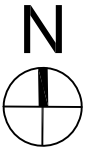
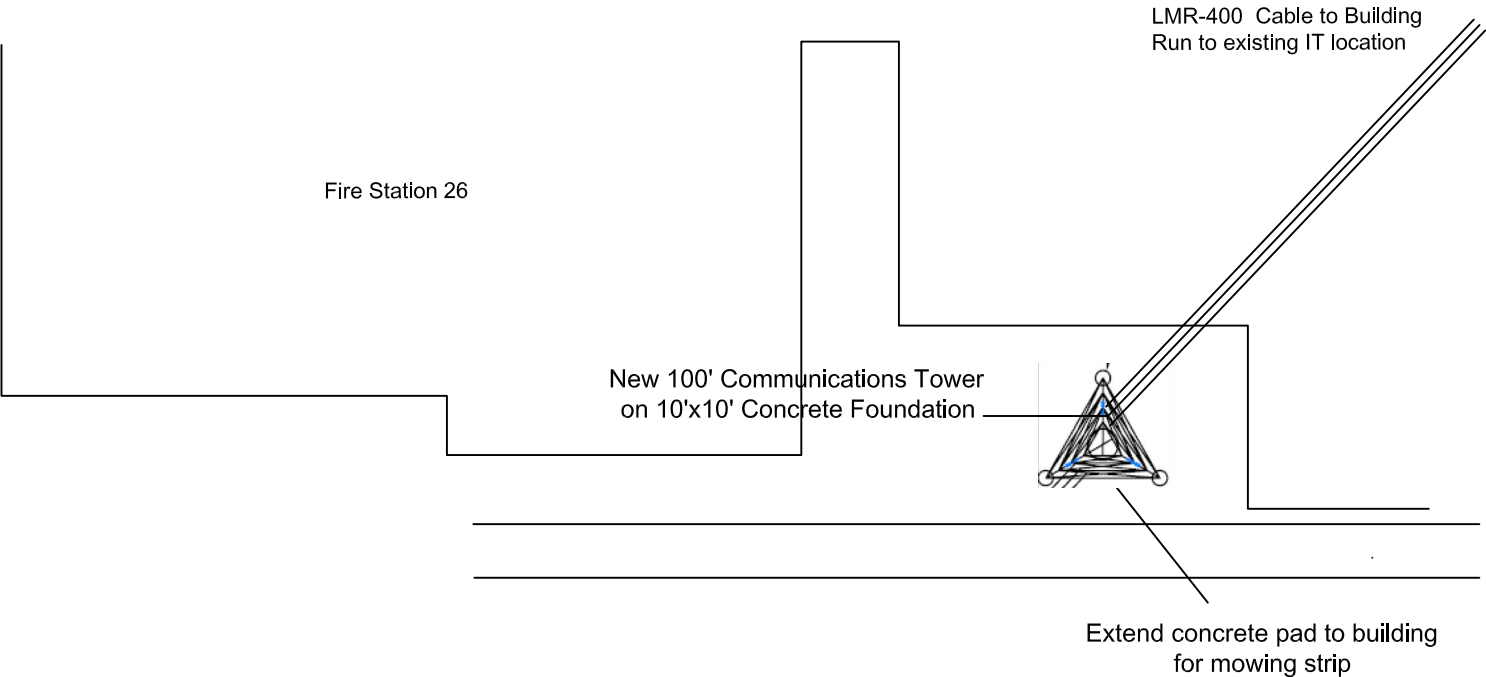


Tower Elevation
NTS

Equipment Specifications

Owner to provide space required for iFiber Equipment at their existing IT closet, including one 110V Quad Receptacle wired to separate 20A grounded circuit.

- 100' Self Supported Tower with Foundation, U-4.5
- Horizon Quantum 400 11Ghz, Dual Channel, Single Radio w/Adv
- Antenna, 11Ghz, 4' Antenna
- Grounding Kit and Cable Ties
- Anti-Climb Shields
- APC Full Sine Wave UPS RT2200VA RM 120V w/SNMP Card
- UPS Configuration
- Indoor Open Rack



Partial Site Plan
NTS

General Notes

Tower Elevation
and
Site Plan

No.	Revision/Issue	Date

Firm Name and Address

Urban Communications, Inc.
5320 W 159th Street
Suite 503
Oak Forest, IL 60452
ph. 708-687-2090

Project Name and Address

Buffalo Grove Fire Station 26
1051 Highland Grove Dr.
Buffalo Grove, Illinois

Latitude (Datum NAD 83) : N41.650596d
Longitude (Datum NAD 83) : W-90.078786d

Project
iFiber - Erie, Illinois

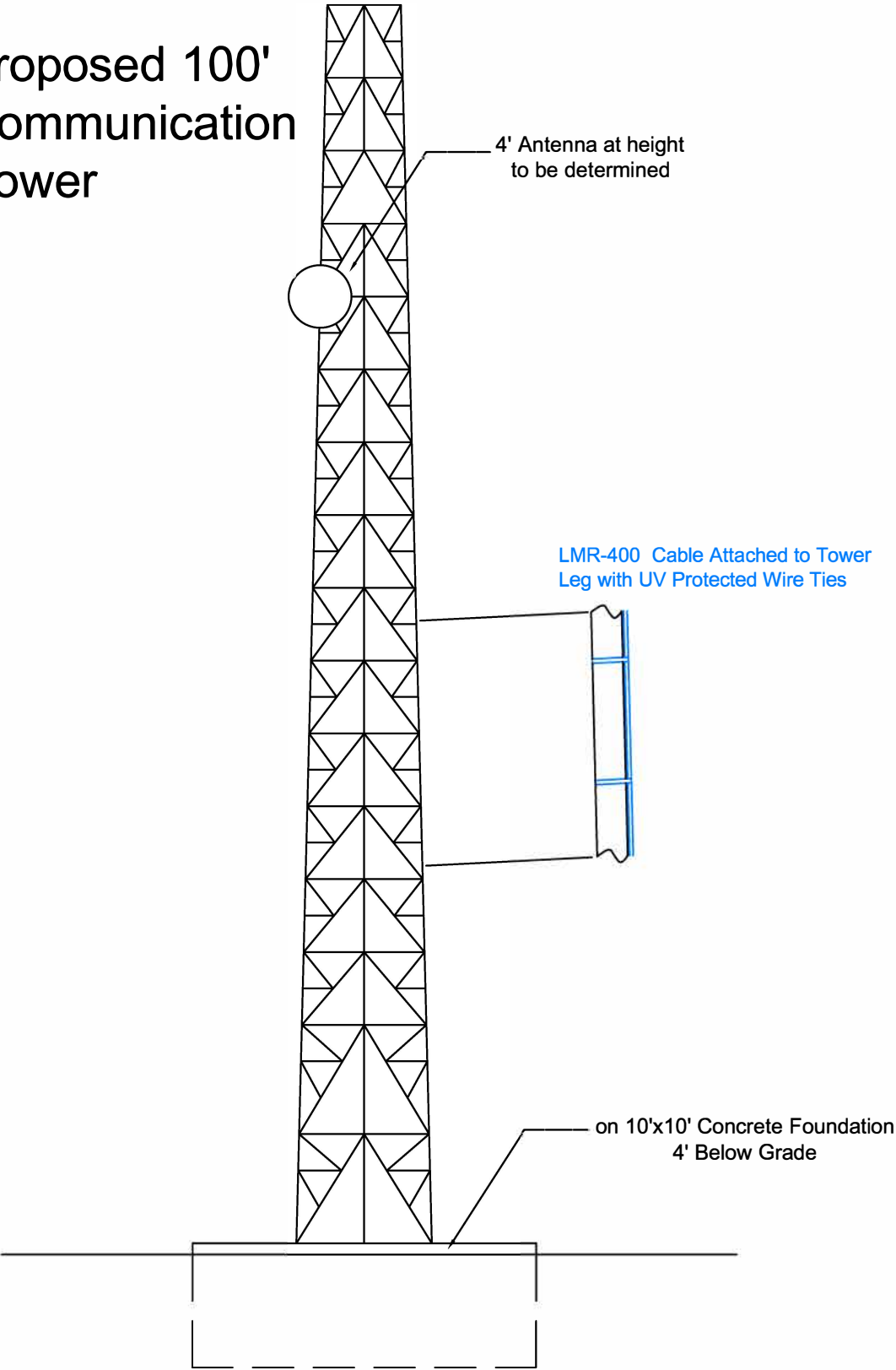
Date
April 28, 2012
Rev. July 27, 2012

Scale

Sheet

1

Proposed 100' Communication Tower



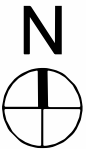
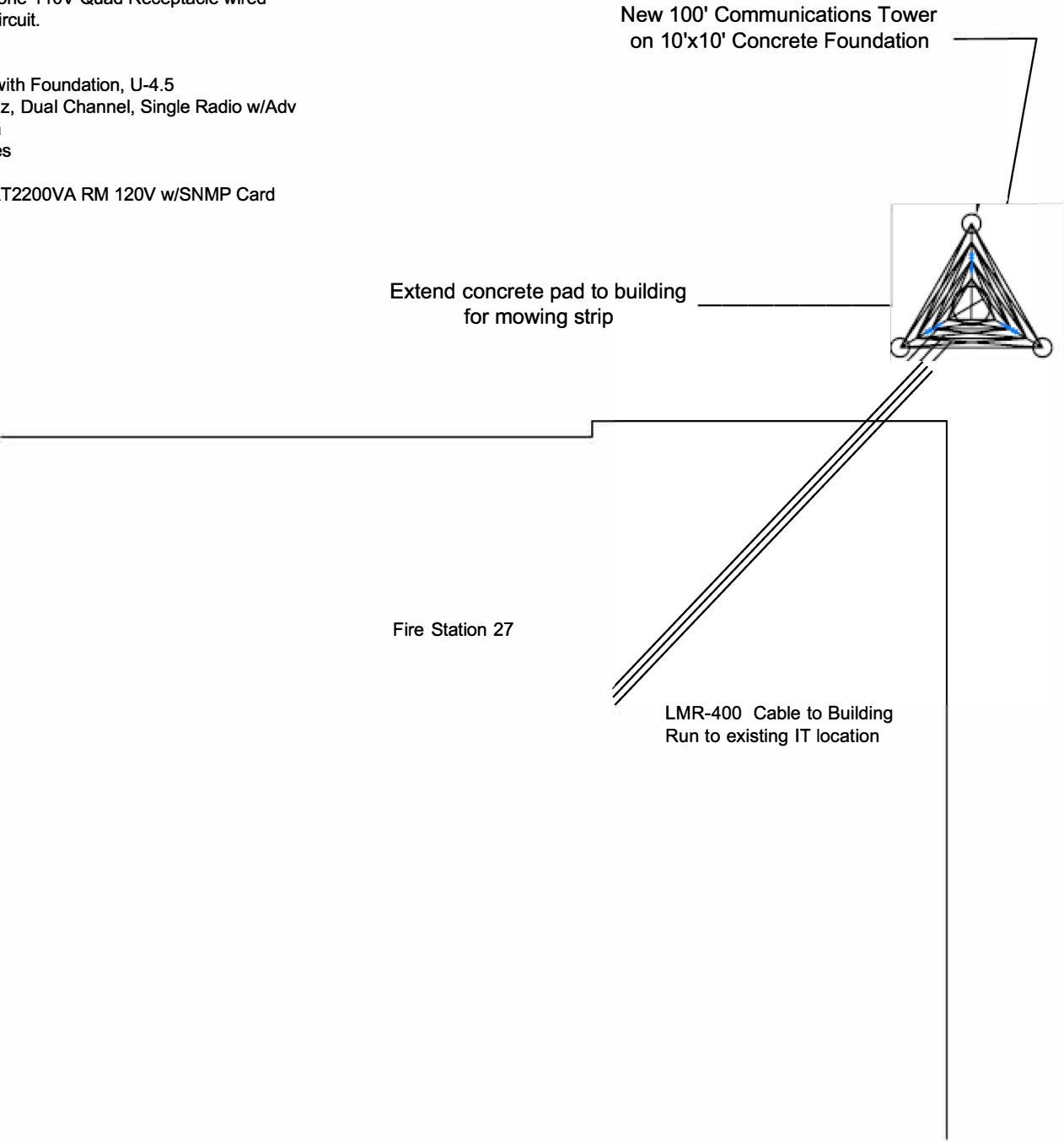
Tower Elevation

NTS

Equipment Specifications

Owner to provide space required for iFiber Equipment at their existing IT closet, including one 110V Quad Receptacle wired to separate 20A grounded circuit.

- 100' Self Supported Tower with Foundation, U-4.5
- Horizon Quantum 400 11Ghz, Dual Channel, Single Radio w/Adv Antenna, 11Ghz, 4' Antenna
- Grounding Kit and Cable Ties
- Anti-Climb Shields
- APC Full Sine Wave UPS RT2200VA RM 120V w/SNMP Card
- UPS Configuration
- Indoor Open Rack



Partial Site Plan

NTS

General Notes

Tower Elevation and Site Plan

No.	Revision/Issue	Date

Firm Name and Address
Urban Communications, Inc.
5320 W 159th Street
Suite 503
Oak Forest, IL 60452
ph. 708-687-2090

Project Name and Address
Buffalo Grove Fire Station 27
w 60089, 100 W Half Day Rd
Buffalo Grove, Illinois

Latitude (Datum NAD 83) : N41.650556d
Longitude (Datum NAD 83) : W-90.078786d

Project	Sheet
iFiber - Erie, Illinois	
Date	Scale
April 28, 2012 Rev. July 27, 2012	1/4" = 1'

LANDMARK

ENGINEERING LLC

DATE: NOVEMBER 8, 2019
 SUBJECT: BUFFALO GROVE FIRE STATION #26 – 109 DEERFIELD RD. BUFFALO GROVE, IL

The following is the 1A FAA certificate for the above listed site.

GEOGRAPHIC COORDINATES
CENTER OF PROPOSED FREE STANDING TOWER

	DEGREES	MINUTES	SECONDS	
LATITUDE	N 42°	10'	15.91"	NAD 83
LONGITUDE	W 87°	57'	21.05"	NAD 83

Latitude N 42.17109 NAD 83
 Longitude W 87.95585 NAD 83

ELEVATION OF GROUND 684 (NAVD 88) 0 (AGL)

FIELD DATE: OCTOBER 31, 2019

RE: BUFFALO GROVE FIRE STATION #26
 (SITE NAME) (SITE NO.)

LOCATION: BUFFALO GROVE ILLINOIS
 (CITY) (STATE)

I CERTIFY THAT THE LATITUDE OF NORTH 42 DEGREES 10 MINUTES 15.91 SECONDS (42.17109°) AND THE LONGITUDE OF WEST 87 DEGREES 57 MINUTES 21.05 SECONDS (87.95585°) (NAD 83) ARE ACCURATE TO WITHIN PLUS OR MINUS 15 FEET HORIZONTALLY; AND THAT THE GROUND ELEVATION OF 684 FEET AMSL IS ACCURATE TO WITHIN PLUS OR MINUS 3 FEET VERTICALLY. THE HORIZONTAL DATUM (COORDINATES) ARE IN TERMS OF THE NORTH AMERICAN DATUM OF 1983 (NAD 83) AND ARE EXPRESSED AS DEGREES TO THE NEAREST 0.00001 AND AS DEGREES AND MINUTES AND SECONDS TO THE NEAREST HUNDREDTH OF A SECOND. THE VERTICAL DATUM (HEIGHTS) ARE IN TERMS OF THE NORTH AMERICAN VERTICAL DATUM OF 1988 (NAVD 88) AND ARE DETERMINED TO THE NEAREST FOOT.



RICHARD P. URCELL
 P.L.S.



19-10-116

Attachment: Plan Set (Consider Special Use in the R District and Height Variation for Public Safety Communication Antenna)

LANDMARK

ENGINEERING LLC

DATE: NOVEMBER 8, 2019

SUBJECT: BUFFALO GROVE FIRE STATION #27 – 100 HALF DAY ROAD BUFFALO GROVE, IL

The following is the 1A FAA certificate for the above listed site.

GEOGRAPHIC COORDINATES
CENTER OF PROPOSED FREE STANDING TOWER

	DEGREES	MINUTES	SECONDS	
LATITUDE	N 42°	11'	48.10"	NAD 83
LONGITUDE	W 87°	57'	39.38"	NAD 83

Latitude N 42.19669 NAD 83
Longitude W 87.96094 NAD 83

ELEVATION OF GROUND 692 (NAVD 88) 0 (AGL)

FIELD DATE: OCTOBER 31, 2019

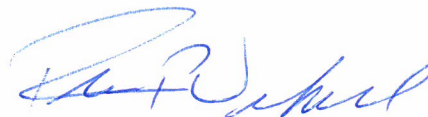
RE: BUFFALO GROVE FIRE STATION #27
(SITE NAME)

(SITE NO.)

LOCATION: BUFFALO GROVE
(CITY)

ILLINOIS
(STATE)

I CERTIFY THAT THE LATITUDE OF NORTH 42 DEGREES 11 MINUTES 48.10 SECONDS (42.19669°) AND THE LONGITUDE OF WEST 87 DEGREES 57 MINUTES 39.38 SECONDS (87.96094°) (NAD 83) ARE ACCURATE TO WITHIN PLUS OR MINUS 15 FEET HORIZONTALLY; AND THAT THE GROUND ELEVATION OF 692 FEET AMSL IS ACCURATE TO WITHIN PLUS OR MINUS 3 FEET VERTICALLY. THE HORIZONTAL DATUM (COORDINATES) ARE IN TERMS OF THE NORTH AMERICAN DATUM OF 1983 (NAD 83) AND ARE EXPRESSED AS DEGREES TO THE NEAREST 0.00001 AND AS DEGREES AND MINUTES AND SECONDS TO THE NEAREST HUNDREDTH OF A SECOND. THE VERTICAL DATUM (HEIGHTS) ARE IN TERMS OF THE NORTH AMERICAN VERTICAL DATUM OF 1988 (NAVD 88) AND ARE DETERMINED TO THE NEAREST FOOT.



RICHARD P. URCELL
P.L.S.

19-10-117

